Sun Storage 6000 Series Array

Firmware Upgrade Guide

Part No. 820-7197-12
August 2010, Revision A

Please
Recycle

Contents

About This Guide

This *Sun Storage 6000 Series Array Firmware Upgrade Guide* explains how to use the Sun Storage 6000 Series Upgrade Utility to upgrade Oracle's StorageTek 6540 array, 6140 array, or FLX380 storage array from controller firmware version 6.x to 7.x.

Written for technicians, system administrators, authorized service providers (ASPs), and users who have experience with the array's storage management software, this guide explains how to use the upgrade utility to install your new storage array code.

Related Documentation

Title
Sun Storage Common Array Manager Release Notes
Sun Storage Common Array Manager CLI Guide
Sun Storage Common Array Manager Software Installation and Setup Guide
SANtricity Storage Manager Concepts Guide
Storage System Planning Guide for SANtricity Storage Manager
Sun StorageTek 2500 Series Array Firmware Upgrade Guide

Documentation, Support, and Training

These web sites provide additional resources:

Function	URL
Documentation	http://docs.sun.com/
Support	http://www.sun.com/support/
Training	http://www.sun.com/training/

Documentation Feedback

Submit comments about this document by clicking the Feedback[+] link at http://docs.sun.com. Include the title and part number of your document with your feedback:

Sun Storage 6000 Series Array Firmware Upgrade Guide, part number *820-7197-12*.

CHAPTER 1

Using the Upgrade Utility

The Sun Storage 6000 Series Upgrade Utility is required to upgrade storage array controller firmware and NVSRAM from version 6.x to version 7.15. After upgrading to 7.15, you must upgrade the controller firmware to the latest version of 7.x (currently 7.60) using Sun Storage Common Array Manager or SANtricity management software.

Use this utility to upgrade the following arrays:

- StorageTek 6540 and 6140 arrays with controller firmware 6.x
- StorageTek FLX380 controllers with controller firmware 6.x

Note – This upgrade utility does not apply to FLX240, FLX280, 6130, or 2500 series controllers.

This upgrade utility is the first step in the upgrade path. After upgrading controller firmware to version 7.15 you must complete the following:

- Upgrade to the latest controller firmware version of 7.x (currently 7.60) using Common Array Manager or SANtricity
- Upgrade IOM/ESM and drive firmware using Common Array Manager or SANtricity

Sun Storage Common Array Manager Software

1. **To download the latest version of the CAM software, go to:**

   `http://www.oracle.com/us/products/servers-storage/storage/storage-software/031603.htm`

2. **Click Get It Now to go to the Oracle Sun store.**
3. **Click Get the Software to download the free software.**
4. **Download the critical patch(es) for your operating system environment.**

About the Upgrade Utility

The Sun Storage 6000 Series Upgrade Utility is a stand-alone application you install independently of any storage management application. Due to the internal reorganization of this upgrade, you must install this utility and use it to upgrade the StorageTek 6140, 6540, and FLX380 arrays.

Note – You cannot use CAM or SANtricity to upgrade controller firmware and NVSRAM from version 6.x to version 7.15.xx.xx.

The utility upgrades two files, the RAID controller firmware and NVSRAM (non-volatile memory that manages failover issues).

The upgrade utility ensures the selected storage arrays meet the following conditions:

- Controller model and controller firmware version are supported
- Configuration and event logs are saved for later use, if required
- Array is offline for the minimum amount of time required
- No condition exists that could prevent the upgrade from completing successfully

Caution – Downgrading is not recommended. Do not attempt to restore the original firmware. If problems occur during the upgrade, contact the Support Center at http://www.sun.com/support/.

When an upgradeable storage array is identified, the installation packages are made available. The following packages are bundled with the upgrade utility.

TABLE 1-1 RAID Controller Firmware and NVSRAM Revisions

RAID Controller	Firmware	NVSRAM
6140 array	RC_07151117_crystalM_apollo_399x.dlp	N399X-710843-006.dlp
6540 array	RC_07151117_crystalM_apollo_6091.dlp	N6091-710843-005.dlp
FLX380 array	RC_07151117_crystalM_apollo_6091.dlp	N6091-710855-005.dlp

---

Note – An additional NVSRAM file N399X-710843-902.dlp is included for single controller configurations. However, this configuration and file is not supported.

Note – Firmware version 7.15.11.17 is a limited function firmware provided as the initial step in the upgrade path to get to the latest controller firmware (currently version 7.60). All upgrades from 6.x firmware to the latest controller firmware version require the use of this utility to first upgrade to 7.15.11.17.
Once the controller firmware is at 7.15.11.17, you *must* use the latest version of CAM or SANtricity upgrade procedures to install the latest firmware version. Arrays already running any version of 7.x firmware do not require this utility and can upgrade directly to a higher level using CAM or SANtricity.

Upgrade Procedure

TABLE 1-2 summarizes the firmware upgrade procedure.

TABLE 1-2 Steps for Upgrading Firmware From 6.x to 7.x

Step	Task	Where to Find Procedure
1	Understand your storage management software.	"Prerequisites" on page 4
2	Review array requirements.	"Verifying Array Upgrade Requirements" on page 4
3	Install the upgrade utility.	"Installing the Upgrade Utility" on page 6
4	Run the upgrade utility.	"Running the Upgrade Utility" on page 7
5	Check the status of storage arrays.	"Checking the Storage Array Upgrade Status" on page 10
6	Review conditions that could cause problems.	"Reviewing Conditions that Prevent Firmware Upgrade" on page 11
7	Download and activate firmware.	"Downloading and Activating Firmware" on page 15
8	Reregister the storage array.	"Verifying and Completing the Firmware Upgrade" on page 19
9	Upgrade to the latest controller firmware (currently version 7.60).	Common Array Manager or SANtricity online help
10	Upgrade IOM/ESM and disk firmware.	Common Array Manager or SANtricity online help
11	Reapply custom NVSRAM settings (if applicable).	

Prerequisites

Before installing and using this upgrade procedure, you must:

- Have an operational understanding of the storage management software that you use.
  - Common Array Manager users can go to `http://docs.sun.com/` Storage Software > Disk Device Software for CAM documentation.
  - SANtricity Storage Manager users can go to `http://docs.sun.com/` Storage Software > Disk Device Software for SANtricity documentation.
- Make sure your storage array is ready to receive and accept the controller firmware upgrade as described in "Verifying Array Upgrade Requirements" on page 4). Read all the information in this document prior to upgrading the controller firmware on your 6000 Series array or FLX380 array.

Caution – This upgrade reorganizes DACstore on each disk drive. Do not attempt to restore the original firmware without assistance from support. If problems occur during the upgrade, contact support at `http://www.sun.com/support/`.

Verifying Array Upgrade Requirements

1. **Verify the following conditions are met for each storage array you are upgrading:**
   - An optimal state is present
   - Arrays are offline (controllers idle and no background tasks operating)
   - Controller firmware is at 6.14 or higher
   - Modifications to NVSRAM are documented
   - Only the first Ethernet port is in use on the controllers
   - The management host to run the upgrade utility is identified
   - Functional management connections exist to each controller
   - The latest management software or SANtricity has been installed
2. **If using out-of-band management, verify that the controller IP addresses are static.**

   Display the IP configuration to make sure that both ports on both controllers indicate a static connection. Change to static if not.

3. **Make sure there is no I/O to the** storage **array.**
   - Quiesce all I/O to the array.
   - Label and unplug host connections to the array (out-of-band management only) or unmap all data "Installing the Upgrade Utility" on page 6volumes (do not unmap an Access volume if using in-band management).

4. **Turn off media scan at the storage array level.**

   CAM users:

   a. **From the Common Array Manager navigation pane, expand the array for which you want to disable disk scrubbing.**

   b. **Choose Administration.**

   c. **Click the check box to the right of Disk Scrubbing Enabled to remove the check mark and disable disk scrubbing on the array.**

   d. **Click Save.**

   SANtricity users:

   a. **From the Enterprise Management window, select the array.**

   b. **From the Array Management Window menu bar, select Storage Array > Change > Media Scan Settings.**

   c. **From the Change Media Scan Settings window, uncheck Enable background media scan and click OK.**

5. **Reset each controller.**

   Resetting a controller makes it unavailable for I/O until the reset has been completed. If a host is using volumes owned by the controller that is being reset, the I/O directed to the controller will be rejected.

   CAM users:

   a. **From the Common Array Manager navigation pane, expand the array for which you want to reset the controller.**

   b. **Expand Physical Devices and select Controllers.**

   c. **Click Reset Controller for controller A.**

      A confirmation dialog is displayed.

   d. **Click OK.**

   e. **Repeat for controller B.**

   SANtricity users:

   a. **From the Array Management window, select controller A.**

b. Go to Advanced > Recovery > Reset Controller.

c. Repeat for controller B.

Installing the Upgrade Utility

The upgrade utility is a GUI-based application. If the application is being installed on a stand-alone UNIX server without a monitor, first export the display to a different computer so you can use the utility.

Note – Upgrading controller firmware to 7.15.xx.xx is an offline procedure. Users need to ensure that no I/O is sent to the storage array during the upgrade process.

---

1. **Download the upgrade utility from:**

   `http://www.oracle.com/technology/software/sun_az_index.html`

2. **Scroll to find the Sun StorageTek 6000 Series Array Firmware Upgrade Utility.**

3. **Download the utility and save it to a secure location, for example** `/var/tmp`**.**

4. **Enter one of the following commands, depending on your OS (and the latest release level).**

OS / Platform	Upgrade Installer (Minimum version)
Solaris on any Sparc Platform	`SMFWUpgInstaller-SOL-10.36.01.06.bin`
Solaris on any 64-bit x86 Platform	`SMFWUpgInstaller-SOLX86-10.36.01.06.bin`
Linux on any 32-bit x86 Platform	`SMFWUpgInstaller-LINUX-10.36.A1.06.bin`
Linux on IA64 (Itanium) Platform	`SMFWUpgInstaller-LINUX64-10.36.A1.06.bin`
Windows on any 32-bit x86 Platform (XP/Vista)	`SMFWUpgInstaller-WS32-10.36.31.06.exe`
Windows Server on IA64 (Itanium) Platform	`SMFWUpgInstaller-WS64-10.36.31.06.exe`
Windows Server on any 64-bit x86 Platform	`SMFWUpgInstaller-WSX64-10.36.31.06.exe`

For example, for the Solaris OS, enter the following command to start the installer and display the Introduction screen:

```
./SMFWUpgInstaller-SOL-10.36.01.06.bin
```

Note – You can install the upgrade utility using a GUI or CLI (using `-i console`). However, a GUI is required to run the upgrade utility.

5. **Follow the displayed instructions to install the utility.**
6. **Click Next to display the Upgrade Utility License Agreement:**
7. **Read and accept the license agreement, and click Next.**

   A preinstallation summary report is displayed which shows you the location in which the utility will be installed, the disk space required by the utility, and the current available disk space.

8. **Click Next.**

   This action installs various files and folders into your directory structure and provides the path to the files you will need to perform the upgrade.

   The Install Complete window is displayed when the installation completes successfully.

9. **Note the location of the upgrade utility files displayed in the final screen.**
10. **Click Done.**

Running the Upgrade Utility

The upgrade utility checks the current status and firmware level of controller firmware in preparation for the firmware upgrade.

1. **To launch the utility, change to the directory for your OS.**

OS	Location
Solaris	`/opt/CFWDnld/client/SMfwupgrade`
Linux	`/opt/STKupgrade/client/STKupgrade`
Windows 32-bit	`\Program Files\CFWDnld\client\STKupgrade.bat`
Windows 64-bit	`\Program Files (x86)\CFWDnld\client\STKupgrade.bat`

Note – This upgrade utility does not support OpenSolaris platforms.

For example, for Solaris enter:

```
cd /opt/CFWDnld/client
```

2. **Enter the `SMfwupgrade` command:**

   ```
   ./SMfwupgrade
   ```

   The Select Addition Method window is displayed.

3. **Select one of the following methods:**

   - Manual (recommended): Allows you to control which storage arrays you want to upgrade. You supply the management method (out-of-band or in-band) by which the management host accesses the array and the IP address of each controller. Go to Using Manual Discovery.
   - Automatic: Discovers all storage arrays within the network. Go to Using Automatic Discovery.

Using Manual Discovery

When you select Manual, the Add Storage Array window is displayed allowing you to select the method by which the management host accesses the array.

1. **Select one of the following management methods.**

   - Out-of band-management and enter the IP address of each controller.
   - In-band management and enter the host name or IP address of the management host.

2. **Click Add.**

   A confirmation is displayed indicating the array was added successfully.

3. **Continue to add each storage array you want to upgrade. When all arrays are discovered, click No to close the window.**

   After the specified array is discovered, the Controller Firmware Upgrade Tool window is updated. The Status column indicates the current condition of the array.

The utility displays a status for each array, shown by an icon and text description.

4. **Select the storage array.**

   - If no problems are detected, the Status column displays Upgradeable: Optimal. You can follow the procedure in "Installing Firmware" on page 15.

- If another status is displayed, such as Not upgradeable, highlight the storage array row to gather more information about its status. Refer to TABLE 1-3 for a recommended action to resolve before proceeding.

Using Automatic Discovery

The Automatic method discovers many storage arrays. In this case, the upgrade utility identifies the storage arrays that are ready for the upgrade, and flags the arrays that are not.

When you select the Automatic method, the Firmware Upgrade Tool screen is displayed. From there, select the storage arrays you want to add (to the controller firmware upgrade list).

Note – If your storage array is not discovered, use the "Using Manual Discovery" on page 8 method to explicitly specify the IP address of your controller.

Checking the Storage Array Upgrade Status

The following table describes array status and shows the corresponding icons.

TABLE 1-3 Storage Array Status

Icon	Status	Description
	Not-upgradeable	You cannot upgrade the storage array for one or more reasons. See "Reviewing Conditions that Prevent Firmware Upgrade" on page 11.
	Upgradeable: Optimal	No problems are detected. You can upgrade the storage array.
	Upgradeable: Needs Attention	Resolve any storage array problems (using CAM or SANtricity) before attempting the upgrade. Failure to resolve storage array problems prior to the upgrade, could result in a failed upgrade and possible data loss.
	Downloading	Controller firmware is downloading to the storage array and indicating progress.
	Firmware pending	The storage array has pending firmware that is ready for activation.
	Firmware activating	The new controller firmware is activating (i.e., replacing the current firmware).
	Firmware OK	The storage array has the required version of firmware.
	Refreshing	Storage array status is refreshing.

TABLE 1-3 Storage Array Status *(Continued)*

Icon	Status	Description
	Connecting	The utility is connecting to the storage array.
	Error	There was an error during the operation. See the CAM Service Advisor or SANtricity Recovery Guru for this particular storage array.
	Unresponsive	The storage array cannot be contacted. Look for fault LEDs on the storage array and consult the Service Advisor or Recovery Guru.

Reviewing Conditions that Prevent Firmware Upgrade

TABLE 1-4 lists possible failure types and associated action.

TABLE 1-4 Conditions Preventing Firmware Upgrade

Failure Type	Action
Unsupported firmware version	Verify the prerequisites in "Verifying Array Upgrade Requirements" on page 4.
Unsupported controller type	Verify the prerequisites in "Verifying Array Upgrade Requirements" on page 4.
Unsupported failure types	Verify the prerequisites in "Verifying Array Upgrade Requirements" on page 4.
Controller is non-optimal condition	Refer to CAM Service Advisor (or SANtricity Recovery Guru) for help in resolving the problem.
Event log verification error: You cannot upgrade the storage array until the problem is resolved. Contact your technical support representative to resolve this issue. Event log issues: Too many destination driver events (DDEs).	If the upgrade fails during the upgrade from 6.x to 7.15.11.17, contact the Support Center.
Data validation error	Collect support data and contact the Support Center.
Drives with DACstore infringing on the 512MB space required for migration to the format supported by the new firmware	Collect support data and contact the Support Center.

TABLE 1-4 Conditions Preventing Firmware Upgrade *(Continued)*

Failure Type	Action
Exclusive operations in progress for any virtual disk (such as defragmenting a volume group, copy-back to a drive, initialization of a volume, and others)	Collect support data and contact the Support Center.
Failed assigned drives	Collect support data and contact the Support Center.
In-use hot spare drives	Collect support data and contact the Support Center.
Incomplete virtual disks and volumes due to missing associated drives	Collect support data and contact the Support Center.
Missing volumes	Collect support data and contact the Support Center.
Storage partitions database corruption	Collect support data and contact the Support Center.

Resolving Conditions Before Upgrading

1. **Use the storage management software (**CAM or SANtricity**) to resolve any problems.**

2. **If you cannot resolve the problem, gather the Upgrade log file and collect support data before you contact the Support Center (see** "Documentation, Support, and Training" on page vi**.)**

   The Upgrade log file, named *YYYMMDD_HHMM*, is located in the directory from which you launched the Upgrade utility.

   To collect support data in CAM:

   a. **Log into CAM and select** *array* **> Service Advisor > Collect Support Data.**

   b. **Collect custom storage profile and pool data, using the following commands:**

      `sscs list -a` <*array*> `profile` <*profilename*>

      `sscs list -a` <*array*> `pool`

      sscs list -a <*array*> `pool` <*poolname*>

   To collect support data in SANtricity:

   a. **Collect event log information by selecting Array Management > Advanced > Troubleshooting > Collect ... Data.**

CHAPTER 2

Installing Firmware

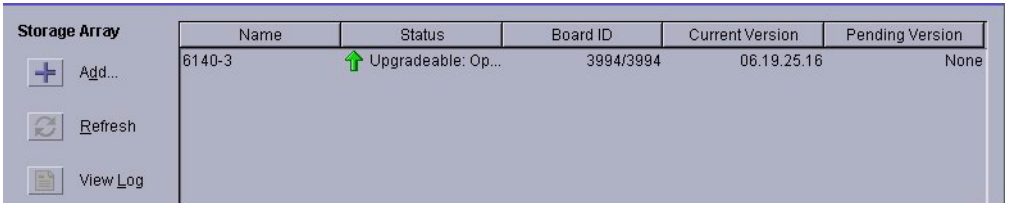
This chapter completes the firmware upgrade process by explaining the following.

Downloading and Activating Firmware

When you select a controller firmware file to download, the upgrade utility performs compatibility-checking to ensure the file is compatible with the controller model for the selected storage array.

The download process involves transferring files and activating them. The files are activated after the transfer is complete, and then the controller reboots to activate the new code.

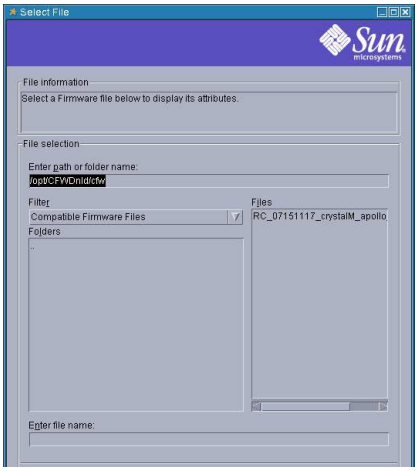
1. **Select the arrays that have an Upgradeable status.**

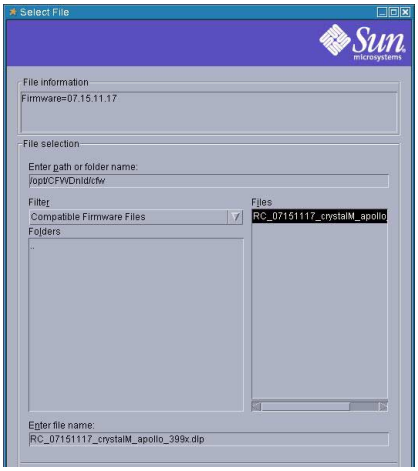


2. **Click Download.**

Note – Files for the Solaris OS are located in the directory `/opt/CFWDnld/cfw`. Linux /opt/STKupgrade/cfw and Windows \Program Files\CFWDnld\cfw.

3. Enter the path for your OS, select the firmware file, and click OK.





Note – An additional NVSRAM file N399X-710843-902.dlp is included for single controller configurations. However, this configuration and file is not supported.

4. Select the correct NVSRAM file for your array, and click OK.

Storage array	Correct File
6140	N399X-710843-006.dlp
6540	N6091-710843-005.dlp
FLX380	N6091-710855-005.dlp

5. Read the summary and click Yes to continue with the upgrade process.

Note – It will take at least a few minutes to download controller firmware files. The progress is shown in the Status column.

After the download completes, the array status changes to Firmware activating.

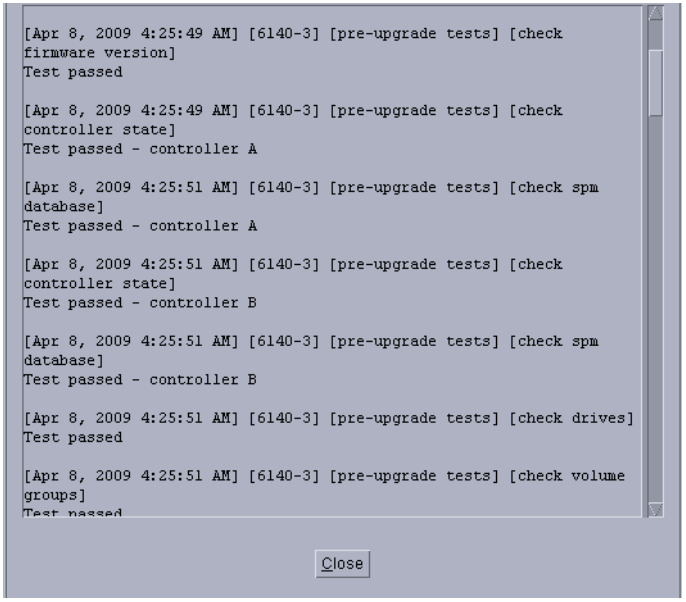
When the activation process begins, the array is offline and unable to receive I/O from hosts. During the activation process, the current controller firmware is replaced, and the array is rebooted.

The new firmware becomes active after the array reboots. The controller must reboot to move from a Firmware pending status to a Firmware activating status.

If the activation process has not completed within 30 minutes, check the controller fault LEDs on the array and contact technical support personnel if there appears to be a fault.

Result: After the activation completes, the array status changes to Firmware OK.

6. **Optional: Click View Log to review log details.**



7. **Close the log window and close the utility window.**

Note – Host I/O should not resume if there are NVSRAM edits that have to be made as they require an array reboot to take affect (see Step 4 in "Verifying and Completing the Firmware Upgrade" on page 16)

Verifying and Completing the Firmware Upgrade

After the firmware has been upgraded, complete the following:

1. **Reregister the storage array.**

   CAM users:

   a. **Log into CAM.**

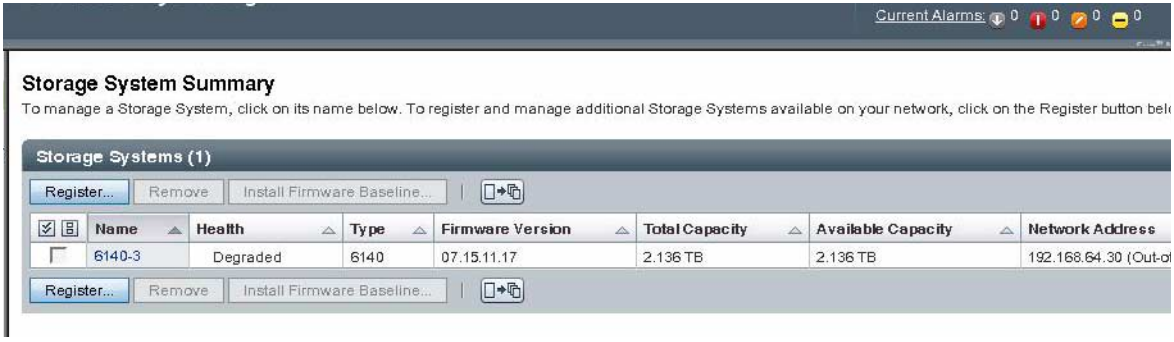
   b. **From the Storage System Summary page, select the array you upgraded.**

   c. **Click Remove to unregister the array.**

   d. **Click Register to reregister the array with the new firmware.**

      The Register Storage System wizard guides you through the registration steps.

   e. **From the Storage System Summary page, check that the firmware version is correct**



   SANtricity users:

   a. **From the Enterprise Management window, highlight the storage array(s), and select Edit > Remove.**

   b. **From the Enterprise Management window, select Edit > Add Storage Array.**

   c. **In the pop up window enter the IP addresses of the controllers (for out-of-band management) or the IP address of the management host (for in-band management).**

2. **Upgrade to the latest controller firmware using CAM or SANtricity.**

3. **Upgrade the IOM/ESM and disk firmware using CAM or SANtricity.**

4. **Reapply any custom NVSRAM changes noted before the firmware was upgraded and reboot the array.**

   When all controller firmware upgrades and NVSRAM changes are complete, host I/O can resume.

Troubleshooting

The following are additional operations you can use to improve the process or to gather additional information about issues.

Note – See the Readme file for more information.

Clearing Controller Firmware

Select a storage array and click Clear to remove the pending controller firmware version.

This has no effect on the current version of controller firmware; it simply removes the pending version. It does not require the array to be offline. It is recommended to clear controller firmware to ensure that the pending version is not unintentionally activated.

Closing and Restarting the Application

Storage arrays do not persist in the utility after you close the application. If you exit and restart the utility, any arrays that were added previously will no longer be displayed in the table. You will have to add them again. Since storage arrays do not persist if you close the utility, it is advisable to complete all upgrades in a single session.

Performing a Parallel Clear

It is possible to clear pending controller firmware on multiple storage arrays simultaneously, provided they all have pending controller firmware.

Performing Parallel Downloads

It is possible to download controller firmware files to multiple storage arrays simultaneously. Parallel upgrading is possible only when the selected arrays have the same controller model and an upgradeable status.

Recovering from Upgrade Errors

Before activation, storage array configuration data is saved to help in recovery should the upgrade fail. The following data is saved within the directory where the upgrade utility was installed, within a subdirectory of the same name as the array:

- Storage array configuration data
- Read Link Status Diagnostics data (Fibre Channel arrays only)
- Recovery profile
- Major Event Log (MEL) data
- Upgrade log file (named *YYYMMDD_HHMM*.log and located in the directory from which you launched the Upgrade utility)

This data can be used to reconfigure an array in the event of a failed upgrade, or by technical support personnel to assist with upgrade problems.

Refreshing Storage Array Data

Storage array status is checked immediately before performing an operation to ensure that the array is still eligible for the selected operation. Click Refresh to re-check the status of arrays and update the table.

Data shown within the table in the main application window refreshes automatically when an operation completes (such as downloading controller firmware).

Viewing the Log

To view the informational log for an storage array, click the View Log button.

The log includes a list of all actions that take place while the utility is running, and it may be helpful in diagnosing problems that might prevent an upgrade. The log is kept in the directory location noted in the log viewer window. A new log file is created every time the utility is started. Log files are text files, and they can be viewed using any application that can read files in text format.

View the upgrade utility's log files.

`suffix = .cfg`	Storage array configuration data
`suffix = .csv`	RLS data or preupgrade data
`suffix = .log`	MEL entries during the upgrade
`suffix = .ref`	Encoded data

Note – Restrictions, recommendations, and instructions for using the utility are contained in the Readme file, which is a part of the SMfwupgrade package.

Index

T

U

V