

IBM Storage Device Driver for VMware VAAI
Version 1.3.0

Installation Guide



Note

Before using this document and the product it supports, read the information in "Notices" on page 11.

Edition notice

Publication number: GC27-3910-06. This publication applies to Version 1.3.0 of the IBM Storage Device Driver for VMware VAAI and to all subsequent releases and modifications until otherwise indicated in a newer publication.

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About this guide

This guide describes how to install and configure the IBM® Storage Device Driver for VMware VAAI.

Who should use this guide

This guide is intended for system administrators who are familiar with the VMware ESX and ESXi environments, and with specific IBM storage product in use.

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Related documentation

For additional information related to the IBM Storage Device Driver for VMware VAAI, refer to the following publications.

- IBM Storage Host Software Solutions Information Center (publib.boulder.ibm.com/infocenter/strhosts/ic)
- IBM SAN Volume Controller Information Center (publib.boulder.ibm.com/infocenter/svc/ic)
- IBM Storwize® V7000 Information Center (publib.boulder.ibm.com/infocenter/storwize/ic)
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- VMware VAAI website (www.vmware.com/products/vstorage-apis-for-array-integration)
- Performance Best Practices for VMware vSphere 4.1 (www.vmware.com/pdf/Perf_Best_Practices_vSphere4.1.pdf)
- vSphere Command-Line Interface Installation and Reference Guide (www.vmware.com/pdf/vsphere4/r40/vsp_40_vcli.pdf)

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Procedure

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Chapter 1. Introduction

The IBM Storage Device Driver for VMware VAAI is a software plug-in that integrates with the VMware ESX 4.1 and ESXi 4.1 environments, as part of VMware's vStorage APIs for Array Integration (VAAI).

The IBM software plug-in consists of a kernel module that reports to the VMware VAAI driver and allows offloading extended VMware operations to supported IBM storage systems.

The following extended VMware operations can be offloaded to the supported IBM storage systems:

- Full copy (clone) – Copies data from one logical unit (LUN based) to another without writing to the ESX server. Rather than issuing read and write requests from the host, the data copying operation is initiated on the storage system. This speeds up the virtual machine (VM) cloning operation and reduces the CPU load on the host.
- Block zeroing – Assigns zeroes to large storage areas without actually sending the zeros to the storage system. This speeds up the VM initiation operation, and reduces the I/O and CPU load on the host.
- Hardware-assisted locking – Locks a particular range of blocks in a shared logical unit, providing exclusive access to these blocks. Instead of using SCSI reservation that locks the entire logical unit, locking specific blocks is a more efficient alternative that greatly improves scalability in large server arrays. The locking is performed using Atomic Test & Set (ATS) commands.

The offloading of these extended operations from the ESX or ESXi server to the IBM storage system reduces strain on the server, and saves a significant amount of time and computing resources when performing these operations in a full scale production environment.

Note: VMware ESXi 5.0 or later already includes built-in drivers that support IBM storage systems. The IBM Storage Device Driver for VMware VAAI is required only if you are using ESX 4.1 or ESXi 4.1.

Chapter 2. Installation

This chapter describes how to install the IBM driver, verify its installation, claim specific IBM storage systems, and uninstall the IBM driver when necessary.

Compatibility and requirements

For the complete and up-to-date information about the compatibility and requirements of the IBM Storage Device Driver for VMware VAAI, refer to the latest release notes.

You can find the latest release notes on the IBM Storage Host Software Solutions Information Center (publib.boulder.ibm.com/infocenter/strhosts/ic) or on the IBM Fix Central (www.ibm.com/support/fixcentral).

Note:

- The IBM Storage Device Driver for VMware VAAI is required only if you are using VMware ESX 4.1 or ESXi 4.1.
 - Refer to the relevant VMware documentation for information about how to install the compatible versions of VMware ESX or ESXi.
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Download site

The IBM Storage Device Driver for VMware VAAI is available as a free download.

You can download the latest version at any time from the IBM Fix Central (www.ibm.com/support/fixcentral).

Installing or updating the IBM device driver

You can perform the installation of the IBM device driver either locally or remotely using the command-line interface (vCLI) **esxupdate** or **vihostupdate** command.

Attention: The installation procedure requires server restart after running the installation command.

Installing locally with the **esxupdate** command

To perform a local installation on either an ESX or ESXi server, use the **esxupdate**.

Procedure

1. Copy the following offline bundle file to the ESX server: `vmware-esx-ibm_vaaip_module-offline-bundle.zip`
2. Use the vCLI of the ESX server to enter the following command:

```
esxupdate --bundle=vmware-esx-ibm_vaaip_module-offline-bundle.zip --nodeps
--maintenancemode update
```

Note: This command places the server in maintenance mode.

- Restart the ESX or ESXi server.

Installing remotely with the `vihostupdate` command

VMware recommends using the `vihostupdate` command for remote ESXi servers.

Before you begin

For remote installation, you need to know the IP address and access credentials of each remote ESXi server on which you want to install the IBM device driver

Procedure

To install or update the IBM device driver remotely:

- Copy the `vmware-esx-ibm_vaaip_module-offline-bundle.zip` file to the directory where the vSphere CLI (vCLI) is locally installed.
- Enter the following command and variables (`C:\` is the directory used in this example; server-specific variables are in `< >`):

```
vihostupdate --server <IP address> --username <username> --password <password>
--install -bundle c:\vmware-esx-ibm_vaaip_module-offline-bundle.zip
```

- Switch to maintenance mode using the `vicfg-hostops` command:

```
vicfg-hostops --server <IP address> --username <username> --password <password>
--operation enter
```

- Restart the ESXi server by entering:

```
vicfg-hostops --server <IP address> --username <username> --password <password>
--operation reboot
```

Verifying the installation

After the ESX or ESXi server restarts, you can verify whether the VIB package is properly installed or updated by performing a slightly different verification procedure for each server type (ESX or ESXi).

Verifying on an ESX server

On an ESX server, verify the installation by using the `esxupdate` command.

Procedure

In the vCLI, enter the following:

```
esxupdate --vib-view query | grep ibm-vaaip-module
```

The installation details are displayed:

```
cross_ibm-vaaip-module_410.1.2.0.0-268846 installed 2010-10-08T21:44:47 .261515-07:00
```

Verifying on an ESXi server

On an ESXi server, verify the installation by using the `vihostupdate` command.

Procedure

In the vCLI, enter the following command (server-specific variables are in < >):

```
vihostupdate --server <IP address> --username <username> --password <password> --query
```

The installation details are displayed:

```
-----Bulletin ID----- -----Installed----- -----Summary-----  
IBM-ibm_vaaip_module-268846 2010-12-20T14:29:02 vmware-esx-ibm-vaaip-module: ESX release
```

Checking the driver loading

To ensure that the IBM driver is loaded properly on your ESX or ESXi server, perform the following procedure.

Procedure

In the vCLI, enter the following:

```
#esxcfg-module -l | grep ibm_vaaip_module
```

The driver loading details are displayed:

```
ibm_vaaip_module      8    12
```

In the example above, '8' indicates the number of devices on the server, and '12' indicates the size of the module in kilobytes.

Important: On ESX servers, the IBM driver can be listed as loaded only after at least one IBM storage system has been claimed. The claiming procedure is described in “Claiming IBM storage systems on an ESX server.”

Claiming IBM storage systems on an ESX server

Before the IBM Storage Device Driver for VMware VAAI can be used with specific IBM XIV, Storwize V7000, or SAN Volume Controller systems, you must claim these systems on your ESX server.

About this task

The claiming operation allows your ESX server to detect and connect with specific IBM storage systems.

Note: The claiming operation is not required on ESXi servers. ESXi servers detect and claim the storage systems automatically after the installation and the first server restart.

Procedure

Perform the following procedure to claim the IBM storage systems:

1. Use the `claim_ibm.sh` script that is located in the `/usr/sbin` directory:

```
/usr/sbin/claim_ibm.sh
```

2. Verify the claiming of the IBM storage systems by using the **esxcli vaa1 device list** command:

```
#esxcli vaa1 device list
eui.0017380000b0000
Device Display Name: IBM Fibre Channel RAID Ctlr (eui.0017380000b0000)
VAAI Plugin Name: IBM_VAAIP_MODULE
eui.0017380000b0009
Device Display Name: IBM Fibre Channel Disk (eui.0017380000b0009)
VAAI Plugin Name: IBM_VAAIP_MODULE
eui.0017380000b000a
Device Display Name: IBM Fibre Channel Disk (eui.0017380000b000a)
VAAI Plugin Name: IBM_VAAIP_MODULE
```

Uninstalling the IBM device driver

You can uninstall the IBM device driver at any time either locally or remotely using the command-line interface (vCLI) **esxupdate** or **vihostupdate** command.

Uninstalling locally with the **esxupdate** command

You can uninstall the IBM device driver locally from each individual ESX or ESXi server, by using the **esxupdate** command.

Procedure

1. Enter the following using the specific VIB package name and ID:

```
esxupdate -b cross_ibm-vaai-module_410.1.2.0.0-268846 --nodeps
--maintenancemode remove
```

Note: You can find the VIB package ID by using the **esxupdate --vib-view query** command as described in “Verifying on an ESX server” on page 4.

2. Restart the ESX or ESXi server.

Uninstalling remotely with the **vihostupdate** command

VMware recommends using the **vihostupdate** command for ESXi servers.

Procedure

1. Enter the following using the specific VIB package bulletin ID (server-specific variables are in **< >**):

```
vihostupdate --server <IP address> --username <username> --password <password>
--remove --bulletin IBM-ibm_vaai_module-268846
```

Note: You can find the required bulletin ID by entering:

```
vihostupdate --server <IP address> --username <username> --password <password> --query
```

2. Switch to maintenance mode using the **vicfg-hostops** command:

```
vicfg-hostops --server <IP address> --username <username> --password <password>
--operation enter
```

3. Restart the ESXi server.

Verifying the removal of the IBM device driver

You can verify that the IBM device driver is removed and unloaded by performing the following procedure.

Procedure

Enter the following command:

```
#vmkload_mod -l | grep ibm_vaaip_module
```

The prompted message should state that no module exists.

Chapter 3. Configuration

This chapter details the configuration options that are available for the IBM Storage Device Driver for VMware VAAI.

Setting the data transfer chunk size

When using the clone (full copy) command, the size of the transferred data chunks is defined in the `/DataMover/MaxHWTransferSize` folder.

About this task

You can increase or decrease the size of the transferred data chunks depending on the available bandwidth.

Note: For more information about the importance of data chunk sizing, refer to *Performance Best Practices for VMware vSphere 4.1* at the following web address: http://www.vmware.com/pdf/Perf_Best_Practices_vSphere4.1.pdf

Procedure

1. Check the current data transfer chunk size by entering the following command:

```
# esxcfg-advcfg -g /DataMover/MaxHWTransferSize
```

The default chunk size is 4096 kilobytes.

2. Use the **esxcfg-advcfg** command to set a new chunk size in Kilobytes. For example, enter the following command to set the new chunk size to 16384 kilobytes:

```
esxcfg-advcfg /DataMover/MaxHWTransferSize -s 16384
```

Important:

- A higher value means that more data would be copied in a single command, reducing the time required for the VM cloning operation.
 - For best performance of Storwize V7000 and SVC, change the chunk size to 16384 kilobytes.
-

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Printed in USA

GC27-3910-06

