



IBM Storage Subsystem Management Pack User Guide for Operations Manager 2007

User Guider
49816-00, Rev. A
September 8, 2010

Table of Contents

- Document Version 5**
 - Revision History5
- Introduction to the IBM Storage Subsystem Management Pack 5**
 - Getting the Latest Management Pack and Documentation6
 - What's New6
 - Supported Software and Hardware Configurations6
- Getting Started 8**
 - Before You Import the Management Pack8
 - Files in This Management Pack10
 - Other Requirements11
 - How to Import the IBM Storage Subsystem Management Pack11
 - Create a New Management Pack for Customizations12
- Optional Configuration 12**
 - Storage Subsystem Monitor Interval12
 - Enabling Tracing13
 - Launching the IBM Storage Subsystem Console13
- Security Considerations 14**
- Management Pack Operations 14**
 - Objects the Management Pack Discovers14
 - Classes15
 - Key Monitoring Scenarios15
- Troubleshooting 16**
 - Collecting IBM Storage Subsystem Management Pack Log File16
- Removing IBM Integration Pack 17**

User Guide

IBM Storage Subsystem Management Pack for Operations Manager 2007

The IBM Storage Subsystem Management Pack helps customers monitor their storage subsystem health status from within the System Center Operations Manager environment.

This integration now enables administrators to extend SCOM 2007 R2 and SCOM 2007 SP1 service monitoring capabilities receiving detailed storage subsystem conditions and resolution steps for troubleshooting.

Document Version

The information in this guide is based on the 2.0.0.58 version of the IBM Storage Subsystem Management Pack.

Revision History

Date	Changes
Sept 8, 2010	Original release of this guide
Update, Sept 8, 2010	New topics in this release: <ul style="list-style-type: none"> • IBM Integration Pack (agent managed computer) • IBM Storage Subsystem Discovery Application • PowerShell Cmdlet Library • Recovery Guru Knowledge Content • Cookdown • Windows Event Log Integration • Overrides

Introduction to the IBM Storage Subsystem Management Pack

This guide is for Operations and System Administrators who monitor and troubleshoot IBM storage subsystems. The IBM Storage Subsystem Management Pack provides critical alerts including storage subsystem summary, details, and applicable recovery procedures.

The IBM Storage Subsystem Management Pack uses a PowerShell Cmdlet Library to access the storage subsystem native interface to provide flexibility and low overhead on the agent managed computer. Administrators can now troubleshoot IBM storage subsystems from one SCOM console, which reduces the complexity of dealing with multiple proprietary applications.

The IBM Storage Subsystem Management Pack is for IBM storage subsystem monitoring only. Storage management functions are not performed with this management pack implementation.

For recovery procedure that require storage management functions that are listed in the alert knowledge base articles within the SCOM console, refer to the IBM DS Storage Manager documentation.

Getting the Latest Management Pack and Documentation

You can find the IBM Storage Subsystem Management Pack in the *System Center Operations Manager 2007 Catalog*.

What's New

The following features are new in this release of the IBM Storage Subsystem Management Pack:

- Critical Alert (Recovery Guru) based knowledge content consisting of the following:
 - Critical alert summary information.
 - Critical alert detail information.
 - Critical alert recovery procedure information.
- Object Override capabilities for the following:
 - Monitor Interval.
 - Alert Timeout.
 - Alert Trace.
- Integration Package (Agent Managed Computer)
 - IBM Storage Subsystem Discovery Application.
 - PowerShell Cmdlet Storage Library.
- Windows Event Log Integration.
- Cookdown

Supported Software and Hardware Configurations

The IBM Storage Subsystem Management Pack supports the following configurations:

NOTE: The management pack supports up to 50 IBM storage subsystems concurrently per agent managed computer.

Table 1: Software

Root Management Server	Agent Managed Computer	PowerShell	.Net Framework
<ul style="list-style-type: none"> • Windows Server 2003 Sp2 x86, x64 • Windows Server 2008 Sp2 x86, x64 • Windows Server 2008 R2 • SCOM 2007 Sp1 • SCOM 2007 R2 	<ul style="list-style-type: none"> • Windows Server 2003 Sp2 x86, x64 • Windows Server 2008 Sp2 x86, x64 • Windows Server 2008 R2 	<ul style="list-style-type: none"> • 2.0 • 2.0 • 2.0 	<ul style="list-style-type: none"> • NET 3.5 SP1 • NET 3.5 SP1 • NET 3.5 SP1

Table 2: Hardware

Controller board	Drive-side technology	Native host ports	Host card 1	Host card 2
DS4700	4-Gb FC	4-Gb FC (4)	NA	NA
DS4700	4-Gb FC	4-Gb FC (2)	NA	NA
DS4800	4-Gb FC	NA	4-Gb FC	NA
DS3200	3-Gb SAS	3-Gb SAS (1)	None	NA
DS3200	3-Gb SAS	3-Gb SAS (1)	3-Gb SAS (1)	NA
DS3200	3-Gb SAS	3-Gb SAS (1)	3-Gb SAS (2)	NA
DS3300	3-Gb SAS	Disabled	1-Gb iSCSI	NA
DS3400	3-Gb SAS	Disabled	4-Gb FC	NA
DS5000	7900 is the generic family name for the XBB2 technology			
DS5000	4-Gb FC	NA	4-Gb FC	None
DS5000	4-Gb FC	NA	8-Gb FC	None
DS5000	4-Gb FC	NA	1-Gb iSCSI	None
DS5000	4-Gb FC	NA	10-Gb iSCSI	None
DS5000	4-Gb FC	NA	4-Gb FC	4-Gb FC
DS5000	4-Gb FC	NA	8-Gb FC	8-Gb FC
DS5000	4-Gb FC	NA	1-Gb iSCSI	1-Gb iSCSI
DS5000	4-Gb FC	NA	10-Gb iSCSI	10-Gb iSCSI
DS5000	4-Gb FC	NA	4-Gb FC	8-Gb FC
DS5000	4-Gb FC	NA	4-Gb FC	1-Gb iSCSI
DS5000	4-Gb FC	NA	4-Gb FC	10-Gb iSCSI
DS5000	4-Gb FC	NA	8-Gb FC	1-Gb iSCSI
DS5000	4-Gb FC	NA	8-Gb FC	10-Gb iSCSI
DS5000	4-Gb FC	NA	20-Gb IB	20-Gb IB
Controller board	Drive-side technology	Native host ports	Host Card	
DS3950	4900 is the family name for the Matterhorn technology			
DS3950	4-Gb FC (2)	8-Gb FC (2)	None	
DS3950	4-Gb FC (2)	8-Gb FC (2)	8-Gb FC (2)	
DS3950	4-Gb FC (2)	8-Gb FC (2)	1-Gb iSCSI (2)	
DS3950	4-Gb FC (2)	8-Gb FC (2)	10-Gb iSCSI (2)	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	NA	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	None	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	6-Gb SAS (2)	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	1-Gb iSCSI (4)	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	8-Gb FC (4)	

Table 2: Hardware (Continued)

Controller board	Drive-side technology	Native host ports	Host card 1	Host card 2
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	None	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	6-Gb SAS (2)	
DS3500	6-Gb SAS (1)	6-Gb SAS (2)	10-Gb iSCSI (4)	

Getting Started

Before You Import the Management Pack

Before you install the IBM Storage Subsystem Management Pack on the root management server, perform the following prerequisites tasks on the Systems Center Operations Manager agent managed computer that are used to monitor IBM storage.

Please see the section below Before You Import the Management Pack.

Before you import the IBM Storage Subsystem Management Pack for Operations Manager 2007, take the following actions on the agent managed computer:

Table 3: Agent Managed Computer Requirements

Operating System	Software Dependency
Windows Server 2003 Sp2 (x86, x64)	Install Power Shell version 2.0 or greater
	Install .Net Framework version 3.5
	Install the IBM Integration Pack (available x86, x64 versions)
Operating System	Software Dependency
Windows Server 2008 Sp2 (x86, x64)	Install Power Shell version 2.0 or greater
	Install .Net Framework version 3.5
	Install the IBM Integration Pack (available x86, x64 versions)
Operating System	Software Dependency
Windows Server 2008 R2	Install Power Shell version 2.0 or greater
	Install .Net Framework version 3.5
	Install the IBM Integration Pack (available x64 version)

NOTE: There is no support for in-band IBM storage subsystem monitoring. This IBM Storage Subsystem Management Pack for Operations Manager 2007 supports only out-of-band IBM storage subsystem monitoring.

Before you import the IBM Storage Subsystem Management Pack, take the following actions:

- Enable agent managed computers that monitor IBM storage to act as a proxy and discover managed objects on other computers in the RMS SCOM Server console.
- Ensure software dependencies are completed on the agent managed computer per the requirements table listed above.
- Install the IBM Integration Package on the agent managed computer that will be used to monitor IBM storage.
- Perform IBM storage subsystem discovery on the agent managed computer.

NOTE: A single agent managed computer can monitor multiple storage subsystems.

Enabling Proxy Capability for Agent Managed Computer Steps

Use the following procedure to enable agent managed computers to act as a proxy.

1. Open the SCOM Operations Console.
2. Open the Administration view, and select **Device Management >> Agent Managed**.
3. Right-click the agent managed computer that monitors IBM storage subsystems, and select **Properties**.
4. Select the **Security** tab, and enable **Allow this agent to act as a proxy and discover managed objects on other computers**.
5. Click **OK**.
6. Repeat step 1 through step 5 for each agent managed computer that is used to monitor IBM storage subsystems.

Implementing the IBM Integration Pack

Use the following procedure to implement the IBM Integration Pack.

1. Log on to the agent managed computer with an account that has installation privileges.
2. Locate the desired IBM Integration Pack Installer per platform, SCOM-WS32-00.00.00.00 (x86 platforms), or SCOM-WSX64-00.00.00.00 (x64 platforms).
3. Run the Installer.
The installation wizard appears.
4. Follow the wizard steps to complete the installation.

NOTE: The IBM Integration Pack installation log file named `SCOMIntegrationPackInstalllog.txt` is located in the following directory path: `C:\Program Files\IBM\`.

Discovering the IBM Storage Subsystem

Use the following procedure to initiate an IBM storage subsystem discovery for SCOM monitoring.

1. Select **Start >> All Programs**, and locate the folder labeled `SCOM Integration Pack`.
2. Select the icon labeled **IBM Storage Subsystem Discovery**.

NOTE: The IBM Storage Subsystem Discovery application is also located in the following directory path: `C:\Program Files\IBM\SCOM Integration Pack`.

3. Run the IBM Storage Subsystem Discovery application.
4. Perform either a Manual Discover or Auto Discover of the storage subsystem IP addresses to allow SCOM monitoring of the selected storage subsystem.
5. Add the selected storage subsystem IP addresses to the Windows pane labeled Selected Storage Subsystems.
A confirmation dialog box appears followed by an option to proceed or cancel the IBM Storage Subsystem Discovery process.
6. Click **OK** to continue.

Removing the IBM Storage Subsystem

Use the following procedure to remove an IBM storage subsystem from being monitored in SCOM.

1. Select **Start >> All Programs**, and locate the folder labeled `SCOM Integration Pack`.
2. Select the icon labeled **IBM Storage Subsystem Discovery**.

NOTE: The IBM Storage Subsystem Discovery application is also located in the following directory path: `C:\Program Files\IBM\SCOM Integration Pack`.

3. Run the IBM Storage Subsystem Discovery application.
4. Locate and select the storage subsystem to be removed from SCOM monitoring in the Windows pane labeled Selected Storage Subsystems.
By clicking the **Remove Selected** button, a confirmation dialog box appears followed by an option to continue or cancel the storage subsystem removal process.
5. Click **OK** to continue.

Files in This Management Pack

To monitor IBM storage subsystems, you must first download the IBM Storage Subsystem Management Pack for Operations Manager 2007 from the Management Pack Catalog, located at <http://go.microsoft.com/fwlink/?LinkId=82105>. The IBM Storage Subsystem Management Pack includes the following files:

- `IBMStorageSubsystem.mp`
- `IBMStorageSubsystemOverrideInterval.xml`
- `IBMStorageSubsystemOverrideTimeout.xml`
- `IBMStorageSubsystemOverrideTrace.xml`
- IBM Storage Subsystem Management Pack User Guide

NOTE: If you do not install the IBM Integration Pack on the agent managed computer before you import the IBM Storage Subsystem Management Pack the management pack will not function.

NOTE: If you do not enable agent managed computers that monitor IBM storage subsystems to act as a proxy and discover managed objects on other computers from the root management server the IBM Storage Subsystem Management Pack will not function.

Other Requirements

Table 4: Root Management Server SCOM Requirements

Management Pack	Management Pack Dependency
IBMStorageSubsystem.mp	Microsoft System Center Library Management Pack
IBMStorageSubsystemOverrideInterval.xml	IBM Storage Subsystem Management Pack
IBMStorageSubsystemOverrideTimeout.xml	IBM Storage Subsystem Management Pack
IBMStorageSubsystemOverrideTrace.xml	IBM Storage Subsystem Management Pack

Table 5: Agent Managed Computer Requirements

Operating System	Software Dependency
Windows Server 2003 Sp2 (x86, x64)	Install Power Shell version 2.0 or later.
	Install .Net Framework version 3.5.
	Install the IBM Integration Pack (available x86, x64 versions).
Operating System	Software Dependency
Windows Server 2008 Sp2 (x86, x64)	Install Power Shell version 2.0 or later.
	Install .Net Framework version 3.5.
	Install the IBM Integration Pack (available x86, x64 versions).
Operating System	Software Dependency
Windows Server 2008 R2	Install Power Shell version 2.0 or later.
	Install .Net Framework version 3.5.
	Install the IBM Integration Pack (available x64 version).

How to Import the IBM Storage Subsystem Management Pack

For instructions about importing a management pack, see How to Import a Management Pack in Operations Manager 2007 (<http://go.microsoft.com/fwlink/?LinkId=142351>).

Create a New Management Pack for Customizations

Most vendor management packs are sealed so that you cannot change any of the original settings in the management pack file. However, you can create customizations, such as overrides or new monitoring objects, and save them to a different management pack. By default, Operations Manager 2007 saves all customizations to the default management pack. As a best practice, you create a separate management pack for each sealed management pack you want to customize.

Creating a new management pack for storing overrides has the following advantages:

- The new management pack simplifies the process of exporting customizations that were created in your test and pre-production environments to your production environment. For example, instead of exporting a default management pack that contains customizations from multiple management packs, you can export just the management pack that contains customizations of a single management pack.
- You can delete the original management pack without first needing to delete the default management pack. A management pack that contains customizations is dependent on the original management pack. This dependency requires you to delete the management pack with customizations before you can delete the original management pack. If all of your customizations are saved to the default management pack, you must delete the default management pack before you can delete an original management pack.
- You can more easily track and update customizations to individual management packs.

Optional Configuration

After you import the IBM Storage Subsystem Management Pack, follow these procedures to override the default Interval, or timeout configuration parameters of the IBM Storage Subsystem Management Pack.

The default intervals are listed below.

Storage Subsystem Monitor Interval

- The maximum time before detection of state change) 2 min.
1. Locate the management pack file that you want.
 - IBMStorageSubsystemOverrideInterval.xml
 - IBMStorageSubsystemOverrideTimeout.xml
 2. With a text editor open the management pack xml file and modify all of the number parameters accordingly between the `<Value>` and `</Value>` tags within the file.
Example: `<Value>59</Value>` is now changed to `<Value>239</Value>`

NOTE: All of the number parameters within the management pack xml file between the `<Value>` and `</Value>` tags must be modified with the same number parameter or the management pack may fail. The number value represents time in seconds.

3. Within the file locate the following block of text.

— Example:

```
<Identity>
<ID>IBMStorageSubsystem.Overrides</ID>
<Version>1.0.0.0</Version>
```

```
</Identity>
```

4. Modify the number parameter accordingly between the <Version> and </Version> tags within the file.

— Example:

```
< Identity>
<ID>IBMStorageSubsystem.Overrides</ID>
<Version>1.0.0.1</Version>
</Identity>
```

— This version change from 1.0.0.0 to 1.0.0.1 will ensure that the changes made above will be valid when the management pack is imported into SCOM.

These version change steps are required each time a file is modified.

5. Save the changes and exit the text editor.
6. Import the modified management pack into SCOM. For instructions about importing a management pack, see How to Import a Management Pack in Operations Manager 2007 (<http://go.microsoft.com/fwlink/?LinkId=142351>).

Enabling Tracing

Use the following procedure to enable tracing for the IBM Storage Subsystem Management Pack:

The default intervals are listed below.

■ Trace Level Messages – off.

1. Locate the following management pack file.
 - IBMStorageSubsystemOverrideTrace.xml
2. Import the management pack file into SCOM. For instructions about importing a management pack, see How to Import a Management Pack in Operations Manager 2007 (<http://go.microsoft.com/fwlink/?LinkId=142351>).

The IBM Integration Pack provides a PowerShell Cmdlet library to directly interface with the discovered IBM storage subsystems on the Agent Managed Computer:

NOTE: If an IBM storage subsystem has a `syswipe` command performed, the IBM storage subsystem being monitored will need to be rediscovered with the IBM Storage Subsystem Discovery application to ensure the new WWN will be displayed and persisted correctly.

Launching the IBM Storage Subsystem Console

Use the following procedure to launch the IBM Storage Subsystem Console to execute IBM Storage Subsystem Cmdlets

1. Select **Start >> All Programs**, and locate the folder labeled `SCOM Integration Pack`.
2. Select the icon labeled **IBM Storage Subsystem Console**.
The console will list the storage subsystems managed by the proxy (agent managed computer).
3. At the PowerShell command prompt, enter the command:

```
>Get-Command | More
```

This action lists the commands that are available for execution.

- To obtain help information topics about a specific command, run the following command syntax:

```
> Get-Help Get-SDCredential
```

This example lists help information topics for the `Get-SDCredential` command.

Security Considerations

To install the IBM Integration Pack on the agent managed machine, you need an account with installation privileges.

Management Pack Operations

The IBM Storage Subsystem Management Pack provides critical event IBM storage subsystem monitoring capabilities. Recovery Guru Knowledge Content alerts are displayed in the SCOM console for troubleshooting and root cause analysis.

NOTE: Critical alerts are displayed in the SCOM console when a state change occurs from healthy to critical on the IBM Storage Subsystem. Any subsequent critical alerts of the same critical event type will not be displayed until the initial critical alert has been closed within the SCOM console.

Objects the Management Pack Discovers

The following default discovery information are as follows. The discovery process can vary depending on the SCOM environment and configuration.

- Seed Discovery Interval (max time to discover a new integration pack) 30 min
- Storage Subsystem Discovery (max time to discover a newly configured storage subsystem) 15 min

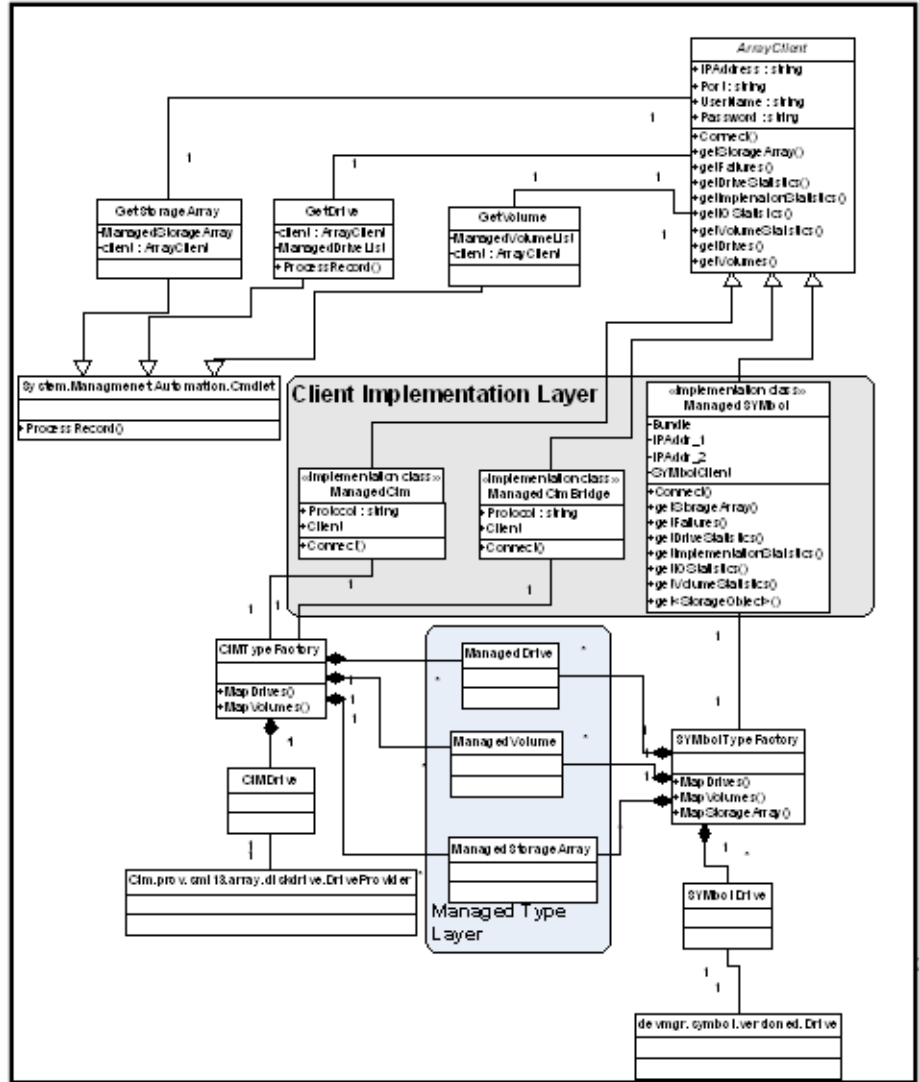
NOTE: In the event both of the controllers for a given IBM Storage Subsystem have been powered off the IBM Storage Subsystem name will not be displayed in the SCOM console. The IBM Storage Subsystem will still be identified however with the WWN and the IP address. The IBM Storage Subsystem name will be displayed again once the controller has been powered on.

The IBM Storage Subsystem Management Pack discovers the object types described in the following table. Not all of the objects are automatically discovered. For information about discovering objects, refer to the "Object Discoveries in Operations Manager 2007" topic in Operations Manager 2007 Help (<http://go.microsoft.com/fwlink/?LinkId=108505>).

Category	Object Type	Discovery Prerequisite
Storage Subsystem	IBM Storage Subsystem	Discovery process requires IBM Integration Pack Installation Discovery process requires IBM Storage Subsystem Discovery tool to persist data for management pack.

Classes

The following diagram shows the classes defined in this IBM Integration Package.



Key Monitoring Scenarios

The IBM Storage Subsystem Management Pack includes monitors for critical state change events for IBM storage subsystems. These monitors are representative of Recovery Guru Knowledge Content that is also defined in DS Storage Manager. Please see the IBM DS Storage Manager Application documentation for details regarding different event type definitions.

For completing recovery procedures that require storage management functions that are listed in the alert knowledge base articles within the SCOM console, refer to the IBM DS Storage Manager documentation to perform these storage subsystem management tasks for corrective action.

Troubleshooting

The IBM Storage Subsystem Management Pack provides logging capability using the Windows Event Log framework. The event log location is based on the Windows Operating System version installation.

Operating System	Physical Event Log Location	Windows Event Viewer Display
Windows Server 2003 Sp2	C:\Windows\system32\Config\	+---Event Viewer \--- IBM Operations Manager
Windows Server 2008 Sp2	C:\Windows\System32\winevt\Logs\	+---Event Viewer \---Applications and Service Logs \---IBM Operations Manager
Windows Server 2008 R2	C:\Windows\System32\winevt\Logs\	+---Event Viewer \---Applications and Service Logs \---IBM Operations Manager

The IBM Storage Subsystem Management Pack also provides file only logging capability for field support troubleshooting. The file format is a comma delimited .csv format.

NOTE: The Debug log file name suffix (YYYYMMDD) is a date format for year, month, and day of the month. A new log file is generated each day, and log files older than seven days are removed from the system.

The field support log location is based on the Windows Operating System version.

Operating System	Physical Field Support Log Location
Windows Server 2003 Sp2	C:\Windows\system32\Config\IBM.Debug.YYYYMMDD.csv
Windows Server 2008 Sp2	C:\Windows\System32\winevt\Logs\IBM.Debug.YYYYMMDD.csv
Windows Server 2008 R2	C:\Windows\System32\winevt\Logs\IBM.Debug.YYYYMMDD.csv

Collecting IBM Storage Subsystem Management Pack Log File

In the event that support requests log files for IBM Storage Subsystem Management troubleshooting use the following steps.

1. Select **Start >> All Programs**.
2. Select the folder labeled `SCOM Integration Pack`.
3. Open a PowerShell session window by selecting the **IBM Gather Support Data** icon.

A PowerShell session opens and launches a Windows Explorer, which opens the containing folder of the support files.

4. Collect the log file directory/files in the following format.
"IBM.DiskSystem.Logs.YYYYMMDD".zip file format.
5. Send the "IBM.DiskSystem.Logs.YYYYMMDD".zip file to the requesting support representative.

Removing IBM Integration Pack

Use the following procedure to remove the IBM Integration Pack on the agent managed computer.

1. Log on to the agent managed computer with an account that has installation privileges.
2. Select **Start >> Control Panel**.
3. Locate and select the icon for uninstalling or add/remove programs depending on the Windows Operating System version.
4. Locate the desired IBM Integration Pack icon per platform, **SCOM-WS32-00.00.00.00** (x86 platforms), or **SCOM-WSX64-00.00.00.00** (x64 platforms)
5. Select the desired **IBM Integration Pack** icon to perform an uninstall or remove process for the IBM Integration Pack application depending on the Windows Operating System version.
The uninstall wizard appears.
6. Follow the wizard steps to complete the uninstall process.

Trademarks and special notices

© Copyright IBM Corporation 2010. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Intel, Intel Inside (logos), MMX, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

