

Chapter 6. IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service for Windows

If you require IBM System Storage support for Microsoft Volume Shadow Copy or Microsoft Virtual Disk Services, continue to use DS CIM agent version 5.3 or later (5.1 or earlier is also supported, but requires some additional steps).

IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service overview

The IBM System Storage Support for Microsoft Volume Shadow Copy and Virtual Disk Services software uses a CIM client query to control storage units. The Microsoft Volume Shadow Copy and Virtual Disk Services software uses the CIM technology to manage proprietary devices as open system devices through storage management applications.

Microsoft Volume Shadow Copy Service

IBM System Storage support for Microsoft Volume Shadow Copy Service enables users to quickly back up and restore large amounts of data on Windows Server 2003 and Windows Server 2008 operating systems. Microsoft Volume Shadow Copy Service coordinates with a provider and the storage unit to create a consistent shadow copy of a volume or a group of volumes at a point-in-time. Point-in-time shadow copies ensure consistency for Microsoft Volume Shadow Copy Service-aware writers, and also work with applications that do not support Microsoft Volume Shadow Copy Service technology. The shadow copy can be created while the volume is mounted and the files are in use.

To perform a quick backup, a backup application initiates a shadow copy backup. Microsoft Volume Shadow Copy Service then coordinates with the Microsoft Volume Shadow Copy Service writers to briefly hold writes on the databases, applications, or both. Next, Microsoft Volume Shadow Copy Service flushes the file system buffers and asks a provider to initiate a FlashCopy of the data. After the FlashCopy operation is logically complete, Microsoft Volume Shadow Copy Service allows writes to resume and notifies the requestor that the backup has completed successfully.

The volumes are then mounted to be used when rapid restore is necessary. The volumes and shadow copies can also be mounted on a different host and used for application testing or backed up to tape.

Microsoft Virtual Disk Service

IBM System Storage Support for Microsoft Virtual Disk Service provides a single vendor and technology neutral interface for managing block storage virtualization, whether done by the operating system software, RAID storage hardware, or other storage virtualization engines. Microsoft Virtual Disk Service enables the management of heterogeneous storage systems, by using both client and provider APIs. The service allows you to perform the following functions:

- List information about:
 - Providers
 - Subsystems
 - Controllers
 - LUNs

- Drives
- Create or delete LUNs
- Configure LUNs automatically, which facilitates dynamic reconfiguration by hardware in response to load or fault handling.

IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software installation requirements

Ensure that your system satisfies the hardware and software prerequisites for installing IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software on a Windows Server 2003 or Windows Server 2008 operating system before you start the installation.

You must install the CIM agent *before* you install Microsoft Volume Shadow Copy and Virtual Disk Services. The IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software can be installed on the same system as the CIM agent.

Hardware

The following minimum hardware is required:

- For Volume Shadow Copy Services, a DS8000, DS6000, or ESS storage unit with FlashCopy Version 1 or 2
- For Virtual Disk Services, a DS8000 storage unit

Note: If you are using ESS Fxx models, at least one ESS in the environment must be a model 800.

- A system capable of running Windows Server 2003 or Windows Server 2008
- 133 -733 megahertz CPU
- 128 -256 megabytes of random access memory
- 1.5 gigabytes of disk space
- A supported QLogic or Emulex fibre-channel host bus adapter (HBA)

Software

The following software is required:

- Windows Server 2003 or Windows Server 2008 operating system. The following editions are supported:
 - Standard Server Edition 32-bit version
 - Enterprise Edition, 32-bit version
 - Standard Server Edition 64-bit version
 - Enterprise Edition, 64-bit version
 - Standard Edition R2 with SP2, 32-bit version
 - Enterprise Edition R2 with SP2, 64-bit version
- Common Information Model (CIM) agent. The CIM agent can be located on the same system as Microsoft Volume Shadow Copy Service or on a different machine. You can find this software on the *CIM agent for IBM System Storage DS Open Application Programming Interface CD*. For VDS, use DS CIM Agent 5.1 or earlier. For VSS, use DS CIM Agent 5.3, however, 5.1 is also supported.

- Microsoft Volume Shadow Copy Service compliant backup software

The following software is recommended:

- Windows Server 2003 R2 Service Pack 2. This software contains important VSS fixes from Microsoft, including KB972623, KB957778, KB949391, KB940349, & KB932532
- Windows Server 2008 Service Pack 2
- Windows Server 2008 R2
- SDDDSM multipathing software

Installing the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software

This task installs the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service on a Windows system.

You must satisfy all prerequisites that are listed in the installation requirements section before you start the installation.

1. Log on to Windows as an administrator.
2. Run the InstallShield Wizard by inserting the *IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service* CD into the CD-ROM drive. The Welcome panel is displayed.
3. Click **Next** to continue. The License Agreement panel is displayed. You can click **Cancel** at any time to exit the installation. To move back to previous screens while using the wizard, click **Back**.
4. Read the license agreement information. Select whether you accept the terms of the license agreement, and click **Next**. If you do not accept, you cannot continue with the installation. The Choose Destination Location panel is displayed.
5. Click **Next** to accept the default directory where the setup program will install the files, or click **Change** to select a different directory. Click **Next**. The Ready to Install the Program panel is displayed.
6. Click **Install** to begin the installation. To exit the wizard and end the installation, click **Cancel**. The Setup Status panel is displayed.
The program setup verifies your configuration. After your configuration is verified, the Select CIM Server panel is displayed.
7. Select the required CIM server, or select Enter the CIM Server address manually, and click **Next**. The Enter CIM Server Details panel is displayed.
8. Enter the following information in the fields:
 - In the **CIM Server Address** field, type the name of the server where the CIM agent is installed.
 - In the **CIM User** field, type the user name that the IBM System Storage Support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software will use to gain access to the server where the CIM agent is installed. For example, enter the name Administrator.
 - In the **CIM Password** field, type the password for the user name that the IBM System Storage Support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software will use to gain access to the CIM agent and click **Next**.

Notes:

- a. If these settings change after installation, you can use the `ibmvcfg.exe` utility to update the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software with the new settings.
 - b. If you do not have the CIM agent server, port, or user information, contact your CIM agent administrator.
The InstallShield Wizard Complete panel is displayed.
9. Click **Finish**. If necessary, the InstallShield Wizard prompts you to restart the system.

If you are connecting to a DS 5.1 or earlier CIM agent, you must perform the following additional configuration steps:

1. Copy the truststore file from the CIM agent server to any location that is on the system where the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service is installed.
2. Open a command prompt and change to the directory where the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service is installed.
3. Issue the following command:

```
ibmcfg set truststore file_name
where file_name is the name of the truststore file.
```

4. Issue the following command:

```
ibmcfg set trustpassword ibmstore
```

5. Stop and then restart the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service.

Creating the VSS_FREE and VSS_RESERVED pools

This task creates the free volume pool (VSS_FREE) and the reserved volume pool (VSS_RESERVED) that are used to assign volumes to the virtual host.

Before you can use the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software, you must specify the volumes that can be used as FlashCopy target volumes. You specify the volumes after you create a VSS_FREE pool and a VSS_RESERVED pool. These pools are represented by virtual hosts that are created on the storage unit. After the virtual hosts are created, you can add volumes to the free pool by assigning a volume to the virtual host.

Perform the following steps using the IBM System Storage DS Storage Manager or DS CLI to create the VSS_FREE and VSS_RESERVED pools:

Important: If you are using the DS CLI, you must perform these steps in order.

1. Create a volume group with the name VSS_FREE or a name that is the same type as the Windows Server 2003 or Windows Server 2008 host. For example, SCSI Map 256.
2. Use the following parameters to create a virtual hostconnect on the storage unit that is named VSS_FREE or another name:

```
-profile Intel -Windows 2003
```

where *Intel -Windows 2003* is the profile to use for the connection.

```
-addrdiscovery LUNPolling
```

`-volgrp`

where *volgrp* is the name of the volume group you created in step 1 on page 40.

`-wwname 5000000000000001`

3. Create a volume group with the name `VSS_RESERVED` or a name that is the same type as the Windows Server 2003 or Windows Server 2008 host. For example, SCSI Map 256.
4. Use the following parameters to create a virtual hostconnect on the storage unit that is named `VSS_RESERVED` or another name:

`-profile Intel -Windows 2003`

where *Intel -Windows 2003* is the profile to use for the connection

`-addrdiscovery LUNPolling`

`-volgrp`

where *volgrp* is the name of the volume group you created in step 3.

`-wwname 5000000000000000`

5. Create and assign free volumes to the `VSS_FREE` volume group.

Note: If you already have volumes that are created for the `VSS_FREE` virtual host, you must assign those volumes to `VSS_FREE`.

Verifying the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software installation

This task verifies that the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software is correctly installed on the server.

Perform the following steps to verify the installation:

1. Click **Start** → **All Programs** → **Administrative Tools** → **Services** from Windows server task bar. The Services window opens.
2. Ensure that there is a service named IBM System Storage Support for Microsoft Volume Shadow Copy that is listed, and that **Status** is started and **Startup Type** is Automatic.
3. Open a command prompt window and type the following command:

```
vssadmin list providers
```

4. Ensure that the IBM System Storage Support for Microsoft Volume Shadow Copy Service is listed as a provider.

If you are able to perform all of these verification tasks successfully, the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software was successfully installed on the server.

Verifying IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software configuration

This task verifies that the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software is correctly configured on the server.

This task assumes that you have already created the VSS_FREE and VSS_RESERVED pools.

Perform the following steps to verify the configuration:

1. Issue the following command to list all of the volumes for the storage unit:

```
ibmvcfg listvols
```

2. If the volumes are not listed, perform the following steps:
 - a. Check the connectivity of the CIM agent.
 - b. Check the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software configuration.
 - c. Check the IBMVSS.log file to view detailed information for the settings that are not correct. The IBMVSS.log file is located in the directory where the IBM System Storage Support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software is installed.
 - d. Use the commands that are provided by the ibmvcg.exe utility to fix any settings that are not correct. See "IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software configuration commands."

If you are able to perform all of these verification tasks successfully, the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software was successfully configured on the server.

IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software configuration commands

You can change the parameters that you defined when you installed the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software. You must use the ibmvcfg.exe utility to change the parameters.

Table 25 describes the configuration commands that are provided by the ibmvcfg.exe utility.

Notes:

1. If you do not know which settings to provide (for example, passwords or user names) for these commands, contact your system administrator.
2. If you are deleting a FlashCopy relationship, the relationship is not deleted if incremental FlashCopy is activated in the IBM hardware provider. To delete an incremental FlashCopy relationship, use the ibmvcfg.exe utility.

Table 25. Microsoft Volume Shadow Copy and Virtual Disk Services software configuration commands

Command	Description	Example
<code>ibmvmcfcfg showcfg</code>	Provides the current settings	<code>ibmvmcfcfg showcfg</code>
<code>ibmvmcfcfg </h, /help, -?, /?></code>	Provides help	<code>ibmvmcfcfg /?</code>
CIMOM settings		
<code>ibmvmcfcfg set cimomHost <IP or host_name></code>	Sets the CIMOM host either host IP or host name can be used.	<code>ibmvmcfcfg set cimomHost 10.1.1.88</code>
<code>ibmvmcfcfg set username <CIMOM username></code>	Sets the CIMOM user name	<code>ibmvmcfcfg set username Johnny</code>
<code>ibmvmcfcfg set password <CIMOM password></code>	Sets the CIMOM user password.	<code>ibmvmcfcfg set password mypassword</code>
<code>ibmvmcfcfg set cimomPort <portnumber></code>	Specifies the CIMOM port number. The default value is 5989. For embedded CIMOM secured port number, by default is 6989.	<code>ibmvmcfcfg set cimomPort 5989</code>
<code>ibmvmcfcfg set usingssl <yes/no></code>	Specifies CIMOM SSL connection. The default value is true.	<code>ibmvmcfcfg set usingssl yes</code>
<code>ibmvmcfcfg timeout <value></code>	Sets the CIM enumeration time out value in second. The default value is 0 zero means infinite timeout.	<code>ibmvmcfcfg set timeout 80</code>
Volume Shadow Copy Service settings		
<code>ibmvmcfcfg set vssFreeInitiator <WWPN></code>	Sets the defined free pool on the DS storage. The default value is 5000000000000000.	<code>ibmvmcfcfg set vssFreeInitiator 80000000000000AA</code>
<code>ibmvmcfcfg set vssReservedInitiator <WWPN></code>	Sets the defined reserved pool on the DS storage. The default value is 5000000000000001.	<code>ibmvmcfcfg set vssReservedInitiator 80000000000000AB</code>
<code>ibmvmcfcfg set backgroundCopy <0-100></code>	Specifies copy rate from 0 to 100. The default value is 50, and 0 zero is no copy.	<code>ibmvmcfcfg set backgroundCopy 0</code>
<code>ibmvmcfcfg set incrementalFC <yes/no></code>	Enable or disable incremental flashCopy. By default is false.	<code>ibmvmcfcfg set incrementalFC yes</code>
<code>ibmvmcfcfg list all <-l></code>	Lists all VDisks, including information about volume ID, UUID, volume name, size, operational state, health status, type of volume, VDisks to host mappings and host name. Use the <code>-l</code> parameter to output in verbose list column format.	<code>ibmvmcfcfg list all</code> <code>ibmvmcfcfg list all -l</code>
<code>ibmvmcfcfg list free <-l></code>	Lists the volumes that are currently in the free pool. Use the <code>-l</code> parameter to output in verbose list column format.	<code>ibmvmcfcfg list free</code> <code>ibmvmcfcfg list free -l</code>
<code>ibmvmcfcfg list reserved <-l></code>	Lists the volumes that are currently in the reserved pool. Use the <code>-l</code> parameter to output in verbose list column format.	<code>ibmvmcfcfg list reserved</code> <code>ibmvmcfcfg list reserved -l</code>
<code>ibmvmcfcfg list assigned <-l></code>	Lists the volumes that are currently in the assigned pool/host. Use the <code>-l</code> parameter to output in verbose list column format.	<code>ibmvmcfcfg list assigned</code> <code>ibmvmcfcfg list</code>

		<i>assigned -l</i>
<i>ibmvcfg list unassigned <-l></i>	Lists the volumes that are currently in the unassigned pool/host. Use the <code>-l</code> parameter to output in verbose list column format.	<i>ibmvcfg list unassigned</i> <i>ibmvcfg list unassigned -l</i>
<i>ibmvcfg list infc <-l></i>	Lists all the FlashCopy relationships on the SAN Volume Controller. This command lists both incremental and non-incremental FlashCopy relationships.	<i>ibmvcfg list infc</i> <i>ibmvcfg list infc -l</i>
<i>ibmvcfg add <unassigned_volumes></i>	Adds one or more volumes to the free pool of volumes.	<i>ibmvcfg add 13036511188</i> <i>ibmvcfg add LUN18</i>
<i>ibmvcfg rem <free_volumes></i>	Removes one or more volumes from the free pool of volumes.	<i>ibmvcfg rem 13036511188</i> <i>ibmvcfg rem LUN18</i>
<i>ibmvcfg del <target_volumes></i>	Deletes one or more FlashCopy relationships. Use the serial number of the FlashCopy target to delete the relationship.	<i>ibmvcfg del 13036511188</i> <i>ibmvcfg del LUN18</i>
Virtual Disk Service setting		
<i>ibmvcfg set trace <value></i>	Sets the trace log debugging information from value 1 to 7. The default value is 3.	<i>ibmvcfg set trace 7</i>

IBM System Storage support for Microsoft Volume Shadow Copy and Virtual Disk Services software error codes

Error codes provide information on the status of operations. Error codes are logged in the Windows Event Monitor and in the Microsoft Volume Shadow Copy and Virtual Disk Services software log file that located in the installation directory.

Table 26 lists the return error codes and their symbolic names and definitions.

Table 26. IBM System Storage support for Microsoft Volume Shadow Copy and Virtual Disk Services software error codes

Code	Symbolic Name	Definition
1000	ERR_JVM	JVM Creation failed.
1001	ERR_CLASS_NOT_FOUND	Class not found: %1.
1002	ERR_MISSING_PARAMS	Some required parameters are missing.
1003	ERR_METHOD_NOT_FOUND	Method not found: %1.

Table 26. IBM System Storage support for Microsoft Volume Shadow Copy and Virtual Disk Services software error codes (continued)

Code	Symbolic Name	Definition
1004	ERR_REQUIRED_PARAM	A missing parameter is required. Use the configuration utility to set this parameter: %1.
1600	ERR_RECOVERY_FILE_CREATION_FAILED	The recovery file was not created.
1700	ERR_ARELUNSSUPPORTED_IBMGETLUNINFO	ibmGetLunInfo failed in AreLunsSupported.
1800	ERR_FILLLUNINFO_IBMGETLUNINFO	ibmGetLunInfo failed in FillLunInfo.
1900	ERR_GET_TGT_CLEANUP	Failed to delete the following temp files: %1
2500	ERR_LOG_SETUP	Error initializing log.
2501	ERR_CLEANUP_LOCATE	Unable to search for incomplete Shadow Copies. Windows Error: %1.
2502	ERR_CLEANUP_READ	Unable to read incomplete Shadow Copy Set information from file: %1.
2503	ERR_CLEANUP_SNAPSHOT	Unable to cleanup snapshot stored in file: %1.
2504	ERR_CLEANUP_FAILED	Cleanup call failed with error: %1.
2505	ERR_CLEANUP_OPEN	Unable to open file: %1.
2506	ERR_CLEANUP_CREATE	Unable to create file: %1.
2507	ERR_HBAAPI_LOAD	HBA: Error loading hba library: %1.
3000	ERR_ESSSERVICE_EXCEPTION	ESSService: An exception occurred. Check the ESSService log.
3001	ERR_ESSSERVICE_LOGGING	ESSService: Unable to initialize logging.
3002	ERR_ESSSERVICE_CONNECT	ESSService: Unable to connect to the CIM agent. Check your configuration.
3003	ERR_ESSSERVICE_SCS	ESSService: Unable to get the Storage Configuration Service. Check your configuration.
3004	ERR_ESSSERVICE_INTERNAL	ESSService: An internal error occurred with the following information: %1.

Table 26. IBM System Storage support for Microsoft Volume Shadow Copy and Virtual Disk Services software error codes (continued)

Code	Symbolic Name	Definition
3005	ERR_ESSSERVICE_FREE_CONTROLLER	ESSService: Unable to find the VSS_FREE controller.
3006	ERR_ESSSERVICE_RESERVED_CONTROLLER	ESSService: Unable to find the VSS_RESERVED controller. Check your configuration.
3007	ERR_ESSSERVICE_INSUFFICIENT_TARGETS	Unable to find suitable targets for all volumes.
3008	ERR_ESSSERVICE_ASSIGN_FAILED	ESSService: The assign operation failed. Check the CIM agent log for details.
3009	ERR_ESSSERVICE_WITHDRAW_FAILED	ESSService: The withdraw FlashCopy operation failed. Check the CIM agent log for details.

Uninstalling the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software

You can use the Add or Remove Programs tool that is provided with Windows operating systems to uninstall the IBM System Storage support Microsoft Volume Shadow Copy Service and Virtual Disk Service software.

Perform the following steps to uninstall the IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software:

1. Log on to your system as the local administrator.
2. Click **Start** → **Control Panel**. The Control Panel window opens.
3. Double-click Add or Remove Programs. The Add or Remove Programs window opens.
4. Select **IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service** and click **Remove**.
5. Click **Yes** when you are asked if you want to completely remove the selected application and all of its components. The progress window quickly opens and closes.
6. When the Finish window opens, click **Finish**. The removal is now complete.

The IBM System Storage support for Microsoft Volume Shadow Copy Service and Virtual Disk Service software is no longer installed on the Windows system.