



# IBM High IOPS Management Application

## User Guide

for Driver Release 2.2.3

5.4.2011

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## IBM High IOPS Management Application User Guide for Driver 2.2.3

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# Introduction

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Welcome to the IBM High IOPS Management Application for the IBM High IOPS Adapter. This manual shows you how to use the IBM High IOPS Management Application to maintain your IBM High IOPS Adapter at peak performance and troubleshoot any issues with the device.

**NOTE** Throughout this manual, when you see a reference to an "IBM High IOPS Adapter," you may substitute your device.

"IBM High IOPS Duo Adapter" refers to devices with two memory modules, including the IBM High IOPS SD/MD Class SSD PCIe Adapters.

## Operating System Support

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

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

### Windows

The IBM High IOPS Management Application runs on the following versions of Windows:

- Microsoft Windows 2003 Server 64-Bit (with SP2 or higher)
- Microsoft Windows 2008 Server 64-Bit, all versions (with SP1 or higher)

### Linux

IBM High IOPS Management Application supports the following distributions:

- Red Hat Enterprise Linux (RHEL) 5, 6
- SUSE Linux Enterprise Server (SLES) 10, 11

# Software Installation

The IBM High IOPS Management Application downloads as part of one of these:

- Windows Setup package.
- Linux IBM High IOPS Management Application .RPM package.

The IBM High IOPS Adapter Windows Setup program places a shortcut in IBM High IOPS Management Application and can create a desktop icon at C:\Program Files\IBM High IOPS\IBM High IOPS Management Application as part of the installation.

## Windows

To install the IBM High IOPS Management Application under Windows,

1. Run the IBM High IOPS Adapter Windows installer for the latest version of the driver (unless you've already done so).

The IBM High IOPS Adapter driver Windows installer application automatically installs the IBM High IOPS Management Application (by default in C:\Program Files\IBM High IOPS\IBM High IOPS Management Application) and can optionally create a IBM High IOPS Management Application desktop icon as part of the installation.

The 64-bit Java Runtime Environment (JRE) is required for the IBM High IOPS Management application. To install the JRE,

1. Download and install version 1.6 or higher of the 64-bit Java Runtime Environment from <http://www.java.com>.
2. Follow the instructions on <http://www.java.com> and in the JRE installer to complete the JRE installation.

**NOTE** For technical assistance in running the IBM High IOPS Management software, contact IBM Support at <http://www.ibm.com/systems/support>

## Linux

The Linux version of IBM High IOPS Management Application is a separate download from the IBM High IOPS Adapter driver software. Also, the 64-bit Java Runtime Environment (JRE) is required for the IBM High IOPS Management application.

To install the IBM High IOPS Management Application under Linux,

1. Ensure that your session is currently running with root privileges.
2. Download and install version 1.6 or higher of the 64-bit Java Runtime Environment from <http://www.java.com>.
3. Follow the instructions on <http://www.java.com> and in the JRE installer to complete the JRE installation.
4. Determine the default version of Java currently in use by running the following command:

```
/usr/bin/java -version
```

This is necessary because on Linux the default JRE does not automatically change with a new JRE installation.

5. If the default Java version is anything other than the Linux 64-bit Java version 1.6 or higher, change the default version using the following command:

```
/usr/sbin/alternatives --config java
```

The command displays a numbered list of all installed Java JRE's.

6. From the list of installed JRE's, select the correct Java version by number and press Enter to complete the change.  
**NOTE** For technical assistance in running the IBM High IOPS Management software, contact IBM Support at <http://www.ibm.com/systems/support>
7. Select your Linux distribution from <http://www.ibm.com/systems/support>.
8. Download the IBM High IOPS Management Application .rpm package.
9. Enter this command:

```
$ rpm -Uvh high_iops-gui*.rpm
```

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

This package installs the IBM High IOPS Management Application in /usr/bin (application is /usr/bin/high\_iops) along with the command line utilities. The IBM High IOPS Management Application also now appears in **System/Administration**.

## Device Management

---

The IBM High IOPS Management Application console provides a single point of management for all IBM High IOPS Adapters installed on the computer. There are two tabs: **Device Report** and **Performance**.



### Device Report

On the Device Report tab there are two sections:

- The Device Tree on the left displays a list of the installed devices on the computer.
- The Device Report panel on the right displays details on one or more selected devices.

The screenshot displays the IBM High IOPS Management Application interface. At the top, there is a navigation bar with buttons for 'Update Firmware', 'Format Low-level', 'Attach Device', 'Detach Device', and 'Page File Settings'. The main window is divided into two panes. The left pane shows a list of attached devices, including a server (10.10.7.164, Windows Vista v.6.0) and several High IOPS storage devices (9011-9018). The right pane displays a detailed 'Device Report' for device 9011 - High IOPS 320, which is currently 'Attached'. The report includes the following information:

- Serial number:** 11063
- Driver version:** 2.1.0
- Firmware version:** 42895
- Manufacture date:** Jun 8, 2009
- Advertised max capacity:** 322.55 GB (300.40 GiB)
- Formatted capacity:** 322.55 GB (300.40 GiB)
- Formatted sector size:** 512 bytes
- PCI Address:** 5:0.0
- Device ID:** 0x1005
- Vendor ID:** 0x1AED
- Subsystem Device ID:** 0x3C3
- Subsystem Vendor ID:** 0x1014
- Slot number:** 0
- Reserve Space:** 100%
- Page File Support:** Disabled

Runtime statistics for the device are also provided:

- Current temperature:** 39 °C
- Lifetime physical read volume:** 12184 GiB
- Lifetime physical write volume:** 12022 GiB

At the bottom of the application window, there are two tabs: 'Device Report' (which is currently selected) and 'Performance'.

## Performance Report

When you click the Performance tab, the IBM High IOPS Management Application draws a real-time graph of the throughput of selected attached devices. You can view Read and Write vs. Time, which measures throughput in megabytes per second, or you can separate the data into two graphs: Read (MB/sec) vs Time, and Write (MB/sec) vs Time. The lower left corner of each window shows how long the data has been captured, in minutes and seconds. You can re-size the window to gather more data.



## IBM High IOPS Management Application Interface Options

IBM High IOPS Management Application also includes four options on the menu bar at the top of the screen, available in both Device Report view and Performance view. These options help you manage your IBM device(s).



- **Update Firmware** — Upgrades the firmware on the selected device(s).
- **Low Level Format** — Performs a low-level format to change the logical size of the selected device(s).
- **Attach Device** — Attaches an IBM High IOPS Adapter so that the operating system can interact with it. **Attach Device** only works on a detached device.
- **Detach Device** — Detaches an IBM High IOPS Adapter so you can perform a low-level format or upgrade the firmware. **Detach Device** only works on an attached device

- **Page File Settings** — Enables or disables the use of the an IBM High IOPS Adapter as a page file device.  
NOTE Page File settings are the equivalent of settings on Linux.

## Detached IBM High IOPS Adapter after Install

An IBM High IOPS Adapter may appear detached right after installation and the first time you run the IBM High IOPS Management Application, as shown below.



Check to see if the **Device Report** panel shows that the device has outdated firmware. If this is the case, go to the **Update Firmware** section in this guide to update the firmware.

## Navigating IBM High IOPS Management Application

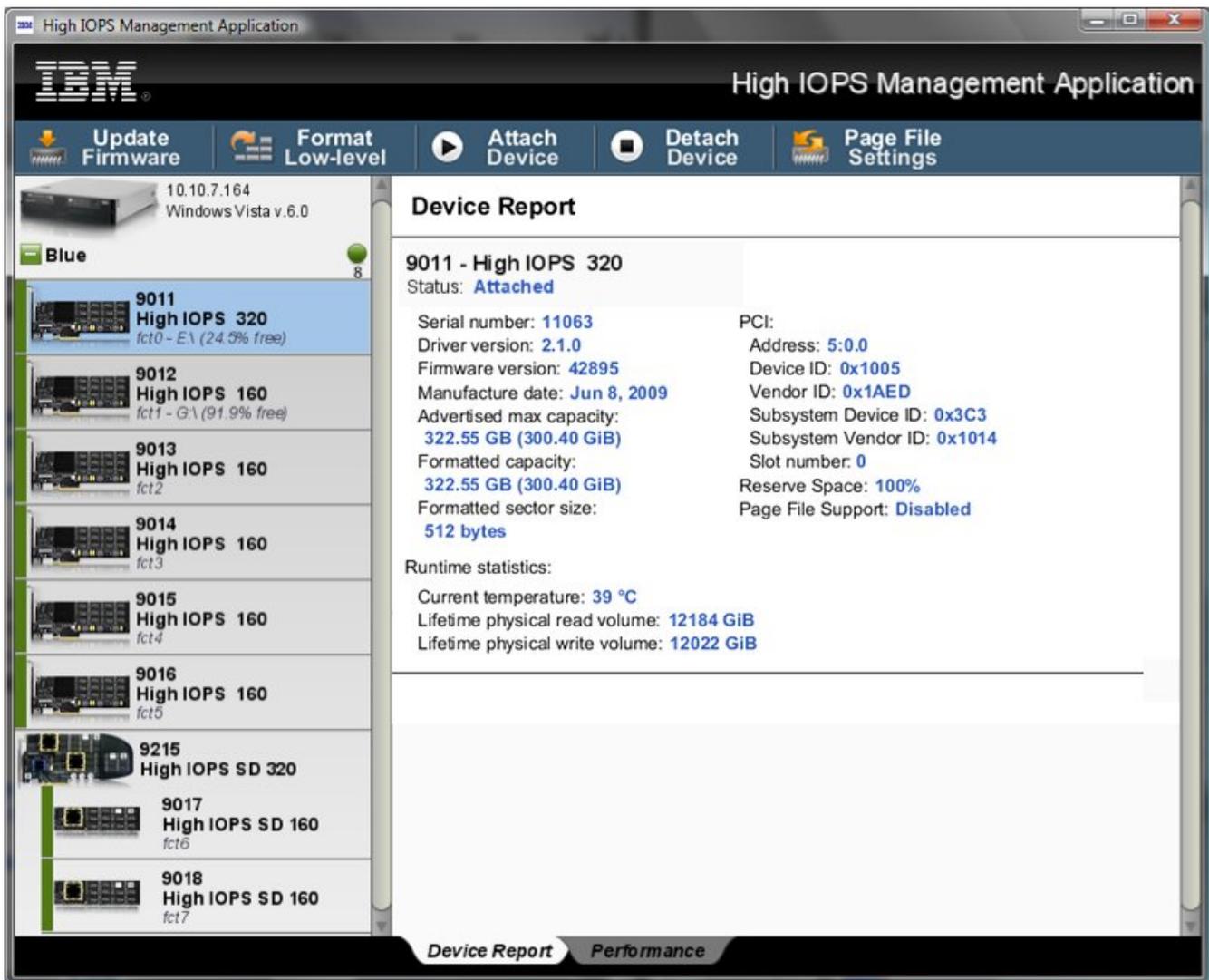
You can navigate IBM High IOPS Management Application using familiar keyboard controls:

- The **Tab** key moves the focus between onscreen components.
- The Enter key activates a selection.
- The Scroll keys (**Up Arrow**, **Down Arrow**, **PgUp**, **PgDn**, **Ctrl-Home**, **Ctrl-End**, etc.) control the Device Report panel scrolling.
- The **Esc** key closes dialog boxes.
- The **Ctrl-A** key combination selects all the available items in a list (such as all the IBM High IOPS Adapters in the **Device Tree**).
- To display a context menu with available operations, Highlight and right-click on one or more IBM High IOPS Adapter(s) in the **Device Tree**.

To exit the IBM High IOPS Management Application, click the X in the upper-right corner of the application window.

# Device Tree

The **Device Tree** the panel on the left side of the console screen below, shows a tree view of all installed IBM High IOPS Adapter and IBM High IOPS Adapter devices on this computer.



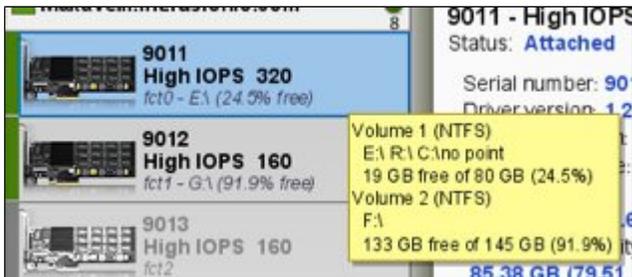
The computer is identified with its:

- Server Name

- IP Address
- Operating System and version (if known)

Each installed IBM High IOPS Adapter is identified by name on a separate branch of the tree. (In Windows, the number in the name, such as the "4" in fct4, is the PCIe bus where you installed the device. You can also confirm this bus number using Device Manager. In Linux, the number represents the order in which you installed the devices—fct0 for the first device, fct1 for the second, etc.)

You can also find out more information about each drive by hovering over it with the mouse pointer in the **Device Tree** (Windows only.) A tool tip, as shown in the figure below, pops up, showing mount points, how much free space is available, and file system information:



On Windows, right-clicking the tool tip brings up a context menu (shown below) so you can "Open in Explorer," opening a Windows Explorer program to that drive's root directory.



## Drive Status

The tree also shows the status of each drive — attached, detached, which operation is in progress, or if an error condition exists.

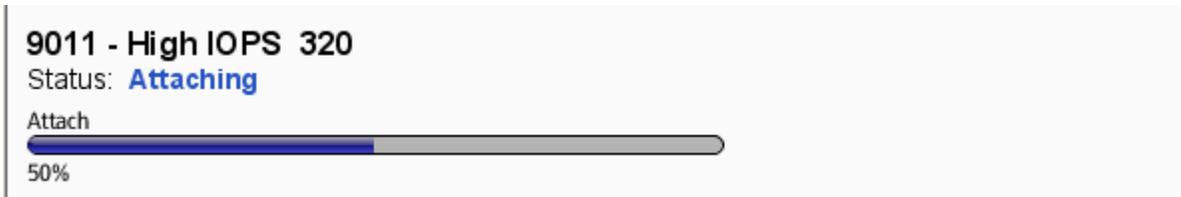
**Drive Normal:** When a drive is attached to the operating system and available to users, it appears connected to the **Device Tree** with a solid green line, as shown below. When a IBM High IOPS Adapter is attached, Device Tree shows the device's mount point, just below the device name. If the drive is mounted to multiple file system mount points, only the first one is shown in the **Device Tree**. The other mount points and detailed file system information can be seen by mousing over the device and waiting for the tool tip to appear. All of this information shows up in the tool tip (unless there is an error on the device, in which case the error is displayed instead). (Tool tips work in Windows only.)



**Drive Detached:** When a drive is not available to the operating system or users, the line from the **Device Tree** does not connect to the drive, as shown below. (This results from a **Detach Device** operation, or if the drive is not functioning, or if the firmware is out of date.)



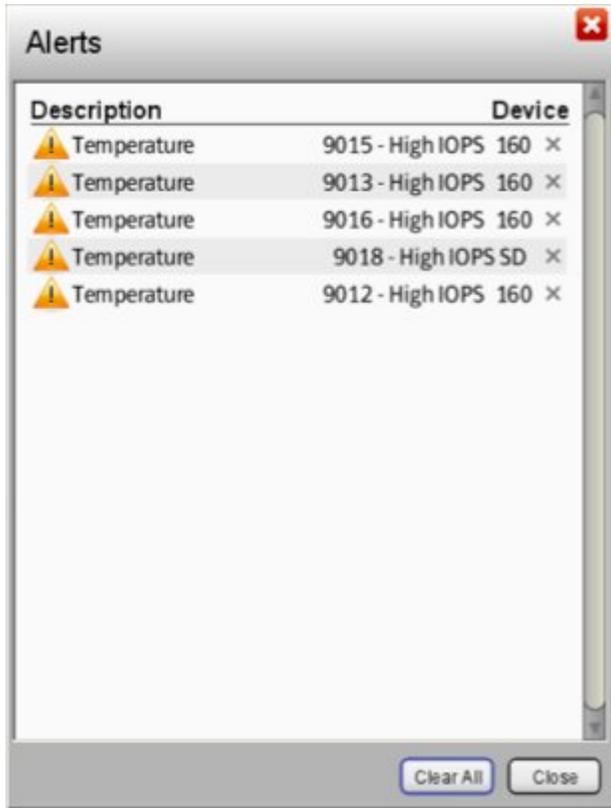
**Operation in Progress:** The device shows an activity icon, as shown below. A message in the **Device Report** panel indicates which operation is executing, the percent complete, and an estimated time for completing the operation.



**Error Conditions:** When conditions require attention, the IBM High IOPS Management Application indicates warnings and errors in the **Device Tree**, as shown below. Warnings are indicated by a yellow triangle with an exclamation mark, while errors are indicated by a red stop sign with an exclamation mark. A message in the **Device Report** panel provides troubleshooting information for selected devices.

## Viewing Alerts

IBM High IOPS Management Application shows alerts that have been received by all the devices it is managing. Alerts are shown next to each IBM High IOPS Adapter, as well as being rolled up by host and group, with a summary for all managed devices shown in the alerts tray at the bottom of the IBM High IOPS Management Application window. To view a complete list of all alerts, click the Alerts tray to open the Alerts pane:



To dismiss an alert, click the X next to it.

To dismiss all alerts, click Clear All.

To see the details of an alert, click it.

## IBM High IOPS Duo Adapters

The IBM High IOPS Management Application Device Tree also displays IBM High IOPS Duo Adapters. The two ioMemory modules in each IBM High IOPS Duo Adapter appear separately in the tree:



You can select and manage each module as you would a standalone IBM High IOPS Adapter. (For example, highlighting two or more modules would display their details as well.) Each module also displays the same activity or

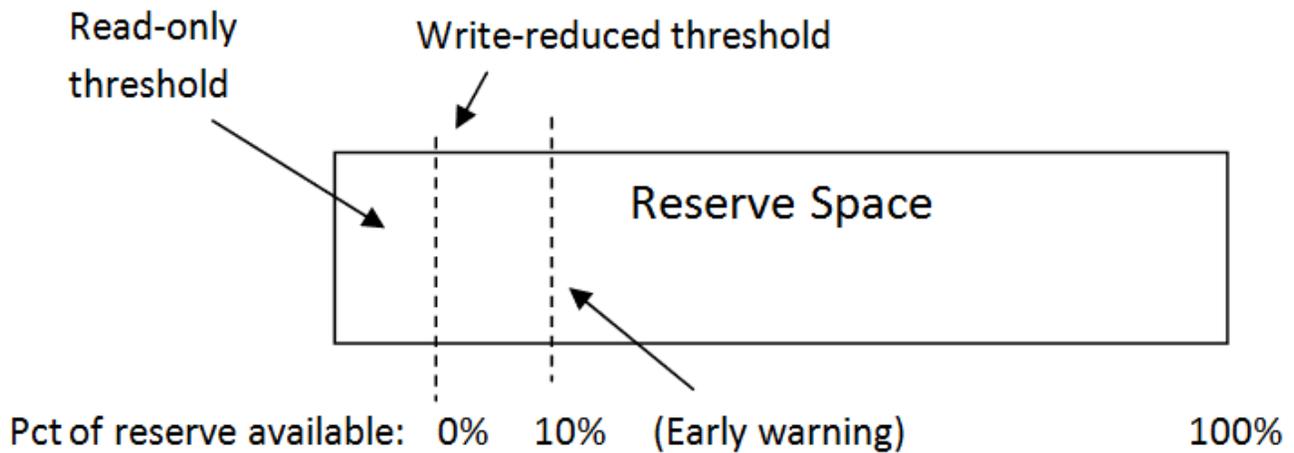
error condition icons as other devices.

## Reserve Space and Device Health

The health of the device is determined by the percentage of reserve space available. The reserve space decreases as NAND blocks are retired, with write operations tending to wear out blocks faster than reads do.

An early warning message is sent by the driver when the amount of reserve is close to reaching the 10%-available threshold. If the reserve space decreases to 0% of its original size, the device enters write-reduced mode (degraded) in order to prolong the lifespan of the device. Sometime after the reserve space is depleted, the device enters read-only mode; no further writes to the device can be done. If crossed, these thresholds and their accompanying messages should provide ample time for you to back up and migrate data on the device.

The diagram below illustrates the reserve space thresholds:



## Device Report Panel

The **Device Report** panel, shown below, displays details on each IBM High IOPS Adapter and IBM High IOPS Duo Adapter memory module installed in this computer. To view information on one or more IBM High IOPS Adapters:

- Click one of the IBM High IOPS Adapters in the **Device Tree**.
- Hold the left mouse button down to select several devices in a row.
- Use **Ctrl+Click** (left mouse button) to select two or more separate devices.

The **Device Report** panel displays details about each device (individual devices may vary in what fields they report due to hardware differences):

- Device Name — The number indicates the device's Serial Number.
- Status—Shows the status of the device. Normal status is Attached. Other status messages include detached, scanning data, stopped, or in an error condition.
- Serial number
- Driver version — Indicates the more IBM High IOPS Adapter driver software version.
- Firmware version
- Manufacture date
- Advertised Max Capacity — Indicates this IBM High IOPS Adapter's largest size for user data, under default formatting. This can be increased by using the Maximum Write Performance option during formatting.
- Formatted Capacity — Indicates this IBM High IOPS Adapter's current size.
- Formatted Sector Size — Indicates this sector size of the current format.

The dialog also shows the associated PCIe bus details:

- Address
- Device ID
- Vendor ID
- Subsystem Device ID
- Subsystem Vendor ID

- Slot number
- Reserve space — Percentage of reserve space available (10% or less triggers write-reduced mode; 0% triggers read-only mode)

The following runtime statistics are provided:

- Current temperature, in degrees Centigrade
- Lifetime physical read volume (bytes read so far during the life of this device)
- Lifetime physical write volume (bytes written so far during the life of this device)

## Saving IBM High IOPS Adapter Information

You can save information from the selected IBM High IOPS Adapter(s) by using the Copy feature. To do this:

1. Highlight one or more IBM High IOPS Adapters in your Device Tree. Use the **Shift** or **Ctrl** keys to select which drives you want to view. The IBM High IOPS Management Application displays each drive's information in the Device Report panel as you select it.
2. Click in the **Device Report** panel to change the focus to that list.
3. Press **Ctrl-A** to select all the device information. (Or highlight text with the mouse cursor to choose a smaller piece of data.)
4. Press **Ctrl-C** to copy the information.

The IBM High IOPS Management Application saves the contents of the Device Report panel to the Clipboard. You can then paste this information as needed into a report or other document.

# Performance Monitoring

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## Performance Reporting

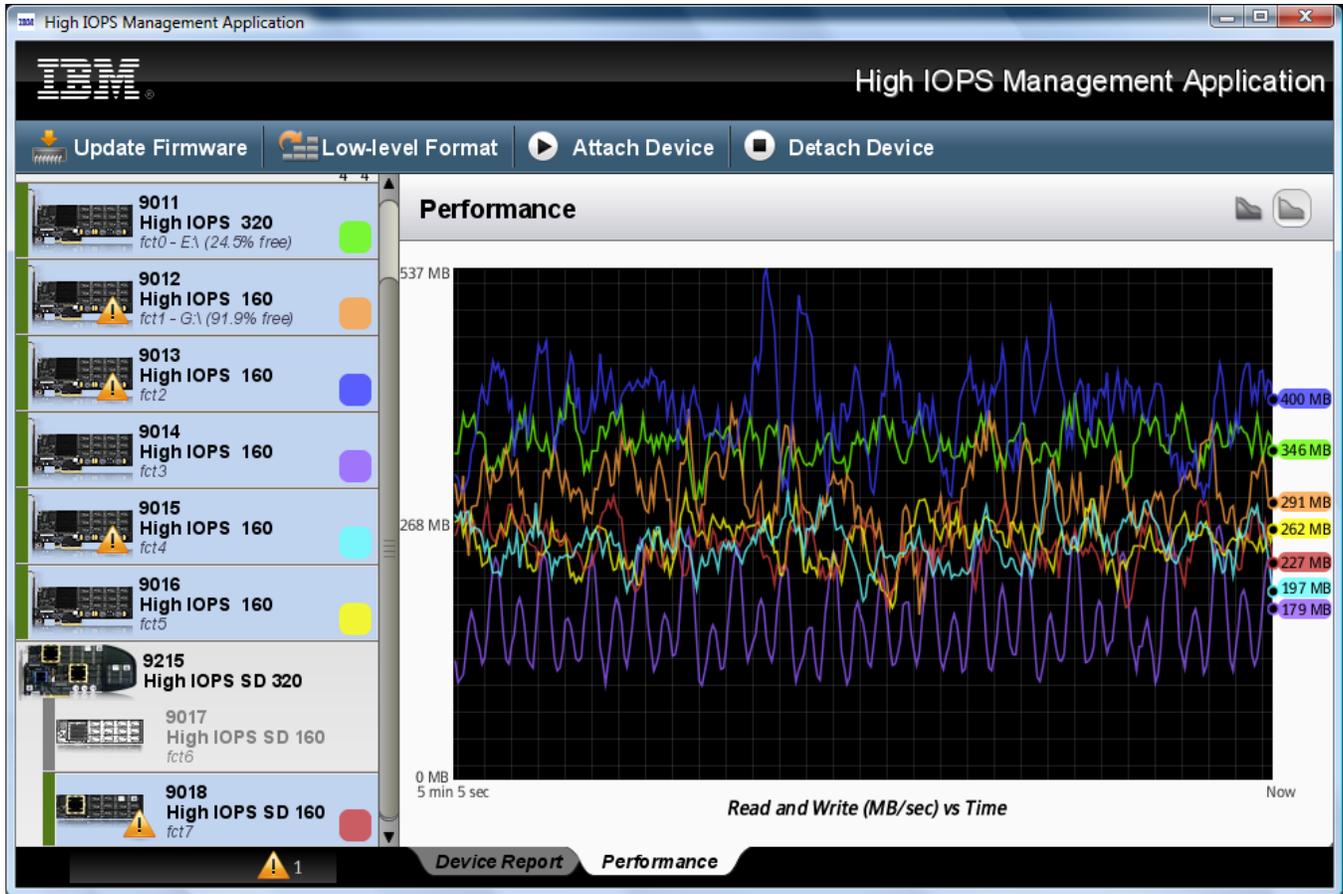
When you click the Performance tab, IBM High IOPS Management Application draws a real-time graph of the read and write performance of selected attached devices, as shown below. Read and Write vs Time measures throughput in megabytes per second.

The lower left corner of each window shows how long the data has been captured, in minutes and seconds. Each drive has a color-coded circle to match its graph color. Also, you can re-size the window to gather more data.

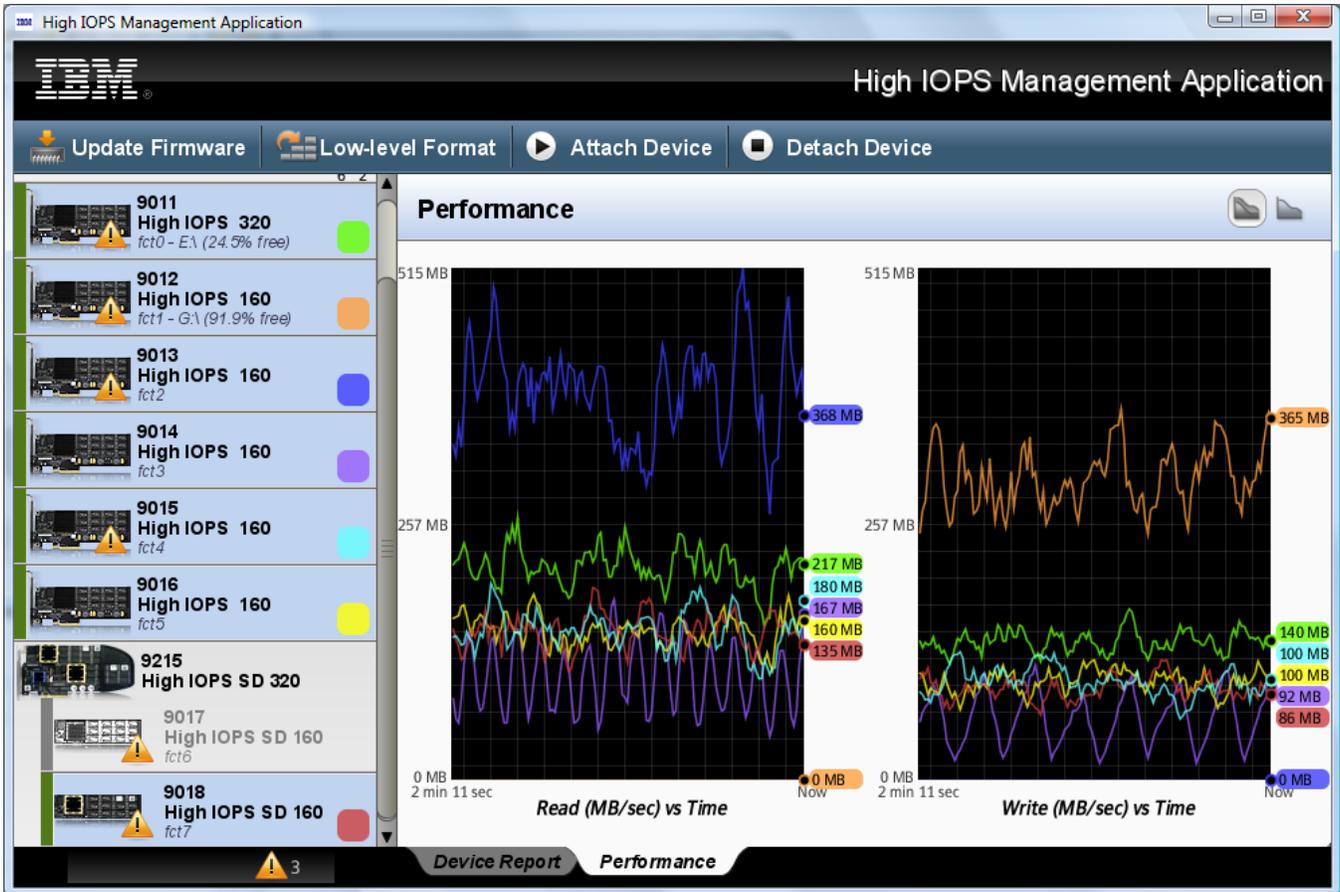
The default view is combined, with two windows:

- Read and Write (MB/s) vs. Time
- Read and Write Operations (IOPS, or I/O per second) vs. Time

The Combined view is showed below:



To view performance data in *separate windows*, click the Separate View icon on the upper-right corner of the Performance window, as shown below.



The Separate Views panel shows four categories of performance for each selected device:

- Read (MB/s) vs. Time
- Write (MB/s) vs. Time
- Read IOPS vs. Time
- Write IOPS vs. Time

To switch back to Combined View, click on the Combined View icon at the upper right of the Performance window. To select devices you want to monitor, click on their images in the left panel. If performance data is not available for a device, IBM High IOPS Management Application will indicate with a black circle that the data isn't available, as shown below.



# Operations

The menu bar (shown below) provides options for working with the highlighted IBM High IOPS Adapter(s).



- **Update Firmware** — Upgrades the firmware on the selected device(s).
- **Low Level Format** — Performs a low-level format to change the logical size of the device.
- **Attach Device** — Attaches an IBM High IOPS Adapter so that the operating system can interact with it. **Attach** works only on detached devices.
- **Detach Device** — Detaches an IBM High IOPS Adapter so you can perform a low-level format or upgrade the firmware. **Detach** works only on attached devices.
- **Page File Settings** — Enables or disables an IBM High IOPS Adapter as a page file space.

To manage one or more IBM High IOPS Adapters:

- Click one of the IBM High IOPS Adapters in the **Device Tree**.
- Hold the left mouse button down to select several devices at once.
- Use **Ctrl+Click** (left mouse button) to select two or more separate devices.

## Update Firmware

The **Update Firmware** operation lets you upgrade the IBM High IOPS Adapter's firmware. You should upgrade the firmware if:

- IBM High IOPS Management Application presents a warning icon stating that the firmware is out of date.
- The Windows System Event Log or Linux system log (typically in `/var/log/messages`) reports a problem due to out-of-date firmware.
- You are instructed to do so by IBM Customer Support.
- You are instructed to do so in the Release Notes and Errata document that comes with each driver release.

**NOTE** In most cases, if you upgrade the IBM High IOPS Adapter firmware you must upgrade the IBM High IOPS Adapter driver as well. Mismatched firmware and drivers often cause support issues. Only driver versions 1.2.4 and higher, with their corresponding firmware versions, can be upgraded to version 2.2.3. If your driver version is older than 1.2.4, it must be upgraded to 1.2.4 before advancing to a driver/firmware version later than that.

**NOTE** Upgrading the firmware may take some time. Monitor the progress using IBM High IOPS Management Application.

**Attention** Back up the data on your IBM High IOPS Adapter(s) prior to performing the upgrade.

**Attention** It is extremely important that the power not be turned off during a firmware upgrade, as this could cause device failure. If a UPS is not already in place, consider adding one to the system prior to performing a firmware upgrade.

**Attention** Interrupting an update while it is in progress can result in permanent damage to the device. Never use the Windows Task Manager to stop the update, and never kill the process in Linux. (For this reason, the IBM High IOPS Management Application ignores all exit requests.) If the operation fails, it is critical that you restart this operation and complete it successfully before a reboot occurs to prevent damage to the device.

**Important:** To properly complete the firmware upgrade to the device, you will need to perform a cold or warm boot of your system. The IBM High IOPS Management Application will advise you of which action to take, showing one of the following messages:

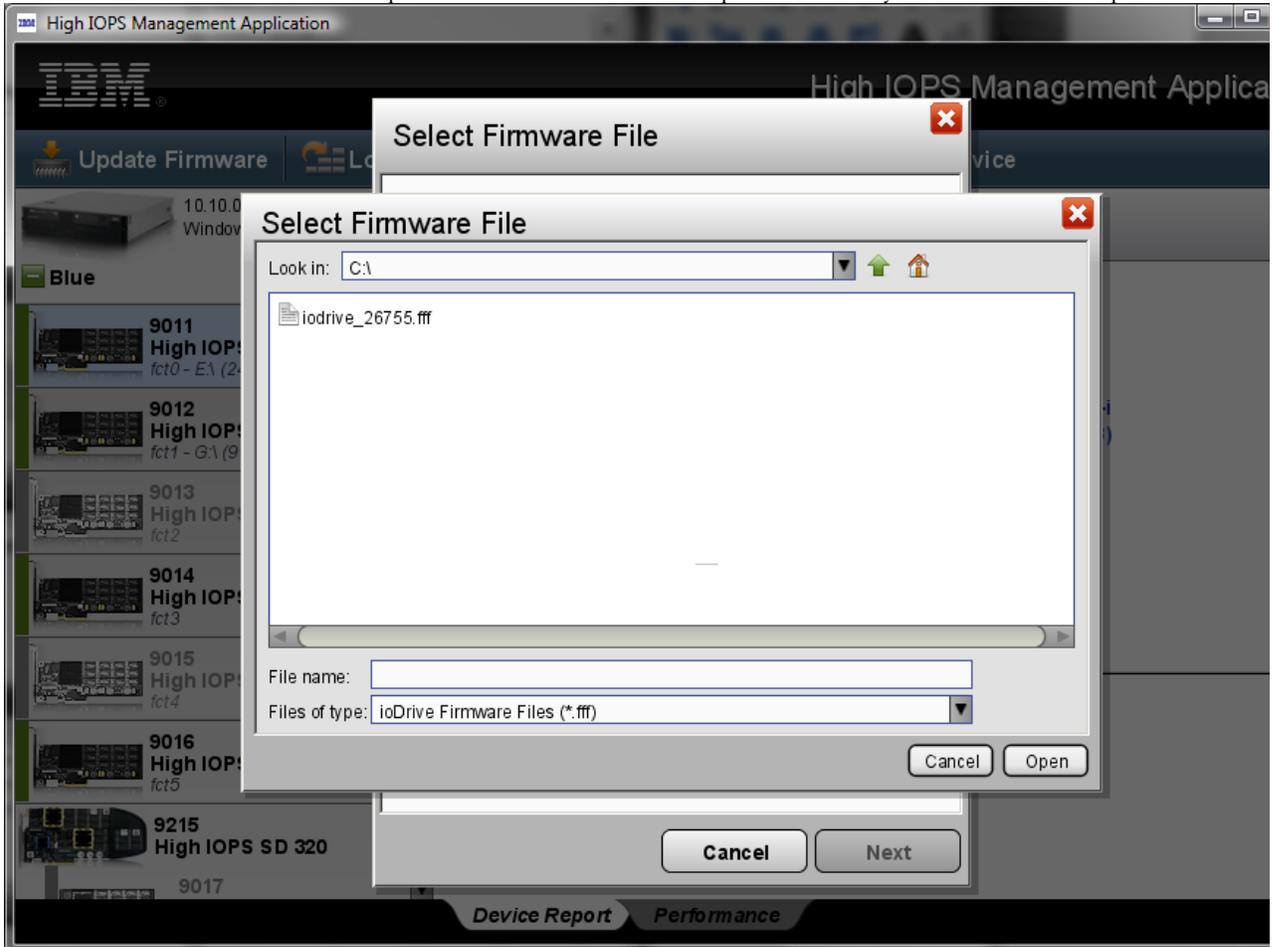
"The firmware on the selected devices was successfully updated. Reboot your computer for the update to take effect."

"The firmware on the selected devices was successfully updated. Shut down your computer and restart for the update to take effect."

To update the firmware,

1. Download the IBM High IOPS Adapter firmware upgrade file from <http://www.ibm.com/systems/support> and place it in a convenient directory.
2. Highlight the device(s) you want to upgrade in the **Device Tree**.
3. Click **Update Firmware** in the menu bar.
4. Select the IBM High IOPS Adapter firmware file using the dialog, as shown in the figure below. (The file naming convention is IBM High IOPS Adapter\_ *version*.fff (where *version* is the numerical version of the firmware). The default location for this file on Windows is C:\Program Files\IBM High IOPS\Firmware, and on Linux it is /usr/share/IBM High IOPS/images.

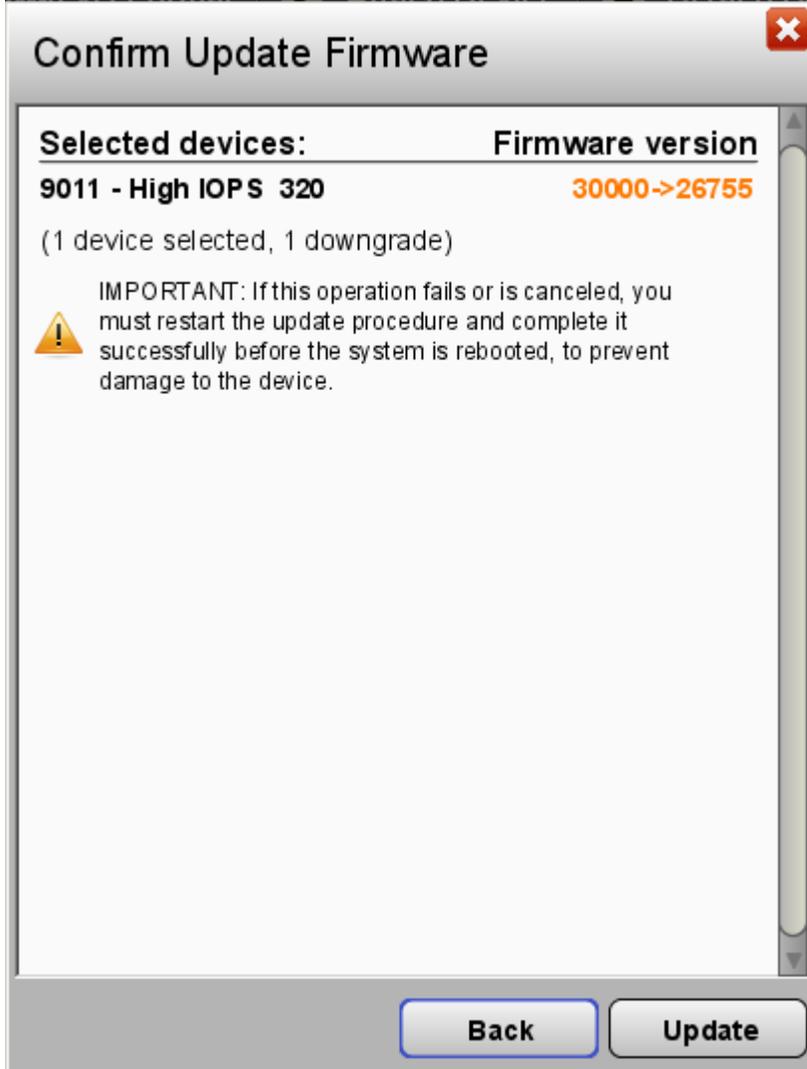
- Use the **Browse** button to navigate to the location of this file. IBM High IOPS Management Application shows the default directories, so unless you have installed the firmware in a non-standard location, the **Select Firmware File** dialog opens to the correct location. Once you have selected a file from a given folder, that folder will be saved as the default place for the file chooser to open next time you do a firmware update.



The selected file now appears in the confirmation dialog.

6. Click **Next** to proceed.

The Confirm Update Firmware dialog appears.



7. Click **Update**.

The selected drive(s) display a blue progress bar in the **Device Report** panel as the update occurs. This bar shows both the percentage as well as the estimated time remaining to complete the update, as shown below.



**NOTE** All three external LED indicators on each selected IBM High IOPS Adapter will also light during the update process.  
When the update completes, IBM High IOPS Management Application will prompt you to reboot to complete the process.

8. Click **OK**.

9. Completely power down and restart the computer to ensure a full reset of the system and installation of the firmware.

### Firmware Already Updated

IBM High IOPS Management Application checks to see if the firmware update version is required for the selected device. If the update and the current firmware versions are the same, IBM High IOPS Management Application notifies you. The IBM High IOPS Management Application also grays-out the **Update** button, because it is not needed in this case.

If you want to cancel the update, click the **X** at the upper right of the dialog to exit.

If you want to select a different firmware update file, click **Back** to return to the file selection dialog.

## Low-Level Format

Your IBM High IOPS Adapter comes pre-formatted, so generally it's not necessary to use this option. However, you would use it if you:

- Need to re-format the drive to change its logical size to enhance write performance.
- Are instructed to do so by IBM Customer Support.

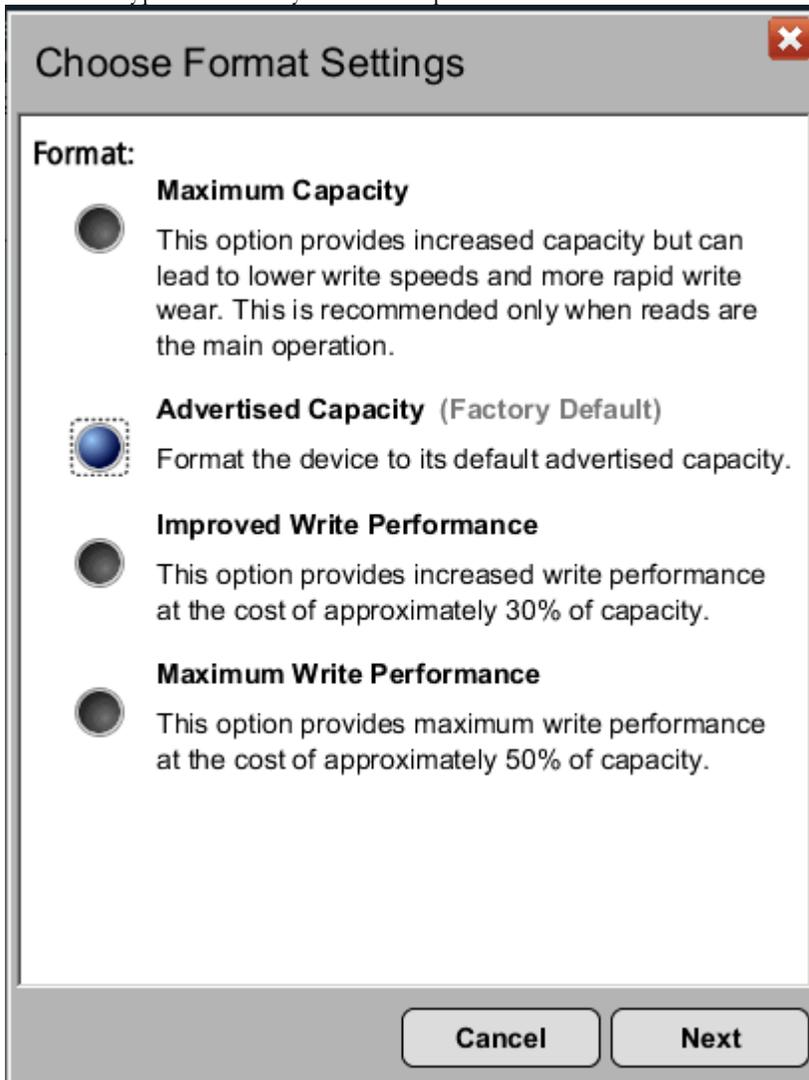
**NOTE** The IBM High IOPS Management Application performs a low-level format that is *different* from a format performed by an operating system using standard disk management utilities. You do not need to perform a low-level format to create an operating system-specific volume on the device.

**Attention** Formatting an IBM High IOPS Adapter will destroy any data still on the device. If you have not backed up the data to another device, choose **Cancel** to prevent the format.

To format an IBM High IOPS Adapter:

1. Select one or more IBM High IOPS Adapter(s) from the **Device Tree**.
2. Click **Low Level Format**.

3. Select the type of format you want to perform:



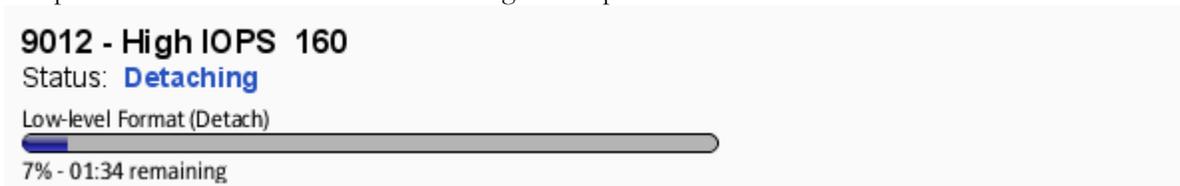
- **Maximum Capacity** — Creates the maximum possible capacity for user data on the device, which is larger than the default Advertised Capacity. The tradeoffs are possible reductions in write speeds and device longevity. For more details, see [Reserve Space and Device Health](#) earlier in this guide
- **Advertised Capacity (default)** — This is the standard format found on a new an IBM High IOPS Adapter. The drive will be formatted to its advertised size.
- **Improved Write Performance** — Formats the device for increased write performance at the cost of approximately 30 percent of capacity.
- **Maximum Write Performance** — Formats the device for maximum write performance at the cost of approximately 50 percent of capacity.

- Choose an option and click **Next**. IBM High IOPS Management Application will list your selected device(s) to format as well as the approximate capacity after formatting for each device, as shown below.



- Click **Format** to perform the format.

At this point, the IBM High IOPS Management Application automatically detaches the selected device(s). It then displays a blue progress bar (shown below) in the **Device Report** panel, showing the percentage of format completion and the estimated time remaining to complete the format.

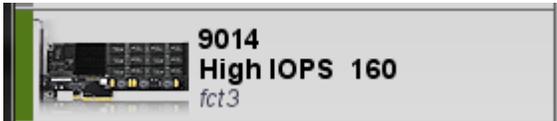


When the format completes, IBM High IOPS Management Application automatically reattaches the newly-formatted IBM High IOPS Adapter(s) for use by the OS.

## Attach Device

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).

The **Device Tree** shows each attached IBM High IOPS Adapter with a green bar:

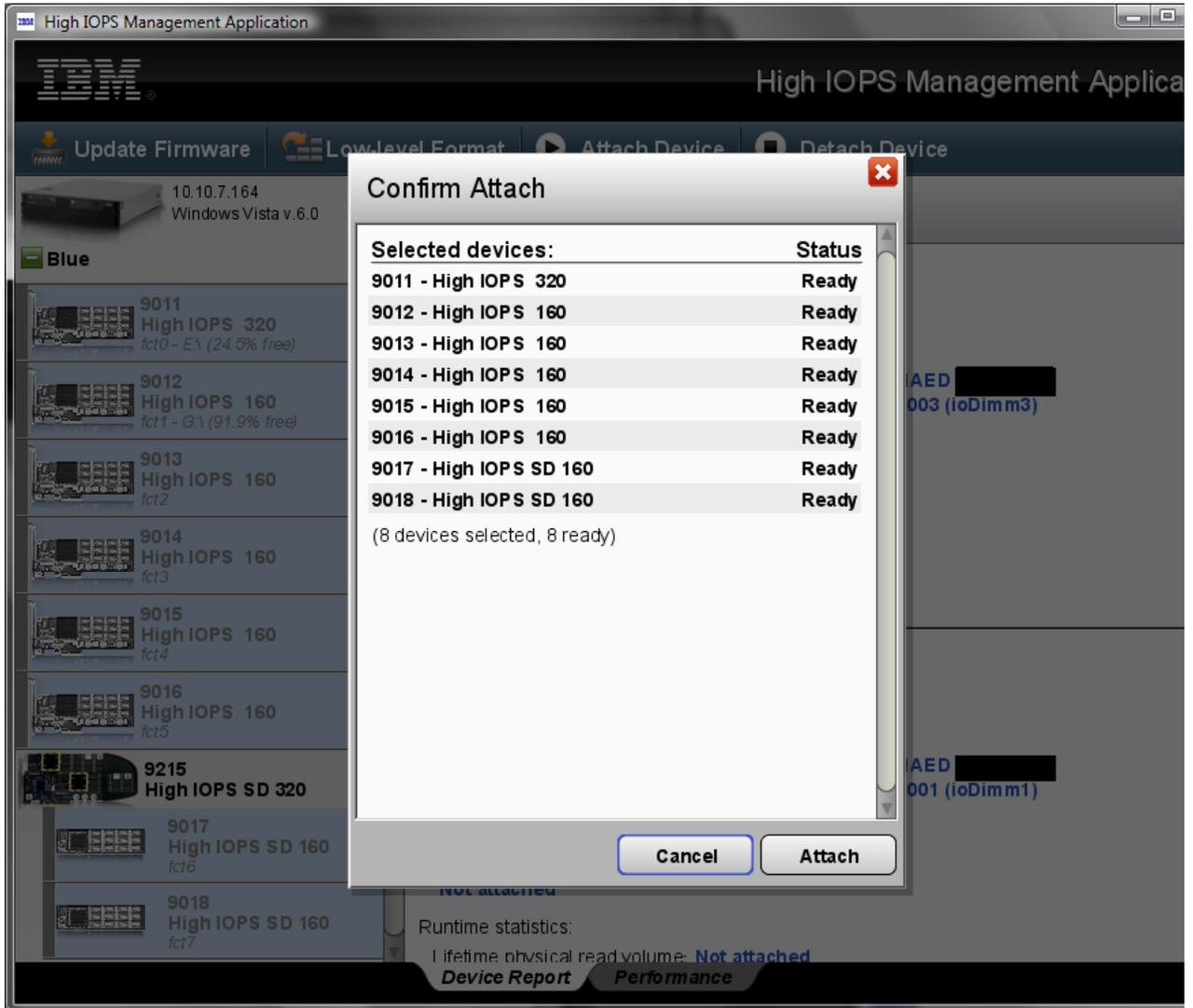


To attach a detached IBM High IOPS Adapter and allow the operating system to interact with the device,

1. Select one or more detached IBM High IOPS Adapter(s) in the tree. They appear with the open link.



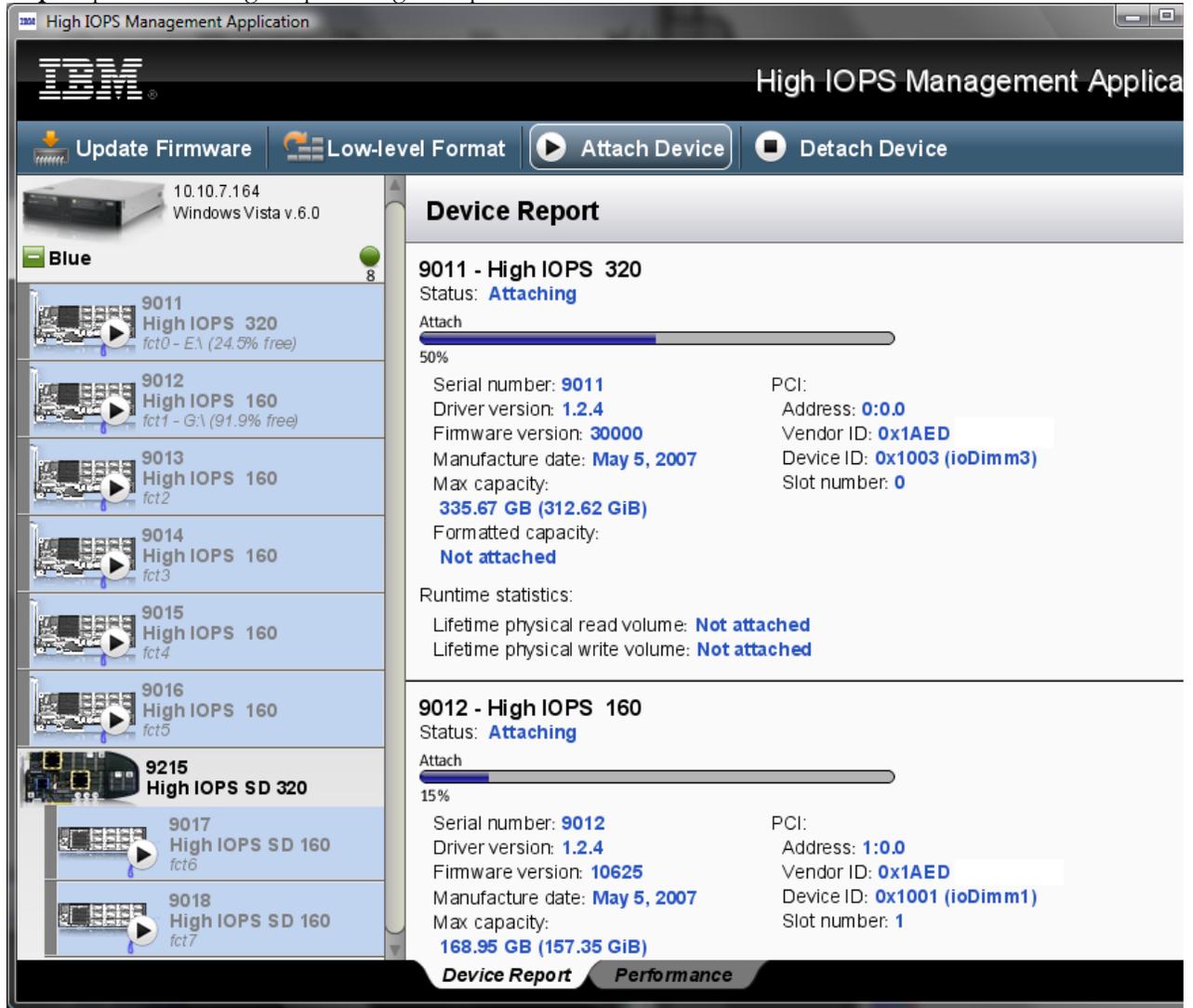
- Click **Attach Device** in the menu bar. IBM High IOPS Management Application asks you to confirm the attachment.



- If the selected drive is already attached, the **Attach** button will be grayed-out.

4. Click **Attach** to confirm the operation.

**Attach Device** connects the device. The **Attach Device** operation's progress bar appears in the **Device Report** panel indicating the percentage completed.



When the **Attach** operation finishes, a message indicates that the device is now attached and available to the OS.

### Attach Device Fails

If the Attach Device operation fails, an error message appears:

### 9013 - High IOPS 160

Status: **Detached**

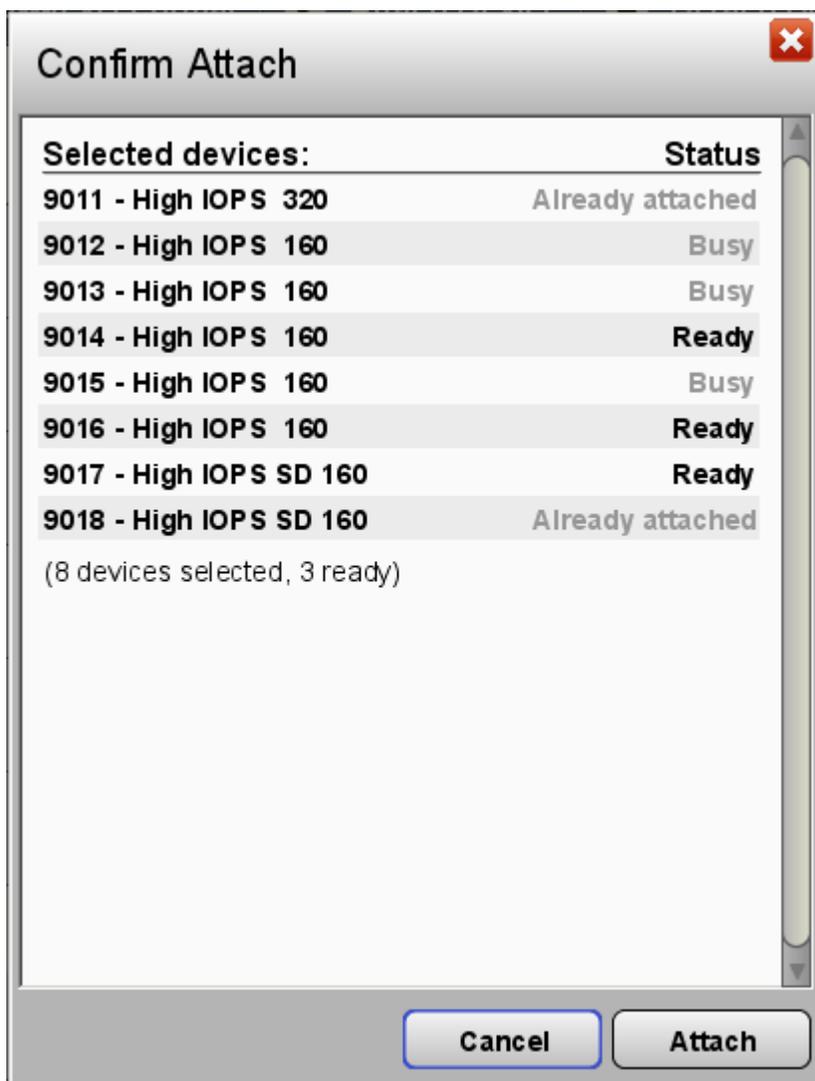
Attach failed.

Reason: Attach failed (Device is missing bad block map)

Contact Customer Support if an error occurs during the Attach Device operation.

### Mixed Attached/Detached Devices

If you select a set of IBM High IOPS Adapters to attach, some of which are attached and some are detached, the Confirm Attach dialog will display a list of the drives and their status.



When you click **Attach**, IBM High IOPS Management Application proceeds to connect only the detached devices (those marked "Ready").

## Detach Device

**Detach Device** disconnects your IBM High IOPS Adapter from the operating system. Once detached, the device will not be accessible to users or applications. (You will need to use **Attach Device** to make it accessible.) You should only need to detach an IBM High IOPS Adapter to perform a low-level format or a firmware upgrade.

The Device Tree shows detached IBM High IOPS Adapter(s) as having a gray link in the Device Tree:

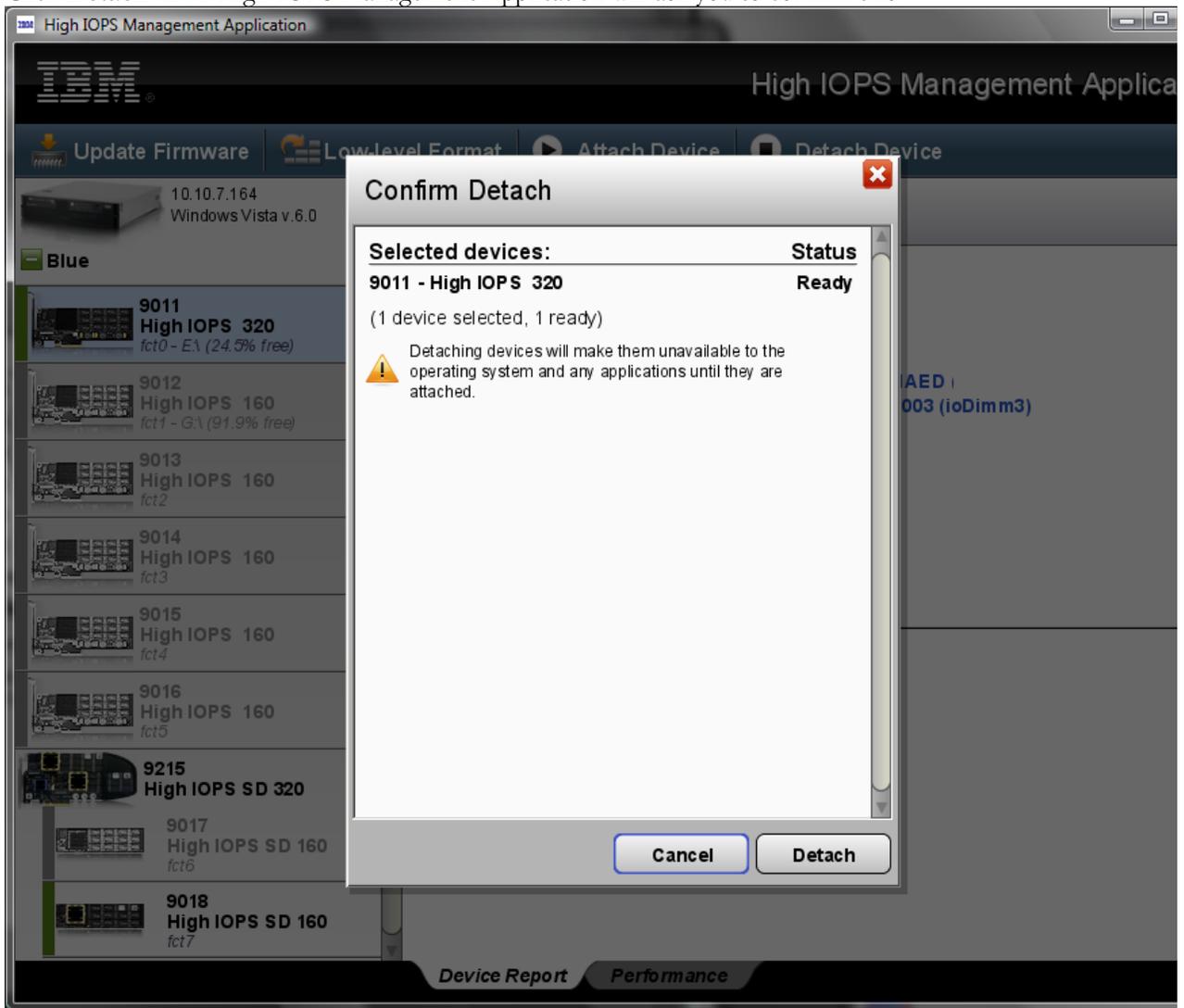


To perform a detach:

1. Select one or more IBM High IOPS Adapter(s) from the **Device Tree**. (You can only detach devices that are currently attached.) Attached devices appear with a green link, as shown in Figure 35.



2. Click **Detach**. IBM High IOPS Management Application will ask you to confirm this:



3. Click **Detach**.

(If the selected device is already detached, the **Detach** button is grayed-out.)

**Detach Device** proceeds to disconnect the device(s). It also shows a progress bar in the **Device Report** panel for each device as it detaches.

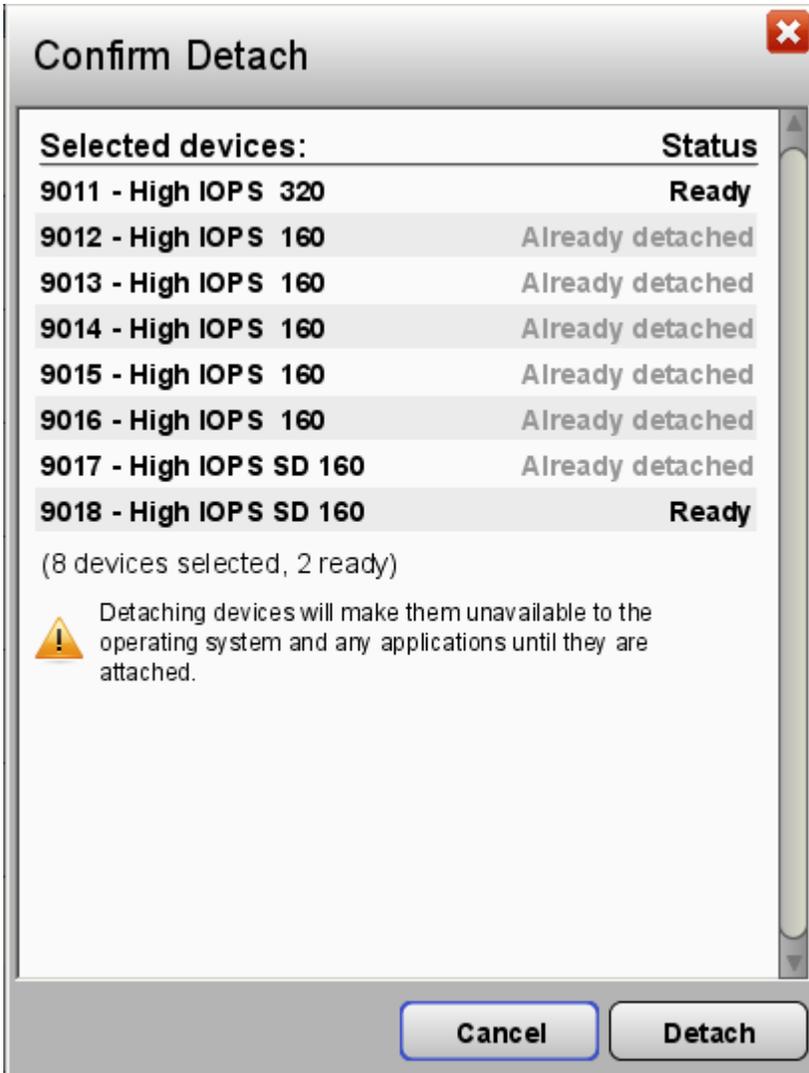
When the **Detach Device** operation finishes, the "Status: detached" message appears.

Use **Attach** to restore the operating system access to the IBM High IOPS Adapter.

Contact Customer Support if an error occurs during the **Detach** operation.

### Mixed Attached/Detached Devices

If you select a set of IBM High IOPS Adapters to detach, some of which are attached and some are detached, the Confirm Detach dialog will display a list of the drives and their status:



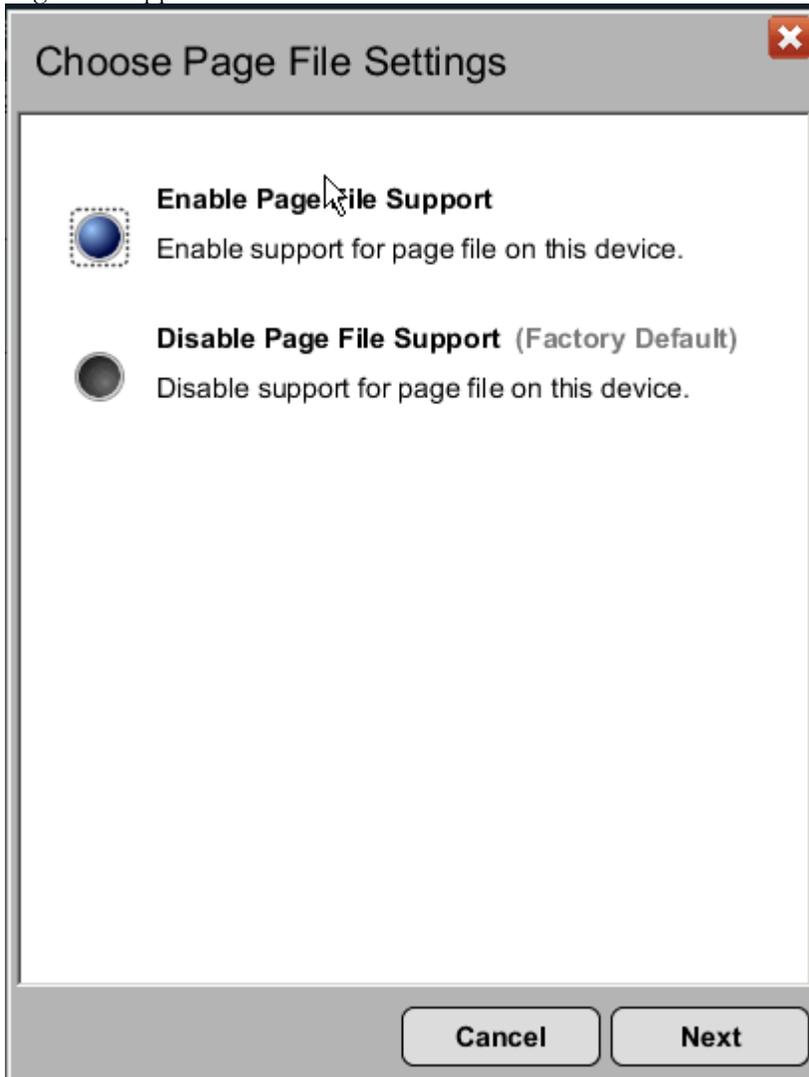
When you click **Detach**, the IBM High IOPS Management Application proceeds to disconnect only the attached devices (those marked "Ready").

### Enabling Page File Settings

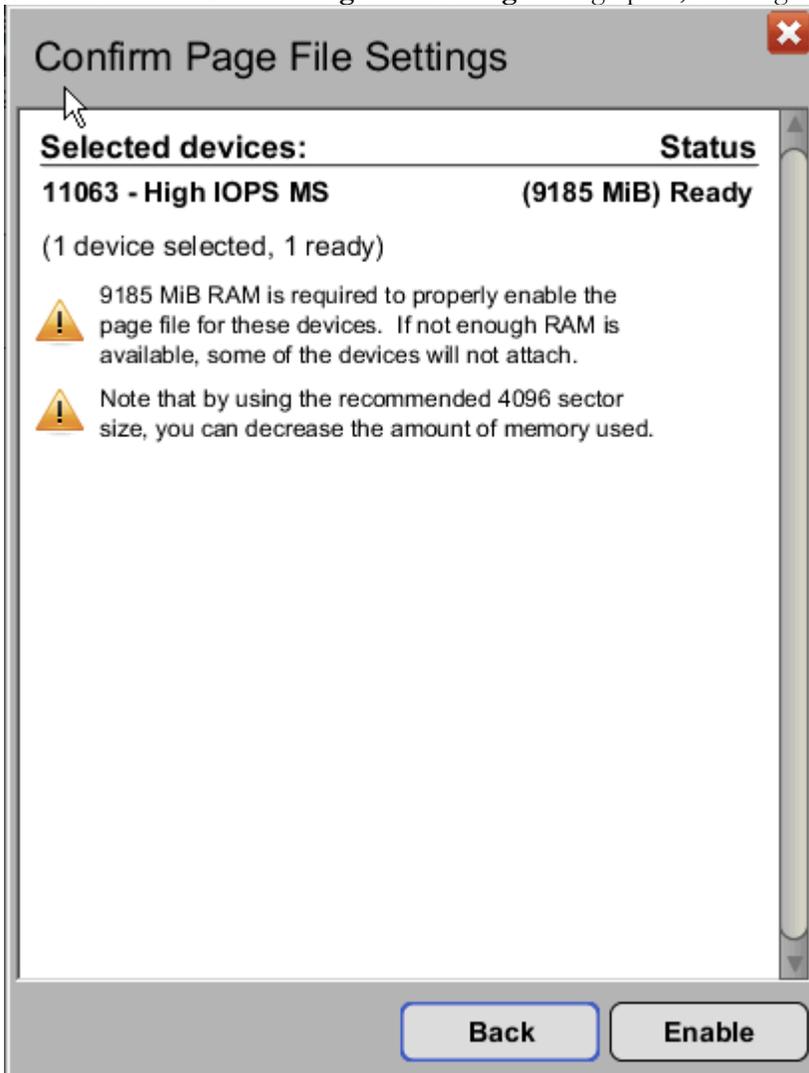
You can enable or disable an IBM High IOPS Adapter device as a page file space. Page File support is disabled by default for all devices.

To enable page file space for a device,

1. Click **Page File Settings** on the **Menu** bar. The **Choose Page File Settings** dialog opens with the **Enable Page File Support** button selected.



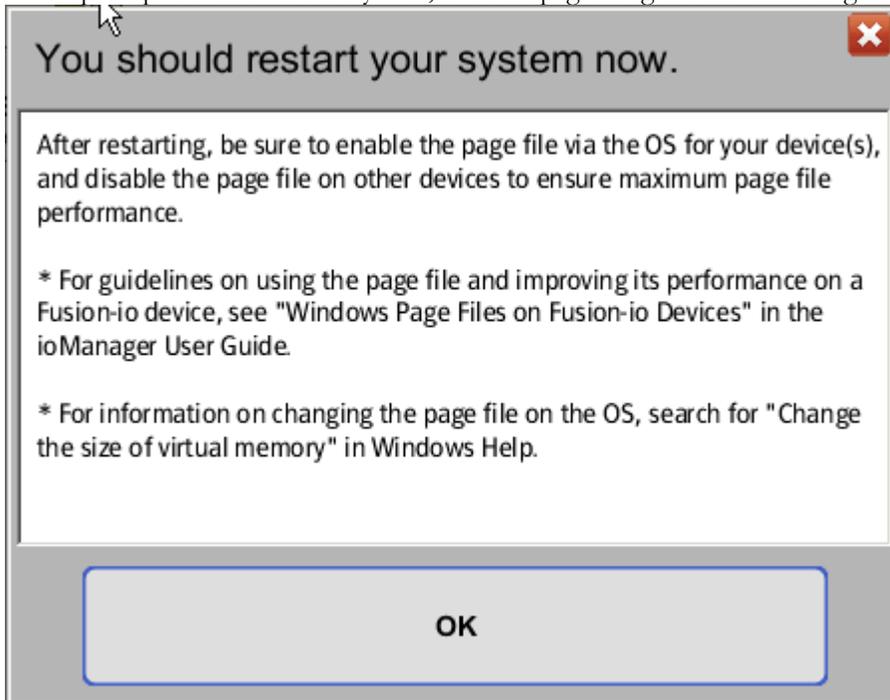
2. Click **Next**. The **Confirm Page File Settings** dialog opens, showing RAM alerts for the devices.



**Attention** Be sure you have enough available RAM (at least 9185 MB) to enable page files.

3. Click **Enable**.

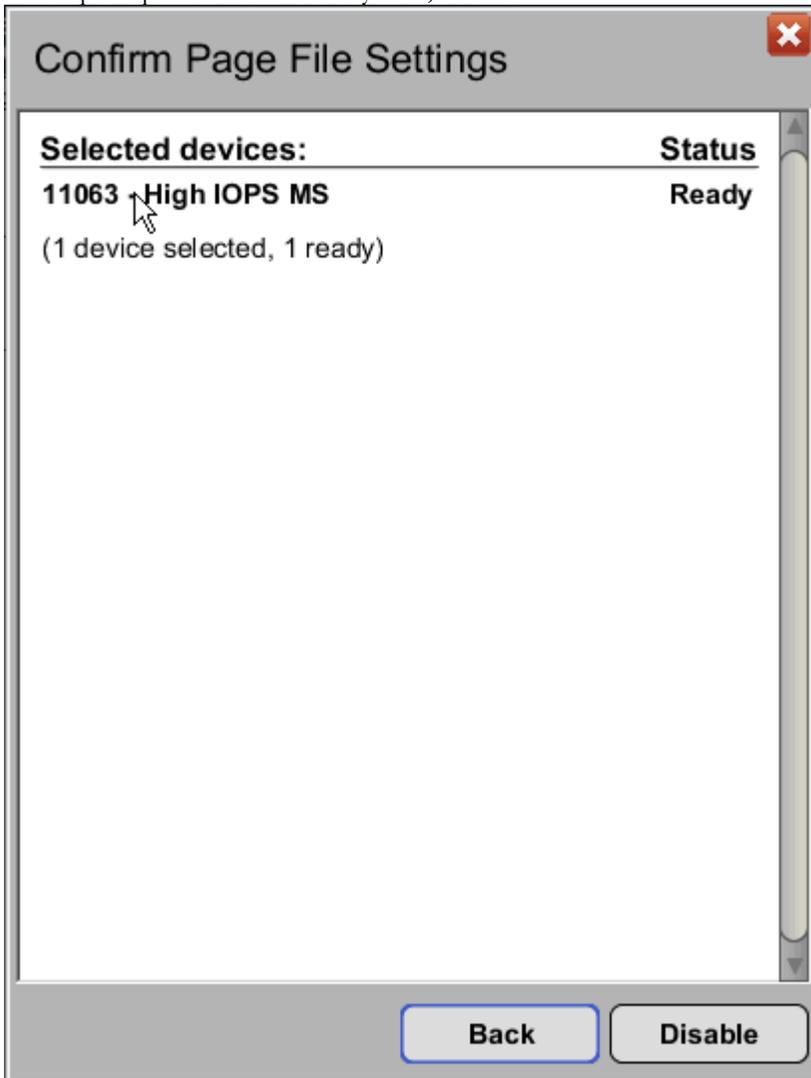
4. When prompted to restart the system, read the page file guidelines in dialog and click **OK**.



To *disable* page file for a device,

1. Click **Page File Settings** on the Menu bar. The **Choose Page File Settings** dialog opens.
2. Select **Disable Page File Settings** and click **Next**. The **Confirm Page File Settings** dialog appears.

3. When prompted to restart the system, click **OK**.



## IBM Support

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Customer Support for IBM High IOPS Adapters is available on the web at the following address:

<http://www.ibm.com/systems/support>

IBM part number 60Y1441