

IBM High IOPS Management Application User Guide for ioMemory VSL 3.1.1

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Introduction

Welcome to the IOPS Management Application software, where you can easily manage IBM High IOPS Adapters. This manual describes the IOPS Management Application software's controls and functionality.

The IOPS Management Application software runs on both Windows and Linux platforms. Visit <http://www.ibm.com> for the latest list of supported systems.



All operating systems must be 64-bit architecture to support the IBM High IOPS Adapter.

System Requirements

IOPS Management Application Requirements

IOPS Management Application on a single host

- RAM: Minimum of 30MB of free RAM
- ioMemory VSL: Version 2.1 or later

Windows: IOPS Management Application runs on the following Windows distributions:

- Microsoft Windows XP Professional 64-Bit (with SP2 or higher)
- Microsoft Windows 2003 Server 64-Bit (with SP2 or higher)
- Microsoft Windows 2008 Server 64-Bit, all versions (with SP1 or higher)
- Microsoft Windows 2008 R2 Server 64-Bit, all versions (with SP1 or higher)
- Microsoft Windows XP, Vista, 7 64-bit, all versions

Linux: IOPS Management Application supports the following Linux distributions:

- Red Hat Enterprise Linux 4, 5, 6
- SUSE Linux Enterprise Server (SLES) 10, 11
- Solaris 10 U8 & U9, 11 (Agent Only)

Supported Browsers

To take advantage of all the IOPS Management Application software's features please use one of the following fully supported browsers:

- Microsoft Internet Explorer 8.0 (Windows)
- Mozilla Firefox 3 (Linux)

The following browsers have not been tested, but are believed to work:

- Google Chrome (Windows, Linux)
- Mozilla Firefox 3 and later (Windows, Mac)
- Safari (Mac)

Browsers with known issues:

- Google Chrome on Mac

Resolution

1024 x 768 or greater

Adobe Flash Player

We recommend that you install the latest version of Adobe Flash Player 10.



Some features may not work if Adobe Flash Player is not installed.

Software Installation

The IOPS Management Application lets you manage IBM High IOPS Adapters using a convenient web interface. There are three main components that you must install to use the IOPS Management Application:

- ioMemory VSL (Driver)
- Agent
- Management Server

ioMemory VSL (Driver)

The ioMemory VSL is the driver that runs IBM High IOPS Adapters. The driver, **along with all of its support packages and utilities**, must be installed for the IOPS Management Application to work. For more information on installing and using the driver, see the *IBM High IOPS User Guide* for your operating system.

Management Server

The Management Server manages ioMemory devices on the host by communicating with the Agent.

The Management Server offers a web user interface for managing your IBM High IOPS Adapters. For information regarding using this web interface, refer to the [IOPS Management Application Features](#) section.

You will install the Management Server on the same machine that runs the IBM High IOPS Adapters and the Agent.

Agent

The Agent interfaces between the ioMemory VSL and the Management Server. The Agent should be installed on a host machine after the ioMemory VSL is already installed.

To install the Management Server and Agent applications, download and install the following files from <http://support.fusionio.com>:

Linux

- `fio-common*.rpm` (if not already installed)
- `ibm-high-iops-msrv*.rpm`
- `fio-agent*.rpm`

Windows

- `High_IOPS_Management_Server_3.1.6_x64.exe` (Server and Agent)
- `Fusion-io_Agent_Setup_*_x64.exe` (Agent only)

Installation and configuration procedures for Windows and Linux are described on the following pages.

Agent Installation and Configuration

Follow the instructions below based on your platform.

Agent Installation - Linux



The Agent requires the ioMemory VSL (driver) to run. Make sure you have installed version 2.2.1 or later of the driver and the `libfio/libvsl` package before installing the Agent.

Install `fio-agent`



All commands require administrator privileges. Log in as "root" or use `sudo` to run the install and start the server.

1. Run the following command:

```
$ sudo rpm -i fio-agent*.rpm
```

2. When installation is complete, start the Agent with the following command:

```
$ sudo /etc/init.d/fio-agent start
```



The Agent is already configured to auto-start on boot.

By default the agent is configured to automatically find and connect to a Management Server.

Agent Installation - Windows

Installation

Run `Fusion-io_Agent_Setup_*_x64.exe` and follow the on-screen instructions.

By default the Agent is configured to automatically find and connect to an IOPS Management Application server.

Management Server Installation

Follow the instructions based on your platform.

Management Server - Linux Installation

Installation

Install `fio-common` (if not already installed)

`fio-common` is a support package that is available with the ioMemory VSL (driver) installation. If you have already installed the driver on this machine, `fio-common` should also be installed. To see if `fio-common` is installed, run:


```
$ rpm -qa | grep -i fio-common
```

 All commands require administrator privileges. Log in as "root" or use sudo to run the install.

1. Run the following command:

```
$ sudo rpm -i fio-common*.rpm
```

Install `fio-msrv`


 All commands require administrator privileges. Log in as "root" or use sudo to run the install and start the server.

1. Run the following command:

```
$ sudo rpm -i ibm-high-iops-msrv*.rpm
```

2. When installation is complete, start the server with the following command:

```
$ sudo /etc/init.d/fio-msrv start
```

 Management Server is already configured to auto-start on boot.

Management Server - Windows Installation

Installation

Run `High_IOPS_Management_Server_*_x64.exe` and follow the installation wizard's on-screen instructions.

Auto-Discover Management Server

The Auto-Discover Management Server setting can be modified in `fio-agent-cfg.xml`, located at:

- Linux: `/etc/fio/`
- Windows: `C:\Windows\system32\config\systemprofile\AppData\Roaming\fio`

Auto-Discover Management Server `<iomanager-discovery-enabled>`

- True=Enable(Default)
- False=Disabled
- Why would you disable?
 - Multiple Management Servers
 - Security
- **Note:** You must delete the XML "comment" tags ("~~!=~~" and "~~=~~>") in order for this parameter to take effect.

Getting Started

Launching the IOPS Management Application

Once the software is loaded, go to the machine where you installed `fio-msrv`, open your local browser, and type: <http://localhost:9051/>

The IOPS Management Application is now ready to use.

Description

The IOPS Management Application lets you easily inventory, configure, and maintain your IBM High IOPS Adapters from a single management web console.

The IOPS Management Application provides many useful features including:

- Discovery and inventory of IBM High IOPS Adapter assets
- Remote IBM High IOPS Adapter configuration management
- Web management console

Menu Bar



The browser window is divided into two pages: **High IOPS** and **Settings**. Each of these pages is accessible using the menu bar.

The menu bar is static and appears at the top of the window regardless of what page you are viewing.

The right area of the menu bar includes links to **Admin**, **Logout**, and **Help**.



The **Logout** link is not visible unless an administrative password is set. An admin password is required for Remote Access. You can set the password by clicking the **Admin** link.

IOPS Management Application Features

This section describes the controls and features of the IOPS Management Application.

High IOPS Tab

The screenshot displays the IBM IOPS Management Application interface. The top navigation bar includes the IBM logo, 'IOPS Management Application', and tabs for 'HIGH IOPS*', 'SETTINGS', 'CONFIGURE', 'LIVE', and 'INFO'. The left sidebar shows a list of storage devices under various categories: 160GB HIGH IOPS SS SSD, 320GB HIGH IOPS MS SSD, 320GB HIGH IOPS SS, and 320GB HIGH IOPS SLC. The main content area is titled '1232D190523' and shows settings for the selected device. The settings include: High IOPS Alias (1232D190523), Device Status (Attached), Swap Support (Disabled), Beacon (Off), Firmware (3.1.0), and Low-Level Formatting (Factory Capacity). A link for 'FIO BUG REPORT FOR HOST: fusiondt3120b' is located in the bottom right corner.

The High IOPS Tab gives you detailed information about each IBM High IOPS Adapter, and lets you perform maintenance and management tasks on several Adapters at once.


A FIO BUG REPORT link is available in the lower right corner of this tab. Click this link to compile and download a bug report for the selected device.


Configure Tab

In the sidebar, click the checkbox next to each device you want to configure. You can adjust the settings and perform the actions listed below:

- IBM High IOPS Adapter Alias (Name, by default the serial number is used)
- Device Status (Attach/Detach)
The **Attach Device** operation creates a link so the IBM High IOPS Adapter interacts with the operating system. In most cases, the operating system driver automatically attaches the installed IBM High IOPS Adapter(s) at boot time, so you only need to use Attach Device when you manually detach an IBM High IOPS Adapter (such as to perform a low-level format).
Detach Device disconnects your IBM High IOPS Adapter from the operating system. Once detached, the device is not accessible to users or applications. (You need to use Attach Device to make it accessible.) You should only need to detach an ioDrive Storage to perform a low-level format or a firmware upgrade.

- Swap Support (Enable/Disable)
IBM High IOPS Adapters can be used as swap space. By enabling swap here, you are enabling the device for use as swap space. This allows the driver to preallocate the memory needed for the device to be used as swap.

 When you select **Enable** here, the device is ready to be used as swap space, but your operating system still needs to be configured to use the device as swap. You will need to configure the system to use the device in that manner. Refer to **Appendix F- Using Windows Page Files with the IBM High IOPS Adapter** in your **IBM High IOPS Adapter User Guide - Windows**, or **Using the IBM High IOPS Adapter as Swap** in your **IBM High IOPS Adapter User Guide - Linux** for more information.

 You must have 400MB of free RAM per 80GB of IBM High IOPS Adapter capacity (formatted to 4KB block size) to enable an IBM High IOPS Adapter for use as swap. Enabling swap without sufficient RAM will result in the loss of user processes and system instability.

- Beacon (On/Disable)
The Beacon feature causes the selected IBM High IOPS Adapter's LEDs to blink, making it easier to find among several devices.
- The **Update Firmware** operation performs a firmware update on the selected device (see [Appendix - Software Updates](#) for more information).

- The **Low-Level Reformat** formats the device. Your IBM High IOPS Adapter comes pre-formatted to factory capacity, so generally it's not necessary to use this option. However, you would use it if any of these situations arise:
 - You need to re-format the drive to change its logical size or modify write performance.
 - Your application supports sector sizes larger than 512 bytes (the default), and you want to tune your device accordingly. Larger sector sizes allow for more optimal CPU/memory use, and the Maximum Capacity format option provides a larger format size when the sector size is increased.
 - You are instructed to do so by company Customer Support.

Warning: Formatting a device will destroy any data still remaining on it. Please be sure to back up your data before proceeding.

The IOPS Management Application performs a low-level format that is different from a format performed by an operating system using standard disk management utilities. You do not need to perform a low-level format to create an operating system-specific volume on the device. You can select one or more IBM High IOPS Adapters in the sidebar to format simultaneously.

LOW-LEVEL FORMAT
 (1 Device)

X CLOSE

FORMATTING

Factory Capacity

▼

This option provides the factory capacity for the device.

SECTOR SIZE: [Modify](#)

512 bytes

Write Performance

Capacity (100%)

DEVICES

▶ 1 High IOPS (160 GB) Formatting to: **160 GB** (100%) [Remove Group](#)

Warning: Formatting a device will destroy any data still remaining on it. Be sure to backup your data before proceeding.

Format Devices

Cancel

When you click the Format button, the Low-Level Format dialog appears. Here you can set the ratio of Write Performance to Capacity. Basically, you can increase Write Performance by decreasing the IBM High IOPS Adapter's

capacity, and vice versa. You can select from a drop-down list of preset ratios (Maximum Capacity, Factory Capacity, Improved Performance, Maximum Performance), or customize the ratio with the Custom selection (also in the drop menu) or by dragging the line between Write Performance and Capacity in the graphic.

You can also modify the sector size here. Click the Modify link and enter a new sector size in bytes.



Warning: Changing sector size to something other than 512 (factory default) may cause unexpected application behavior.

The selected IBM High IOPS Adapter(s) appear as a group below the Write Performance/Capacity graphic. Click the arrow to the left of the group to reveal more details and the option to remove devices from the group, or click Remove Group to remove the device(s) from the Low-Level Format dialog.



If an IBM High IOPS Adapter is unable to format (for reasons such as it's busy or the formatting is not valid for that particular device) it will display in a separate section titled "Unavailable for Formatting" at the bottom. When you're ready to format the selected IBM High IOPS Adapter, click the Format Devices button.

To exit the Low-Level Format dialog without formatting any devices, click, the Cancel link.

Info Tab

The screenshot displays the IBM IOPS Management Application interface. On the left, a sidebar lists various storage configurations: 160GB HIGH IOPS SS SSD, 320GB HIGH IOPS MS SSD, 320GB HIGH IOPS SS, and 320GB HIGH IOPS SLC. The main panel shows the 'INFO' tab for a specific device, identified by the serial number 1232D190517. The interface includes sections for Alerts, General Information, Usage, Volume, and PCI Information. The General Information section provides details such as Serial Number, Device Path, Model, and Block Device Path. The Usage section shows PBW Endurance Rating, PBW Used, MiB Written, and MiB Read. The Volume section shows the current volume size. The PCI Information section provides details about the PCI address, slot number, vendor ID, and device ID. A link to the FIQ BUG REPORT FOR HOST: fusiondt3120b is also visible.

SERVER NAME: fusiondt3120b
IP ADDRESS: 127.0.0.1
OS: Windows 7

1232D190517

Alerts

General Information

Serial Number: 1232D190517
Device Path: /dev/ft17
Model: 160GB High IOPS SS SSD
Block Device Path: /dev/fior

Usage

PBW Endurance Rating: 17 PB
PBW Used: 0 PB
MiB Written: 3,535 MiB
MiB Read: 25,688 MiB

Volume

PCI Information

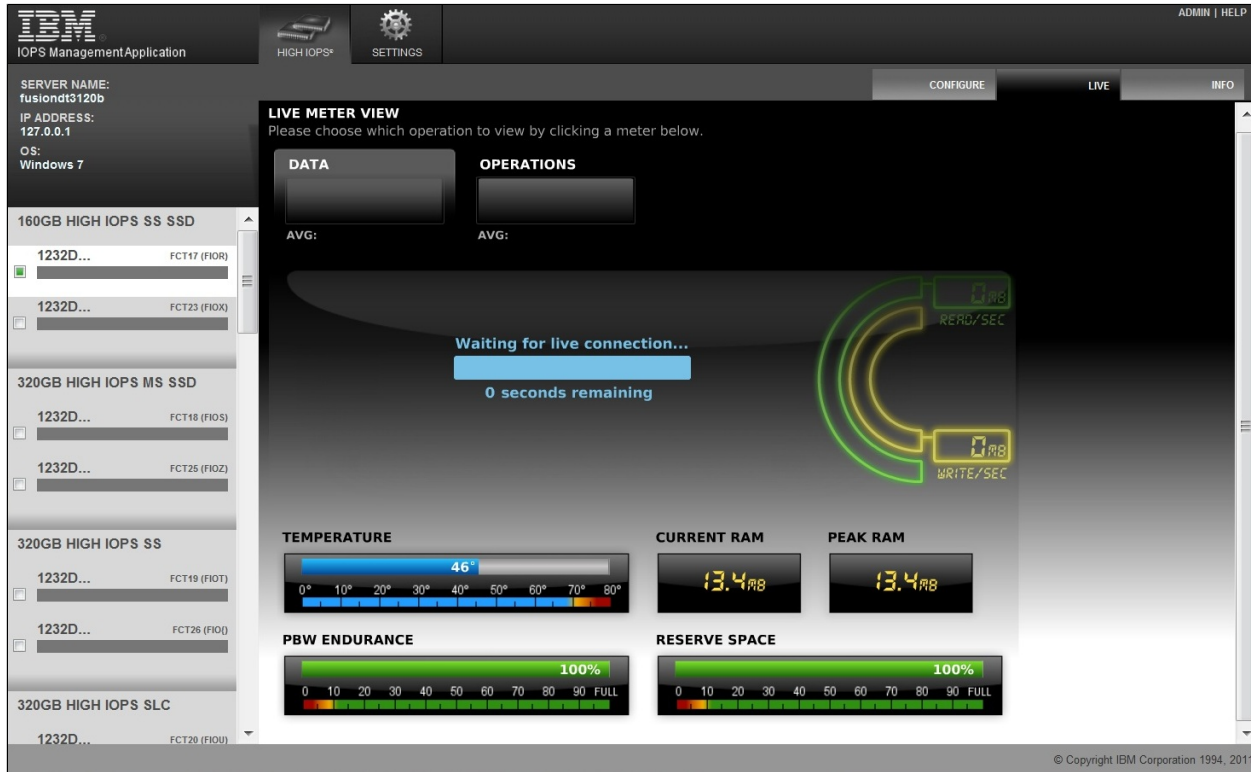
PCI Address: 18:00.0
PCI Slot Number: Unavailable
PCI Vendor ID: 0x1AED
PCI Subsys Vendor ID: 0x1AED
PCI Device ID: 0x7D1
PCI Subsys Device ID: 0x7D1

[FIQ BUG REPORT FOR HOST: fusiondt3120b](#)

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The Info Tab provides details about a single IBM High IOPS Adapter including recent alerts and a history of alerts, the device's serial number, model, device path, block device path, volume information, and PCI information.

Live Tab



The Live tab lets you monitor important information for a single IBM High IOPS Adapter in real time. The Live tab displays IOPS Read/Write when Operations is selected, MB/Second when Data is selected, temperature, total read, total write, and reserve space. Select Data or Operations using the drop-down menu above the graph, or the large buttons below the graph.

Settings Tab

IBM
IOPS Management Application

HIGH IOPS[®] SETTINGS ADMIN | HELP

APPLICATION

REMOTE ACCESS

DATABASE

REMOTE ACCESS

To allow remote browser connections, you must enable and configure the remote access settings.

High IOPS Push Frequency seconds

Enable Remote Access ☒

Server Address (URL)

Host Name

Port

SSL Options

An SSL certificate is required for all remote connections. Please select from the following options to configure your remote SSL connection.

☒ Use pre-configured SSL Certificate.

NOTE: Using the pre-configured SSL certificate will prevent the fio-agent from validating that this server's hostname matches the certificate, and cause web browsers to warn of an untrusted certificate.

This is less secure than using a certificate made specifically for this server that is signed by a trusted CA.

Please consider creating your own SSL certificate for this machine.

☐ Use my own custom SSL Certificate.

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Use the Settings Page to manage remote access options, license options, and database options.

Remote Access

REMOTE ACCESS

To allow remote browser connections, you must enable and configure the remote access settings.

High IOPS Push Frequency seconds

Enable Remote Access ☒

Server Address (URL)

Host Name

Port

SSL Options

An SSL certificate is required for all remote connections. Please select from the following options to configure your remote SSL connection.

☒ Use pre-configured SSL Certificate.

NOTE: Using the pre-configured SSL certificate will prevent the fio-agent from validating that this server's hostname matches the certificate, and cause web browsers to warn of an untrusted certificate.

This is less secure than using a certificate made specifically for this server that is signed by a trusted CA.

Please consider creating your own SSL certificate for this machine.

☐ Use my own custom SSL Certificate.

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Configure users' and hosts' remote access settings here.

High IOPS Push Frequency

How often the agents send information to the host.

Enable Remote Access

Allows remote access to the IOPS Management Application host from other hosts. (Selected by default.)

Remote Access requires an admin password. If you have not set the admin password, you must do so before using Remote Access. This is available in the Admin link

Host Name

Enter the host's name or IP address.

Port

By default, the port is set to 9051, which is reserved for the IOPS Management Application software worldwide and should not conflict with any other applications. You may opt to change the port (to 443, for example) depending on your requirements.

Use pre-configured Fusion-io SSL Certificate

Fusion-io provides a pre-configured certificate, but will result in "untrusted certificate" messages. It is less secure than using a certificate made specifically for your server that is signed by a trusted CA.

Use my own custom SSL Certificate

Select this option to update your own Key, Certificate, and CA Chain.



When you upload a new Key, Certificate, or CA Chain, you may see a warning message indicating a mismatch between the server and the agent. This is normal. The mismatch will be resolved when you click the Submit button.

Database

The screenshot shows the IBM High IOPS Management Application interface. The top navigation bar includes the IBM logo, 'IOPS Management Application', 'HIGH IOPS', and 'SETTINGS' (with a gear icon). The right side of the top bar has 'ADMIN | HELP'. The left sidebar contains a menu with 'APPLICATION', 'REMOTE ACCESS', and 'DATABASE' (highlighted with a right-pointing arrow). The main content area is titled 'DATABASE' and contains the text 'Manage the size of your history database.' Below this, under the 'Size' section, there are two rows of information: 'Current Database Size: 11.1KB (388.3Bytes per High IOPS device)' and 'Keep historical data for: 360 days'. Below the input field for days, it says 'Estimated database size: 96.9MB (3.3MB per High IOPS device)'. At the bottom of the main content area is a 'Save Changes' button. The footer of the page contains the copyright notice '© Copyright IBM Corporation 1994, 2011'.


Here you can adjust the size of your history database by specifying how many days to include in the historical data. Click Save Changes when you're done.

Appendix A - Software Updates

Updating IBM High IOPS Adapters involves two procedures: updating the ioMemory VSL (driver) on the host machine, and updating the firmware on the IBM High IOPS Adapter.

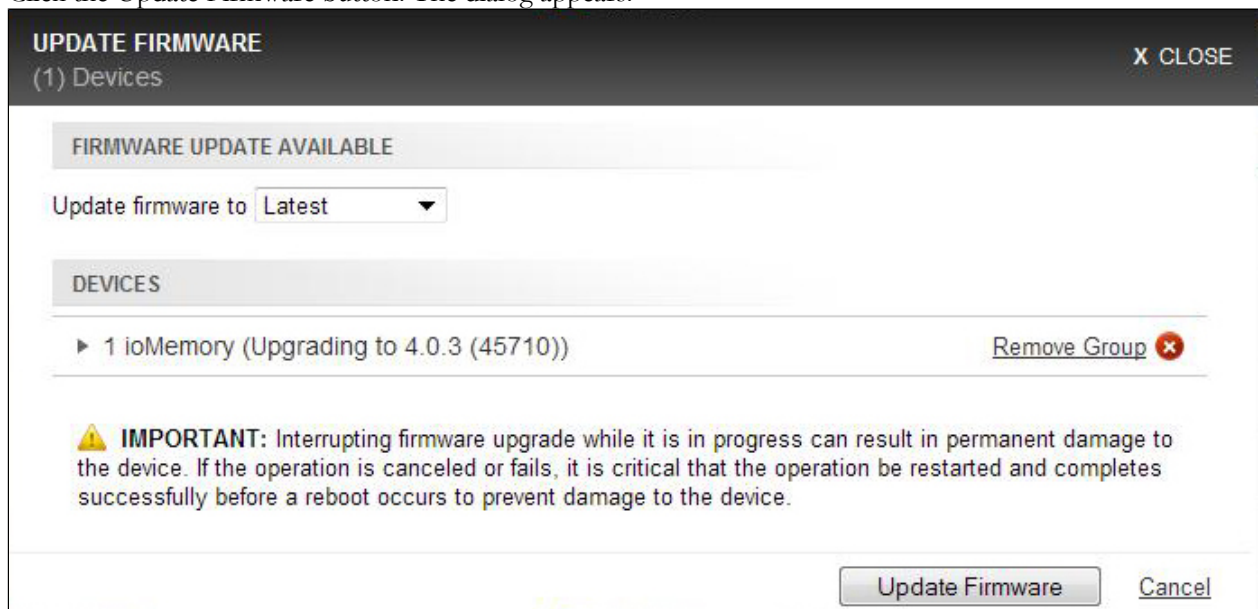
To update the ioMemory VSL on the host machine:

1. Get the latest ioMemory VSL files and documentation from support.fusionio.com.
2. Follow the instructions in the ioDrive User Guide to install the ioMemory VSL on the host machine.

 When you install the ioMemory VSL, the firmware is copied to the host machine (but not installed).

To install the firmware to the ioMemory Storage Devices:

1. Open the IOPS Management Application software.
2. Click the ioMemory tab and, in the sidebar, select the devices you want to update.
3. Click the Update Firmware button. The dialog appears.



4. Click the Update Firmware button to begin updating. the Config History bar appears at the bottom of the screen. Refer to the **Config History - IOPS Management Application** or **Config History - IOPS Management Application** section below for more information.

Config History

CONFIG HISTORY: Update Firmware: (10)
[PROCESSING \(7\)](#)
[SKIPPED \(3\)](#)
X CLOSE

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Click the **PROCESSING** link to automatically select the devices being updated (indicated in the sidebar). Click the **Skipped** link to select the devices (in the sidebar) that are not being updated.

When the firmware update process is complete, the Config History bar shows how many ioMemory Storage devices were updated, how many failed, and how many devices were skipped or require reboot. Click on the **SKIPPED**, **FAILED** or **REQUIRES REBOOT** link to select those devices in the sidebar.

▶
CONFIG HISTORY: Update Firmware: (2)
[REQUIRES REBOOT \(2\)](#)
X CLOSE

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Click the arrow at the left end of the Config History bar to expand the bar and see previous updates.

| | | SKIPPED | FAILED | REQUIRES REBOOT | SUCCESSFUL |
|--|----------------------|---------|--------|-----------------|------------|
| 03-04 08:58:40 AM | Update Firmware: (2) | - | - | 2 | - |
| 03-04 08:56:41 AM | Update Firmware: (2) | - | - | 2 | - |
| 03-04 08:54:13 AM | Update Firmware: (4) | 2 | - | 2 | - |
| ▼ CONFIG HISTORY: Last 10 configuration events since login X CLOSE | | | | | |

Appendix B - Open Source License Acknowledgement

Portions of this software product include and/or use some or all of the following open source software:

Apache Portable Runtime: ('apr-1')

Refer to the [APACHE PORTABLE RUNTIME SUBCOMPONENTS](#) section below.

Apache Portable Runtime Utility: ('apr-util-1')

Refer to the [APACHE PORTABLE RUNTIME UTILITIES SUBCOMPONENTS](#) section below.

Boost C++ Software Libraries: ('boost_filesystem', 'boost_date_time', 'boost_iostreams', 'boost_regex', 'boost_system', 'boost_signals', 'boost_thread', 'boost_process')

Note that `boost_process` is not currently part of the boost library, but its authors have submitted this library to the boost project for future inclusion in the official boost library set.

Refer to the [Boost Software License](#) section below.

bzip2 lossless data compressor: ('bz2')

Refer to the [bzip2 copyright and license](#) section below.

libcurl client-side URL transfer library: ('curl')

Refer to the [libcurl copyright and license](#) section below.

Apache log4cxx: ('log4cxx')

Refer to the [Apache License](#) section below.

Expat C library for parsing XML: ('expat')

Refer to the [expat copyright and license](#) section below.

OpenSSL: ('ssl', 'crypto')

Refer to the [OpenSSL License](#) and [Original SSLeay License](#) sections below.

Protobuf: ('protobuf')

Refer to the [protobuf copyright and license](#) section below.

TinyXML C/C++ XML processing library: ('tinyxml')

Refer to the [zlib copyright and license](#) section below.

C-Ares curl resolver library: ('cares')

Refer to the [c-ares copyright and license](#) section below.

iniparser configuration file parser library: ('iniparser')

Refer to the [iniparser copyright and license](#) section below.

jsoncpp c++ json parser library: ('json')

Refer to the [jsoncpp copyright and license](#) section below.

cyrus sasl authentication library: ('sasl2')

Refer to the [Cyrus SASL copyright and license](#) section below.

net-snmp snmp agent libraries: ('netsnmp', 'netsnmplib', 'netsnmpagent', 'netsnmphelpers')

Refer to the [net-snmp copyright and license](#) section below.

cimble CIM provider framework library: ('cimble', 'cimblecmapiadap')

Refer to the [cimble copyright and license](#) section below.

OpenLDAP: ('ldap', 'ldapcpp', 'lber')

Refer to the [OpenLDAP copyright and license](#) section below.

Pion common and network libraries: ('pion-net', 'pion-common')

Refer to the [Boost Software License](#) section below.

SQLite embedded database library: ('sqlite3')

SQLite and the SQLite library are in the public domain.

Avahi Zeroconf: ('avahi') - non-windows platforms only

Refer to the [GNU Lesser General Public License](#) section below.

Apple Bonjour: ('mdns') - windows platforms only
Refer to the [Apple Bonjour](#) section below.

zlib compression library: ('z')
Refer to the [zlib copyright and license](#) section below.

pthread-win32 POSIX threading library: ('pthread') - windows only
Refer to the [GNU Lesser General Public License](#) section below.

glibc GNU Standard C Library with POSIX extensions: ('c', 'm', 'pthread',
'rt', 'crypt', 'iconv', 'dl') - non-windows only
Refer to the [GNU Lesser General Public License](#) section below.

util-linux Libraries: ('uuid', 'blkid') - non-windows only

- blkid is subject to the terms of the LGPL, version 2.
- uuid is subject to the terms of the 3-clause BSD license.

Refer to the [GNU Lesser General Public License](#) and [libuuid copyright and license \(3-clause BSD\)](#) sections below.

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Version 2.0, January 2004
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```
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```

From network_io/unix/inet_ntop.c, network_io/unix/inet_pton.c:

```
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```

From dso/aix/dso.c:

```

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```

From strings/apr_strnatcmp.c, include/apr_strings.h:

```

strnatcmp.c -- Perform 'natural order' comparisons of strings in C.
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```

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From strings/apr_snprintf.c:

```

*
* cvt - IEEE floating point formatting routines.

```

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```
*/
```

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```



```
*/
```

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*/
```

```
/*
```

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```

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```

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```

For the xml\expat\conf\tools\install-sh component:

```

#
# install - install a program, script, or datafile
# This comes from X11R5 (mit/util/scripts/install.sh).
#
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```

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=====

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bzip2/libbzip2 version 1.0.5 of 10 December 2007

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zlib.h -- interface of the 'zlib' general purpose compression library
version 1.2.5, April 19th, 2010

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