



The main title of the document is "imageSAN™". The word "image" is in a blue, italicized, sans-serif font, and "SAN" is in a larger, bold, black, sans-serif font. A small "TM" trademark symbol is to the right of "SAN". To the left of "image" is a blue sunburst icon.

User's Guide

for Mac OS X

December 5, 2002

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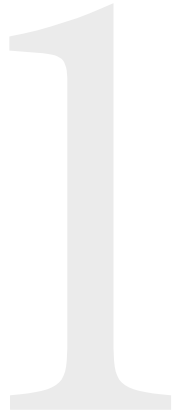
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Introducing ImageSAN

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ImageSAN Software

In today's digital world, the amount of storage required to support each new advance is constantly growing. Storage costs are surpassing both resources and budget, adding more pressure to an evolving environment. With the introduction of new architectures, such as Network-Attached Storage and Storage Area Networks, businesses can finally obtain cheaper, more scalable alternatives for their ever-growing data requirements.

Designed to leverage the benefits of the SAN architecture, ImageSAN OSX presents the tools for a superior networking. An unique approach to arbitrating data, it provides a substantial boost in performance and reliability.

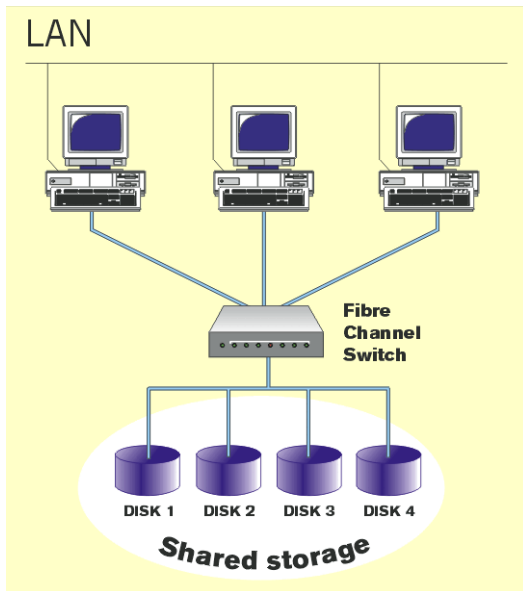
ImageSAN OSX offers a wide and flexible range of application support delivering a file sharing solution for your SAN.

Architectural Overview

Created specifically to work with Mac OS X operating system, ImageSAN OSX works transparently to the users and applications accessing the shared storage. Files located on the shared storage are available for all connected workstations directly over the Fibre Channel.

The typical ImageSAN OSX configuration consists of workstations connected in a Local Area Network (LAN) and a shared storage. The workstations and the storage are connected via Fibre Channel and a Fibre Channel switch. The LAN connection is used for metadata exchange between the master and slave computers. The real data located on the shared storage is accessed directly through the Fibre Channel connection.

You usually choose one of the computers in the LAN to manage the shared volumes. Thus you assign a master to the SAN volumes (see “Volume Master” on page 7). It supervises these volumes and takes care of protecting data from corruption when multiple computers, called slaves access the shared storage (see “Volume Slave” on page 7).



When a slave computer tries to access a file located on the shared storage, for example, the master provides it with service data necessary for the operation to be successful. This metadata travels over the LAN. Real data, however, is transferred over the Fibre Channel benefitting from the higher performance of this type of media.

Concepts and Terminology

The following concepts and terminology are used in this guide:

Volume Master

A *volume master* or *master* is a workstation connected to the Storage Area Network (SAN) that supervises a specific volume and takes care of protecting its data. The master workstation exports, or shares, SAN volumes it is assigned to and thus allows other ImageSAN machines to access the volumes. The master processes all metadata requests from the slave workstations and provides the necessary information to them so they can access the data stored on the shared volume(s) directly over the Fibre Channel.

The master computer always accesses the SAN volumes directly over the Fibre Channel, while the other computers access the volumes over the Fibre Channel only if ImageSAN OSX is activated. For more information about activating ImageSAN OSX, see “Activating ImageSAN OSX” on page 15.

Volume Slave

In an ImageSAN network, a single workstation, called *master*, supervises the volume(s) on the shared storage. When the other ImageSAN machines try to access the data on the shared volumes, they send a request to the *volume master*. As all these machines depend on the permission and information provided by the master, they are called *volume slaves* or *slaves*.

The slave workstations send metadata requests to the master over the Local Area Network (LAN) but access data on the shared storage directly over the Fibre Channel.

Note: A slave workstation accesses the shared storage over the LAN if ImageSAN has not been activated on it while the master computer always accesses the SAN volumes directly over the Fibre Channel. If ImageSAN OSX master is not licensed yet, slave computers cannot connect to it and do not have access to SAN volumes.

Each volume can have a single *master* and multiple slave workstations connected to it.

Metadata Requests

Metadata is data about data. For example, the file size, its title, the physical location of a file on a disk, etc. constitute the file metadata.

In the ImageSAN network, when a slave workstation tries to access a file on the shared storage, it sends a query, or *metadata request*, to the master of a specific volume about the exact location of the file on the physical disks. The master workstation provides the requested metadata and the slave accesses the file.

All metadata traffic - requests and replies - goes over the LAN. The real data, however, travels over the Fibre Channel.

Public Volume

A *public volume* is a volume on the shared storage which can be mounted and its data is protected by ImageSAN. Public volumes are shared between all ImageSAN workstations.

A public volume is set to Public Master mode on the machine which supervises it, and to Public Slave mode on the other machines in the network.

When you install ImageSAN on a given machine, you specify which volumes are to be mounted by setting them to different modes - Public, Private, or Not Available. For details about installing ImageSAN, see “Installing and Uninstalling ImageSAN OSX” on page 12.

To see how to change the state of a volume, refer to “Setting Volumes to Public Slave Mode” on page 29.

Private Volume

A *private volume* is a volume for which ImageSAN does not provide data protection. The operating system takes care for mounting and managing this volumes. It is accessed from the computer as if ImageSAN OSX has not been installed on it.

Set a volume to private mode when you do not want to share the data on it with other Image SAN users.

Warning: Be careful when using the Private volume mode. Before you make a volume Private on one workstation, make sure that it is in Not Available mode on all other ImageSAN workstations. Otherwise data corruption is possible since ImageSAN does not protect Private volumes.

To see how to set a volume to private mode, refer to “Setting Volumes to Private Mode” on page 30.

Not Available Volume

A volume in *not available* mode is a volume that is not mounted by the system, but the data on it is protected by ImageSAN as the users cannot introduce changes to it.

When you set a SAN volume to private mode on a one of the computers in your ImageSAN network, on all other computers connected to the SAN you must set the volume to Not Available.

To see how to set a volume to Not Available mode, refer to “Setting Volumes to “Not Available” Mode” on page 30.

NFS Startup Item

Startup items are procedures run during the last phase of booting to prepare a MAC OS X system for normal operating.

The NFS startup item is one of several startup items available in the Mac OS X. It starts and stops the Network File System. When modifying the NFS startup item during ImageSAN installation, you set it to activate the Network File System every time the Mac OS X is started. The Network File System should be running for ImageSAN OSX to work properly.

You can modify the NFS startup item while performing an ImageSAN OSX installation.

For details on modifying NFS Startup item, see “Installing and Uninstalling ImageSAN OSX” on page 12.

System Requirements

Each system on your SAN must meet the following requirements:

Each volume in the SAN should be formatted to work with the *Extended Hierarchical File System* (HFS+).

The following ports - ImageSAN port (8100), Portmapper port (111) and NFS port (2049), which are automatically added to your Firewall database during installation of ImageSAN, should be allowed.

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Installing and Uninstalling ImageSAN OSX

This section contains a detailed description of the steps and procedures for installing and uninstalling ImageSAN OSX.

Important: You should install ImageSAN OSX on all workstations connected to the shared storage. ImageSAN OSX will not be able to work properly and fatal errors may occur on the shared storage disks if there is a network machine that sees the shared storage volumes but does not have ImageSAN OSX installed on it.

Prerequisites

Before you install ImageSAN OSX on any workstation, make sure that:

- All workstations are running Mac OS X (Jaguar) operating system.

- On each workstation, an ATTO Express PCIFC 2300 Host Bus Adapter (HBA) is properly installed.

- The SAN switch and all drives are set up. Volumes are formatted using HFS+.

- All workstations are connected to the storage and see the storage volumes.

- All workstations are connected to the same segment of the Local Area Network (LAN)

- Each computer has a unique IP address and is able to ping the other computers in the LAN segment.

Note: Configuration of workstations connected using a crossover cable is not supported.

Installing ImageSAN OSX

In a typical ImageSAN OSX configuration there is only one machine serving as a master to the shared

volumes and all other machines are set to be slaves. That is why it is highly recommended to begin with installation of ImageSAN OSX on the machine you have chosen to be master, making sure all other machines are shut down and only after that proceed with ImageSAN OSX installation on slave machines.

During installation you can choose which volumes of the shared storage to be mounted by setting them to different modes (see “Concepts and Terminology” on page 7).

Note: *The installation of ImageSAN OSX requires that you restart your computer after completing it.*

Install ImageSAN OSX on one workstation at a time starting with the volumes’ master.

Important: *The master computer should be started with ImageSAN OSX running when installing and restarting ImageSAN OSX slave workstations.*

To install ImageSAN OSX on a master machine:

1. **Make sure all other computers in the network are shut down.**
2. **In the Finder window, browse for and double-click the `ImgSANInstall` file.**
The ImageSAN Setup dialog appears.
3. **In the ImageSAN Setup dialog, click Next.**
4. **Click the Authorize button to authenticate you have administrative rights for this machine.**
The Authenticate dialog appears.
5. **Enter the user name and password or phrase and click OK.**
6. **In the ImageSAN Setup dialog click Next.**
7. **Select which volumes to mount by setting them to Public Master, Private or Not Available, and click Next.**

Important: *If any of your local disks appears as one of the volumes listed in the Setup dialog, set it to Private mode.*

Tip: *To set all volumes to one and the same mode with a single mouse click, use the Set All Volumes To box to choose the desired mode.*

8. **Enable the “Modify startup item” box and click Next.**

Warning: *Choosing ‘Do not modify NFS Startup item’ is not recommended. Select this option only if you are very advanced user and you are sure you can manually modify all startup items in the system. Choosing this option does not guarantee the proper functionality of Image SAN OSX.*

9. **Choose whether to allow ImageSAN ports (ImageSAN port - 8100, Portmapper port - 111 and NFS port - 2049) in your firewall database and click Next.**

Note: *These ports should be allowed in your firewall or the firewall should be disabled in order ImageSAN OSX to work properly.*

10. **Enable the “Always start utility at login time” check box if you want to start the Graphic User Interface (GUI) utility of ImageSAN OSX automatically at every login, and click Next.**
11. **To complete the installation process, choose to restart your computer when prompted, and click Finish.**
The computer restarts.

To install ImageSAN OSX on a slave machine:

1. **Make sure that only the master of the volumes and machines running ImageSAN OSX are turned on.**
2. **In the Finder window, browse for and double-click the `ImgSANInstall` file.**
The ImageSAN Setup dialog appears.
3. **In the ImageSAN Setup dialog, click Next.**

2 Installing and Uninstalling ImageSAN

4. **Click the Authorize button to authenticate you have administrative rights for this machine.**

The Authenticate dialog appears.

5. Enter the user name and password or phrase and click OK.
6. In the ImageSAN Setup dialog click Next.
7. Select which volumes to mount by setting them to Public Slave, Private or Not Available mode.

Important: *If any of your local disks appears as one of the volumes listed in the Setup dialog, set it to Private mode.*

Tip: *To set all volumes to one and the same mode with a single mouse click, use the Set All Volumes To box to choose the desired mode.*

8. (optional) Select the Enable Security checkbox if you want to configure the security settings now, and click Next.

The Security Settings dialog appears.

For more information about configuring the security settings, refer to “Enabling ImageSAN OSX Security” on page 33

Note: *If you do not configure any Security Settings during installation or later ImageSAN OSX operates with no security and all users are able to browse and use all data on the share d storage.*

9. Enable the “Modify startup item” box and click Next.

Warning: *Choosing ‘Do not modify NFS Startup item’ is not recommended. Select this option only if you are very advanced user and you are sure you can manually modify all startup items in the system. Choosing this option does not guarantee the proper functionality of Image SAN OSX.*

10. Choose whether to allow ImageSAN ports (ImageSAN port - 8100, Portmapper port - 111 and NFS port - 2049) in your firewall database and click Next.

Note: *These ports should be allowed in your firewall or the firewall should be disabled in order ImageSAN OSX to work properly.*

11. Enable the “Always start utility at login time” check box if you want to start the Graphic User Interface (GUI) utility of ImageSAN OSX automatically at every login, and click Next.
12. To complete the installation process, choose to restart your computer when prompted, and click Finish.

The computer restarts.

Uninstalling ImageSAN OSX

The procedures for uninstalling ImageSAN OSX are the same for each workstation connected to the Storage Area Network (SAN).

Note: *It is recommended to shut down all slave workstations, when uninstalling ImageSAN OSX on the master machine. If you want to remove ImageSAN OSX from all your computers, first uninstall it from all slave computers, shut them down and only then remove ImageSAN OSX from the volumes master.*

To uninstall ImageSAN OSX:

1. In the Finder window, browse for and double-click ImageSANInstall file.
The ImageSAN Setup dialog appears.
2. In the ImageSAN Setup dialog, enable the “Remove ImageSAN” check box and click Next.
3. Press Authorize to authorize setup with administrative privileges.
The Authenticate dialog appears.
4. Enter the user name and password or phrase and click OK.
5. Choose to restart the computer when prompted and click Finish.

Warning: *Fatal errors may occur on the shared storage disks if more than one workstation sees them and have*

access to them, but does not have ImageSAN OSX installed.

Activating ImageSAN OSX

After installing ImageSAN OSX on your computer, you need to activate the product in order to achieve the performance your SAN offers.

As long as your copy of ImageSAN on a slave machine is not activated, all data is redirected across the Local Area Network (LAN). When ImageSAN is not activated on a master machine all slave machines cannot see the shared storage volumes.

There are three types of ImageSAN OSX licenses - *Evaluation, Commercial* and *NFR (Not For Resale)*.

If you have installed an evaluation copy of ImageSAN OSX, its license expires 30 days after activation on the licensing server. You will be notified that your evaluation copy has expired. After that period all data will be redirected across the Local Area Network (LAN).

Important: If an evaluation copy of ImageSAN OSX has been installed on a master machine, after it expires, only the master machine will see and have access to the shared storage volumes.

To activate ImageSAN:

1. In the ImageSAN application window, choose **ImageSAN | About**.
The About ImageSAN dialog appears.
2. On the dialog, click **Activate**.
The Activation dialog appears.
3. In the Activation Key box, type the Activation key generated for your copy of ImageSAN.
4. Click **OK**.
5. In About ImageSAN dialog, click **OK**.

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Getting Started

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Starting and Quitting ImageSAN OSX

If installed, ImageSAN OSX starts automatically each time you log in to your workstation and should always be running.

Displaying the ImageSAN OSX icon:

When you log in to the computer, the ImageSAN OSX icon appears on the Dock if you have enabled The Graphic Utility check box during installation.

To display the ImageSAN OSX icon on the Dock:

In the Finder window go to Applications | Utilities folder and double-click ImageSAN.

The ImageSAN OSX icon appears on the Dock.

To keep the ImageSAN OSX icon on the Dock:

Control-click ImageSAN OSX icon on the Dock and select Keep In Dock.

By quitting ImageSAN OSX you only exit the Graphic User Interface utility, not the application itself. After quitting ImageSAN OSX, the application's icon disappears from the Dock. However, you can still access the SAN volumes but you cannot change any of the ImageSAN settings until you start the GUI application.

To quit ImageSAN OSX:

Do one of the following:

In the ImageSAN OSX window, choose ImageSAN | Quit ImageSAN

Control-click the ImageSAN icon on the Dock and choose Quit.

Displaying ImageSAN OSX Window

Use ImageSAN OSX window to specify the volumes that you want ImageSAN to manage and to configure different ImageSAN settings.

To display ImageSAN OSX window:
 Click on the ImageSAN OSX icon on the Dock.
 The ImageSAN OSX window appears.


Note: *If the ImageSAN icon is not on the Dock, refer to "Starting and Quitting ImageSAN OSX" on page 18.*

ImageSAN User Interface





This section describes the main interface elements of ImageSAN OSX.

ImageSAN OSX Window

ImageSAN OSX window displays all volumes of the shared storage to which your computer is connected via the Fibre Channel. Each volume in the window is represented by an icon. The appearance of the volumes' icons may differ depending on the mode the volumes are set to on your computer:

Icon	Description
	An icon with an ImageSAN logo on it designates that the volume is set to either Public Master or Public Slave mode on the machine. For more information about this volume type, see "Public Volume" on page 8

Displaying ImageSAN OSX Window

Icon	Description
	A standard volume icon, without ImageSAN logo on it designates that the volume is set to Private mode. For more information about this volume type, see "Private Volume" on page 8.
	A standard volume icon but slightly transparent, without ImageSAN logo on it designates that the volume is set to Not Available mode. For more information about this volume type, see "Not Available Volume" on page 8.
	A broken volume icon designates that there is an error on the volume. For example, a broken icon appears when the volume's master cannot be found.
	An Attention Sign on the icon designates that the volume settings have changed but the changes have not been applied yet.

Control-clicking an icon in the ImageSAN OSX window displays the context menu for the volume. There you can view the mode to which the volume is set and also change some of its settings.

If you have selected a volume in the ImageSAN OSX window you can view its details in the right side of the window:

Mode — This field shows you the current mode to which the volume is set on your computer.

Size — Displays the size of the selected volume in GB.

State — shows you if all the changes made to this volume have been applied successfully.

Note: When there are changes that could not be applied, the text Error appears in this field. Clicking on the Details button beside displays details about the system failure.

In the right side of the ImageSAN OSX window below the ImageSAN icon you can see the IP address which identifies your computer among the other ImageSAN computers in the network.

For more details about changing the IP address of your machine refer to “Managing IP Addresses” on page 33

Besides, activation information is displayed indicating if your copy is activated and the type of the license used (Commercial, Evaluation or NFR).

In the ImageSAN OSX window there are also three buttons:

Authorize/Unauthorize — This button allows you to quickly enter or exit an authorized ImageSAN OSX session. Its name changes depending on the type of session you are working in.

Refresh — Use to update the information about all elements displayed in the ImageSAN OSX window. If any changes have been introduced in the ImageSAN OSX volumes, but have not been applied yet, after clicking the Refresh button you will be notified that volume settings have changed and will be asked whether you want to discard the changes or not.

Close — This button closes the ImageSAN OSX window.

Note: Closing the ImageSAN OSX window does not mean you have exited the authorized session. In order to exit an authorized session you have to click the Unauthorize button.

ImageSAN OSX Dialogs

This section describes all ImageSAN dialogs and explains the options they provide.

Volume Info Dialog

You can use the Volume Info dialog to view or configure different volume settings.

To display the Volume Info dialog do one of the following:

In the ImageSAN OSX window, double-click a volume's icon.

In the ImageSAN OSX window, control-click a selected volume and choose Get Info.

In ImageSAN window select a volume and choose Volume | Get Info.

Note: The Volume Info dialog cannot be displayed if no volume has been selected in the ImageSAN OSX window.

The Volume Info dialog provides the following information:

Mode — Displays the mode (Private, Public Master, Public Slave or Not Available) to which the selected volume is set on your computer and allows you to change it to another mode.

Master — Displays the IP address of the selected volume's master.

Previous Mode — Shows you the previous mode to which the volume has been set on your computer.

Note: Previous mode field keeps track of the changes only if they have not been applied.

Size — Displays the size of the selected volume in GB.

Device — Displays the disk groups from which the volume is created.

Type — Displays the type of the File System to which the volumes are formatted.

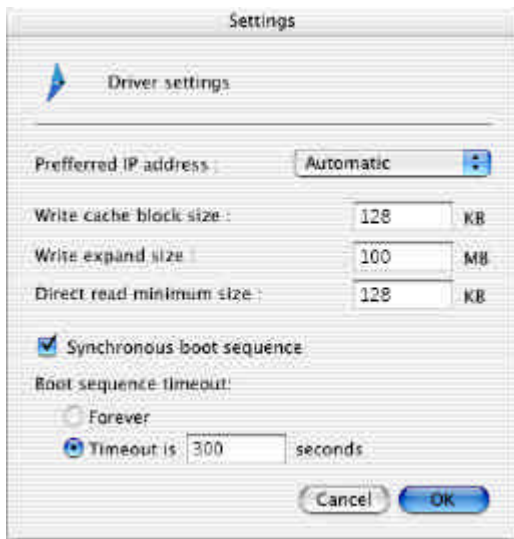
Note: For ImageSAN OS X to recognize a volume it should be formatted using HFS+. This field should always contain the text "HFS+".

ImageSAN Driver Settings Dialog

Use ImageSAN Driver Settings dialog to configure SAN options for the computer you are logged in to.

To display ImageSAN Driver Settings dialog:

In the ImageSAN window, choose Settings | Driver Settings.



The Driver Settings dialog provides the following options:

Preferred IP address — Allows you to select the preferred synchronization interface card, which is identified by an IP address. If you have more than one network adapters on your workstation, you should

select the one which connects the computer to the other ImageSAN computers. You can allow ImageSAN to automatically select the IP address to use for communication with the other SAN-connected computers or to select a preferred IP address from the drop-down list.

Write Cache Block Size — Displays the size in KB. When applications or the system write blocks with a size below the one specified here, the information is stored on the cache instead of on the disks. When the write cache is full, its stored data is transmitted to the disks in one whole bulk. The default Write Cache Size is set to 128 Kb, which can be changed locally for each workstation.

Write Expand Size — Displays size in MB. Use to adjust the size of the buffer to be allocated on a SAN drive when write operation is performed. When an application reaches the write expand size while performing a write operation, a new buffer with the specified size is allocated on the SAN drive.

Direct Read Minimum Size — Displays the size in KB. When a slave workstation requests a file with size below the specified here the file is delivered to the requestor over the LAN instead of the Fibre Channel. The default Direct Read Minimum Size is set to 128 Kb, which can be changed locally for each workstation.

Synchronous Boot Sequence — Enable if you want to prevent the starting of the operating system before the shared storage volumes have been mounted on your workstation. Do not enable (asynchronous boot sequence) to allow your workstation to mount the shared storage volumes after the operating system has been started.

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Forever — enable to set unlimited duration of the asynchronous boot sequence. This field is not active if you have selected synchronous boot sequence.

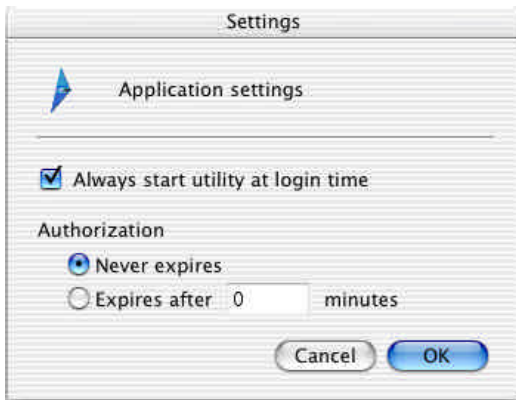
Timeout is — Use to set the duration in seconds during which your workstation to attempt to mount the shared storage volumes. The default timeout is set to 300 seconds.

ImageSAN Application Settings Dialog

Use the Application Settings dialog to determine the duration of an authorized session in ImageSAN OSX. You can either choose a never-expiring session or set a specific duration in minutes for your session.

To display the Application Settings dialog:
In the ImageSAN window, choose Settings | Application Settings.

The Application Settings dialog appears.



The Application Settings dialog offers the following options:

Always Start Utility at Login Time — Enable this check box if you want to start the Graphic User Interface (GUI) utility of ImageSAN OSX automatically at every login.

Never Expires — enable to select an authorized session which does not expire.

Expires after — Use to set limited duration in minutes of an authorized session.

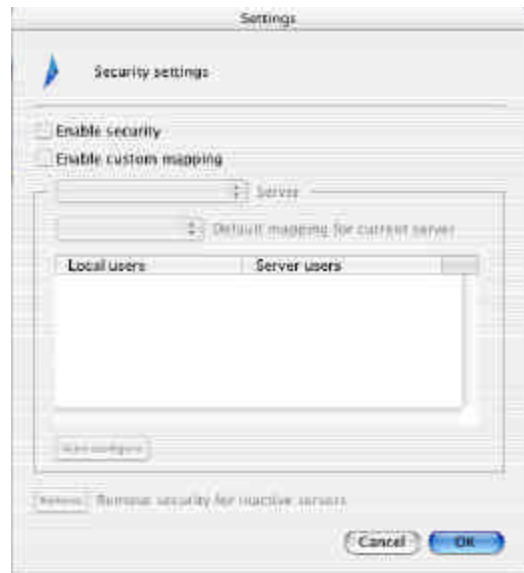
Security Settings Dialog

Use the Security Settings dialog to enable centralized security and to set volume access rights for local users on the slave workstations by mapping them to users on the master workstation. The Security settings can be configured during installation or after installing ImageSAN OSX.

Note: If you do not configure any Security Settings all users will be granted full access to the data on the shared storage.

To display the Security Settings dialog:
In the ImageSAN window, choose Settings | Security Settings.

The Security Settings dialog appears.



The Security Settings dialog provides the following information:

Enable Security — This checkbox allows you to enable centralized security in the SAN network managed by a Mac OSX Server. It also allows you to proceed with custom security configuring on your workstation.

Important: You should not enable centralized security if a Mac OSX Server is not installed on any of the computers in your network.

Enable Custom Mapping — Enable this checkbox if you want to create custom security mappings of user accounts on the slave and the master workstations. For more information about setting custom security mappings, refer to “Configuring ImageSAN OSX Security Settings” on page 34.

Servers — ImageSAN OSX automatically detects all master workstations that supervise volumes which are set to Public Slave mode on your machine. Select the name of the master machine for which you want to configure user mapping from the drop-down box.

Default User — In this field are listed all existing user accounts on the selected server. Select an account which to serve as default for this server from the drop-down box. Thus all local users that do not have matching accounts on the server will be automatically mapped to the selected default user and will access data with the permissions specified for the mapped user on the master computer.

Note: If nothing else is selected ImageSAN OSX automatically sets Nobody status as default for this field.

Local Users — In this column of the Security settings dialog are listed all local user accounts for this workstation.

Server Users — This column shows you the mapping of the local user on the master machine. Use the drop-down box to change the mapping for a specific user.

Auto configure — Let ImageSAN OSX automatically configure custom security mappings on your workstation by matching user accounts with one and the same name on the slave and master workstation, and mapping all other users to the account specified in the Default User box for the selected server.

Note: If no Default User have been specified, ImageSAN automatically sets it to Nobody.

Remove Servers dialog

ImageSAN OSX keeps track of the security configurations even when a specific server is not active anymore so that you can use them again the next time you use this server. The Remove Servers dialog allows you to delete custom security settings for servers which are currently not active.

To display the Remove Servers dialog:

1. In the ImageSAN window, choose Settings | Security Settings.
The Security Settings dialog appears.
2. Press the Remove button at the bottom of the Security Settings dialog.
The Remove Servers dialog appears.

The Remove Servers dialog gives you the following options:

2 Getting Started

Selection — Use these checkboxes to select the servers for which to remove the security settings records on your workstation.

Tip: Use the *Select All* button for quick selection of all unavailable servers in the dialog.

Server — View the list of all inactive servers and select for which one to delete the custom security settings configuration on your workstation.

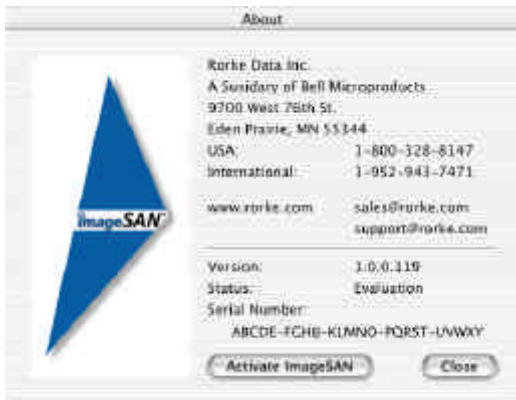
About Dialog

The About dialog displays version information of your copy of ImageSAN, registration status and serial number. You also use the dialog to register ImageSAN OSX.

To display the About dialog:

In ImageSAN window, choose **ImageSAN | About ImageSAN**.

The About dialog appears.



Version — Displays the version and build number.

Status — Displays the activation status of your copy of ImageSAN- Not Activated, Evaluation, Expired and etc.

Serial — Displays the serial number generated for your computer. You need this number when providing registration information to activate ImageSAN OSX.

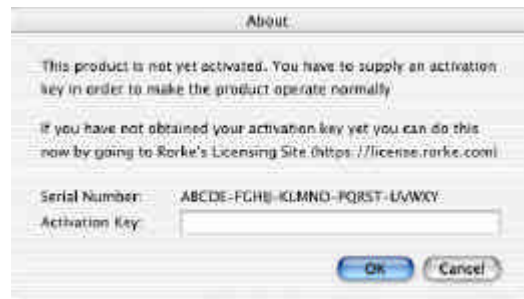
Activate — Use to display the ImageSAN Activation dialog in order to activate ImageSAN OSX, or upgrade it from an evaluation to registered version. The command is not available if your copy of ImageSAN OSX is already activated.

Activation Dialog

Use the Activation dialog when you want to activate your copy of ImageSAN or upgrade it from an evaluation version.

To display the Activation dialog:

In the About ImageSAN dialog, click **Activate**.



Serial Number — Displays the serial number of your copy of ImageSAN. The activation key you receive, corresponds to this serial number.

Activation Key — Provides a space for you to enter the activation key for your ImageSAN.

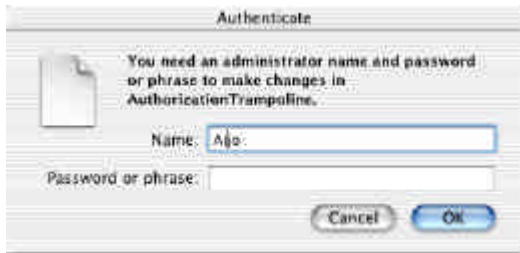
Authenticate Dialog

When you install and uninstall ImageSAN on a computer, you are prompted to supply an administrator's name and password or phrase in order to obtain administrative privileges, without

which you can neither install nor remove ImageSAN OSX from the computer.

You also need administrative privileges when changing the settings of ImageSAN.

Use the Authenticate dialog to enter the required name and password or phrase.



The Authenticate dialog contains the following fields:

Name — Use to enter the user name for the administrative account.

Password or phrase — Use to enter the password or phrase for the administrative account.

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3

Administrating ImageSAN

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3

Overview

With ImageSAN OSX, you can execute tasks, such as scanning and protecting the volumes of the shared storage. You can also optimize the usage of your SAN.

After ImageSAN OSX has been installed, its icon appears on the Dock. Clicking on the icon, opens the ImageSAN OSX application window, where you can view the details for the shared volumes and modify some of their settings.

To administer ImageSAN OSX and change any of its settings, you should enter an *authorized session*. To do this you need to use an account with administrative privileges for your computer.

To enter an authorized ImageSAN session:

In ImageSAN OSX window, click the **Authorize** button.

The **Authenticate** dialog appears.

Type the user name and password or phrase for an account with administrative privileges on your computer, and click **OK**.

The **Authorize** button changes to **Unauthorize**.

You can specify how long to stay in an authorized session. To see how to adjust the duration of an authorized session, refer to “Configuring ImageSAN OSX Application Settings” on page 35.

To exit an authorized session:

Click the **Unauthorize** button in the ImageSAN OSX window. If you have set exact duration for an authorized session in the **Application Settings** dialog you can wait until the specified time expires - then you will be notified that the **Authorized session** has expired and that you need to reauthorize if you want to proceed with ImageSAN OSX administration.

Volume Control

With ImageSAN OSX, you can manage the volumes of the shared storage by setting them to different modes.

To view the current mode of a volume do one of the following:

In the ImageSAN OSX window control-click a volume's icon to display its context menu.

Select the volume and choose Get Info from the context menu or from the menu bar to view all available details for this volume.

In the ImageSAN OSX window select a volume and view its details in the right side of the window.

You can set the volumes to Public Master, Public Slave, Private or Not Available mode. For more information about volume modes, see “Concepts and Terminology” on page 7.

Setting Volumes to Public Master Mode

To allow other workstations to use a shared storage volume that is supervised by your workstation, you must set that volume to Public Master mode. This way you establish a connection between the workstations and the volume and allow them to work with the data, contained on it.

Each volume should be set to Public Master Mode on only one machine in the SAN. In the typical ImageSAN OSX configuration all volumes are supervised by a single master and are set to Public Master Mode only on this machine.

During the installation of ImageSAN OSX, you specify the master for all volumes by setting them to Public Master mode on a specific machine. However, later you can choose another master for a specific

volume but then you should change the mode to Public Slave on the former volumes master.

To change master of a volume (set volume to Public Master mode):

1. Set the volume to Not Available mode on all workstations in the SAN network.

To see how to set a volume to Not Available mode, refer to “Setting Volumes to “Not Available” Mode” on page 30.

2. Open the ImageSAN OSX window and enter an authorized session.

To see how to enter an authorized session, refer to “Overview” on page 28.

3. Open the Volume Info dialog by choosing Volume | Get Info.

4. Choose Public Master from the box of the Volume Info dialog.

The volume's icon changes to Public Master with an attention sign on it.

Tip: You can also change the mode of a volume by control clicking its icon and selecting the new mode from the context menu.

5. Choose Settings | Apply single volume settings in order the changes to take effect.
6. On all other computers set the volume to Public Slave or Not Available mode.

See “Setting Volumes to Public Slave Mode” on page 29 and “Setting Volumes to “Not Available” Mode” on page 30.

Setting Volumes to Public Slave Mode

To allow your workstation to use a volume on the shared storage, you must set that volume to Public Slave mode. This way a connection between your workstation and the volume is established and you are able to work with the data, contained on it. If you

do not set any volume to Public Slave mode, you will not be able to access the shared storage.

During the installation of ImageSAN OSX, you are able to select the modes to which you want to set the different volumes. However, later you can change these settings after entering an authorized session in ImageSAN OSX.

To set a volume to Public Slave mode:

1. **Open the ImageSAN OSX window and enter an authorized session.**
To see how to enter an authorized session, refer to “Overview” on page 28.
2. **Open the Volume Info dialog by choosing Volume | Get Info.**
3. **Choose Public Slave from the box of the Volume Info dialog.**
The volume’s icon changes to Public Slave with an attention sign on it.

Tip: You can also change the mode of a volume by control clicking its icon and selecting the new mode from the context menu.
4. **Choose Settings | Apply single volume settings in order the changes to take effect.**

Setting Volumes to “Not Available” Mode

When you do not want to mount a particular volume on your computer, you should set it to Not Available mode. There are different cases when you do not want a specific volume to be mounted on your computer. For example, when this volume is set to Private mode on another computer in the SAN, you should set it to Not Available mode on all other SAN machines in order to avoid the risks of data corruption.

You can set a volume to Not Available mode in the ImageSAN OSX window.

To set a volume to Not Available mode:

1. **Open the ImageSAN OSX window and enter an authorized session.**
To see how to enter an authorized session, refer to “Overview” on page 28.
2. **Open the Volume Info dialog by choosing Volume | Get Info.**
3. **Choose Not Available from the box of the Volume Info dialog.**
The volume’s icon changes to Not Available with an attention sign on it.

Tip: You can also change the mode of a volume by control clicking its icon and selecting the new mode from the context menu.
4. **Choose Settings | Apply single volume settings in order the changes to take effect.**

Setting Volumes to Private Mode

Use the Private disk mode to make your workstation the sole user of a volume.

Warning: Before setting a volume to Private mode, make sure that no other SAN workstation is using it. If another workstation is using the volume, do not under any circumstances set the volume to Private mode because this can lead to data corruption.

To set a volume to Private mode:

1. **Make sure the selected volume is set to Not Available mode on all other SAN computers.**
See “Setting Volumes to “Not Available” Mode” on page 30.
2. **Open the ImageSAN window and enter an authorized session.**
To see how to enter an authorized session, refer to “Overview” on page 28.
3. **Open the Volume Info dialog by choosing Volume | Get Info.**

4. Choose **Private** from the box of the Volume Info dialog.

The volume's icon changes to **Private** with an attention sign on it.

Tip: You can also change the mode of a volume by control clicking its icon and selecting the new mode from the context menu.

5. Choose **Settings | Apply single volume settings** in order the changes to take effect.

Applying more than one volume settings

ImageSAN OSX allows you to change the mode of more than one volume and apply all new settings at the same time. This may be very convenient if you have to change the settings of multiple volumes. Thus you reduce the time and efforts applying the settings for just one volume at a time.

To set more than one volume to different modes:

1. Open the ImageSAN window and enter an authorized session.

To see how to enter an authorized session, refer to “Overview” on page 28.

2. In the ImageSAN OSX window change the mode of the desired volumes.

For more details about setting volumes to different modes refer to “Volume Control” on page 29

3. Choose **Volume | Apply All Volumes Settings** in order the changes to take effect.

Note: *If you want to return to the previous settings without applying the changes, you should click the Refresh button in the right side of the ImageSAN OSX window and discard the changes when prompted.*

Undo volume settings

ImageSAN OSX allows you to return to the last applied settings for one or more volumes before applying the changes you have introduced.

To undo single volume settings do one of the following:

In the ImageSAN OSX window select a volume's icon with an Attention sign on it and choose Volume | Undo single volume settings.

The Attention sign disappears from the volume's icon.

Tip: You can also select Undo Volume Settings from the volume's context menu.

To undo all volumes settings do one of the following:

In the ImageSAN OSX window choose Volume | Undo all volumes settings.

In the ImageSAN OSX window click the Refresh button and choose to discard all changes when prompted.

Important: *By choosing to undo volume settings you choose to return to the last applied settings.*

Optimizing the SAN

The Storage Area Network (SAN) ensures high performance through fast direct access to the files on the physical disks. It is optimized for work with large file sizes that require high bandwidth. When working with small portions of data, the performance of the SAN may be the same as the performance of the Local Area Network (LAN), and in some cases it can be even worse. For example, copying a large number of small size files through the LAN can be faster than copying them through the SAN. This can be explained with the frequent repositioning of the disks' heads when copying files through the SAN (for

each file the heads are repositioned) and with the more advanced cache provided by the operating system.

The LAN uses various optimization mechanisms to ensure the performance when working with small portions of data. For this reason ImageSAN OSX redirects such data traffic through the LAN transparently to the user. You can specify different values for the data portions to be redirected through the LAN or stored directly on the disks through the SAN in order to optimize your SAN.

Specifying the Write Expand Size

ImageSAN OSX sets a default write expand size for all write operations on the storage. Later this size can be changed locally on each workstation.

The *write expand size* is the fixed size of the disk space in Megabytes appointed to store data changes resulting from all write operations. For each write operation performed, the information to be saved is allocated in an exact write expand size, even if a much smaller size would be sufficient. If there is more space needed for a certain operation, another set size is added. If after the completion of a write operation, a part of the write expand block is left unutilized, it is then released.

You can change the default write expand size on each slave workstation. This means that when initiating a write operation from a particular workstation, the data will be saved in a block size on the shared storage, set by the client.

Note: The value for write expand size should be between 1 and 500 MB. The default value is set to 100 MB.

You can modify the write expand size in the Driver Settings dialog.

To specify the Write Expand Size:

1. In the ImageSAN window, choose Settings | Driver Settings.
The Driver Settings dialog appears.
2. In the Write Expand field, specify value between 1 and 500 MB.
3. Click OK.

Specifying Write Cache Block Size

When applications or the system write blocks with a size below the Write Cache Block size, the information is stored on the cache instead of on the disks. When the write cache is full, its stored data is transmitted to the disks in one whole bulk.

The default Write Cache Block Size is set to 128 Kb, which can be changed locally for each workstation.

You can specify the Write Cache Block size for all write operations performed on the SAN in the Settings dialog.

To specify the Write Cache Block size:

1. In the ImageSAN window, choose Settings | Driver Settings.
The Driver Settings dialog appears.
2. In the Write Cache Block Size field, specify the desired value in Kb.
3. Click OK.

Specifying Direct Read Minimum Size

When a slave workstation requests a file which size is below the Direct Read Minimum Size, the file is delivered to the requestor over the LAN instead of the Fibre Channel.

The default Direct Read Minimum Size is set to 128 Kb, which can be changed locally for each workstation.

You can specify the Direct Read Minimum Size for all requests over the SAN in the Driver Settings dialog.

To specify the Direct Read Minimum size:

1. In the ImageSAN OSX window, choose **Settings | Driver Settings**.
The Driver Settings dialog appears.
2. In the Direct Read Minimum Size field, specify the desired value in Kb.
3. Click OK.

Managing IP Addresses

In order to be able to send and receive metadata requests and to communicate with other computers in the network you should be using a valid IP address - the one which identifies you in the network. If you have more than one network adapters in your workstation you should make sure ImageSAN OSX is using the IP address which connects you to the other ImageSAN OSX computers on the same network segment.

You can choose either to allow ImageSAN to automatically select the IP address to use for communication with other SAN-connected computers, or manually select a preferred IP address for ImageSAN to use.

To select the IP address for ImageSAN OSX:

1. In the ImageSAN OSX window, choose **Settings | Driver Settings**.
The Driver Settings dialog appears.
2. In the Preferred IP address field select one of the following:
 - Automatic - to allow ImageSAN to automatically select the IP address to use for communication with other SAN-connected computers, and click OK.

Select a preferred IP address for ImageSAN to use to communicate with the other computers on the network, and click OK.

The selected IP address appears in the right side of the ImageSAN OSX window below the ImageSAN icon.

3. Restart the computer.

Important: If you have changed the IP address of the Master machine you should restart all slave workstations too.

If you have to change the IP address of your computer and ImageSAN OSX uses this address, make sure to follow the steps below.

To change the IP address of your workstation:

1. Change the IP address of your workstation.
Check your Mac OS X® documentation for details about changing the IP address.
Note: If you have changed the IP address which identifies your workstation in the SAN- network, the Preferred IP address field of the Driver Settings dialog will change to "Automatic".
2. (optional if multiple network adapters are installed) In the ImageSAN OSX window, choose **Settings | Driver Settings**. Select the new address from the Preferred IP address field, and click OK.
3. Restart the computer.

Important: If you have changed the IP address of the Master machine you should restart all slave workstations too.

Enabling ImageSAN OSX Security

The typical ImageSAN OSX configuration does not implement any security restrictions for users of one and the same workstation on which there are

volumes set to **Public Slave mode**. If you have not enabled security every local user will have unlimited access to all data on these volumes of the shared storage.

ImageSAN allows you to modify the access rights of specific users to the shared storage by applying either centralized security or custom mapping security.

Enabling ImageSAN OSX centralized security is recommended if you have Mac OS Server installed. Thus you will allow ImageSAN OSX to use the security implemented by Mac OSX Server. If you do not have Mac OSX Server installed but you want to modify different access rights for the local users of your workstation you can take advantage of ImageSAN OSX custom mapping security.

For more details about configuring custom mappings refer to “Configuring ImageSAN OSX Security Settings” on page 34

To enable ImageSAN OSX security:

1. In the ImageSAN OSX window, choose **Settings | Security Settings**.

The Security Settings dialog appears.

2. Check the **Enable Security** checkbox to turn centralized security on, and click **OK**.

Important: Enabling centralized security if you do not have Mac OSX server installed is not recommended.

Configuring ImageSAN OSX Security Settings

ImageSAN OSX allows you to grant different access rights to users of one and the same workstation by mapping them on the master machine. Mapping a user means selecting a server (or master) user 's account whose access rights to be used by the local user. The security settings can be configured on all slave machines during installation or later.

To configure ImageSAN OSX security settings:

1. In the ImageSAN OSX window, choose **Settings | Security Settings**.

The Security Settings dialog appears.

2. Enable the **Custom Security** checkbox.

Note: This checkbox is not active if you have not enabled the Security Checkbox above it.

3. Select the server for which to configure the user mappings from the **Server** drop-down box.
4. From the **Default User** box select a user account which to serve as default mapping for all users that do not have matching accounts on the server.

Note: If nothing else is selected ImageSAN OSX automatically sets Nobody as default mapping.

5. Do one of the following:

Press the **Auto Configure** button to allow ImageSAN to automatically configure custom security on your workstation by matching user accounts with one and the same name on the slave and master workstation, and assigning all other users to the mapping specified in the **Default User** box for the selected server, and click **OK**.

Manually select the desired user mapping from the **Server Users** column, and click **OK**.

Check your Mac OS X® documentation for details about setting different access rights.

Removing Security for Inactive Servers

ImageSAN OSX keeps record of the security settings configured on each slave workstation for all servers even when they are not active anymore. This is very useful if you return to this server later and do not want to configure all user mappings again. You can

also remove custom security for servers which are currently not active.

To remove security for inactive servers:

1. In the ImageSAN OSX window, choose Settings | Security Settings.

The Security Settings dialog appears.

2. Press the Remove button at the bottom of the Security Settings dialog.

The Remove Servers dialog appears.

3. Select which inactive server's security settings to remove by selecting its checkbox from the Selection column, and click OK.

Note: Use the Select All button to remove custom security for all inactive servers on your workstation.

Configuring ImageSAN OSX Application Settings

With ImageSAN you can determine the duration of an authorized session. This means that when logging in to the computer, in order to use ImageSAN and modify security and/or driver settings, you are prompted to supply a user name and password for an account with administrative privileges. You cannot modify any ImageSAN settings if you are not logged in with such an account. Every time you log in and out of the computer through this account, you begin and end an authorized ImageSAN session. You can either choose a never-expiring session or set a specific duration for your session. If you choose a never-expiring session, you will be able to work until you log yourself out. If you choose to set a specific duration for your working session, you will not be allowed to continue your work after the specified time period has expired.

Configuring ImageSAN OSX Application Settings

To choose a never-expiring session:

1. In the ImageSAN window, choose Settings | Application Settings.

The Application Settings dialog is displayed.

2. Enable the Never expires box.
3. Click OK.

To set a duration for a session:

1. In the ImageSAN window, choose Settings | Application Settings.

The Application Settings dialog is displayed.

2. In the Expires after field, specify the duration in minutes for your session.
3. Click OK.

Specifying Boot Sequence

ImageSAN OSX allows you to synchronize the starting of the operating system and the mounting of the shared storage volumes on your computer. For example, you can choose synchronous boot sequence when some of your applications will not work if there are no volumes mounted. Thus the operating system will not start until the time during which your workstation attempts to mount the volumes expires. You can also choose asynchronous boot sequence which allows your workstation to try to mount the shared storage volumes after starting the operating system. In this case you can select Forever (unlimited duration) as boot sequence or specify timeout in seconds.

To specify ImageSAN OSX boot sequence:

1. In the ImageSAN window, choose Settings | Driver Settings.

The Driver Settings dialog is displayed.

2. Do one of the following:

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Enable Synchronous Boot Sequence checkbox to prevent the starting of the operating system before the shared storage volumes have been mounted on your workstation.

Disable Synchronous Boot Sequence checkbox to allow your workstation to mount the shared storage volumes after the operating system has been started.

3. **Check the Forever checkbox or check Timeout Is checkbox and specify the desired duration in seconds.**

Note: The Forever checkbox is not active if you have selected Synchronous Boot Sequence.

4. **Click OK.**



Volumes Maintenance

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Volume Maintenance Operations

Operations such as creating or deleting volumes require higher protection since they are related to re-configuring the shared storage and that is why volume maintenance operations can be initiated only by an user with an administrator's account. With such an account, the following operations can be initiated:

Disk defragmentation

Check disk

Formatting volumes

Deleting volumes

Changing names of volumes

Creating volumes

Before you attempt any of the above operations, you must do the following:

Set the shared volumes to Not Available mode on all slave computers.

On the master computer, log in using account with administrative privileges.

Set the volume you want to work with to Private mode on the master computer.

Perform the desired maintenance.

Return the volumes to the previous state on the master and slave computers.

Formatting Volumes

It is recommended to format SAN volumes on the ImageSAN master workstation. Before formatting a SAN volume, make sure that:

You have set it to Not Available mode on all slave computers.

You have logged on the master computer using account with administrative privileges.

You have set the volume you want to format to Private mode on the master workstation.

For steps about formatting disks, check your Mac OS X® documentation.

Note: *If the volume you want to format will participate in your SAN and will be managed by ImageSAN OSX, you should format it using HFS +.*

For details about changing the mode of volumes, see “Volume Control” on page 29.

Creating New Volumes

You can create new volumes on the shared storage after installing ImageSAN OSX. For this purpose you need to shut down all workstations except the master machine from which the new volume will be created. On the master computer, set all SAN volumes to Private mode.

To create a volume:

1. Make sure all slave workstations are shut down.
2. On the master computer, set all SAN volumes to Private mode.
3. Follow the procedures about creating volumes, described in your Mac OS X® documentation.
4. In the ImageSAN OSX window click the Refresh button.

The new volume appears as Private in the ImageSAN OSX window.

5. Set the new volume to Public Master mode.
6. After restarting the slave computers, check the mode of SAN volumes in the ImageSAN OSX

window and, if necessary, change the modes to the desired state.

For details about setting a volume to Public Master mode refer to “Setting Volumes to Public Master Mode” on page 29

For details about setting a volume to Public Slave mode refer to “Setting Volumes to Public Slave Mode” on page 29

For details about setting a volume to Not Available mode refer to “Setting Volumes to “Not Available” Mode” on page 30

Running Check Disk

Before running Check Disk for a volume, make sure that you have set the SAN disks to Not Available mode on all slave computers. On the master machine, log in with an account with administrative privileges and change the mode to Private mode.

For detailed procedures about checking disks, refer to your Mac OS X® documentation.

Performing Disk Defragmentation

Before performing disk defragmentation on a SAN volume, make sure that you have set the SAN disks to Not Available mode on all slave computers. On the master machine, log in with an account with administrative privileges and change the mode to Private mode.

For steps about defragmenting disks, check the documentation of your defragmentation software.

4 Volumes Maintenance

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Best Practices

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5

Calculating Folders' Sizes

The Calculate Sizes option, available in List view of the Finder window, can be set to calculate sizes per folder and per window. Activate this option only for folders on your local discs. Do not enable it for folders on the shared storage volumes, as this will temporarily (while it is calculating) slow down performance and all network workstations seeing the volumes for which this option is enabled will not be able to work on them.

For details about managing the "Calculate Sizes" option refer to your Mac OS X® documentation.

Changing Volume's Icons

ImageSAN OSX allows you to change the appearance of your volumes' icons on the local machine.

For details about changing volumes icon refer to your Mac OS X® documentation.

You can change the appearance of a volume's icon on your workstation, but if the volume is set to Public Slave or Public Master mode its original ImageSAN icon will be restored immediately after restarting the master of the volume and your personal icon will be deleted.

If you change a volume's icon appearance on your workstation this new icon will be visible to all other workstations seeing the same volume after clicking Refresh or restarting them.

Using a DHCP Server In an ImageSAN OSX Network

A Dynamic Host Configuration Protocol (DHCP) server automatically assigns and leases IP addresses to computers as they are added to a network.

Constant IP addresses of SAN-connected machines are indispensable for the proper communication between them and for ImageSAN to work. That is why you should not allow run-time configuring of IP addresses, supported by some DHCP servers, on workstations connected to the shared storage and running ImageSAN OSX. This will result in ImageSAN OSX breakdown.

Writing on the Shared Storage Volumes

ImageSAN OSX is optimized for streaming operations, such as consecutive writing of large blocks of data as is the case with digitizing video material, for example. Vice versa - the performance is poor when writing small data amounts on SAN disks. That is why it is not recommended to initiate write operations for too many small size files on the shared storage discs (for example, copying the user folder to the SAN disks) as this will highly increase the network traffic and will result in poor performance of the system.

Viewing ImageSAN Errors

The Errors Log of ImageSAN OSX is designed for more advanced users in order to help them to cooperate with the post-release support team if necessary. It displays a log of all errors or failures which occurred in ImageSAN OSX.

Normally, if ImageSAN OSX does not generate any errors, the errors log is empty.

To view the ImageSAN OSX Errors Log:
In the ImageSAN OSX window go to Diagnostics | Errors Log.

The Errors Log dialog appears.

Using the buttons located at the bottom of the Errors Log dialog, you can update the data displayed in the dialog, save the log or delete it.

To update the currently displayed data in Errors Log dialog:

With the Errors Log dialog displayed, click the Refresh button.

If, for some reason ImageSAN OSX is unable to mount SAN disks, you can save the errors log, if necessary, and send it to the post-release support team for troubleshooting.

To save the error log:

With the Errors Log dialog displayed, click the Save button at the bottom of the dialog. Specify a name and location for the errors log file and click Save.

If the errors log file becomes extremely large (the size of the file is more than 100 MB), the performance of ImageSAN OSX may drop considerably and, in some cases, this may cause poor performance of the system as whole. That is why it is a good idea to periodically check and, if necessary, delete the errors log.

To delete the errors log:

Display the Errors Log dialog and click the Delete button, located at the bottom of the dialog. Confirm the operation, if prompted.

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