



**Intelligent Management Agent  
User's Guide  
For Release 1.0.0**

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# *Introduction*

The Intelligent Management Agent (IMA) is a utility that works with Concerto snapshot agents.

Using IMA, you can perform a number of different tasks, including adding and deleting storage servers, changing protocol settings, and allocating virtual devices.

IMA provides interfaces for users in various operating system environments.

- ? SAN Disk Manager (SDM) offers a graphical user interface for Windows. A command-line interface is also available.
- ? IMA for Linux/Unix operating systems uses a command-line interface.

## **About this guide**

The Intelligent Management Agent User Guide describes how to use IMA on various operating systems.

- ? **Getting Started** - How to install your software and prepare your storage server.
- ? **SAN Disk Manager for Windows** - How to use the Windows interface.
- ? **Command Line Interface** - How to configure and use IMA from the command line for all supported operating systems.

# Getting Started

This chapter explains how to install, the Intelligent Management Agent (IMA) and prepare your storage server to work with it.

## Windows installation

IMA is automatically installed with Concerto snapshot agents.

Note that an administrator account is required to install IMA.

## Linux/Solaris/AIX/HP-UX installation

1. Run the following command:

```
chmod 755 <package_name>
```

2. Run the following command:

```
./<package_name>
```

## Prepare the storage server for IMA

Before you add a storage server or create a virtual disk using IMA, you must complete the following steps on the storage server.

1. If you want each client to have secure access to the storage server, create a user name and password for each client on the storage server. The user name must match the client's full computer name and use all uppercase letters.

If you're using Concerto Data Protection (CDP), start the Concerto Management Console and right-click the name of the server. Select *Accounts*, click *Add*, select *Concerto User* from the *Type* list, and complete the dialog box.



Note: If the storage server is a member of a domain, you can use domain authentication to provide secure access to the server. If you use domain authentication, you don't have to create a *CentralClient* group on the server.

Alternatively, you can provide all clients with a single user name and password, but this potentially allows clients to access each other's data. You can also use the administrator user name and password, but this is not recommended for security reasons.

2. If you're using CDP/Concerto, set up your resources and licensing:
  - ? Create a storage pool and assign to this pool the user(s) that you created in step 1.



Note: By default, when you create a storage pool, all types of usage are supported. If you change the supported usage types, you must select *Storage* and *Snapshot* in order to create disks using SAN Disk Manager.

- ? License and enable all protocols that you plan to use.
- ? If you plan to take snapshots, license the MemSnap option.

For instructions on these procedures, refer to the *Concerto 7000 All Flash Array User's Guide*.

3. If the client already exists on the storage server, it is recommended that you delete it. When you create a virtual disk using SAN Disk Manager, a new client will be created automatically using the appropriate name, iSCSI initiator settings (if any), and authentication level. This prevents potential authentication problems. You can subsequently re-assign any existing resources to that client.

# ***SAN Disk Manager for Windows***

SAN Disk Manager (SDM) is a utility that is automatically installed with any Windows-based Concerto host application that installs the Intelligent Management Agent (IMA) and snapshot agents.



## **Notes:**

- If a previous version of the SAN Client software is currently installed, you must remove it before you install IMA and SAN Disk Manager.
- SAN Disk Manager creates a Windows system account on the SDM machine. This account has *\_IMA\_User\_* as the prefix followed by a random string. It is safe to delete this account.

Using SAN Disk Manager, you can perform a number of different tasks:

- ? Register a CCM server
- ? Add and delete storage servers, change their protocol settings, view their properties, reset the iSCSI CHAP secret, set iSCSI target access mode, and enable/disable in-band cluster access
- ? Delete virtual disks as well as view their properties
- ? View a list of local host applications and their status and version information
- ? View events associated with SDM/IMA and snapshot agents
- ? View, add, change, or remove licenses for host applications and SAN Disk Manager
- ? Take an x-ray
- ? Set location information

The advanced options of SAN Disk Manager allow you to perform the following additional tasks:

- ? Create and expand virtual disks
- ? View, create, mount, dismount, and delete snapshots, as well as view their properties

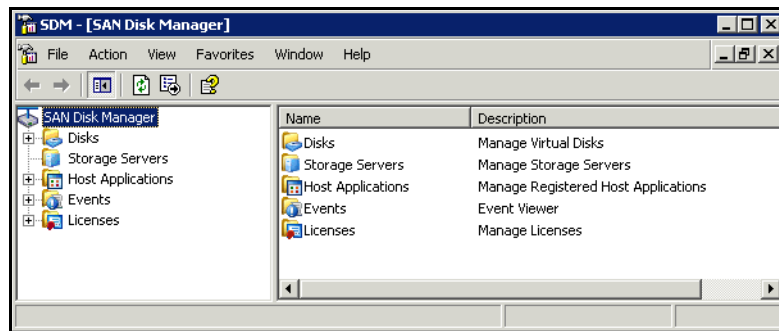


## Starting SAN Disk Manager

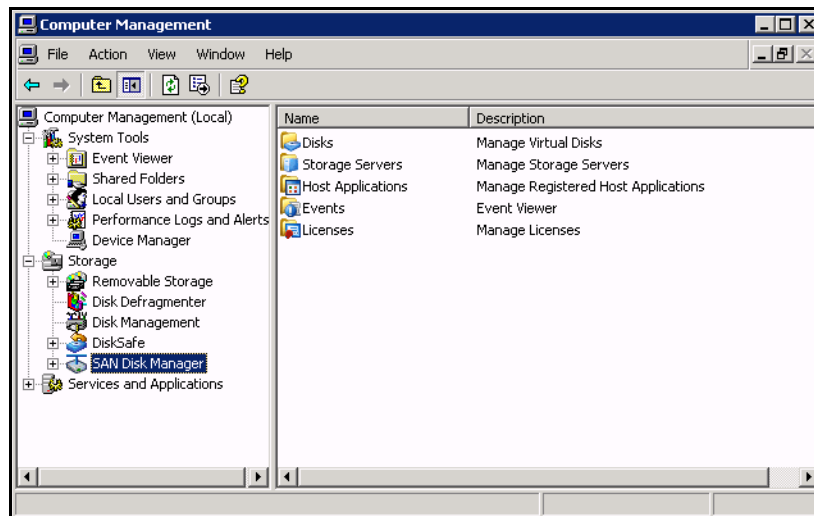
Once SAN Disk Manager has been installed, you can access it in two ways:

- ? Via the Start menu (*Start --> Programs --> SAN CLIENT --> SAN Disk Manager*)
- ? Via Computer Management (right-click My Computer and click *Manage*, expand *Storage*, and click *SAN Disk Manager*)

When you run SAN Disk Manager from the Start menu, a window similar to the following appears:



When you access SAN Disk Manager from Computer Management, the window looks similar to the following:



You can run both instances simultaneously. Whether you run SAN Disk Manager from the Start menu or access it from Computer Management, it operates the same.

## Navigating SAN Disk Manager

The SAN Disk Manager application window is divided into two panes. The left pane contains a navigation tree with nodes that you can click, expand, and collapse. When you click a node in the navigation tree, the right pane displays associated information. For example, when you click the *Disks* node in the navigation tree, the right pane displays a list of all virtual disks (that is, SAN resources or logical units) that have been assigned to the client.

### Accessing SAN Disk Manager functions

The menus at the top of the application window provide access to several functions that are common to all Microsoft® Management Console-based applications, such as exiting the application.

Functions that are specific to SAN Disk Manager typically appear in the *Action* menu. The *Action* menu is context-sensitive; the items that appear here change, depending on which item in the application window has focus. For example, when you click *Disks* in the navigation tree, the *Action* menu displays *New Disk*. When you click a disk in the right pane, the *Action* menu displays *Expand Disk*, *Create Snapshot*, *Remove Disk*, and *Properties*.

You can also access SAN Disk Manager functions by right-clicking the elements in the application window. For example, to create a new virtual disk, you can either click *Disks* in the navigation tree and click *New Disk* from the *Action* menu, or you can right-click *Disks* and click *New Disk* from the pop-up menu.

### Showing, hiding, or re-ordering columns

You can determine which columns appears in the right pane. For example, when you click *Disks* in the navigation tree, the right pane displays the *Name*, *Drive*, *Capacity*, *Server Name*, *Protocol*, and *Description* columns by default. If you don't want to view the *Protocol* column, you can remove it from the screen. To do this, right-click *Disks*, click *View --> Add/Remove Columns*, click *Protocol* in the *Displayed columns* list, and then click *Remove*.

To restore the *Protocol* column, you would click it in the *Available columns* list and then click *Add*. You can also restore the right pane to its default state by clicking *Restore Defaults*.

In addition, you can change the order of the columns. For example, to move the *Capacity* column to the left of the *Drive* column, you would click *Capacity* in the *Displayed columns* list and then click *Move Up*. To move it back to the right of the *Drive* column, you would click *Capacity* and then click *Move Down*.



Note: You cannot remove the left-most column.

## Sorting data

To quickly find the information that you want, you can click the column headings in the right pane to sort the information in that column alphanumerically. For example, when you click the *Disks* node, you can click the *Capacity* column heading to sort the listed disks by size, or you can click the *Server Name* column heading to sort them by the name of the storage server where they reside.

## Refreshing data

If the right pane does not display the information you expect, you might have to refresh the application window. To do this, right-click the corresponding node in the navigation tree and click *Refresh*.

## Central Client Manager and SAN Disk Manager

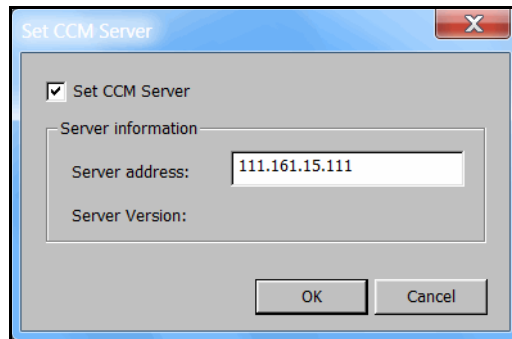
Concerto Central Client Manager (CCM) provides centralized reporting, monitoring, and policy management for clients.

SAN Disk Manager can perform the following tasks with CCM:

- ? Collect system information including host name, IP address, disk information, CPU, memory, operating system, installed Concerto products, and license information; and update the information to a registered CCM server
- ? Communicate with the CCM server and perform CCM operations on a client. You can also force a client's system to synchronize

To register with a CCM server:

1. In the tree, right-click *SAN Disk Manager*, and select *Set CCM Server*.



If the client is already registered to a CCM Server, the *Set CCM Server* checkbox will be checked and the IP address of the server and the CCM server version number will be displayed.

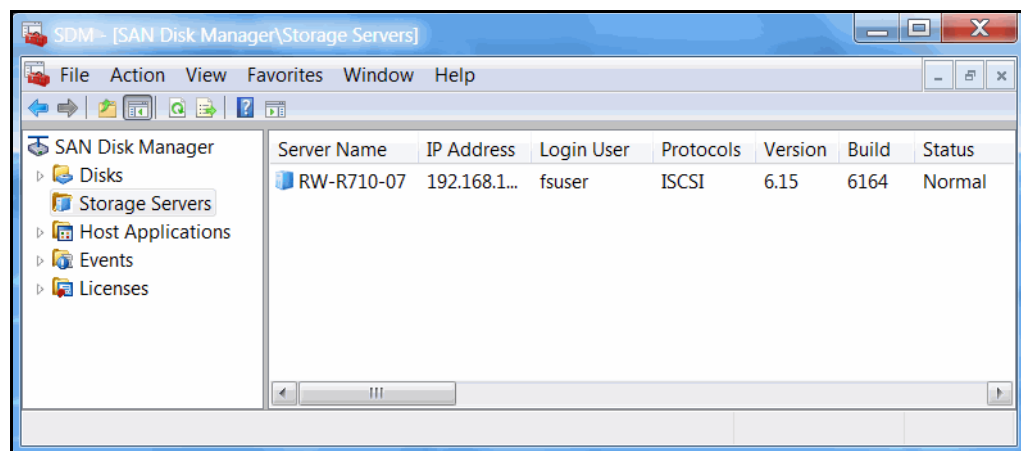
2. Check the *Set CCM Server* checkbox, type the server address, and click *OK*.

If you want to unregister a CCM server, uncheck the *Set CCM Server* checkbox and click *OK*.

## Storage servers

When you add a storage server to the list of targets in your iSCSI initiator, information about your storage server is saved on your computer. However, this information is not automatically detected by SAN Disk Manager. In order to see information about existing virtual disks that have been assigned to the client, you must add the server to SAN Disk Manager.

When you click *Storage Servers* in the SAN Disk Manager navigation tree, the right pane displays a list of all the storage servers that have been added to SAN Disk Manager.




For each listed storage server, the right pane displays the following information:

- ? The name of the server
- ? The IP address of the server
- ? The user that is logged into the server
- ? All protocols currently enabled on the server (*iSCSI* and/or *FC*)
- ? The version number of the storage server software
- ? The build number of the storage server software
- ? The status of the server (*Normal*, *Invalid Storage Server*, *Invalid Storage Server protocol information*, or *Storage Server does not support IMA*)

Using SAN Disk Manager, you can add and delete servers, change their protocol settings, view their properties, reset the iSCSI CHAP secret, reset iSCSI target access mode, and enable/disable in-band cluster access.

## Adding a server

Once you add a storage server to SAN Disk Manager, it automatically appears in the list of available servers when you subsequently create a virtual disk (as described in [“Creating a disk”](#) on page 16).

 Note: When you add a storage server, SDM will automatically register it to CCM under the following conditions:

- ? The client has not registered to any CCM server
- ? The storage server build is no less than 6164

To add a storage server:

1. In the navigation tree, expand *SAN Disk Manager*, right-click *Storage Servers*, and click *Add Server*.
2. In the *Server name* text box, type the name or IP address of the storage server.
3. Clear the *Windows Domain Authentication* check box.  
You must UNCHECK this option.
4. In the *User name* text box, type a user name for accessing the server or domain.

If you created a unique user name for this client (as described in [“Prepare the storage server for IMA”](#) on page 3), type that user name here. Otherwise, type an administrator user name.

If the storage server is in a Windows domain and you want to add a storage server with a domain account, type the user name as:

`domain_name\username`

You cannot use the root account.

5. In the *Password* text box, type the password for that user name.
6. Select the communication protocol(s) to use (*iSCSI* and/or *Fibre Channel*).  
Only CDP/Concerto supports Fibre Channel and multiple protocols. Selecting multiple protocols here registers the use of each protocol with that storage server.
7. If you're using the iSCSI protocol, by default the first detected iSCSI HBA is utilized to communicate with the storage server. If no HBA is detected, the Microsoft iSCSI Initiator is used by default. To change this setting, click the *Advanced* button next to the *iSCSI* check box, select the desired mechanism from the list, and then click *OK*.

You can also click *Advanced* to specify the target portal IP address and port number to use for communicating with the storage server.

8. If you're using Fibre Channel protocol and you want to use a specific Fibre Channel worldwide port name, click the *Advanced* button next to the *Fibre Channel* check box, select the *Enable specific Fibre Channel WWPN setting* check box, click *Add*, type the appropriate WWPN, click *OK* on the Fibre Channel WWPN dialog box, and then click *OK* on the Fibre Channel Advanced Settings dialog box.

A maximum of eight WWPNs is supported.

9. Click *OK* on the Add Server dialog box.

The server information appears in the right pane.

## Changing the server protocol settings

If you want to enable a protocol that is currently disabled on the storage server, update the server to reflect changes to your iSCSI initiator or Fibre Channel hardware settings, change the iSCSI target portal IP address or port number, specify which iSCSI adapter to use, or specify which Fibre Channel worldwide port name to use, you can do so using SAN Disk Manager.

To change the server protocol settings:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.
2. In the right pane, right-click the storage server whose protocol settings you want to change and click *Protocol Settings*.

3. Take the desired action:

- ? To enable a particular protocol, click *Enable* next to that protocol.

The *Enable* button appears only if the protocol is currently disabled. You can enable the Fibre Channel protocol only for a server running CDP/Concerto. For CDP/Concerto servers, the protocol must be licensed.

- ? To update the server to reflect changes to your iSCSI initiator or Fibre Channel hardware settings, click *Update* next to the appropriate protocol. When the confirmation message appears, click *OK*.

The *Update* button appears only if the protocol is currently enabled.

- ? To change the iSCSI target portal IP address or port number, or to specify which iSCSI adapter to use, click *Advanced* next to the *iSCSI* protocol.

In the *Target portal IP address* text box, type the IP address on the storage server to use for communicating with the client.

In the *Port* text box, type the port number to use on the storage server.

In the *Local adapter* list, select the local mechanism that you want to use to communicate with the server. If you select *Default*, SAN Disk Manager uses the first detected iSCSI HBA. If no HBA is detected, the Microsoft iSCSI Initiator is used instead. You can select *Microsoft iSCSI Initiator* to use that initiator even if you have an HBA installed. If listed, you can also select a specific HBA.

- ? To specify the worldwide port name, click *Advanced* next to the *Fibre Channel* protocol, select the *Enable specific Fibre Channel WWPN setting* check box, click *Add*, type the appropriate WWPN, and click *OK* on the Fibre Channel WWPN dialog box. You can add up to eight WWPNs. When you have finished, click *OK* on the Fibre Channel Advanced Settings dialog box.
- 4. When you have completed your changes, click *Close*.

## Resetting the iSCSI CHAP secret

If you're using the iSCSI protocol to communicate with the storage server, security is normally achieved via the iSCSI Challenge Handshake Authentication Protocol (CHAP) secret. Whenever you create a disk using SAN Disk Manager, a random secret is generated automatically.

Change the CHAP secret using SAN Disk Manager to ensure that the secret is correctly changed in both the iSCSI initiator and the storage server.



Note: Resetting the iSCSI CHAP secret in SAN Disk Manager will not change the authentication level specified on the storage server. For example, if the CDP/Concerto authentication setting for the client's iSCSI protocol is *None*, the client and server will continue to use that authentication method. The iSCSI CHAP secret might be successfully changed, but this will have no effect on authentication between the client and server.

To change the iSCSI CHAP secret:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.
2. In the right pane, right-click the storage server whose iSCSI CHAP secret you want to change and click *Reset iSCSI CHAP Secret*.
 

If the iSCSI protocol is not enabled for the selected storage server, this option appears dimmed. To confirm which protocols are enabled, check the *Protocols* column. If *iSCSI* does not appear in that column, enable the iSCSI protocol (as described in "[Changing the server protocol settings](#)" on page 11).
3. In the *CHAP secret* text box, type the CHAP secret to use (12–16 characters).
4. In the *Confirmation* text box, type the same password.
5. Click *OK*.

The CHAP secret is changed in both iSCSI initiator and the storage server.

## Resetting the storage server IP address or server name

If you have changed the IP address or server name of a storage server, do the following to reflect the new IP address/server name in SDM:

1. Delete the server from SDM.



2. Add the server back into SDM using the new IP address/server name.  
This change will not impact provisioned storage devices or the existing environment.

### Setting the iSCSI target access mode

If you are using the iSCSI protocol to communicate with the storage server, you can select an access mode for all the disks that are allocated with the iSCSI protocol. By default, the access mode is *Read/Write Non-Exclusive*.

To set the iSCSI Target Access Mode:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.
2. In the right pane, right-click the storage server whose iSCSI target access mode you want to change and click *Set the iSCSI Target Access mode*.

If the iSCSI protocol is not enabled for the selected storage server, this option appears dimmed. To confirm which protocols are enabled, check the *Protocols* column. If *iSCSI* does not appear in that column, enable the iSCSI protocol (as described in "[Changing the server protocol settings](#)" on page 11").

3. In the *Access Mode* box, select a mode.

*Read/Write* - Only one client can access a SAN resource at a time. All others (including *read only*) will be denied access.

*Read/Write Non-Exclusive* - Two or more clients can connect at the same time with both read and write access. You should be careful with this option because if you have multiple clients writing to a device at the same time, you have the potential to corrupt data. This option should only be used by clustered servers, because the cluster itself prevents multiple clients from writing at the same time.

*Read Only* - This client will have read only access to a SAN resource. This option is useful for a read-only disk.

4. Click *OK*.

The iSCSI target access mode is changed for the storage server.

### Enable/disable in-band cluster access

You can enable or disable the *Is Clustered* option of a SAN client on the server side. This option allows clustered SAN Clients to take advantage of persistent reserve/release to control disk access between various cluster nodes. For Windows 2003 and earlier platforms, this option is disabled by default. Otherwise, it will be enabled.

To enable/disable in-band cluster access:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.

2. In the right pane, right-click the storage server for which you want to enable/disable in-band cluster access by clients.

The *Is Clustered* option is changed accordingly on the server side.

## Viewing the server properties

You can view the properties of any storage server, including the following information:

- ? The name and IP address of the server
- ? The version and build number of the storage server software
- ? All protocols currently enabled on the server (*ISCSI* and/or *FC*)
- ? The status of the server (*Normal*, *Invalid Storage Server*, *Invalid Storage Server protocol information*, or *Storage Server does not support IMA*)

To view the storage server properties:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.
2. In the right pane, double-click the storage server whose properties you want to view.  
Alternatively, you can right-click the server and click *Properties*.
3. When you have finished viewing the properties, click *OK*.

## Removing a server

When you remove a server, it no longer appears in the SAN Disk Manager application window, and information about any disks or snapshots that reside on that server also no longer appear.

In addition, if you're using the iSCSI protocol, the server is removed from the iSCSI initiator. However, you might not lose your connection to the virtual disks currently assigned to your computer from that storage server until you either log off using the iSCSI initiator or restart your computer.


To remove a storage server:

1. In the navigation tree, expand *SAN Disk Manager* and click *Storage Servers*.
2. In the right pane, right-click the storage server that you want to remove and click *Remove Server*.
3. When the confirmation message appears, click *Yes*.

The storage server disappears from the right pane.

## Disks

When you click *Disks* in the navigation tree, the right pane displays a list of all the virtual disks currently assigned to this client.

 Note: If virtual disks have been assigned to the client but those disks do not appear in the right pane, you must add the storage server where the disks reside (as described in [“Adding a server”](#) on page 10). SAN Disk Manager does not automatically detect existing connections.

For each listed disk, the right pane displays the following information:

- ? The number of the virtual disk as it appears in Disk Management
- ? The drive letter(s) (if any) associated with the disk or the partitions of the disk
- ? The capacity of the disk
- ? The name of the storage server where the disk resides
- ? The protocol used to communicate with the storage server (*ISCSI* or *FC*)
- ? The type of disk it is (*Normal Virtual Disk*, or *Mounted Snapshot*)

The advanced options of SAN Disk Manager allow you to create or expand any normal virtual disks. You can also delete any normal virtual disks and view the properties of any listed disks.

## Creating a disk

You can create a virtual disk using SAN Disk Manager. When you create a virtual disk, it is automatically assigned to the client with read/write (non-exclusive) privileges.

If MemSnap is licensed on the storage server, snapshots are automatically enabled for any virtual disks created using SAN Disk Manager. In addition, snapshot agent notification is also automatically enabled.

To create a virtual disk:

1. Make sure that the storage server where you plan to create the virtual disk appears in SAN Disk Manager.

To do this, expand *SAN Disk Manager* in the navigation tree, click *Storage Servers*, and observe the right pane. If the desired storage server doesn't appear there, add it (as described in [“Adding a server”](#) on page 10).

2. In the navigation tree, expand *SAN Disk Manager*, right-click *Disks*, and click *New Disk*.
3. In the *Servers* list, select the storage server where you want to create the new virtual disk.
4. Select the communication protocol to use (*iSCSI* or *Fibre Channel*).

If the protocol that you want to use is not currently enabled, click *Enable*.

If you changed your protocol settings (such as the iSCSI initiator name or Fibre Channel HBA settings) after the server was added to the *Servers* list, click *Update* to update these properties on the storage server. (The *Update* button appears only after the protocol has been enabled.)

If you are using the iSCSI protocol, by default SAN Disk Manager uses the first detected iSCSI HBA to communicate with the storage server. If no HBA is detected, the Microsoft iSCSI Initiator is used by default. To change this setting, click the *Advanced* button next to the *iSCSI* protocol and select the desired local adapter.

You can also click *Advanced* to specify the target portal IP address and port number to use for communicating with the storage server.

If you are using the Fibre Channel protocol and an error message appears when you enable this protocol, click the *Advanced* button next to the *Fibre Channel* protocol, select the *Enable specific Fibre Channel WWPN setting* check box, click *Add*, type the appropriate Fibre Channel worldwide port name, click *OK* on the Fibre Channel WWPN dialog box, and then click *OK* on the Fibre Channel Advanced Settings dialog box.

If the iSCSI initiator name does not end with *:hostname* or *:hostname.domainname* (where *hostname* is the name of your computer and *domainname* is the name of the domain to which your computer belongs, if any), you are prompted to either use the original initiator name, change the name (an acceptable name is displayed automatically), or use the current name.

If you change the name, other iSCSI targets (including any virtual disks that you are currently using) might not be accessible until you reconfigure the client on the storage server.

5. If you want to use Thin Provisioning, select the *Enable thin provisioning* checkbox and set the initial disk size.

Thin Provisioning allows storage space to be assigned to clients dynamically, by allocating a minimum amount of space for a disk. Then, when needed, additional storage is allocated. Each client sees the full size of its provisioned disk while the actual amount of storage used is much smaller. The maximum size of a disk with thin provisioning enabled is limited to 16,777,146 MB.

6. In the *Disk size* text box, specify the number of megabytes that you want to allocate for the new virtual disk.

If you are using Thin Provisioning, the disk size is the *full size* of the provisioned disk.

7. Click the *Options* button next to the *Disk Size* box to set the size of this disk's snapshot resource and to enable continuous data protection for this disk.

A snapshot resource is a temporary snapshot storage area that is used to track changes to data. Each snapshot initially uses no disk space. As new data is written to the source volume, the old data blocks are moved to the Snapshot Resource. Therefore, it is not necessary to have 100% of the size of the SAN Resource reserved as a Snapshot Resource. The suggested amount of space initially reserved for each Snapshot Resource is calculated as follows (for CDP/Concerto):

- ? Disk is less than 4096 MB - 2048MB reserved
- ? Disk is 2 GB or more - 50% reserved

CDP enhances the benefits of using snapshots by recording all changes made to data, allowing you to recover to any point in time. The minimum size required for the CDP journal is 1 GB, which is the default size.

Click *OK* when done setting options.

8. Click *OK* to create the disk.
9. If you plan to use the virtual disk locally, initialize and partition the disk using Disk Management.

## Expanding a disk

You can expand a virtual disk using SAN Disk Manager. Most virtual disks can be expanded as more storage is needed. Only virtual disks that were imported on the storage server and mounted snapshots cannot be expanded.

To expand a virtual disk:

1. In the navigation tree, expand *SAN Disk Manager* and click *Disks*.
2. In the right pane, right-click the virtual disk that you want to expand and click *Expand Disk*.



Note: If the disk that you want to expand does not appear in the right pane, click *Storage Servers* in the navigation tree and make sure that the storage server appears in the right pane. If it doesn't, add it (as described in [“Adding a server”](#) on page 10) and try again.

3. In the *Expand Size (MB)* text box, type the number of megabytes to add to this disk.
4. Click *OK*.

The number in the *Capacity* column reflects the new disk size.

If you did not previously initialize and partition the virtual disk, the expanded disk space is added to the original unallocated space, and you can initialize and partition the entire disk using Disk Management.

If you previously initialized and partitioned the virtual disk, the expanded disk space is treated as additional unallocated space, and you can partition it using Disk Management. If you would like to add the expanded disk space to your existing volume, you must use a third-party application such as DiskPart, Norton PartitionMagic™, or VERITAS™ Volume Manager™.

## Viewing the disk properties

For any virtual disk—normal virtual disks and mounted snapshots—you can view the properties of that disk, including the following information:

- ? The number of the virtual disk as it appears in Disk Management
- ? The size of the disk
- ? The address of the disk expressed as a port number, bus number, target ID, and logical unit number (LUN)
- ? The drive letter(s) (if any) associated with the disk or the partitions of the disk
- ? The name of the storage server where the disk resides
- ? The name used to identify the disk on the storage server

- ? The device ID (also known as the virtual ID)
- ? The protocol being used to communicate with the storage server
- ? Whether or not snapshots are enabled for this disk
- ? The maximum number of snapshots that can be taken of this disk
- ? The current number of snapshots of this disk
- ? The date and time when the last snapshot of this disk was taken



Note:

- ? For mounted snapshots, the Properties dialog box indicates that snapshots are not enabled and displays no information about snapshots, since you cannot create a snapshot of a mounted snapshot.

To view the virtual disk properties:

1. In the navigation tree, expand *SAN Disk Manager* and click *Disks*.
2. In the right pane, double-click the virtual disk whose properties you want to view. Alternatively, you can right-click the disk and click *Properties*.
3. When you have finished viewing the properties, click *OK*.

## Deleting a disk

Most virtual disks can be deleted to free disk space on the storage server for other uses. Deleting a mounted snapshot is the same as dismounting the snapshot. In addition, if any snapshots of the disk that you want to delete are mounted, you must dismount them before you can delete the disk.



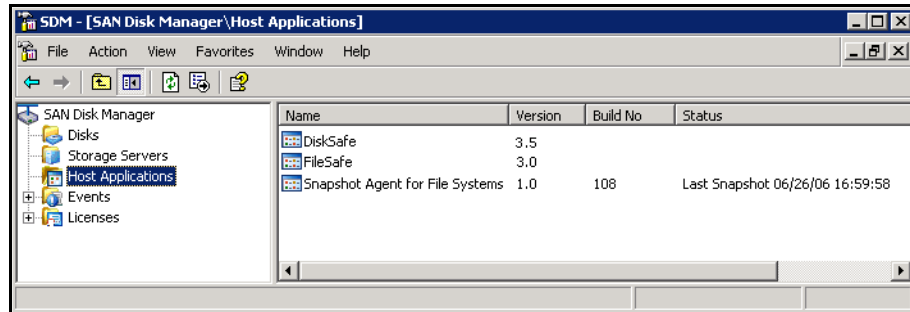
Caution: When you delete a virtual disk, all the data associated with that disk is deleted, along with any snapshots of that disk.

To delete a virtual disk:

1. In the navigation tree, expand *SAN Disk Manager* and click *Disks*.
2. In the right pane, right-click the virtual disk that you want to delete and click *Remove Disk*.  
  
If the *Description* column displays *Normal Virtual Disk*, dismount all snapshots of the disk (as described in “[Dismounting a snapshot](#)” on page 26), try again.
3. When the confirmation message appears, click *Yes*.

## Host applications

When you click *Host Applications* in the navigation tree, the right pane displays a list of all host applications that use IMA, including snapshot agents.



For each listed application, the right pane displays the following information:

- ? The name of the application
- ? The version number of the application
- ? The build number of the application
- ? The status of the application

### ! Notes:

- ? Version numbers, build numbers, and status information might not be available for some applications.
- ? For snapshot agents, the *Status* is the date and time of the most recent snapshot.

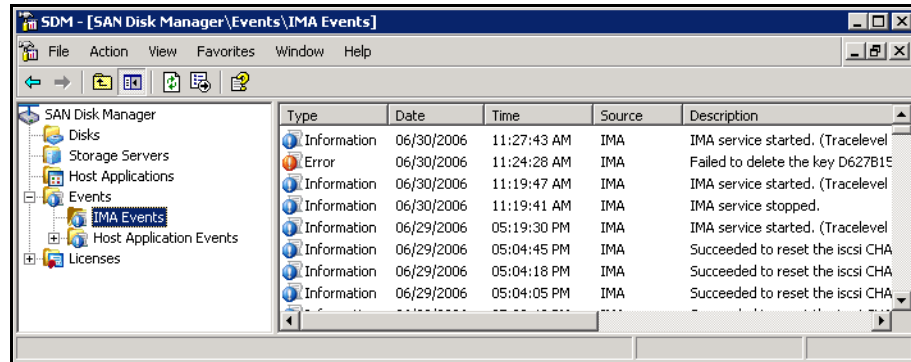
To view these same properties on the Host Application Properties dialog box, you can double-click the application. (Alternatively, you can right-click the application and then click *Properties*.)

## Events

All activities performed by IMA and the snapshot agents are recorded in the Windows event logs. To make it easier to view the events associated with these components, you can access them via SAN Disk Manager.



When you expand the *Events* node in the navigation tree and click *IMA Events* or *Host Application Events*, the right pane displays a list of all the events associated with that component.



For each listed event, the right pane displays the following information:

- ? The event type (*Information*, *Error*, or *Warning*)
- ? The date and time when the event occurred
- ? The component that generated the event
- ? A description of the event

To ensure that you don't have to enlarge and scroll the application window to view the entire event description, you can double-click the event to view all the details on the Event Properties dialog box. (Alternatively, you can right-click the event and then click *Properties*.)

## Filtering the events

Although you can easily sort the displayed events by clicking the column headings, you can also filter the list so that the right pane displays only events that occurred on specific dates, only specific kinds of events, and/or only events with certain words in their description.

To filter the events list:

1. In the navigation tree, expand *SAN Disk Manager* --> *Events*, right-click the events that you want to filter (*IMA Events* or *Host Application Events*), and then click *Set Filter*.
2. If desired, specify the desired time range.

To display all events that have occurred since a specific date or time, up to the present, select the *From* check box and specify the desired date and time in the adjacent lists. (Leave the *To* check box cleared.)

To display all events that have occurred up to a specific date or time, select the *To* check box and specify the desired date and time in the adjacent lists. (Leave the *From* check box cleared.)

To display all events that have occurred between specific dates or times, select the *From* check box and specify the beginning date and time in the adjacent lists. Then select the *To* check box and specify the ending date and time.

If you clear both the *From* and *To* check boxes, the time range is not limited.

3. Select or clear the desired *Type* check boxes to specify the kind of events that you want to display. (You can select more than one check box, but you must select at least one to display any events.

For example, to view events that resulted from successful operations, select the *Information* check box. To view events that are not necessarily problems but that might have destructive or irreversible consequences, select the *Warning* check box. To view events that indicate serious problems or require intervention or correction, select the *Error* check box.

4. If desired, specify the text that should appear in the event description in the *Description search* text box.

Only events that contain this text in their description will be listed.



Note: The specified text must match the description exactly. For example, if you type `add new server`, events that contain the phrase `add a new server` will not be included.

5. Click *OK*.

## Snapshots

A snapshot is a point-in-time image of a disk. If MemSnap is licensed on the storage server, you can create snapshots to make different versions of your data available for later retrieval. You can also mount snapshots and perform “what if” operations on an image of your data set without affecting your actual, working data.

When you click *Snapshots* in the navigation tree, the right pane displays a list of all the virtual disks currently assigned to this client.




Notes:

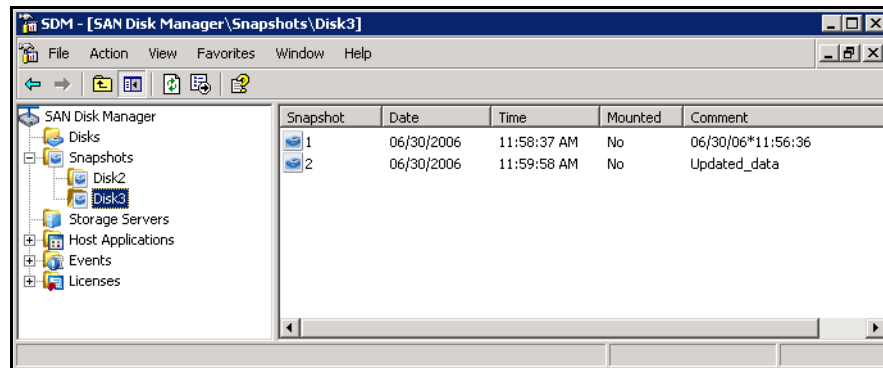
- ? The *Snapshots* node appears in the navigation tree only if you licensed the advanced options of SAN Disk Manager.
- ? If virtual disks have been assigned to the client but no disks appear in the right pane, you must add the storage server where the disks reside (as described in [“Adding a server”](#) on page 10). SAN Disk Manager does not automatically detect existing connections.

For each listed disk, the right pane displays the following information:

- ? The name of the virtual disk
- ? Whether or not snapshots are enabled for that disk on the storage server
- ? The total number of snapshots available
- ? The date and time of the most recent snapshot

 Note: If MemSnap is licensed on the storage server, snapshots are automatically enabled when you create a virtual disk using SAN Disk Manager (as described in “Creating a disk” on page 16). If you created the virtual disk using CDP/Concerto, you must enable snapshots for that disk on the storage server before you can create snapshots using SAN Disk Manager.

When you expand the *Snapshots* node and click one of the disks listed beneath it, the right pane displays a list of all snapshots associated with that disk (if any).



For each listed snapshot, the right pane displays the following information:

- ? The number used to identify the snapshot
- ? The date when the snapshot was created
- ? The time when the snapshot was created
- ? Whether or not the snapshot is currently mounted
- ? Any comment provided when the snapshot was created

Using SAN Disk Manager, you can view the properties of any listed snapshot. You can also create, mount, dismount, and delete snapshots for normal virtual disks.

## Creating a snapshot

You can create a snapshot using SAN Disk Manager. Before you can create a snapshot of a virtual disk, MemSnap must be licensed on the storage server. If that option was licensed when you created the disk using SAN Disk Manager, snapshots were automatically enabled for that disk. However, if you licensed that option after creating the disk, or if you created the disk using CDP/Concerto, you must enable snapshots for that disk on the storage server before you can create snapshots using SAN Disk Manager.

To determine whether or not snapshots are enabled for a particular virtual disk, click *Snapshots* in the SAN Disk Manager navigation tree. If snapshots are enabled for a particular disk, the *Snapshot Enabled* column in the right pane displays *Yes* for that disk.

To create a snapshot:

1. In the navigation tree, expand *SAN Disk Manager* --> *Snapshots*, right-click the desired disk in the navigation tree, and then click *Create Snapshot*.

Alternatively, you can click *Disks* or *Snapshots* in the navigation tree and right-click the desired disk in the right pane.


The Create Snapshot dialog box appears.

2. If desired, type your own description for the snapshot in the *Comment* text box (up to 30 characters). Spaces are not allowed, although the comment can be blank.

By default, the *Comment* text box displays the current date and time.

3. Click *OK*.

When you click the disk in the navigation tree, the new snapshot appears in the right pane.

 Note: If the storage server is CDP/Concerto, IMA will try to upload snapshot catalog information to the CDP/Concerto server when taking a snapshot.

## Mounting a snapshot

The advanced options of SAN Disk Manager allow you to mount snapshots. When you mount a snapshot, a separate virtual disk is created. As long as the disk has a valid NTFS partition and the automount feature is enabled in Windows, the mounted snapshot is automatically assigned a drive letter on the client. The mounted snapshot is an exact image of the data as it existed at the time the snapshot was created. Since a mounted snapshot is simply a virtual image, it does not require any additional disk space on the storage server.

A mounted snapshot is not intended to be a working disk. Any changes made to a mounted snapshot are lost as soon as the snapshot is dismounted. However, you can use a mounted snapshot to restore previous versions of files or folders, as well as perform “what if” scenarios or other operations without affecting your production data.

Once a snapshot has been mounted, it will not be deleted to make room for new snapshots until it is dismounted or unless the storage server runs critically low on resources and cannot track all the changes being made to the mounted snapshot.

Although you can mount snapshots only one at a time, you can mount more than one.

To mount a snapshot:

1. In the navigation tree, expand *SAN Disk Manager* --> *Snapshots* and click the disk whose snapshot you want to mount.
2. In the right pane, right-click the snapshot that you want to mount and then click *Mount Snapshot*.
3. In the *Name* text box, type a name to use for the mounted snapshot (up to 64 characters).  
This is the name used to identify the mounted snapshot on the storage server.
4. Click *OK*.

The *Mounted* column displays *Yes*, and a drive letter is automatically assigned to the mounted snapshot so that you can easily access it using My Computer/Windows Explorer.



Notes:

- ? If the first drive letter after your local disks is mapped to a network drive, you must use Disk Management to change the drive letter assigned to the mounted snapshot so that you can view it.

For example, if your system disk is mapped to C:, your CD-ROM drive is mapped to D:, and a network drive is mapped to E:, and you mount a snapshot, you will continue to see the network drive when you explore E:, and you will not see a new drive letter for the mounted snapshot. (Internally, the mounted snapshot is also mapped to E:, since that was the first drive letter after the local disks.) However, when you use Disk Management to change the drive letter for the mounted snapshot from E: to F:, you will be able to see both the mapped network drive (E:) and the mounted snapshot (F:).

- ? If a drive letter is not assigned to the mounted snapshot automatically, you might not be able to explore it until you assign one using Disk Management. If the mounted snapshot has no file system, you must restart the client before you assign the drive letter.

- ? Windows caching can affect the content of the mounted snapshot. If the content does not appear to be correct, restart the client and check again.

## Dismounting a snapshot

The advanced options of SAN Disk Manager allow you to dismount any mounted snapshots. Dismounting a snapshot prevents further access to it, disregards any changes that were made to it, and allows the storage server to delete the snapshot as space for newer snapshots is required.

To dismount a snapshot:

1. In the navigation tree, expand *SAN Disk Manager* --> *Snapshots* and click the disk whose snapshot you want to dismount.
2. In the right pane, right-click the snapshot that you want to dismount and then click *Dismount Snapshot*.

This option is enabled only if the snapshot is mounted (that is, if the *Mounted* column displays *Yes*).

3. When the confirmation message appears, click *Yes*.  
The *Mounted* column now displays *No*, and the drive letter is no longer mapped to the mounted snapshot

## Viewing snapshot properties

The advanced options of SAN Disk Manager allow you to view the properties of any snapshot, including the following information:

- ? The number used to identify the snapshot
- ? The name of the disk associated with the snapshot
- ? The date and time when the snapshot was created
- ? The amount of data (in kilobytes) that changed between the last snapshot and the selected one
- ? Whether or not the snapshot is currently mounted
- ? Any comment provided when the snapshot was created

To view the snapshot properties:

1. In the navigation tree, expand *SAN Disk Manager* --> *Snapshots* and click the disk whose snapshot properties you want to view.
2. In the right pane, double-click the snapshot whose properties you want to view.  
Alternatively, you can right-click the snapshot and click *Properties*.
3. When you have finished viewing the properties, click *OK*.

## Deleting a snapshot

When the maximum allowed number of snapshots for a virtual disk is reached, the oldest snapshot is deleted automatically whenever a new snapshot is created. However, the advanced options of SAN Disk Manager allow you to manually delete an unmounted snapshot at any time, as long as it has not been mounted on the storage server.

To delete a snapshot:

1. In the navigation tree, expand *SAN Disk Manager --> Snapshots* and click the disk whose snapshot you want to delete.
2. If the snapshot that you want to delete is mounted (that is, if the *Mounted* column in the right pane displays *Yes*), right-click the snapshot and then click *Dismount Snapshot*.

When the confirmation message appears, click *Yes*.

The *Mounted* column now displays *No*.

3. In the right pane, right-click the snapshot that you want to delete and then click *Delete Snapshot*.
4. When the confirmation message appears, click *Yes*.

The deleted snapshot disappears from the list in the right pane.

## Other SAN Disk Manager tasks

From the SAN Disk Manager node, you can perform the following tasks:

- ? Take an x-ray
- ? Set location information

### Take an X-ray

Taking an X-ray of your system is useful for your technical support team to help solve system problems. Each X-ray contains technical information about your system, such as messages and a snapshot of your server's current configuration and environment. You should not create an X-ray unless you are requested to do so by your Technical Support representative.

To take an X-ray:

1. In the tree, right-click *SAN Disk Manager*, and select *Take X-Ray*.
2. Specify a location for the X-ray file.

The X-ray file name format is: SDMxRay-yyyymmdd-hhmmss.build.cab.

### Set location information

You can set information about the location of this system and who is responsible for maintaining it. You can also include a .digital photograph of the appliance or its location.

To set location information:

1. In the tree, right-click *SAN Disk Manager*, and select *Location Information --> Properties*.

You can also import or export an existing XML file containing this information.

2. Specify the appropriate information.

If you want to include a photograph, click the ellipse button to locate it. The image must be smaller than 500 KB.



# Command Line Interface

The command line interface allows you to perform most IMA functions. The commands in this section can be performed on Windows/Unix/Linux/Solaris systems, except as noted.

You must have administrative rights in order to use the interface.

You should be aware of the following as you enter commands:

- ? Type each command on a single line, separating arguments with a space.
- ? Arguments that appear within brackets [ ] are optional.
- ? The order of the arguments is irrelevant.

The following commands are available (link jumps to command):

## General commands

- ? [Display IMA information](#)
- ? [Display error message](#)
- ? [Get disk information](#)
- ? [Take IMA X-ray](#)
- ? [Enable debug level](#)
- ? [Set user account](#)
- ? [Check iSCSI status](#)

## Override drive setting commands

- ? [Set drive override settings](#)
- ? [Get drive override settings](#)
- ? [Delete drive override settings](#)

## Server commands

- ? [Connect client to CDP/Concerto controller](#)
- ? [Disconnect client from CDP/Concerto server](#)
- ? [List CDP/Concerto controllers](#)
- ? [Add protocol to use with a CDP/Concerto controller](#)
- ? [Allocate a virtual disk from a CDP/Concerto controller](#)
- ? [List all allocated virtual disks](#)
- ? [Delete an allocated virtual disk](#)
- ? [Reset iSCSI password](#)
- ? [Repair server connection](#)

## Encryption key management commands

- ? [Add a key](#)
- ? [Delete a key](#)
- ? [List all keys](#)
- ? [Export a key](#)
- ? [Import a key](#)

**License management commands**

- ? Add a license
- ? Get license information
- ? Export a license
- ? Import a license
- ? Delete a license
- ? Print product codes

**Task commands**

- ? Create a schedule
- ? Create a daily schedule
- ? Create a weekly schedule
- ? Create a monthly schedule
- ? Create a weekday of month schedule
- ? Update a schedule
- ? Get schedule information
- ? Get all schedule information
- ? Delete a schedule
- ? Create a task
- ? Update a task
- ? Get task information
- ? Get all task information
- ? Suspend a task
- ? Resume a suspended task
- ? Run a task
- ? Delete a task
- ? Create a holiday
- ? Update a holiday
- ? Get specific holiday information
- ? Get all holiday information
- ? Delete a holiday

**CCM server commands**

- ? Register with a CCM server
- ? Un-register a CCM server
- ? List CCM servers

## General commands

### Display IMA information

```
iscmcli info
```

#### Description

This command displays the IMA installation directory and version number, etc.

#### Sample output

Windows:

```
SDM Path      :C:\Program Files\Concerto\IMA
SDM Version   :2.50.462
Host Name     :FS26188
SDM Service   :Running
```

Linux:

```
SDM Path      :/usr/local/fsima
SDM Version   :2.50.423
Host Name     :FSHLinux
SDM Service   :Running
```

Solaris:

```
SDM Path      :/opt/software/fsima/
SDM Version   :2.50.423
Host Name     :SOL10-225
SDMService    :Stop
```

HP-UX:

```
SDM Path      :/usr/local/fsima
SDM Version   :2.50.463
Host Name     :HPUXIA6401
SDMService    :Stop
```

### Display error message

```
iscmcli errmsg <error code>
```

#### Description

This command displays the error message indicated by the error code.

## Get disk information

```
iscmcli diskinfo <device path>
```

### Description

This command displays disk information, include capacity, diskWWID (a unique ID for each hardware disk supplied by the vendor), and volume information, etc.

### Sample output

#### Windows:

```
Beginning to get disk info...
Disk 0 Info
Capacity      : 238475 MB
IPStor Disk   : No
diskWWID      : 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
ABTL          : 02-00-00-00
Partition     Filesystem      Capacity
SYSTEM(C:)    NTFS                    50000 MB
WORK(E:)      NTFS                    100007 MB
VM(F:)        NTFS                    88468 MB

Disk 1 Info
Capacity      : 100 MB
IPStor Disk   : Yes
diskWWID      : 60-00-D7-75-42-5D-8A-AB-9B-52-00-00-4B-14-DA-5D
ABTL          : 04-00-00-00
No volume on this disk.
```

#### Linux:

```
Beginning to get disk info...
Device Path   : /dev/sda
Capacity      : 25600 MB
IPStor Disk   : No
diskSN        :
Partition Number Partition Type      Capacity
1              Normal Partition    101 MB
2              Normal Partition    15257 MB
3              Normal Partition    10236 MB
```

#### Solaris:

```
Beginning to get disk info...
Device Path   : /dev/rdisk/cld0p0
Capacity1     : 120084480 MB
Capacity2     : 97 MB
Capacity      : 49664 MB
IPStor Disk   : No
diskSN        :
Partition Number Partition Type      Capacity
1              Normal Partition    5898 MB
2              Normal Partition    563 MB
3              Normal Partition    63976 MB
5              Normal Partition    7 MB
7              Normal Partition    29 MB
```

**HP-UX:**

```
Beginning to get disk info...
Device Path   : c6t0d0
Capacity     : 15000 MB
IPStor Disk  : Yes
diskSN       : VW6PMLAA973J  FALCON  17zYM70K1RcoLsof3h
No partition on this disk.
```

**AIX:**

```
Beginning to get disk info...
Device Path   : /dev/hdisk6
Capacity     : 51072 MB
IPStor Disk  : Yes
diskSN       : 486ZMV72INNY
No partition on this disk.
```

## Take IMA X-ray

```
iscmcli xray
```

**Description**

This command generates an X-ray package in the current directory.

The X-ray file name format is: SDMXRay-yyyymmdd-hhmmss.cab(tar.gz).

## Enable debug level

```
iscmcli enabledebuglog enable
iscmcli enabledebuglog disable
```

**Description**

This command sets the log level.

## Set user account

```
iscmcli setuseraccount -u username -c password
```

**Description**

(Windows administrators only) This command overrides the default, encrypted user account created by IMA. Specify the new username and password to be used.

## Check iSCSI status

```
iscmcli checkiscsistatus <enable|disable>
```

**Description**

If enabled, the IMA service continuously checks iSCSI status and reconnects if necessary. By default, this is enabled.

## Override drive setting commands

When a snapshot is taken on the server side and notification is sent to the client, the client needs to get the virtual disk's local properties, such as drive letter or mount point, in order to quiesce the disk. Sometimes the virtual disk's drive letter or mount point is not accessible. The override drive list tells the system what drive letters or mount points to use.

### Set drive override settings

```
iscmcli setoverridedrive -d override
```

#### Description

This command sets the drive override settings. Specify a list of drive letters or mount points separated by ";".

-d: Drive override list.

#### Examples

```
iscmcli setoverridedrive -d "c;d;"  
iscmcli setoverridedrive -d "/root;/export"
```

### Get drive override settings

```
iscmcli getoverridedrive
```

#### Description

This command gets the drive override settings.

### Delete drive override settings

```
iscmcli deloverridedrive
```

#### Description

This command deletes the drive override settings.

## Server commands

### Connect client to CDP/Concerto controller

```
iscmcli addserv -s <server> -u <username> -c <password> -p <protocol>
[-n <sanclientname>] [-d <domainname> -t <target> -w <WWPN>]
```

#### Description

This command connects the current client to a CDP or Concerto controller.

-s: Server name or IP address.

-u: User name.

-c: Password for login.

-p: Protocol to enable (2:FC or 4:iSCSI).

-d: Client name, if different from the current client.

-d: Domain name (Windows only).

-t: Target (Windows only).

-w: If enabling FC, you can manually specify the WWPN. Up to eight WWPNs can be specified. For AIX, if you are enabling FC, you must specify -w `wwpn`.

#### Examples

```
iscmcli addserv -s 172.16.222.22 -u test -c pswd -p 4
Iscmcli addserv -s 172.16.6.50 -u test -c pswd -p 2 -w XX-XX-XX-XX-XX-XX-XX-XX
```

### Disconnect client from CDP/Concerto server

```
iscmcli delserv -s <server> [-f]
```

#### Description

This command disconnects the current client from a CDP or Concerto controller.

-s: Server name or IP address.

-f: An option to force the deletion. If there is an iSCSI connection between the host and the server, you must specify "-f" to delete the server.

#### Example

```
iscmcli delserv -s 172.16.222.22
```

## List CDP/Concerto controllers

```
iscmcli listserv [-s <server>]
```

### Description

This command lists all CDP or Concerto controllers to which this client is connected.

-s: An option to list specific server information.

### Examples

```
iscmcli listserv  
Iscmcli listserv -s 172.16.222.22
```

## Add protocol to use with a CDP/Concerto controller

```
iscmcli enableprotocol -s <server> -p <protocol> [-w <WWPN>]
```

### Description

This command adds a protocol to use between the current client and a CDP/Concerto controller.

-s: Server name or IP address.

-p: Protocols (2:FC or 4:iSCSI).

-w: If enabling FC, you can manually specify the WWPN. Up to eight WWPNs can be specified. For AIX, if you are enabling FC, you must specify -w *wwpn*.

### Example

```
iscmcli enableprotocol -s 172.16.222.22 -p 4
```

## Allocate a virtual disk from a CDP/Concerto controller

```
iscmcli newdisk -s <server> -n <size(MB) | sectors> -p protocol  
--sparse-disk [-a <application>]
```

### Description

This command allocates a virtual disk from a CDP/Concerto controller.

-s: Server name or IP address.

-n: Size of the new virtual disk (in MB) or number of sectors. Specify "MB" for disk size (disk size must be at least 10 MB.). If "MB" is not specified, it will allocate sectors (minimum 20480 sectors).

-p: Protocol to use (2:FC or 4:iSCSI).

--sparse-disk: Enable sparse disk. If server supports sparse disk, it will allocate the disk using this feature. Otherwise, the server will ignore this flag.



**-a:** An option to specify an application prefix (`sdm` for SAN Disk Manager) that will allocate the virtual disk.

### Example

```
iscmcli newdisk -s 172.16.222.22 -n 100MB -p 4
iscmcli newdisk -s 172.16.222.22 -n 20480 -p 4 -a ds
iscmcli newdisk -s 172.16.222.22 -n 10000MB -p 4 -sparse-disk
```

## List all allocated virtual disks

```
iscmcli getvdevlist -s <server> -p <protocol>
```

### Description

This command lists all virtual disks allocated to this client from a CDP/Concerto controller.

**-s:** Server name or IP address.

**-p:** Protocol. (2:FC or 4:iSCSI).

### Example

```
iscmcli getvdevlist -s 172.16.222.22 -p 4
```

## Delete an allocated virtual disk

```
iscmcli delvdev -s <server> -p <protocol> -v <deviceID> [-f]
```

### Description

This command deletes a specified virtual disk allocated to the current client from a CDP/Concerto controller.

**-s:** Server name or IP address.

**-p:** Protocol. (2:FC or 4:iSCSI).

**-v:** Virtual disk device ID.

**-f:** An option to force the deletion.

### Example

```
iscmcli delvdev -s 172.16.222.22 -p 4 -v 152
```

## Reset iSCSI password

```
iscmcli resetiscsipwd -s <server> -c <new password>
```

### Description

This command resets an iSCSI password.

**-s:** Server name or IP address.

-c: New password (12-16 characters).

**Example**

```
iscmcli resetiscsipwd -s 172.16.222.22 -c password1234
```

NOTE: On AIX, the reset iSCSI password command does not automatically change the password on the server side. You must manually change the password on the server.

**Repair server connection**

```
iscmcli repairconn [-s <server>]
```

**Description**

This command repairs an iSCSI connection to all servers or specified server. Since iSCSI CHAP is recorded in a private IMA profile, the iSCSI initiator has no way to reconnect to an iSCSI target if the previous session is lost. The IMA service checks the state and reconnects every hour, if needed. This command repairs the connection any time it is needed.

-s: An option to specify a server name or IP address.

## Encryption key management commands

### Add a key

```
iscmcli keyadd -n <name> -c <secret phase>
```

#### Description

This command adds a key to IMA.

-n: The unique encryption key name (maximum 60 characters).

-c: Secret phase for this key (maximum 128 characters). This is the phrase that FileSafe uses to invoke encryption. Long, complicated phrases that include a mix of uppercase and lowercase letters, numbers, and punctuation marks are the most secure. The phrase is case-sensitive. You can re-create a key only if you remember both the key name and the secret phrase.

#### Example

```
iscmcli keyadd -n aa -c abc
```

### Delete a key

```
iscmcli keydel -n <name>
```

#### Description

This command deletes a key from IMA.

-n: The name of an existing encryption key.

#### Example

```
iscmcli keydel -n aa
```

### List all keys

```
iscmcli keylist
```

#### Description

This command lists all encryption keys that have been created on this machine.

### Export a key

```
iscmcli keyexport -n <name> [-n <name> ... ] -f <keyfile> -c <password>
```

#### Description

This command export a key to a file.

-n: Name of an existing encryption key to export. You can enter multiple key names.

-f: The name that should be given to the generated encryption key file, including the export destination path, in the format /path/filename.fsk.

-c: The password that must be provided in order to import the encryption key.

### Example

```
iscmcli keyexport -n aa -n bb -f c:\key -c 111
```

## Import a key

```
iscmcli keyimport -f <keyfile> -c <password>
```

### Description

This command imports a key from a file.

-f: The name of an exported encryption key, including the import source path, in the format /path/filename.fsk.

-c: The password that was associated with the encryption key when it was exported.

### Example

```
iscmcli keyimport -f c:\key -c pswd
```

## License management commands

### Add a license

```
iscmcli licadd -k <key code> -p <product code> [-i <skip activation>]
```

### Description

This command adds a license for a specified product.

-k: Key code.

-p: Product code (173 for SDM).

-i: An option to skip license activation.

### Example

```
iscmcli licadd -k XXXXXXXXXX -p 156 -i
```

## Get license information

```
iscmcli licget [-p <product code>] [-i <skip activation>]
```

### Description

This command gets all license information or specified license by product and attempts activation, if necessary.

-p: An optional product code.

-i: An option to skip license activation.

### Example

```
iscmcli licget -p 156
```

## Export a license

```
iscmcli licact_export -k <key code> -f <activation request file>
```

### Description

This command exports a license to a file in order to perform offline activation.

-k: Key code.

-f: Offline activation request file name. The file name can contain only the following characters "A-Z", "a-z", and "0-9" and must have a ".dat" extension.

### Example

```
iscmcli licact_export -k XXXXXXXX -f c:\offline_activate
```

## Import a license

```
iscmcli licact_import -f <activation reply file> [ -p <product code>]
```

### Description

This command imports an activation reply file to finish offline license activation.

-f: Offline activation reply file.

-p: An option to specify a product code.

### Example

```
iscmcli licact_import -f c:\offline_activate_reply
```

## Delete a license

```
iscmcli licdel -k <key code>
```

### Description

This command deletes a license for a specified product.

-k: Key code.

### Example

```
iscmcli licdel -k XXXXXXXXXX
```

## Print product codes

```
iscmcli productcode
```

### Description

This command prints each product code with its related product name.

## Task commands

Schedule, task, and holiday commands can be used together to perform functions on an as-needed basis. When you define a task, you can assign it a particular schedule. This schedule can be set to exclude holidays that you have defined.

### Create a schedule

```
iscmcli task scheduler_create_interval -n name -st starttime|now  
[-ed <end time>] [-h <hours>] [-m <minutes>] [-s <seconds>]  
[-eh <exclude_hours>] [-em <exclude_month>] [-emd <exclude_monthday>]  
[-ewd <exclude_weekday>] [-ih <is_exclude_holidays>] [-d <description>]
```

### Description

This command creates an IMA schedule that runs at regular intervals.

-n: Schedule name.

-st: Start time for this schedule. To start this schedule right now, specify "now".

-ed: An option to specify the end of this schedule.

-h: Hours interval (2=every two hours).

-m: Minutes interval.

-s: Seconds interval.

Note: You must specify either -h, -m, or -s.

-eh: An option to exclude specific hours.

-em: An option to exclude specific months.

-emd: An option to exclude specific days in a month.

-ewd: An option to exclude specific days in a week.

-ih: An option to exclude all holidays you have defined with the `task holiday_create` command.

-d: An optional description for this schedule.

### Examples

```
iscmcli task scheduler_create_interval -n myscheduler -st now -h 12 -m 30 -s 19 -eh 1 -em 3 -emd 12 -ewd 2 -d my_first_scheduler
```

```
iscmcli task scheduler_create_interval -n myscheduler2 -st "2008-11-21 11:20:59" -h 12 -d my_second_scheduler
```

### Create a daily schedule

```
iscmcli task scheduler_create_daily -n name -st starttime|now [-ed endtime] -ds days [-em exclude_months] [-emd exclude_monthdays] [-ewd exclude_weekdays] [-ih exclude_holidays[yes|no]] [-d description]
```

### Description

This command creates a daily IMA schedule.

-n: Schedule name.

-st: Start time for this schedule. To start this schedule right now, specify "now".

-ed: An option to specify the end of this schedule.

-ds: How often to run the schedule, in days (1=every day, 2=every two days, etc.).

-em: An option to exclude specific months.

-emd: An option to exclude specific days in a month.

-ewd: An option to exclude specific days in a week.

-ih: An option to exclude all holidays you have defined with the `task holiday_create` command.

-d: An optional description for this schedule.

**Example**

```
iscmcli task scheduler_create_daily -n myschedule3 -st now -ed "2010-06-01 08:10:00" -ds
1 -em 3 -emd 15 -ih yes -d "daily schedule"
```

**Create a weekly schedule**

```
iscmcli task scheduler_create_weekly -n name -st starttime|now
[-ed endtime] -ds days -wi week_interval
[-em exclude_months] [-emd exclude_monthdays]
[-ih exclude_holidays[yes|no]] [-d description]
```

**Description**

This command creates a weekly IMA schedule.

-n: Schedule name.

-st: Start time for this schedule. To start this schedule right now, specify "now".

-ed: An option to specify the end of this schedule.

-ds: Weekdays (1=Monday, 2=Tuesday, 3=Wednesday, etc.).

-wi: Weekly interval (1=every week, 2=every two weeks, etc..) Works in combination with -ds. For example “-ds 1 -wi 2” means run on Monday every two weeks and “-ds 3 -wi 1” means run every Wednesday.

-em: An option to exclude specific months.

-emd: An option to exclude specific days in a month.

-ih: An option to exclude all holidays you have defined with the task holiday\_create command.

-d: An optional description for this schedule.

**Example**

```
iscmcli task scheduler_create_weekly -n myschedule4 -st now -ds 3 -wi 1 -em 1 -emd 20 -ih
yes -d "weekly schedule"
```

**Create a monthly schedule**

```
iscmcli task scheduler_create_monthly -n name -st starttime|now
[-ed endtime] -ds days [-em exclude_months]
[-ewd exclude_weekdays] [-ih exclude_holidays[yes|no]]
[-d description]
```



**Description**

This command creates a monthly IMA schedule.

-n: Schedule name.

-st: Start time for this schedule. To start this schedule right now, specify "now".

-ed: An option to specify the end of this schedule.

-ds: Day of the month (i.e. 3=3rd day of the month).

-em: An option to exclude specific months.

-ewd: An option to exclude specific days in a week.

-ih: An option to exclude all holidays you have defined with the task holiday\_create command.

-d: An optional description for this schedule.

**Example**

```
iscmcli task scheduler_create_monthly -n myschedule5 -st now -ds "1,5,25-31" -em 12 -ewd 7
```

**Create a weekday of month schedule**

```
iscmcli task scheduler_create_weekdayofmonth -n name -st starttime|now
[-ed endtime] -w week -wd weekdays [-em exclude_months]
[-emd exclude_monthdays] [-ih exclude_holidays[yes|no]]
[-d description]
```

**Description**

This command creates an IMA schedule that runs on a specific day each month (First Friday, second Monday, etc).

-n: Schedule name.

-st: Start time for this schedule. To start this schedule right now, specify "now".

-ed: An option to specify the end of this schedule.

-w: Week of the month.

-wd: Weekdays (1=Monday, 2=Tuesday, 3=Wednesday, etc.). Works in combination with -w. For example "-w 1 -wd 5" means run on the first Friday every month and "-w 2 -wd 3" means run on the second Wednesday every month.

-em: An option to exclude specific months.

-emd: An option to exclude specific days in a month.

-ih: An option to exclude all holidays you have defined with the task holiday\_create command.

-d: An optional description for this schedule.

### Example

```
iscmcli task scheduler_create_weekdayofmonth -n myschedule6 -st now -w 1 -wd 5 -em 1 -emd 1-10
```

### Update a schedule

```
iscmcli task scheduler_update_interval -n name -st starttime|now
[-ed endtime] [-h hours] [-m minutes] [-s seconds]
[-eh exclude_hours] [-em exclude_months]
[-emd exclude_monthdays] [-ewd exclude_weekdays]
[-ih exclude_holidays[yes|no]] [-d description]
```

```
iscmcli task scheduler_update_daily -n name -st starttime|now
[-ed endtime] -ds days [-em exclude_months]
[-emd exclude_monthdays] [-ewd exclude_weekdays]
[-ih exclude_holidays[yes|no]] [-d description]
```

```
iscmcli task scheduler_update_weekly -n name -st starttime|now
[-ed endtime] -ds days -wi week_interval
[-em exclude_months] [-emd exclude_monthdays]
[-ih exclude_holidays[yes|no]] [-d description]
```

```
iscmcli task scheduler_update_monthly -n name -st starttime|now
[-ed endtime] -ds days [-em exclude_months]
[-ewd exclude_weekdays] [-ih exclude_holidays[yes|no]]
[-d description]
```

```
iscmcli task scheduler_update_weekdayofmonth -n name -st starttime|now
[-ed endtime] -w week -wd weekdays [-em exclude_months]
[-emd exclude_monthdays] [-ih exclude_holidays[yes|no]]
[-d description]
```

### Description

These commands update an existing IMA schedule. Refer to the appropriate section for a description of fields.

### Examples

```
iscmcli task scheduler_update_interval -n myschedule -st now -h 12 -m 30 -s 19 -eh 1 -em 3 -emd 12 -ewd 2 -d my_first_scheduler
```

```
iscmcli task scheduler_update_interval -n myschedule2 -st "2010-11-21 11:20:59" -h 12 -d my_second_scheduler
```

## Get schedule information

```
iscmcli task scheduler_get -n <scheduler_name>
```

### Description

This command gets specific schedule information.

-n: Schedule name.

### Example

```
iscmcli task scheduler_get -n myscheduler
```

## Get all schedule information

```
iscmcli task scheduler_get_list
```

### Description

This command retrieves all schedule information.

## Delete a schedule

```
iscmcli task scheduler_delete -n <schedule_name>
```

### Description

This command deletes a schedule.

-n: Schedule name.

### Example

```
iscmcli task scheduler_delete -n myscheduler2
```

## Create a task

```
iscmcli task task_create -n name -e <executable> [-p <parameter>] [-sp <stop_paramters>]  
[-stp <status_parameters>] [-c <currentdir>] [-d <description>] [-f <product_type>] [-s  
<scheduler_name> ... ]
```

### Description

This command creates a task in one or more schedules.

-n: Task name.

-e: Executable file name.

-p: Optional parameters to execute.

-sp: Optional parameters to execute to stop task.

-stp: Optional parameters to execute to get task status.

-c: An option to specify the current directory.

-d: An optional description for this task.

-f: Optional product type.

-s: An optional schedule(s) that should be bound to this task.

### Example

```
iscmcli task task_create -n mytask -e c:\run.exe -p run_param -s myschedule -s  
myschedule2
```

## Update a task

```
iscmcli task task_update -n name -e <executable> [-p <parameter>] [-sp <stop_paramters>]  
[-stp <status_parameters>] [-c <currentdir>] [-d <description>] [-f <product_type>]
```

### Description

This command updates an IMA task.

-n: Name of task.

-e: Executable file name.

-p: Optional parameters to execute.

-sp: Optional parameters to execute to stop task.

-stp: Optional parameters to execute to get task status.

-c: An option to specify the current directory.

-d: An optional description for this task.

-f: Optional product type.

### Example

```
iscmcli task task_update -n mytask -e c:\2.exe
```

## Get task information

```
iscmcli task task_get -n name
```

### Description

This command gets specific task information.

-n: Name of task.

### Example

```
iscmcli task task_get -n mytask
```

## Get all task information

```
iscmcli task task_get_list [-f <product_type>]
```

### Description

This command retrieves all task information.

-f: An option to get tasks that belong to a specific product name.

### Example

```
iscmcli task task_get_list
```

## Suspend a task

```
iscmcli task task_suspend -n name
```

### Description

This command suspends a task. Once suspended, the task will not run when the schedule is triggered.

-n: Name of task.

### Example

```
iscmcli task task_suspend -n mytask
```

## Resume a suspended task

```
iscmcli task task_resume -n name
```

### Description

This command resumes a suspended task.

-n: Name of task.

**Example**

```
iscmcli task task_resume -n mytask
```

**Run a task**

```
iscmcli task task_runnow -n name
```

**Description**

This command runs a task now.

-n: Name of task.

**Example**

```
iscmcli task task_runnow -n mytask
```

**Delete a task**

```
iscmcli task task_delete -n name
```

**Description**

This command delete an IMA task.

-n: Name of task.

**Example**

```
iscmcli task task_delete -n mytask
```

**Create a holiday**

```
iscmcli task holiday_create -n name [-m month] [-d day]
```

**Description**

This command creates a holiday. When you create a schedule, you can specify that all holidays should be excluded.

-n: Holiday name.

-m: Month.

-d: Day.

**Example**

```
iscmcli task holiday_create -n myholiday -m 2 -d 14
```

## Update a holiday

```
iscmcli task holiday_update -n name [-m month] [-d day]
```

### Description

This command updates an existing IMA holiday.

-n: Holiday name.

-m: Month.

-d: Day.

### Example

```
iscmcli task holiday_update -n myholiday -m 5 -d 20
```

## Get specific holiday information

```
iscmcli task holiday_get -n name
```

### Description

This command gets information about a specific IMA holiday.

-n: Holiday name.

### Example

```
iscmcli task holiday_get -n myholiday
```

## Get all holiday information

```
iscmcli task holiday_get_list
```

### Description

This command retrieves all holiday information.

### Example

```
iscmcli task holiday_get_list
```

## Delete a holiday

```
iscmcli task holiday_delete -n name
```

### Description

This command deletes an IMA holiday.

-n: Holiday name.

**Example**

```
iscmcli task holiday_delete -n myholiday
```

## CCM server commands

### Register with a CCM server

```
iscmcli ccm setccmserver -s <server_address>
```

**Description**

This command registers the client with a CCM server.

**Example**

```
iscmcli ccm setccmserver -s 172.16.6.50
```

**Sample output**

```
Server 172.16.6.50 was registered successfully.  
CCM Server: 172.16.6.50 (Host Name: IPStor50)  
Version    : 1.60 (Build 392)
```

### Un-register a CCM server

```
iscmcli ccm setccmserver -d
```

**Description**

This command un-registers the client from a CCM server, if the server exists.

**Example**

```
iscmcli ccm setccmserver -d
```

**Sample output**

```
Server was unregistered successfully.
```

### List CCM servers

```
iscmcli ccm listccmserver
```

**Description**

This command lists the CCM server.



**Example**

```
iscmcli ccm listccmserver
```

**Sample output**

```
CCM Server: 172.16.6.50 (Host Name: IPStor50)  
Version    : 1.60 (Build 392)
```

# Port Usage

IMA uses the following ports for incoming requests. Network firewalls should allow access through these ports for successful communications. In order to maintain a high level of security, you should disable all unnecessary ports. For Concerto appliances, ports marked ● are enabled by default.

Protocol	Port	Usage
HTTP	80 ●	Standard HTTP port to access Concerto for online registration of license key codes. Note: Port 80 is used to send license material to the Concerto license server for registration. The registration reply is then sent back using HTTP protocol, where a local random port number is used on the server in the same way as Web-based pages. The firewall does not block the reply if the 'established bit' is set to let established traffic in.
TCP	11762	Secure RPC communication port between the client host and the server for management functions such as snapshot notification, configuration, and retrieval of client information.

# Troubleshooting

## Error codes

For any error not listed in this table, contact Violin Memory Customer Support.

Number	Text/Action
819	The iSCSI portal could not be added.
820	The iSCSI target list could not be retrieved.
821	Login to the iSCSI target failed.
822	The iSCSI target could not be found.
823	The properties could not be retrieved.
824	The device WWID does not match.
825	The device does not support WWID.
826	The device WWID matches.
827	The value is invalid.
828	The iSCSI authentication information could not be saved.
829	The specified disk ID could not be found.
830	The server name could not be retrieved.
831	The iSCSI initiator name is invalid.
832	Install Microsoft iSCSI Initiator software to use iSCSI protocol.
833	Invalid parameters.
834	You must log off the corresponding iSCSI target and remove the iSCSI portal using Microsoft iSCSI Initiator before you can remove the server.
835	The specified server has already been added.
836	The maximum number of supported servers has been reached. You must remove one of the listed servers to add another one.
837	The server shared secret could not be retrieved
838	The iSCSI initiator name could not be set.
839	The iSCSI initiator name could not be retrieved.
840	The server was not found. Make sure the IP address is correct or the server name can be resolved by your DNS.
841	Loading the snapshot agent information failed.
842	Unknown message.
844	The server type could not be retrieved.

Number	Text/Action
845	The iSCSI CHAP information could not be retrieved from the registry.
846	The server list could not be refreshed.
847	Server authentication failed.
848	A fatal error occurred. Review the logs to identify the problem.
849	The specified server does not support this operation.
850	A fatal memory error has occurred.
851	The iSCSI HBA setting of the server could not be retrieved.
852	The iSCSI HBA for the server could not be set.
853	The iSCSI HBA list could not be retrieved.
868	The disk information could not be retrieved.
869	The serial numbers do not match.
870	The disk does not have a serial number.
871	The serial numbers match.
872	The server version could not be retrieved.
873	The iSCSI extended settings of the registered server could not be retrieved.
874	The iSCSI extended settings for the registered server could not be set.
875	The specified iSCSI name contains invalid characters or is too long.
876	The specified file does not exist.
898	The caller did not initialize SDM API library bus using iscmInitLib and iscmFiniLib functions.
899	Failed to get SDM X-ray.
900	There is not enough memory.
901	Not support the function on this platform.
903	SDM service is not running now.
918	Connection to the server failed.
923	The client could not be authenticated.
924	Client authentication with Windows domain failed. Re-enter password and make sure that the server is in the Windows domain.
925	The shared secret could not be reset.
926	The "root" account could not be used to add the server.
928	The client could not be added to the server.

Number	Text/Action
929	The client with Windows domain authentication could not be added.
930	The server was not found. Make sure the IP address is correct or the server name can be resolved by your DNS.
938	The protocol list could not be retrieved.
948	The iSCSI CHAP secret could not be reset.
958	Disk allocation failed.
959	The specified disk size must be less than 2TB.
963	The disk could not be expanded.
968	The protocol could not be enabled.
973	The client devices could not be retrieved.
974	The client device could not be deleted.
978	The iSCSI properties could not be set.
979	Make sure iSCSI Initiator service is running.
988	The Fibre Channel properties could not be set.
989	A Fibre Channel HBA with HBA API support could not be found on your computer.
990	A Fibre Channel HBA port could not be found.
998	All valid connections could not be repaired.
999	The application controller could not be executed.
1000	The database snapshot agent could not be executed.
1001	The configuration file for the application could not be created.
1002	An application could not be added to the configuration file.
1003	An application could not be removed from the configuration file.
1004	Clean up of an application configuration file failed.
1005	The specified application could not be found in the registration list.
1008	The storage server software is not properly licensed.
1009	The iSCSI option is not enabled on the server.
1010	A backup storage pool is not available or there is not enough space on the server.
1011	The client iSCSI protocol is not enabled on the server. Enable the iSCSI protocol and try again.
1012	The Fibre Channel option is not enabled on the server.
1013	The client Fibre Channel protocol is not enabled on the server.

Number	Text/Action
1014	Fibre Channel protocol is not supported on iSCSI Storage Server.
1015	There is not enough storage space for a snapshot area on the server.
1016	The server does not support Windows domain authentication.
1017	This client is not the owner of the specified device.
1018	This client is not the creator of the specified device.
1019	The incorrect protocol has been specified for this device.
1020	This client does not have write access to the device.
1021	The specified device is not a valid Concerto SAN resource.
1022	The specified device has MemClones.
1023	The specified device is in a snapshot group.
1024	The specified device has a replica.
1025	The snapshot of the specified device is being copied.
1026	The specified device enabled the backup option.
1027	The specified device enabled the MemSnap option.
1028	The MemSnap of the specified device is being copied.
1029	The current version of the storage server software does not support SDM.
1030	The storage server encountered an error. Check the server.
1031	MemSnap is not licensed on the server.
1032	The client storage space quota has been exceeded.
1033	The user is not assigned to any storage pool on the server. Contact the server administrator to assign a storage pool to the user.
1034	The server does not have any storage pool specified for this application. Contact the server administrator to define storage pools using the corresponding application tag.
1035	A critical error occurred on the server during storage allocation process. Contact the server administrator to correct the situation then try again.
1036	The server does not have any storage pool specified for resource allocation. Contact the server administrator to get storage pools of the type "Storage".
1037	The server does not have any storage pool specified for Snapshot resource allocation. Contact the server administrator to get storage pools of the type "Snapshot".
1038	This server does not support this feature. Upgrade the server to the latest version.
1039	The iSCSI initiator name has been assigned to another client.
1040	The maximum number of connections on server has reached.

Number	Text/Action
1041	The server does not have any storage pool specified for CDP journal allocation. Contact the server administrator to get storage pools of the type "Journal".
1042	There is not enough storage space for a CDP journal on the server.
1043	The WWPN has been assigned to another client.
1044	Can not add client using Concerto admin user account.
1058	Failed to create snapshot group.
1059	Failed to get information about snapshot group.
1060	Failed to join snapshot group.
1061	Failed to leave snapshot group.
1062	Failed to enable MemSnap option for snapshot group.
1063	Failed to disable MemSnap option for snapshot group.
1066	The information about the available storage pools on the server could not be retrieved.
1067	Cannot change resource ACL.
1068	The license could not be added.
1069	The license could not be retrieved.
1070	The product license could not be verified on the server.
1118	The specified key name already exists.
1119	The key could not be found.
1120	There is an invalid parameter.
1121	An error occurred in encryption/decryption.
1122	An error occurred when accessing the repository.
1123	There is not enough memory.
1124	The maximum number of keys has been reached.
1125	The password is incorrect.
1126	The environment variable "ISHOME" could not be found.
1128	The key repository file could not be opened.
1129	The key repository file could not be read.
1130	Write operation to the key repository file failed.
1131	System call failed.
1132	The output buffer is too small.

Number	Text/Action
1133	The operation on the key repository file failed; automatic rollback to the previous state could not be done. Manually copy keys.dat.prev in \$ISHOME/etc/\$HOSTNAME to keys.dat.
1134	The current key repository file is corrupted. Manually copy keys.dat.prev in \$ISHOME/etc/\$HOSTNAME to keys.dat.
1135	The export key file could not be opened. Make sure there is not already a read-only export file for this key.
1136	The export key file could not be read. Make sure it is a valid export key file.
1137	Write operation to the export key file failed.
1138	The version of export key file is not correct.
1168	An invalid algorithm was specified.
1169	The input size is not a multiple of 16 as required.
1170	The output buffer is too small.
1171	There is not enough memory available for cryptographic operation.
1218	A shared secret could not be generated for the peer.
1219	Connection to the peer failed.
1220	The authentication secret for the peer could not be retrieved.
1221	The action could not be performed on the peer.
1222	The host information of the remote peer could not be retrieved
1223	The local host could not register to the server.
1224	The remote peer could not register host to the server.
1225	The protocol for the local host could not be registered.
1226	The protocol for the remote peer host could not be registered.
1227	The server list on the local host could not be retrieved.
1228	The server list on the remote peer host could not be retrieved.
1229	Storage space allocation for the local host failed.
1230	Storage space allocation for the remote peer host failed.
1231	Connection to the remote peer host failed.
1232	The specified file already exists.
1233	The file could not be created.
1234	Data could not be read from the file.
1235	Writing data to the file failed.



Number	Text/Action
1236	The file could not be deleted.
1237	The true name from the peer partner node could not be retrieved.
1318	The cluster information could not be enumerated.
1319	The cluster could not be opened.
1320	The cluster enumerator could not be opened.
1321	The cluster quorum resource could not be retrieved.
1322	The cluster group could not be opened.
1323	The cluster group enumerator could not be opened.
1324	The cluster resource could not be created.
1325	The special quorum resource could not be found.
1326	Cluster information query failed.
1327	Cluster registry key could not be opened.
1328	Cluster registry key could not be found.
1329	Cluster information could not be retrieved.
1330	Resource type in the cluster could not be created.
1331	Resource type from the cluster could not be deleted.
1332	At least one resource in the group has failed.
1333	At least one resource in the group is pending but no failure has been detected yet.
1334	All resources in the group are online.
1335	At least one resource in the group is online. No resource is pending or failed.
1336	All resources in the group are offline or there are no resources in the group.
1337	The state of the resources in the group is unknown.
1338	The resource or one of its dependent online resources returned an error (ERROR_IO_PENDING).
1339	The resource or one of its dependent online resources returned an error (ERROR_IO_PENDING).
1340	The offline or failed resource could not become online.
1341	Cluster resource could not be opened.
1342	The online or failed resource could not become offline.
1343	The resource can be dependent on another resource.
1344	Dependency between two resources could not be removed.
1345	Cluster resource enumerator could not be opened.

Number	Text/Action
1346	The cluster group could not be found.
1347	An operation affecting a resource could not be initiated.
1348	Adding/removing dependency for cluster resource failed.
1349	The cluster resource disk information could not be retrieved.
1350	The disk size information for the cluster resource could not be retrieved.
1351	Dependency between two resources could not be set up.
1417	The scheduler encountered a fatal error.
1420	Scheduler could not be started.
1421	Scheduler could not be stopped.
1422	The task does not exist.
1423	The scheduler does not exist.
1426	Scheduler has already been started.
1427	The maintenance thread of Scheduler could not started.
1431	The scheduled job could not be retrieved.
1436	The time schedule could not be retrieved.
1441	The holiday definition could not be retrieved.
1445	The selected item already exists.
1451	The schedule could not be exported.
1452	The schedule could not be imported.
1456	The holiday does not exist.
1457	The task already exists.
1458	The scheduler already exists.
1459	The holiday already exists.
1460	Task configuration file(s) could not be created.
1461	Task configuration file(s) could not be updated.
1462	Task configuration file(s) could not be read.
1463	Task configuration file(s) could not be locked.
1464	The scheduler is being used by a task so it cannot be deleted.
1518	This key code is not for the application you are using. Enter a correct key code.
1519	This key code is not a valid key code. Enter a valid key code.

Number	Text/Action
1520	The activation signature is invalid. It may not match the local hardware information.
1521	The activation signature file is invalid. It may be corrupted or is made for another product.
1522	The license could not be activated because your unique hardware information could not be retrieved. Make sure your network adapter is enabled.
1523	The activation server could not be reached. If your Internet connection is temporarily down, your license will be activated the next time you run this product with an Internet connection. If you do not have an Internet connection on this computer, you must perform offline activation.
1524	The key code is not recorded on the activation server. Make sure your key code is correct and try again.
1525	This key code was already activated with other hardware. Export your current license data and e-mail the file to vate.Keycode@Concerto.com, indicating that your hardware has changed.
1526	The key code could not be set.
1527	The key code could not be retrieved.
1528	The key code could not be removed.
1529	The activation material could not be exported to the file
1530	The activation signature could not be saved.
1531	The license repository could not be created.
1532	The license repository could not be opened.
1533	Registration on the activation server failed.
1534	The activation signature associated with the key code could not be retrieved.
1535	The activation server configuration is invalid.
1536	The activation code could not be imported.
1537	The unique data from the license repository could not be retrieved.
1538	The system class could not be retrieved.
1539	License registration failed.
1540	This key code does not correspond to the current OS class. Enter a valid key code for this OS.
1541	The connection count is invalid.
1542	The hardware information in activation signature file does not match the local hardware.
1568	Failed to perform the VSC operation.
1569	The VSC operation is time out.
1570	Invalid function.
1571	The VSC operation is canceled by server.

Number	Text/Action
1572	The argument is too big.
1573	Failed to send the SCSI command.
1574	The server is busy.
1575	Invalid result.
1618	The commands could not be executed.
1619	The command list from the request script could not be generated.
1620	The request script is not valid.
1621	The digital signature is not valid.
1628	The upgrade statue for the product could not be verified.
1629	The upgrade check server could not be reached.
1630	The response from the upgrade check server could not be retrieved.
1718	The password of built-in account could not be generated.
1719	The built-in account could not be created.
1720	The built-in account could not be deleted.
1721	The built-in account could not be found.
1722	The username of built-in account could not be generated.
1818	iscmccmlib is not initialized.
1819	CCM dispatcher module is not initialized.
1918	The snapshot group is existing.
1919	The snapshot group doss not existing.
1920	The snapshot group contains member(s).
1921	The snapshot group's CDP is enabled.
1922	The snapshot group has same VID member.
1923	The snapshot group join member failed.
1924	The snapshot group leave member failed.
1925	The snapshot group does not contain this member.
1926	Failed to delete snapshot group.
1927	Failed to create snapshot group.

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