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hyperI/O LLC

**hIOmon™**

I/O Performance Monitor

Version 7.0.229.0 (November 2011)

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\*\*\*\* hIOmon ReadMe File \*\*\*\*

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## NOTICE !

The "Late-breaking news" section contains information that might affect the installation and use of the hIOmon software product.

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## Contents

### 1. Introduction

- 1.1 -- Purpose of this ReadMe file
- 1.2 -- Distribution and Use Policy
- 1.3 -- Product Description (Overview, Features, Uses and Architecture)
- 1.4 -- Operating Systems and Associated Software (System Requirements and Components)

### 2. Late-breaking news

- 2.1 -- New Features
- 2.2 -- Known Problems

### 3. Operation

- 3.1 -- Getting Started
- 3.2 -- Presentation Client - Control and Display Descriptions
- 3.3 -- hIOmon WMI Browser - Control and Display Descriptions

### 4. Hints and issues

- 4.1 -- Hints
- 4.2 -- Software issues

## 5. Installation

- 5.1 -- Installation notes: all Microsoft(R) Windows platforms
- 5.2 -- Installation instructions: Windows 7, Vista, XP, 2003, and 2008
- 5.3 -- Uninstalling the hIOmon software

## 6. Technical assistance and support information

- 6.1 -- Obtaining additional information from hyperI/O LLC
- 6.2 -- Obtaining information via the Internet
- 6.3 -- Ordering software

## 7. Legal statements

- 7.1 -- Trademark notices
- 7.2 -- Legal notice
- 7.3 -- Copyright

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## **1. INTRODUCTION**

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### **1.1 PURPOSE OF THIS README FILE**

This ReadMe file provides a brief product description and operation overview, installation instructions, support information, and software release notes for the hIOmon™ File I/O Performance Monitor software product from hyperI/O LLC.

To print this ReadMe file, choose the Print command usually found under the File menu.

### **1.2 DISTRIBUTION AND USE POLICY**

Please read the hyperI/O LLC Software License Agreement (EUSLA) for the conditions and terms associated with the use (including installing and copying) of the hIOmon software product from hyperI/O LLC. The EUSLA can be found in the “license.pdf” document file; the “license.pdf” along with the “license.rtf” and “license.txt” document files (which are all equivalent in content) are copied to the installation directory as part of the hIOmon software installation process. The “license.pdf” can be found within the “Documents” directory.

Do not use hIOmon software until you have carefully read this EUSLA. Copying, installing, or otherwise using the hIOmon software indicates that you have read, understand and accept this EUSLA and agree to be bound by all of the terms of this EUSLA. If you do not accept this EUSLA, do not copy, install or otherwise use the hIOmon software.

## 1.3 PRODUCT DESCRIPTION

### Overview

hIOmon is an innovative, unique performance analysis software tool that enables disk I/O operations and their performance to be both measured and monitored up at the application level upon a specific, individual FILE (as well as disk and process/application) basis. It examines and efficiently records the performance of user-selected file (and device) I/O operations for real-time and/or subsequent display.

The file and device I/O operation information collected by hIOmon can be either:

- An “I/O Trace” of the individual I/O operations (i.e., a separate trace record for each and every I/O operation being monitored by hIOmon), and/or
- “Summary” (i.e., I/O operation performance information automatically aggregated by hIOmon upon an individual file, device, and/or process basis for a concise, higher-level survey of the selected I/O activity).

Both types of I/O operation information can be viewed (locally or remotely over the network) either in real-time and/or in a historical “replay” display mode through the use of the hIOmon Presentation Client, which is a Java™-based Graphical-User-Interface (GUI) application.

Summarized performance metrics about selected file I/O operations can also be written by hIOmon to the System Event Log for display and other use by popular system management tools that monitor the System Event Log.

In addition to a Java-based application GUI, hIOmon includes a “command line interface (CLI)” component that serves as an alternate means of control over the operation of hIOmon and of displaying, in a simple and efficient manner, a comprehensive set of file and device I/O operation performance metrics collected by hIOmon. Several “Export” capability options are also provided that allow you to write the I/O trace and/or summarized performance metrics to a “Comma Separated Values (CSV)” file for use by spreadsheets (such as Microsoft® Excel), databases and other application programs (such as the MXG® Software from Merrill Consultants) so that you can easily perform your own specific analysis upon the performance metrics and generate customized charts and graphs. The “I/O Trace” operation information selectively captured by hIOmon can also be exported to an XML-format file, which can be directly used (without conversion) by the “Intel® NAS Performance Toolkit” tools (both the NASPT Analyzer and the NASPT Exerciser).

hIOmon additionally features support for Windows® Management Instrumentation (WMI). This support not only allows for programmatic control over the operation of hIOmon but also enables broad, industry-standard access to the robust set of file and disk I/O operation performance metrics uniquely collected by hIOmon. The hIOmon real-time summarized file and disk I/O operation performance metrics can be accessed by simple scripts (including VBScript, JScript, PowerShell, and Perl), the Windows Script Host (WSH), Active Server Pages

(ASP), Internet Explorer, and C/C++ applications along with a variety of management applications, such as Storage Resource Management (SRM) applications and the IBM® Tivoli® Monitoring solutions, that leverage WMI and the Common Information Model (CIM) standard. The hIOMon software includes the “hIOMon WMI Browser” (an HTML application) that enables the simple use of Internet Explorer to easily control hIOMon operation and display the real-time summarized I/O operation performance metrics collected by hIOMon on a specific file, device, and/or process basis. In addition, the hIOMon “Disk I/O Ranger Display” HTML application provides a real-time display of the selected hIOMon “Performance Threshold Range Metrics” for an individual logical device, physical device, file, or process/application.

hIOMon also provides a “Performance Extension DLL” (PerfLib) component that lets you use the Windows System Monitor (7/Vista™/XP/2003/2008) and other performance-monitoring applications to collect, display and further process the summarized I/O operation performance metrics which are observed, measured and monitored by hIOMon.

The hIOMon monitoring facilities support sophisticated Alert capabilities as well. Specific thresholds (such as maximum response time, average data transfer rate, I/O operations per second, etc.) can be set for selected file I/O operations; upon detection of these thresholds having been reached, hIOMon can optionally generate a System Event Log record (which in turn allows notification via system management tools that monitor the System Event Log).

hIOMon allows you to quickly, easily and effectively answer the question:

“How fast are your files?”™

## Features

The many features provided by hIOMon include:

- **Individual application/process, disk, and file-level perspectives.**
- **Specific file selection (along with options to explicitly include/exclude by specific process-name).**
- **Support for network-attached files.**
- **Raw device support (with a “Physical Device Extended Metrics” option).**
- **Support for Solid State Disk (SSD) related metrics (e.g., TRIM command usage).**
- **Selectable range of detail (e.g., “I/O trace” or “summarized”).**
- **Essential I/O performance statistics - at the individual file level, including “system file cache” metrics (e.g., “hit” and “miss” counts), the hIOMon “Performance Threshold Range Metrics”, and the “DataTransferred/Time Index (DXTI)” metric along with along with sequential detection!**

- **Associated process name and account name – with summarized file I/O performance metrics available on a specific process basis.**
- **Precision time-stamps.**
- **Summary performance data on a periodic, close-file, or Alert basis.**
- **Alert capabilities for monitoring selected file I/O performance parameters.**
- **Easy-to-use, with both a Command-Line-Interface (CLI) along with a simple windows-type GUI display interface.**
- **Real-time and Replay display modes.**
- **Windows® Management Instrumentation (WMI) support, including the hIOmon WMI Browser, the hIOmon “Disk I/O Ranger Display”, and extensive scripting support.**
- **Provides support for the Microsoft Performance Monitor and System Monitor.**
- **Validated as “Ready for IBM Tivoli software”.**
- **Several export capabilities (including selectable export field options).**
- **Enables the easy and quick collection of selective I/O trace input files for direct use with the “Intel NAS Performance Toolkit (NASPT)”.**
- **Configurable startup options.**
- **Configurable setup options, including support for “Profiles”.**
- **Local or remote control/display over the network.**
- **hIOmon usage statistics.**
- **“Code-signed” (i.e., digitally-signed) installation files and kernel-mode component.**
- **Extensive help information.**

Please refer to the “hIOmon User Guide” (HMG-1093) for more information about the many features listed above. The “hIOmon User Guide” is included in the “Documents” directory as “hIOmonUserGuide.pdf”.

## Uses

You can easily use the powerful features of hIOmon to quickly and effectively handle such tasks as:

- **Identify files/devices with poor I/O performance.**

As the first step in analyzing performance problems with key applications, you can quickly use hIOmon to determine if the associated files are experiencing poor I/O operation performance (and to exactly what extent if so); you can even get summarized file I/O operation performance metrics upon a specific process basis.

- **Impact of system changes upon file and device I/O performance.**

hIOmon allows you to determine the actual impact (with precise measurements as evidence) of changes within the computer system (such as the addition, replacement, or modification of: disk subsystems, computer memory, file systems, processors, operating systems, etc.).

- **Product/system comparisons, particularly amongst vendors.**

Without having to rely only upon benchmarks (and needing to correlate how closely these benchmarks match your particular applications), hIOmon allows you to use your actual applications and associated files just as you normally would with the products and/or systems that you want to compare (such as different disk subsystems, servers, etc., perhaps from different vendors) to see their effect on (even specific) file and device I/O operation performance.

- **Monitor and confirm Quality of Service (QoS) for file and device I/O performance.**

hIOmon allows you to (independently) monitor the actual I/O operation activity of your (specific) files and devices; you can easily confirm whether these files and devices are meeting your expectations as regards I/O performance.

- **Development and support aid**

For a broad range of developers and "troubleshooters" (including application developers concerned about file and device I/O performance; file system and device driver developers; disk subsystem developers; etc. - as well as for all of the respective associated support personnel), hIOmon provides an easy way of seeing exactly what (of interest) is happening in the file and device I/O activity (and if necessary, down to an I/O trace of the individual file and device I/O operations).

With all of its features and benefits, hIOmon is "The I/O Speedometer and Odometer for your Files, Devices, and Applications"<sup>TM</sup> and is the essential tool required to help you qualify, validate, maintain and monitor the I/O operation performance of your files and devices.

Please send questions or comments about hIOMon to [hIOMonSupportInfo@hyperIO.com](mailto:hIOMonSupportInfo@hyperIO.com).

## **Architecture**

hIOMon features a very flexible and scalable architecture. It is comprised of the following three (3) main components:

### **Presentation Client**

The hIOMon "Presentation Client" is a Java application that provides a standard windows-type graphical user interface (GUI). This GUI communicates with the hIOMon Manager to set the various control options of the hIOMon I/O Monitor (such as which particular files/devices are to be monitored and the particular types of I/O operation performance metrics to be collected). The Presentation Client is also used to display the collected file and device I/O operation performance statistics (in real-time or "replay" mode).

### **Manager**

The hIOMon "Manager" runs as an operating-system service (daemon). It manages the hIOMon "I/O Monitor" component (largely based upon control option requests from or set by the hIOMon "Presentation Client"); it also transforms, records, and transfers the collected file and device I/O operation performance metrics to the "Presentation Client". The hIOMon "Manager" allows the "I/O Monitor" to be much more simpler, faster and efficient in operation.

### **I/O Monitor**

The hIOMon "I/O Monitor" is a lightweight component that performs the actual monitoring of the selected I/O operations; based upon such monitoring, it collects the requested I/O operation performance metrics. The "I/O Monitor" is very efficient and introduces negligible overhead into the overall file and device I/O operation (especially when compared to the time durations of I/O operations); moreover, the "I/O Monitor" does not require any file system modifications nor does it require any operating system code changes (nor application or file changes).

hIOMon also includes a hIOMon Command-Line-Interface (CLI) component, a hIOMon "WMI Support DLL" component (that provides Windows Management Instrumentation support) along with the "hIOMon WMI Browser" and hIOMon "Disk I/O Ranger Display", a hIOMon "Performance Extension DLL" component (a "PerfLib" that provides Windows System Monitor support) and a hIOMon "Client Communication DLL" (that acts as an interface between the hIOMon Manager and the hIOMon CLI, hIOMon WMI, and Windows PerfMon/SysMon support components).

## 1.4 OPERATING SYSTEMS AND ASSOCIATED SOFTWARE

### System requirements

Note: See the "Late-breaking news" section for more information on using and configuring the product in the Windows 7, Windows Vista, Windows XP, Windows Server 2003 and Windows Server 2008 operating system environments.

The hIOmon software has the following minimum system requirements:

- IBM PC (or 100% compatible);
- 42 MB (megabytes) or more of free hard disk space (approximately 20 MB for the Sun Java Virtual Machine and 22 MB for the hIOmon software components at installation). Note that the Java Virtual Machine (JVM) is only required if the hIOmon Presentation Client GUI is used; Sun Java 2.0 Runtime Environment (JRE) Release 1.6.0 or higher is required for running the hIOmon Presentation Client upon the supported Windows operating system environments noted above.
- Microsoft Windows 7/Vista/XP (Final Release or above) or Windows Server 2003/2008/2008R2 (Final Release or above).
- The Windows Management Instrumentation (WMI) Core 1.5 software package is required for the hIOmon "WMI Support". This WMI core software package is already installed by default on Windows 7/Vista/XP/2003/2008. Internet Explorer version 5.5 or higher is required for use of the hIOmon WMI Browser.
- The Microsoft Visual C++ Runtime Libraries. Note that these libraries can automatically be installed as part of the hIOmon software installation process.
- Pentium® 233 MHz or faster processor;
- 64MB or more RAM (Windows XP), 128MB or more RAM (Windows Server 2003), 512MB or more RAM (Windows 7/Vista/2008).

### Components

The hIOmon software contains the following principal components:

- Installer software –  
Installs all of the other software files.
- hIOmon Presentation Client -  
Java application that provides a standard windows-type of graphical user interface (GUI), which is used to set the various control options of the hIOmon I/O monitor

and to also display the collected file and device I/O operation performance metrics.

- **hIOmon Manager -**  
Runs as an operating-system service (or daemon). It is used to manage the hIOmon I/O Monitor (largely based upon control option requests received from the hIOmon Presentation Client). It also transforms, records, and transfers the collected file and device I/O operation performance metrics to the hIOmon "Presentation Client".
- **hIOmon I/O Monitor -**  
Performs the actual monitoring of the selected file and device I/O operations; implemented as a "filter device driver" under Windows 7/Vista/XP/2003/2008.
- **hIOmon Command-Line-Interface (CLI) -**  
Provides a "command-line-interface" for limited control over the operation of hIOmon and for the display of real-time summarized file and device I/O operation performance metrics.
- **hIOmon Windows Management Instrumentation (WMI) Support DLL -**  
A "WMI Support DLL" that provides the support required to interface with Windows Management Instrumentation (WMI).
- **hIOmon WMI Browser -**  
Enables the use of Internet Explorer through WMI to control hIOmon operation and display real-time summarized file, device, and process I/O operation performance metrics.
- **hIOmon Disk I/O Ranger Display -**  
Enables the real-time display and export of the hIOmon "Performance Threshold Range Metrics" for an individual device, file, or process; these metrics are a selected set of automatically-summarized I/O operation performance metrics that are specifically focused upon the ranges of I/O operations per second (IOPS), megabytes-per-second (MB/s) data transfer rates, response times, and I/O operation queue depths/lengths actually observed by the hIOmon I/O Monitor for individual files, devices, and processes.
- **hIOmon Windows Performance Monitor / System Monitor PerfLib -**  
A Windows "Performance Extension DLL" that provides the Windows Performance Monitor and System Monitor support.
- **hIOmon Client Communication Interface -**  
Provides a common communication path between the hIOmon Manager and "clients" such as the hIOmon CLI component, hIOmon WMI component, and the hIOmon PerfLib component.

- hIOmon Service Install -  
A utility program used to complete the load/unloading of the hIOmon Manager and hIOmon I/O Monitor service/driver programs.

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## 2. LATE-BREAKING NEWS

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This section contains information that might impact the installation and use of the hIOmon product. It also includes a brief description of new features incorporated in the latest version of hIOmon.

**NOTE:** All released hIOmon version components are General Availability (GA) versions of hIOmon. If you encounter any errors or difficulties, please let us know by contacting hyperI/O LLC Technical Support (see section 6 for contact information).

### 2.1 NEW FEATURES

Version 7.0.229.0 of the hIOmon software is a maintenance release of the hIOmon I/O Performance Monitor software, which includes the recently-introduced hIOmon “DataTransferred/Time Index (DXTI)” metric that provides a “high-level” means for a relative comparison of I/O operation performance, where “higher is better” (i.e., the higher the Index number, the better the performance). This Index metric is provided upon an individual file, device, and process/application basis; it resembles the “fuel economy” index for an automotive vehicle (i.e., “miles-per-gallon” or “kilometres/litre”) as an overall measure of “performance efficiency”.

The new hIOmon “DataTransferred/Time Index” metric can be displayed by the hIOmon Disk I/O Ranger Display application, the hIOmon WMI Browser, the hIOmon Presentation Client, and the hIOmon CLI support. It can also be easily calculated from the summary I/O operation performance metrics that can be exported by the hIOmon software.

The prior hIOmon version 7.0.135.0 introduced the hIOmon “Disk I/O Ranger Display”, which is an HTML application that enables the real-time display and export of the hIOmon “Performance Threshold Range Metrics” for an individual device, file, or process.

The “Performance Threshold Range Metrics” are a selected set of summarized I/O operation performance metrics that are specifically focused upon the ranges of I/O operations per second (IOPS), megabytes-per-second (MB/s) data transfer rates, response times, and I/O operation queue depths/lengths actually observed by the hIOmon I/O Monitor for individual files, devices, and processes.

These metrics are automatically included within the summarized I/O operation performance information that can be collected by the hIOmon I/O Monitor. They can be also displayed by the hIOmon CLI and the hIOmon WMI Browser. These metrics are also accessible via the hIOmon WMI Support.

The hIOMon “Performance Threshold Range Metrics” can also be directly exported to a CSV formatted hIOMon Manager Export File.

In addition, the hIOMon Presentation Client can also be used to display these metrics within a “Bar Chart” graphic format.

Please note that the hIOMon “Performance Threshold Range Metrics” reflect the actual I/O operation activity observed by the hIOMon I/O Monitor. For instance, the “IOPS < 100” Range Count for read I/O operations reflects the number of one-second intervals during which the hIOMon I/O Monitor actually observed a total number of monitored read I/O operations that was less than 100 read I/O operations.

Similarly, the “MBS 100 < 200” Range Count for write I/O operations reflects the number of one-second intervals during which the hIOMon I/O Monitor actually observed a total amount of data transferred by write I/O operations that was 100 000 000 bytes (i.e., 100 megabytes) or more, but less than 200 000 000 bytes (i.e., 200 megabytes).

The hIOMon “Performance Threshold Range Metrics” provide a quick and easy way to assess the **actual** “speeds and feeds” I/O performance of your particular files, devices and applications in everyday, normal usage! And the new hIOMon “Disk I/O Ranger Display” provides a quick and easy way to display and export these metrics!

Please see the “hIOMon User Guide” document for additional information about these latest enhancements to the hIOMon software.

Please refer to the “hIOMon User Guide” (HMG-1093) for additional details about this new release of the hIOMon software package along with information about other recent enhancements and updates to the hIOMon I/O Performance Monitor.

Also please be sure to read the “Major How-To’s” chapter within the “hIOMon User Guide” document for brief answers to common questions related to the hIOMon software along with other considerations and recommendations regarding its operation and use. And see the “Hints and Issues” section 4 below for additional suggestions about using the hIOMon software.

## **2.2 KNOWN PROBLEMS**

None to report at this time. Please report any problems to hyperI/O LLC (see section 6 for contact information).

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## **3. OPERATION**

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### **3.1 GETTING STARTED**

Once you have completed the installation of the hIOMon software, you can perform a simple set

of basic steps to start using hIOmon. Please refer to the steps described within the “Getting Started – Quick Start” section of the “hIOmon User Guide” (HMG-1093), which is included within the “Documents” directory as “hIOmonUserGuide.pdf”. These steps show you how to start hIOmon file I/O monitoring and then display "real-time" I/O operation performance information for a selected set of files.

A Quick-Start using the hIOmon Presentation Client is provided along with a Quick-Start using the hIOmon WMI Browser as well as the hIOmon “Automated Monitoring Configuration Setup Script”. The hIOmon “Getting Started” FAQ html (accessible via the “Start -> Programs -> hIOmon -> Getting Started Help” shortcut) describes all of these Quick-Start procedures. The Help menus of the hIOmon Presentation Client and the hIOmon WMI Browser also provide access to the respective Quick-Start instructions.

Getting started with hIOmon using the “Quick Start” procedures to view the "real-time" performance information for selected file/device I/O operations is as easy as:

- I. Selecting the particular file/device I/O operation activities/metrics of interest.
- II. Viewing the corresponding I/O operation performance metrics in the format that you like.

### **3.2 PRESENTATION CLIENT CONTROL AND DISPLAY DESCRIPTIONS**

As a Java-application, the hIOmon "Presentation Client" provides an easy-to-use method of controlling the overall operation of hIOmon and displaying, in a clear and organized fashion, the collected file and device I/O operation performance information. It supports both real-time and “replay” mode displays.

Please refer to the “hIOmon User Guide” (HMG-1093), which is included in the “Documents” directory as “hIOmonUserGuide.pdf”, for a complete description of the various Presentation Client control commands and display features.

### **3.3 hIOmon WMI BROWSER CONTROL AND DISPLAY DESCRIPTIONS**

As an HTML application utilizing Internet Explorer and WMI, the hIOmon "WMI Browser" provides another easy-to-use method of controlling the overall operation of hIOmon and for displaying the real-time summarized file and device I/O operation performance metrics collected by hIOmon.

Please refer to the “hIOmon User Guide” (HMG-1093), which is included in the “Documents” directory as “hIOmonUserGuide.pdf”, for a complete description of the various hIOmon WMI Browser control commands and display features.

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## **4. HINTS AND ISSUES**

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### **4.1 HINTS**

Attempting to monitor and view a large amount of I/O trace information in real-time mode can potentially degrade system performance (especially if the hIOMon Presentation Client is being run upon the same system that is being monitored by hIOMon). Instead, and as a first step, use the hIOMon filters and summary capabilities (particularly the alert and file close options, along with the ability to arrange the summarized file and device I/O operation performance information in a particular order) to begin your observations of file/device I/O operation performance from the overall perspective (i.e., a “top-down” approach). Then, based upon the I/O operation performance metrics provided by hIOMon, drill-down if necessary to the particular files/devices of interest. Using the hIOMon “replay mode” facility can also aid performance as well as allow the ability to (repeatedly) study at a later time the I/O operation performance information collected by hIOMon.

Also consider using the “hIOMon Add-Ons”, which provide a quick and easy way to configure the hIOMon software for collecting, exporting, and displaying file and device I/O operation performance metrics, especially when performing “top-down” file, device, and process/application I/O performance characterizations and/or determining the actual impact of file fragmentation upon file I/O operation performance.

Also be sure to read the “Major How-To’s” chapter within the “hIOMon User Guide” document for brief answers to common questions related to the hIOMon software along with other considerations and recommendations regarding its operation and use. And visit the hyperI/O LLC website for the latest “hIOMon Best Practices” information and the “Getting Started Tutorials”.

### **4.2 SOFTWARE ISSUES**

None to report.

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## **5. INSTALLATION**

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This section contains instructions for installing the hIOMon software under Windows 7, Windows Vista, Windows XP, Windows Server 2003, and Windows Server 2008.

NOTE: The hIOMon Presentation Client will run on Windows 7/Vista/XP/2003/2008; the hIOMon Manager and hIOMon I/O Monitor components likewise support Windows 7, Windows Vista, Windows XP, Windows Server 2003, and Windows Server 2008.

See the "Hints and issues" section to solve issues that might occur when installing the software.

## 5.1 INSTALLATION NOTES: ALL MICROSOFT(R) WINDOWS PLATFORMS

The hIOmon Installer software makes use of the Microsoft Windows Installer to perform the basic installation of the hIOmon software. The hIOmon Installer software will automatically install the proper version of the Windows Installer if the Windows Installer is not found (in which case the computer system might require a reboot).

## 5.2 INSTALLATION INSTRUCTIONS: WINDOWS 7/Vista/XP/2003/2008

To install the hIOmon software on Windows 7/Vista/XP/2003/2008:

1. If the "New Hardware Found" screen has opened, click Cancel.
2. Quit all open programs.
3. If you are installing from a CD-ROM, insert the hIOmon CD-ROM into the CD-ROM drive (usually D). When the welcome screen opens, follow the instructions on the screen. If the welcome screen does not open, click Start, and then Run. Type X:Setup, replacing "X" with the letter of your drive, and click OK.

If you are installing the downloaded version of the hIOmon software, click Start and then Run. Open the "setup.exe" file that is located within the directory containing the downloaded hIOmon software (NOTE that you must first extract/unzip the downloaded hIOmon software). When the welcome screen opens, follow the instructions on the screen.

**NOTE:** To install the software on Windows 7/Vista/XP/2003/2008, you must log on with administrator privileges. Also note that the hIOmon software installation files are "code-signed" (i.e., digitally-signed), which ensures that these files came from hyperI/O LLC and protects them from alteration after publication by hyperI/O LLC. Finally note that if you had previously uninstalled the hIOmon software but **not yet restarted** the machine, then you must reboot the machine before attempting to re-install the hIOmon software.

4. Follow the instructions on the screen. When you are prompted for a **serial number**, please be sure to correctly enter the serial number from the CD-ROM label (or the serial number that you obtained from hyperI/O LLC if you are installing the downloaded version of the hIOmon software).

The hIOmon Manager and hIOmon I/O Monitor software components must be loaded as services under Windows 7/Vista/XP/2003/2008. The Windows Installer installation process provides several "Custom Installation Options", one of which is to have the

Windows Installer installation process automatically load (as part of the installation process) these hIOmon software components. This “automatic load” installation option is a **recommended** option (and so is enabled by default).

However, if you decide not to enable this “automatic load” installation option, then you must manually load the hIOmon Manager and hIOmon I/O Monitor software components before you can use the hIOmon software. To manually load these hIOmon software components, click on the “Manually Load the hIOmon Manager and IO Monitor” shortcut found within the “hIOmonSI” directory where the hIOmon software was installed as part of the Windows Installer installation process. Also note that on operating systems such as Windows 7, “administrator privilege” level must first be enabled prior to clicking on this shortcut. This can be done by going to the shortcut using Windows Explorer, selecting the shortcut and then right-click, select the “Properties” menu option, click on the “Compatibility” tab, and then check the “Run this program as an administrator” checkbox under the “Privilege Level” section. Then double-click on the shortcut to run the shortcut.

In addition to loading the hIOmon Manager and hIOmon I/O Monitor software components as services under Windows 7/Vista/XP/2003/2008, the “load” process (whether invoked automatically as part of the Windows Installer installation process or manually thereafter) also uses the hIOmon “Service Installation” program to perform the following:

- Invoke the Windows 7/Vista/XP/2003/2008 Service Control Manager to immediately start both the hIOmon Manager and hIOmon I/O Monitor.
- Load/install the “performance counters” required to provide the “Windows® PerfMon/SysMon Support”.
- Compile/load the hIOmon WMI MOF file (into the WMI Repository) and register the hIOmonWMI DLL component, both of which are required for the hIOmon WMI Support.

**NOTE** that the hIOmon Manager is loaded such that it will automatically be started when Windows 7/Vista/XP/2003/2008 starts. While the hIOmon I/O Monitor is loaded such that it will not be automatically started by Windows 7/Vista/XP/2003/2008, the hIOmon Manager is configured by default (by the software installation process) so that the hIOmon Manager will automatically start its associated hIOmon I/O Monitor when the hIOmon Manager is started. The hIOmon Presentation Client can also be used to manually start the hIOmon I/O Monitor (see the hIOmon Presentation Client “Actions -> Start/Stop Monitor” menu display) or enable/disable the hIOmon Manager’s automatic start of the hIOmon I/O Monitor when the hIOmon Manager is started (see the hIOmon Presentation Client “Edit -> Setup Options -> Monitor StartUp” menu display). Enabling/disabling the “automatic-start” of the hIOmon I/O Monitor by the hIOmon Manager can also be performed through the hIOmon WMI Browser.

The Windows Installer installation process also provides a “Custom Installation Options” whereby you can run the hIOMon “Automated Monitoring Configuration Setup Script” as part of the Windows Installer installation process. This VBScript enables you to easily and quickly configure the hIOMon software to monitor specific files of interest, to collect particular types of I/O operation metrics, and to export these metrics in real-time and within a CSV-format to specific hIOMon Manager Export Files. This script also supports the “hIOMon Add-Ons” so that you can invoke a selected hIOMon Add-On immediately as part of the hIOMon software installation process. Also note that this script can also be manually run after the Windows Installer installation process completes. See the “Getting Started Help” information for additional details about this script.

Another option provided by the “Custom Installation Options” is the “Install hIOMon Clients only” option. This option enables you to install only the hIOMon Clients software (which includes the hIOMon Presentation Client, the hIOMon WMI Browser and WMI support, and the hIOMon CLI support) and without installing the hIOMon Manager and hIOMon I/O Monitor software components, which are required to actually collect the I/O operation performance metrics on the computer system. The installed hIOMon Clients will, however, enable you to access a hIOMon Manager that is currently running upon another computer system, so that you can control the operation of the hIOMon software as well as access the I/O operation metrics collected by the hIOMon software upon that system.

The setup takes a few minutes. When it is complete, remove the CD-ROM.

Please check the System Event Log “Application Log” to see the results of the hIOMon software installation process.

**NOTE:** The hIOMon software installation process will not be able to successfully load and start the hIOMon I/O Monitor component if this hIOMon component is already running when the hIOMon “Service Installation” program is invoked to actually load this component as a service. In this case, the hIOMon “Service Installation” program will add an entry to the System Event Log (Application Log) to report that it was unable to successfully load and start the hIOMon I/O Monitor component. You must restart the operating system and then perform this step again for the hIOMon I/O Monitor component to be successfully loaded.

5. If you intend to use the hIOMon Presentation Client (which is a Java application), then the computer upon which you run the hIOMon Presentation Client must have version 1.6.0 or higher of the Java Runtime Environment (JRE) Java Virtual Machine (JVM) installed. Note that the JVM is only required by the hIOMon Presentation Client; the hIOMon Manager, the hIOMon I/O Monitor and the hIOMon WMI Support components do not require the JVM to execute. If you do not use the hIOMon Presentation Client or already have the required JRE JVM version installed, then you do not need to perform this step. If you do need to install the JVM, then you can download the latest JVM from the Sun Java web (<http://www.java.com/>).

6. Please read the “Read This First!!!” by using the “Start -> Programs -> hIOmon -> Getting Started Help -> Read This First!!!” shortcut, which will display a hIOmon Help html page that includes important information to help you get started using the hIOmon software.

### 5.3 Uninstalling the hIOmon software

Use the Windows “Control Panel” to remove the hIOmon software. Select “Add/Remove Programs” within the “Control Panel”, then select “hIOmon” within the list box and click on “Remove” to remove/uninstall the hIOmon software.

As part of the uninstall process, the Windows Installer will automatically invoke the hIOmon “Service Installation” (ServiceInstall.exe) program, which in turn uses the Windows 7/Vista/XP/2003/2008 Service Control Manager to unload the hIOmon Manager and hIOmon I/O Monitor components as services under Windows 7/Vista/XP/2003/2008; the hIOmon “Service Installation” utility will also automatically unload the “performance counters” (required to provide the “Windows PerfMon/SysMon Support”) and unload/remove the hIOmon WMI MOF file from the WMI Repository and un-register/unload the hIOmonWMI DLL component (both of which are required to provide the hIOmon WMI Support).

**NOTE:** The hIOmon Manager is first stopped prior to requesting that it be unloaded by the Windows 7/Vista/XP/2003/2008 Service Control Manager. Also note that if the hIOmon I/O Monitor component is running at the time of this hIOmon Service Installation program invocation, then the hIOmon I/O Monitor will **not** be stopped and will continue to execute; the hIOmon I/O Monitor component will subsequently be unloaded/removed from the system when Windows 7/Vista/XP/2003/2008 is restarted. If you subsequently decide to re-install the hIOmon software, then you must first **restart** the machine before attempting to re-install the hIOmon software (so that the hIOmon I/O Monitor component from the prior installation is completely removed before performing the re-installation of the hIOmon software).

Please check the System Event Log “Application Log” to see the results of this hIOmon Service Installation program invocation.

**NOTE:** When the hIOmon software is uninstalled as described above, several subdirectories (and their contents) will remain within the directory into which the hIOmon software was installed (in addition to the “hyperIO” folder within the “ProgramData” folder and any hIOmon folder that might be located within the VirtualStore folder on Windows Vista and later operating systems); see the “UpdateLog.txt” in the “Updates” subdirectory and the “readMe.txt” files in the following subdirectories for additional details: hIOmonGr, ExportFiles, FileIOlogs, FilterSL, hIOmonPC, hIOmonPCprofiles, and AddOns. The “hIOmonPC.cfg” file might also remain within the ..\hIOmon\Support\hIOmonPC directory; this file is generated and used by the hIOmon Presentation Client to maintain configuration information related to the use of the hIOmon Presentation Client. **NOTE** that you must **manually** delete this file (along with the files/folders mentioned above) to totally remove the hIOmon software package.

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## **6. TECHNICAL ASSISTANCE AND SUPPORT INFORMATION**

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### **6.1 OBTAINING ADDITIONAL INFORMATION FROM hyperI/O LLC**

The hyperI/O LLC website provides additional information about hIOMon (including technical assistance and support information). You can also contact hIOMon Technical Support at [hIOMonSupportInfo@hyperIO.com](mailto:hIOMonSupportInfo@hyperIO.com).

### **6.2 OBTAINING INFORMATION VIA THE INTERNET**

The hyperI/O LLC website is located at [www.hyperIO.com](http://www.hyperIO.com). You can also reach hyperI/O LLC via the hIOMon website (located at [www.hIOMon.com](http://www.hIOMon.com)).

### **6.3 ORDERING SOFTWARE**

To order additional copies of the software, contact hyperI/O LLC:

Request by Phone: +1 303.415.2044

Request by Mail: hyperI/O LLC  
4450 Arapahoe Avenue, Suite 100  
Boulder, Colorado 80303-9102 USA

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## **7. LEGAL STATEMENTS**

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### **7.1 TRADEMARK NOTICES**

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## 7.2 LEGAL NOTICE

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****                               End of hIOmon ReadMe                               ****  
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