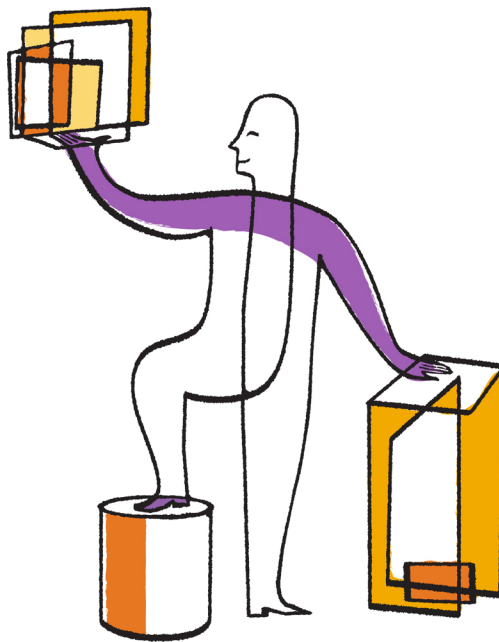




OnCommand® Shift 1.1

Conversion and Administration Guide



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Product overview

OnCommand Shift is a Windows PowerShell-based interface that enables you to convert virtual machines from one hypervisor format to another.

The product leverages NetApp FlexClone technology to support rapid bidirectional conversion of virtual machine hard drives as follows:

- VMware ESXi to Microsoft Hyper-V
- Microsoft Hyper-V to VMware ESXi

OnCommand Shift replaces the MAT4Shift tool.

OnCommand Shift components

You should be familiar with OnCommand Shift components before you install the product.

Shift server

The Shift server executes OnCommand Shift operations. It uses VMware Power CLI and the Hyper-V Server PowerShell module to communicate with VMware ESXi and Microsoft Hyper-V.

You can install Shift on a Microsoft Hyper-V server or on a standalone Windows server (physical or virtual). For supported Shift Server hosts, see the NetApp Interoperability Matrix.

Data ONTAP SVM

A Storage Virtual Machine (SVM) is a logical storage server that provides data access to LUNs and the Network Attached Storage (NAS) namespace. It is a best practice to create a new SVM for use during OnCommand Shift operations.

Depending on the direction of the conversion you want to perform, you use VMware vSphere Storage vMotion or Microsoft Hyper-V Storage Live Migration to move the VMs you want to convert to this SVM. The SVM uses NFS for Hyper-V storage and CIFS for ESXi storage.

For more information about SVMs, see the *Clustered Data ONTAP System Administration Guide*.

PowerShell module

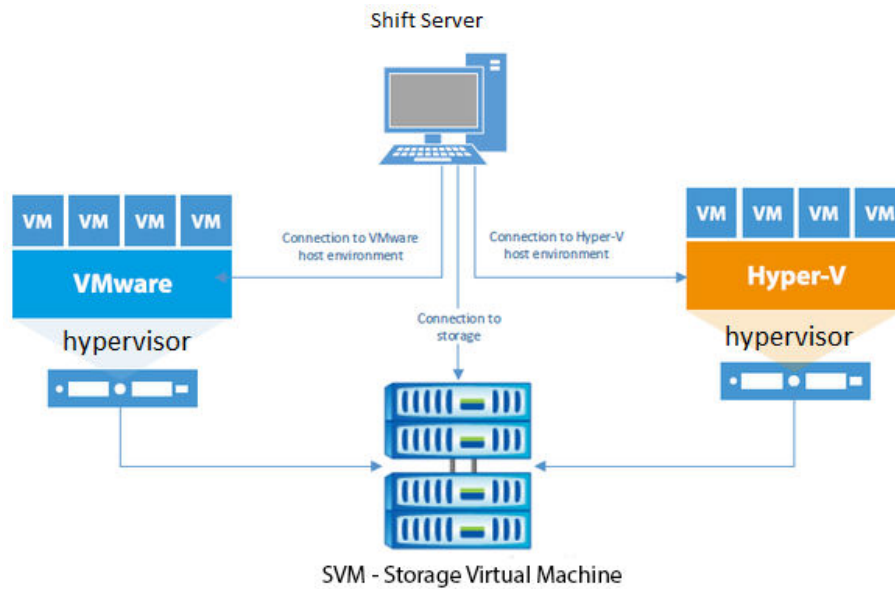
The OnCommandShift PowerShell module contains the PowerShell cmdlets installed with Shift. This module is the client of the Shift server.

Related information

[NetApp Interoperability Matrix Tool](#)

How OnCommand Shift works

At conversion time, OnCommand Shift connects the Shift server to Microsoft Hyper-V and VMware ESXi hosts and to shared NetApp storage. The server leverages NetApp FlexClone technology to convert VM hard drives from one hypervisor format to the other.



Protocols and communication methods

You should be familiar with the protocols and communication methods that OnCommand Shift uses during its operations.

HTTPS

Used by the OnCommandShift PowerShell module to communicate with the Shift server. Also used by the Shift server to communicate with the Data ONTAP cluster. IPv6 is not supported. IPv4 is supported.

VI Java (VI SDK), VMware PowerCLI

Used to communicate with VMware ESXi.

Windows PowerShell module or PowerShell ISE

Used to communicate with Microsoft Hyper-V.

Converting VMs

Before you can convert VMs to another hypervisor format, you must move the VMs to the Data ONTAP SVM you created when you configured Shift. You must also establish a connection with the Shift server (if your host is not already connected to the server). After the conversion is complete, you should verify that the converted VMs are online.

Steps

1. [Moving source VMs to the Data ONTAP SVM](#) on page 6
You must move the VMs you want to convert to the Data ONTAP SVM you created when you configured Shift. Depending on your conversion scenario, you can use VMware vSphere Storage vMotion or Microsoft Hyper-V Live Migration to migrate the source VMs.
2. [Connecting to the Shift server](#) on page 7
To perform most operations on the Shift server, you must first connect to the server using `Connect-ShiftServer`.
3. [Performing a conversion](#) on page 7
You can use OnCommand Shift to perform rapid bidirectional conversion of virtual machines between Microsoft Hyper-V and VMware ESXi. You can queue up to 300 conversion jobs at a time.
4. [Verifying that the converted VMs are online](#) on page 11
You should verify that your VMs are online after conversion has finished.
5. [Restoring a VM after a failed rollback](#) on page 11
If a VM fails to convert to a new format, the default behavior is for the VM to automatically roll back to the previous format using the last FlexClone copy. In some cases, the automatic rollback process fails. When this happens, you can manually restore the VM to its original state.

Moving source VMs to the Data ONTAP SVM

You must move the VMs you want to convert to the Data ONTAP SVM you created when you configured Shift. Depending on your conversion scenario, you can use VMware vSphere Storage vMotion or Microsoft Hyper-V Live Migration to migrate the source VMs.

Before you begin

You must have configured Shift, as described in the [OnCommand Shift 1.1 Installation and Setup Guide](#).

Step

1. According to your conversion scenario, perform one of the following actions:

Conversion scenario	Action
VMware ESXi to Microsoft Hyper-V	vSphere Storage vMotion to the NFS share.
Microsoft Hyper-V to VMware ESXi	Hyper-V Storage Live Migration to the CIFS share.

Connecting to the Shift server

To perform most operations on the Shift server, you must first connect to the server using `Connect-ShiftServer`.

About this task

You must run `Connect-ShiftServer` before issuing any other PowerShell cmdlets, except `Get-ShiftServerState`.

You issue these commands from the Shift server using a PowerShell or PowerShell ISE prompt.

Steps

1. Check the Shift server status:

```
Get-ShiftServerState -host shift_server_host_ipaddress -port  
shift_server_port -timeoutsec timeout_value
```

The command should return `Shift server is running`. If the Shift server is not running, start the Apache Tomcat 7.0 service in **Control Panel > Services**.

2. Connect to the Shift server:

```
Connect-ShiftServer -host shift_server_host_ipaddress -port  
shift_server_port -credential PSCredential -timeoutsec timeout_value
```

If you do not specify the `-credential` parameter, you are prompted for your user name and password.

Example

The following example connects to the Shift server with the default host “localhost” at the default port number 8443:

```
Connect-ShiftServer
```

Example

The following example connects to the Shift server with a specified host name and port number:

```
Connect-ShiftServer -host yourshiftserver.yourdomain.com -port 8181
```

Example

The following example connects to the Shift server with the default host “localhost” at the default port number 8443 using a saved credential object:

```
$password = ConvertTo-SecureString -AsPlainText -Force "password"  
$cred = new-object -typename System.Management.Automation.PSCredential -  
argumentlist "admin", $password  
Connect-ShiftServer -credential $cred
```

Performing a conversion

You can use OnCommand Shift to perform rapid bidirectional conversion of virtual machines between Microsoft Hyper-V and VMware ESXi. You can queue up to 300 conversion jobs at a time.

Jobs run one at a time. You do not need to wait for the current job to finish to queue additional jobs.

Related tasks

[Convert-ShiftVirtualMachine parameters](#) on page 8

[Converting VMs from Microsoft Hyper-V to VMware ESXi](#) on page 9

[Converting VMs from VMware ESXi to Microsoft Hyper-V](#) on page 9

[Checking the status of a conversion job](#) on page 10

Convert-ShiftVirtualMachine parameters

You use the Convert-ShiftVirtualMachine cmdlet to convert VMs.

Parameters are as follows:

Parameter	Definition
source	The hypervisor where the VM currently resides. Either esx or hyperv.
destination	The hypervisor to which the VM will be converted. Either esx or hyperv.
name	The name of the VM to be converted.
credential	The credential for the guest OS. Optional. If not specified, the credential specified with the Set-ShiftGuestOSConfig cmdlet is used.
ipAddress	The IP address of the VM to be converted. Required for Hyper-V to ESXi conversion. Optional for ESXi to Hyper-V conversion.
domain	The current domain of the VM to be converted. Optional. If not specified, the domain specified with the Set-ShiftGuestOSConfig cmdlet is used.
resourcePoolName	The VMware resource pool name. Optional. This parameter is only valid for conversions to ESXi, assigning newly converted VMs to a preexisting VMware resource pool. If not specified, the default resource pool on the ESXi host is used.
rollback	Whether to roll back the source VM. Optional. This parameter is useful for debugging. If a conversion fails when rollback is set to false, the user can login to the guest OS and troubleshoot the issue. If not specified, the default is true.
uninstallvmtools	Whether to uninstall VMware Tools on the source virtual machine. Optional. This parameter is only valid for conversions from ESXi. If not specified, the default value is true.

Converting VMs from Microsoft Hyper-V to VMware ESXi

You can use the `Convert-ShiftVirtualMachine` cmdlet to convert Microsoft Hyper-V VMs to VMware ESXi VMs.

Before you begin

- You must have configured Shift, as described in the [OnCommand Shift 1.1 Installation and Setup Guide](#).

Note: If you are reversing the direction of the conversion, you should change the value of the destination path in your configuration. The destination path identifies the fully qualified path name of the target CIFS or NFS share. This parameter is not the same as the destination parameter you specify when you run `Convert-ShiftVirtualMachine`. That parameter identifies the hypervisor.

- The source VMs must reside on the Data ONTAP SVM.
- Your host must be connected to the Shift server.
- EnableLUA must be turned off on the guest OS. For more information, see [Prestaging fails during conversion](#) on page 14.

About this task

If the conversion fails, the VM should automatically roll back.

You issue these commands from the Shift server using a PowerShell or PowerShell ISE prompt.

Step

1. Convert the VM:

```
Convert-ShiftVirtualMachine -source hyperv -destination esx -name  
vm_name -credential PSCredential -ipAddress vm_ipaddress -domain  
vm_domain -resourcePoolName resource_pool_name -force
```

Tip: You can check the status of the conversion job as described in [Checking the status of a conversion job](#) on page 10.

Example

Converting “TestVM” from Microsoft Hyper-V to VMware ESXi:

```
Convert-ShiftVirtualMachine -source hyperv -destination esx -name TestVM  
-ipAddress 10.10.10.210
```

After you finish

- Verify that your VM is online.
- Use your VM backup management tool to create a backup of your VM. OnCommand Shift does not automatically back up newly converted VMs.

Converting VMs from VMware ESXi to Microsoft Hyper-V

You can use the `Convert-ShiftVirtualMachine` cmdlet to convert VMware ESXi VMs to Microsoft Hyper-V VMs.

Before you begin

- You must have configured Shift, as described in the [OnCommand Shift 1.1 Installation and Setup Guide](#).

Note: If you are reversing the direction of the conversion, you should change the value of the destination path in your configuration. The destination path identifies the fully qualified path name of the target CIFS or NFS share. This parameter is not the same as the destination parameter you specify when you run `Convert-ShiftVirtualMachine`. That parameter identifies the hypervisor.

- The source VMs must reside on the Data ONTAP SVM.
- VMware Tools must be installed on the VMs, and the VMs must be powered on.
- Your host must be connected to the Shift server.
- EnableLUA must be turned off on the guest OS. For more information, see [Prestaging fails during conversion](#) on page 14.

About this task

If the conversion fails, the VM should automatically roll back.

You issue these commands from the Shift server using a PowerShell or PowerShell ISE prompt.

Step

1. Convert the VM:

```
Convert-ShiftVirtualMachine -source esx -destination hyperv -name  
vm_name -credential PSCredential -ipAddress vm_ipaddress -domain  
vm_domain -force
```

Tip: You can check the status of the conversion job as described in [Checking the status of a conversion job](#) on page 10.

Example

Converting “TestVM” from VMware ESXi to Microsoft Hyper-V:

```
Convert-ShiftVirtualMachine -source esx -destination hyperv -name TestVM  
-ipAddress 10.10.10.210
```

After you finish

- Verify that your VM is online.
- Use your VM backup management tool to create a backup of your VM. OnCommand Shift does not automatically back up newly converted VMs.

Checking the status of a conversion job

A VM conversion job is started when you use the `Convert-ShiftVirtualMachine` cmdlet. You can use the `Get-ShiftJobStatus` cmdlet to check the status of one or all of your conversion jobs.

About this task

You issue these commands from the Shift server using a PowerShell or PowerShell ISE prompt.

Step

1. To check the status of conversion jobs, do one of the following:

- To check the status of all jobs, enter:

```
Get-ShiftJobStatus
```

- To check the status of a specific job, enter:

```
Get-ShiftJobStatus -name job_ID -loop
```

The job ID was displayed when you ran `Convert-ShiftVirtualMachine`.

The optional `-loop` parameter causes the job status to refresh automatically every 10 seconds. You can cancel the job status loop by pressing **Ctrl-C**.

Verifying that the converted VMs are online

You should verify that your VMs are online after conversion has finished.

Step

1. To check that the newly converted VMs are online, connect to the destination hypervisor using the appropriate hypervisor manager:
 - VMware vSphere Web Client
 - Microsoft Hyper-V Manager

Restoring a VM after a failed rollback

If a VM fails to convert to a new format, the default behavior is for the VM to automatically roll back to the previous format using the last FlexClone copy. In some cases, the automatic rollback process fails. When this happens, you can manually restore the VM to its original state.

Before you begin

The source VMs must reside on the Data ONTAP SVM.

About this task

You issue these commands from the Shift server using a PowerShell or PowerShell ISE prompt.

Step

1. Restore the VM:

```
Restore-ShiftVirtualMachine -name vm_name -source esx|hyperv -force
```

Example

The following syntax shows how to restore the ESXi VM “TestVM”:

```
Restore-ShiftVirtualMachine -source esx -name TestVM
```

Troubleshooting OnCommand Shift

If you encounter a problem with OnCommand Shift, you should use any error messages that you receive to help with troubleshooting.

Log locations

You can access logs to troubleshoot problems with OnCommand Shift.

Logs are located at `C:\Program Files (x86)\NetApp\OnCommand Shift\log\shift-server.log`.

Prestaging logs are useful for debugging a failed conversion. To view these logs, you must run the `Convert-ShiftVirtualMachine` cmdlet with the rollback option set to false. You can then log in to the guest OS to troubleshoot the failed conversion. You can find the prestaging logs on the source guest OS at `C:\OnCommandShift\shift-prestaging.log`. After completing troubleshooting, you can use the `Restore-ShiftVirtualMachine` cmdlet to restore the source VM.

RPC server is unavailable

Message

The RPC server is unavailable.

Description

This message occurs when the guest system does not have the necessary firewall exception for OnCommand Shift.

Corrective action

Guest OS on Hyper-V	Corrective action
Windows Server 2008	1. Open Start > Control Panel > Windows Firewall. 2. Select Allow a program through Windows Firewall. 3. Click the Exceptions tab. 4. Select the File and Printer Sharing check box. 5. Select the Windows Instrumentation (WMI) check box. 6. Click OK.

Guest OS on Hyper-V	Corrective action
Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2	1. Open Start > Control Panel > System and Security > Windows Firewall. 2. Select Allow a program or feature through Windows Firewall. 3. Select the Windows Management Instrumentation (WMI) check box, which automatically selects the check box in the Domain column. 4. Click OK.
Windows 7 Windows 8 Windows 8.1	1. Open Start > Control Panel > Windows Firewall. 2. Select Allow a program through Windows Firewall. 3. Click the Exceptions tab. 4. Select the File and Printer Sharing check box. 5. Select the Windows Instrumentation (WMI) check box. 6. Click OK.

Execution policy is not changed for external scripts

Messages

You receive the following error messages during installation:

```
PS C:\Users\Administrator.SHIFTQA> Get-ShiftServerState
Get-ShiftServerState : The 'Get-ShiftServerState' command was found in
the module 'OnCommandShift', but the module could
not be loaded. For more information, run 'Import-Module OnCommandShift'.
At line:1 char:1
+ Get-ShiftServerState
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (Get-
ShiftServerState:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CouldNotAutoloadMatchingModule
```

Description

During installation, Set-ExecutionPolicy Unrestricted does not change the execution policy for external scripts. You must go to the group policy editor by using gpedit.msc to change it.

Corrective action

1. Run **gpedit.msc**.

2. Navigate to **Computer Configuration > Administrative Templates > Windows Components > Windows PowerShell**.
3. Double-click **Turn on Script Execution**.
4. In the Turn on Script Execution window, click **Enabled**.
5. In the **Execution Policy** drop-down, select **Allow all scripts**, then click **OK**.
6. Uninstall and reinstall Shift.

VMWARE_DEST_DATASTORE_NOT_FOUND

Message

VMWARE_DEST_DATASTORE_NOT_FOUND

Description

Your NFS server is using a hostname instead of the IP address on the NFS device.

Corrective action

Fix your DNS setup; make sure reverse lookup is working for the NFS server IP address.

Prestaging fails during conversion

Description

The prestaging process fails during a conversion.

Corrective action

You must turn off EnableLUA on the guest OS.

1. In the Windows Registry Editor, navigate to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System.
2. In the right pane, double-click **EnableLUA**.
3. In the edit dialog box, set **Value data** to 0, then click **OK**.
4. Reboot the VM.

ESXi VM does not start after conversion from Hyper-V VM

Description

After converting an ESXi VM to a Hyper-V VM, you cannot convert the Hyper-V VM back to ESXi if the ESXi VM had an automatically generated MAC address identifying a NIC. The ESXi VM does not start.

Corrective action

If you plan to convert an ESXi VM to a Hyper-V VM, and then convert the Hyper-V VM back to ESXi, you must assign the MAC address of the ESXi VM manually before converting the VM to

Hyper-V. The statically assigned MAC address must not be in the range (00:50:56:*:~:~). A valid MAC address might be (10:20:30:40:50:60).

Destination guest OS configuration is incorrect

Description

The destination guest OS configuration is incorrect (for example, the wrong IP address is configured).

Corrective action

When you log in to the destination VM after conversion, you might see an encoded script running in a PowerShell window. You should not interrupt this script.

The Shift server reboots the destination VM twice after conversion, before completing the guest OS configuration. If you interrupt the encoded script or reboot the guest OS during configuration, the configuration process might not complete.

Default gateway address not set on ESXi VM

Description

After conversion, the default gateway address is not set on the ESXi VM.

Corrective action

Set the default gateway address manually.

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