



Installing the NetApp® NFS Plug-in 1.0 for VMware® VAAI

Installing the NetApp NFS plug-in for VMware vStorage APIs for Array Integration (VAAI) involves enabling vStorage on the NetApp storage system, verifying that VAAI is enabled on the VMware host, downloading and installing the plug-in on the VMware ESXi host, and ensuring that the installation is successful.

Before you begin

- NFSv3 must be enabled on the storage system.
- VMware vSphere 5.0 and later is required.

About this task

- If you are using the Cluster-Mode Element Manager or the VMware ESXi CLI to install the plug-in, start with Step 1.
- If you are using the Virtual Storage Console (VSC) for VMware vSphere to install the plug-in, start with Step 3.

Note: The VSC for VMware vSphere enables vStorage on the storage controller and enables VAAI on the ESXi host, which are steps 1 through 2 of this procedure.

Steps

1. Enable VMware vStorage for NFS by one of the following methods:

If you use the...	Then...
Cluster-Mode Element Manager	a. Click Vserver > NFS > Manage, then select Vserver. b. Under the NFS vStorage Support tab, select enabled, and then click modify.
Cluster-Mode CLI	Enable VMware vStorage on a Vserver by using the following command: vserver nfs modify -vserver vserver_name -vstorage enabled <i>vserver_name</i> is the name of the Vserver.

2. Verify that VAAI is enabled on each ESXi host.

If the value of both parameters is 1, VAAI is enabled. (In VMware vSphere 5.0 and later, VAAI is enabled by default.)

If you use the...	Then...
VMware ESXi CLI	a. Enter the following commands to verify that VAAI is enabled: <pre>esxcfg-advcfg -g /DataMover/HardwareAcceleratedMove esxcfg-advcfg -g /DataMover/HardwareAcceleratedInit</pre> The following output is displayed: <pre>~ # esxcfg-advcfg -g /DataMover/HardwareAcceleratedMove Value of HardwareAcceleratedMove is 1 ~ # esxcfg-advcfg -g /DataMover/HardwareAcceleratedInit Value of HardwareAcceleratedInit is 1</pre> b. If VAAI is not enabled, enter the following commands to enable VAAI: <pre>esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedInit esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedMove</pre> The following output is displayed: <pre>~ # esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedInit Value of HardwareAcceleratedInit is 1 ~ # esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedMove Value of HardwareAcceleratedMove is 1</pre>
vSphere Client	a. Using the vSphere client, log in to vCenter. b. For each ESXi server, click the server name. c. In the Software section of the Configuration tab, click Advanced Settings. d. Select DataMover, and ensure that the <code>DataMover.HardwareAcceleratedMove</code> and <code>DataMover.HardwareAcceleratedInit</code> parameters are set to 1.
3. Download the NetApp NFS Plug-in for VMware VAAI: a) Go to the Software Downloads page at support.netapp.com/NOW/cgi-bin/software. b) Scroll down and click NetApp NFS Plug-in for VMware VAAI. c) Select the ESXi platform. d) Download either the offline bundle (.zip) or online bundle (.vib) of the most recent plug-in. 4. Install the plug-in on the ESXi host by one of three methods:	
To...	Then...
Install the online bundle using the ESXi CLI	Enter the following command: <pre>~ # esxcli software vib install -v http_path</pre> <i>http_path</i> is the path to the online bundle (.vib), which must be available online.

To...	Then...															
Install the offline bundle using the ESXi CLI	a. Copy the offline bundle to the ESXi host, or to a common datastore accessible by all ESXi hosts. b. Enter the following command to list the contents of the offline bundle: <pre>~ # esxcli software sources vib list -d file:///path_offline_bundle.zip</pre> In the output examples, the version and release date of the plug-in are for illustration purposes. The most recent version and release date of the plug-in might be different from what is shown. <i>path_offline_bundle</i> is the file name and full path of the offline bundle, and <i>plugin_name</i> is the name of the NFS plug-in. The following output is displayed: <pre>~ # esxcli software sources vib list -d file:///NetAppNasPlugin.v18.zip</pre><table><thead><tr><th>Name</th><th>Version</th><th>Vendor</th><th>Rel Date</th><th>Acceptance Level</th></tr></thead><tbody><tr><td>-----</td><td>-----</td><td>-----</td><td>-----</td><td>-----</td></tr><tr><td>NetAppNasPlugin</td><td>1.0-018</td><td>NetApp</td><td>2012-04-29</td><td>VMwareAccepted</td></tr></tbody></table> c. Enter the following command to install the plug-in from the offline bundle: <pre>esxcli software vib install -n plugin_name -d file:///path_offline_bundle.zip</pre> The following output is displayed: <pre>~ # esxcli software vib install -n NetAppNasPlugin -d file:///NetAppNasPlugin.v18.zip</pre> Message: The update completed successfully, but the system needs to be rebooted for the changes to be effective. Reboot Required: true VIBs Installed: NetApp_bootbank_NetAppNasPlugin_1.0-018 VIBs Removed: VIBs Skipped: <pre>~ #</pre>	Name	Version	Vendor	Rel Date	Acceptance Level	-----	-----	-----	-----	-----	NetAppNasPlugin	1.0-018	NetApp	2012-04-29	VMwareAccepted
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NetAppNasPlugin	1.0-018	NetApp	2012-04-29	VMwareAccepted												
Use the Virtual Storage Console to install the plug-in	a. Extract the offline bundle in .zip format. b. Copy the plug-in .vib file, NetAppNasPlugin.vib, to the VSC for VMware vSphere installation folder. The path name is <i>VSC installation directory</i>\etc\vsc\web, where <i>VSC installation directory</i> is the directory where you installed VSC for VMware vSphere. The default directory path is C:\Program Files\NetApp\Virtual Storage Console\. However, VSC for VMware vSphere lets you change that directory. For example, if you are using the default installation directory, the path to the NetAppNasPlugin.vib file is the following: C:\Program Files\Virtual Storage Console\etc\vsc\web\NetAppNasPlugin.vib. c. Check that the file name of the .vib file that you downloaded matches the predefined name that VSC 4.0 for VMware vSphere uses: NetAppNasPlugin.vib If the file name does not match the predefined name, rename the .vib file. You do not need to restart the VSC client or the NetApp vSphere Plug-in Framework (NVPF) service. d. Go to the NFS Plug-in for VMware VAAI section of the Tools panel of the VSC for VMware vSphere Monitoring and Host Configuration capability, and then click Install to Host. e. In the pop-up box, specify the ESXi hosts on which you want to install the plug-in. f. Click OK. The Monitoring and Host Configuration capability automatically installs the plug-in on the hosts that you specified.															

5. Reboot the ESXi host to complete the installation.

6. Verify that the plug-in was successfully installed on the host by entering the following command at the VMware ESXi command line:

```
~ # esxcli software vib list | more
```

The following output is displayed:

```

Name                Version  Vendor  Acceptance Level  Install Date
-----
NetAppNasPlugin     1.0-018 NetApp   VMwareAccepted    2012-04-29
~ # esxcli software vib get|more

NetApp_bootbank_NetAppNasPlugin_1.0-018
Name: NetAppNasPlugin
Version: 1.0-018
Type: bootbank
Vendor: NetApp
Acceptance Level: VMwareAccepted
Summary: NAS VAAI NetApp Plugin
Description: NetApp NAS VAAI Module for ESX Server
Release Date: 2012-04-29
Depends:
Conflicts:
Replaces:
Provides:
Maintenance Mode Required: False
Hardware Platforms Required:
Live Install Allowed: False
Live Remove Allowed: False
Overlay: False
Payloads: NetAppNasPlugin
~ #
```

7. Set nfs as the access protocol for each export policy rule for ESXi servers that use VAAI.

If you use the...	Then...
Cluster-Mode CLI	Enter the following command: <pre>vserver export-policy rule modify -vserver vserver_name -policyname policy -ruleindex index -protocol nfs</pre> • <i>vserver_name</i> is the name of the Vserver. • <i>policy</i> is the name of the export policy. • <i>index</i> is the index number of the rule. <pre>cluster1::> vserver export-policy rule modify -vserver vs1 -policyname mypolicy -ruleindex 1 -protocol nfs</pre>
Cluster-Mode Element Manager	a. Click Vserver > export-policy > rule. b. Select each export-policy rule from the rule index and select the ESXi server or subnet. c. Enter nfs for Access Protocol. d. Click modify.
System Manager	a. Select the Vserver from the list of Vservers. b. Expand the Vserver with VAAI-enabled datastores, and then navigate to Policies > Export Policies. c. In the main window, expand the export policy for the VAAI-enabled datastores. d. Select each export-policy rule from the Rule Index, and then click Modify Rule to display the Modify Export Rule dialog. e. Under Access Protocols, select NFS. f. Click OK.

You can use export policies to restrict access to volumes to specific clients. For more information about export policy rules, see the *Data ONTAP Cluster-Mode File Access and Protocols Management Guide*.

8. Go to step 10 if you have already mounted the NFS datastores on the ESXi host, as the plug-in works automatically following the installation and reboot.

9. Mount the NFS datastore on the ESXi host by performing the following steps:

- a) Enter the following command:

```
~ # esxcfg-nas -a onc_src -o 10.72.44.120 -s /onc_src
```

The following output is displayed:

```
Connecting to NAS volume: onc_src
onc_src created and connected.
```

- b) Enter the following command:

```
~ # esxcfg-nas -l
```

The following output is displayed:

```
VMS_vol103 is /VMS_vol103 from 10.72.217.154 mounted available
VMS_vol104 is VMS_vol104 from 10.72.217.157 mounted available
dbench1 is /dbench1 from 10.72.217.156 mounted available
dbench2 is /dbench2 from 10.72.217.156 mounted available
onc_src is /onc_src from 10.72.44.120 mounted available
```

Upon completion (by standard VMware behavior), the volume is mounted and available in the `/vmfs/volumes` directory.

10. Verify that the mounted datastore supports VAAI by one of the following methods:

If you use the...	Then...
ESXi CLI	Enter the following command: <pre>~ # vmkfstools -Ph /vmfs/volumes/onc_src/</pre> The following output is displayed: <pre>NFS-1.00 file system spanning 1 partitions. File system label (if any): onc_src Mode: public Capacity 760 MB, 36.0 MB available, file block size 4 KB UUID: fb9cccc8-320a99a6-0000-000000000000 Partitions spanned (on "notDCS"): nfs:onc_src NAS VAAI Supported: YES Is Native Snapshot Capable: YES ~ #</pre>
vSphere Client	a. Click ESXi Server > Configuration > Storage. b. Look in the Hardware Acceleration column for an NFS datastore with VAAI enabled.

For more information about VMware vStorage over NFS, see the *Data ONTAP Cluster-Mode File Access and Protocols Management Guide*.

For details about configuring volumes and space in the volumes, see the *Data ONTAP Cluster-Mode Logical Storage Management Guide*.

After you finish

- Create virtual machines in the thick virtual machine disk (VMDK) format on NetApp volumes.
- Clone existing virtual machines within or across NetApp volumes:

- Clone operations within the same datastore are very fast and do not consume much space on the NetApp volumes in Cluster-Mode.
- Clone operations between datastores that are volumes on the same Cluster-Mode Vserver on the same node offload I/O from the ESXi server, but the data is fully copied within the node.
- Clone operations between datastores that are volumes on the same Cluster-Mode Vserver on different nodes offload I/O from the ESXi server, but the data is fully copied between the nodes over the cluster network.

Note: These clone operations are still faster than non-VAAI clone operations that go through the ESXi host.

For information about using Virtual Storage Console for VMware vSphere to provision NFS datastores and create clones of virtual machines in the VMware environment, see the *Virtual Storage Console for VMware vSphere Installation and Administration Guide*.

For more information about working with NFS datastores and performing cloning operations, see the *VMware vSphere Storage* guide at pubs.vmware.com/vsphere-50/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-50-storage-guide.pdf.