VMware vSphere® 5.0 Evaluation Guide

Volume Four – Auto Deploy

TECHNICAL WHITE PAPER

vmware®

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About This Guide

The purpose of the *VMware vSphere 5.0 Evaluation Guide, Volume Four – Auto Deploy,* is to support a self-guided, hands-on evaluation of VMware vSphere® 5.0 Auto Deploy capabilities.

This guide covers evaluation cases that are suitable for IT professionals who have a very solid understanding of VMware vSphere® 5.0 ("vSphere") and are looking to automate the deployment and updating of VMware ESXi™ hosts.

System Requirements

Hardware Requirements

This guide makes the following assumptions about your existing physical infrastructure:

Servers

You have at least one dedicated host configured for a PXE boot and capable of running ESXi 5.0 to provide resources for this evaluation.[1] For this evaluation guide, the host is expected to be configured by Auto Deploy to join to an existing vSphere cluster to show the full capabilities of Auto Deploy. If you choose not to deploy into a cluster, you can use a single host.

Storage

Auto Deploy loads the ESXi operating system (OS) to host memory. This means the ESXi host has no specific local storage requirement. For the purposes of this evaluation guide, it will be assumed that the ESXi scratch partition will be placed in memory. The user can configure alternate persistent storage for scratch when configuring Auto Deploy for production use.

The *VMware vSphere Evaluation Guide, Volume Four,* deploys a new host into an existing vSphere 5.0 cluster. This means that the new host that will be provisioned by Auto Deploy must have access to shared storage used by other members of the cluster.

Networking

Each host has three virtual networks configured to separate virtual machine traffic, VMware vSphere® vMotion®, and vSphere management. For this evaluation guide, two separate vSphere standard switches are configured to segregate traffic. Your actual configuration may vary depending on your network needs.

The host used to test Auto Deploy must have network access on the same broadcast domain as the DHCP and TFTP servers to support PXE booting. The host being tested will also require access to the Auto Deploy and vCenter servers.

1. These servers must be on the *VMware vSphere 5.0 Hardware Compatibility List* (HCL).

For more detailed requirements see the following table:

HARDWARE	MINIMUM	WHAT'S USED IN THIS GUIDE
ESXi	1 ESXi host CPU – 2 processors of 2GHz Memory – 2GB Network – 1 x 1GB network adaptor	4 ESXi servers (Cisco UCS 1.3.1) CPU – 2 quad-core Nehalem processors at 2.6GHz Memory – 48GB Network – 4 x 10GB network adaptors
Storage	As needed to support virtual machines for testing cluster functionality	3 datastores (Fibre Channel – 100GB each)
Network	1 VLAN for carrying VM traffic; 1 VLAN for carrying management traffic; 1 VLAN for vMotion traffic	1 VLAN for carrying VM traffic; 1 VLAN for carrying management traffic; 1 VLAN for vMotion traffic

Software and Licensing Requirements

This guide makes the following assumptions about your existing software infrastructure:

VMware vSphere

This volume of the *VMware vSphere 5.0 Evaluation Guide* requires vSphere 5.0 and licensing for Enterprise Plus. The vSphere 5.0 evaluation license, available from the VMware evaluation portal, provides Enterprise Plus functionality for 60 days.

Guest Operating Systems

This volume of the *VMware vSphere 5.0 Evaluation Guide* makes no specific requirements on guest operating systems.

Evaluation Guide Environment Setup

Evaluators must configure hosts, networking, and storage according to the following paragraphs in order to carry out the exercises in this volume of the evaluation guide.

Management Cluster Configuration

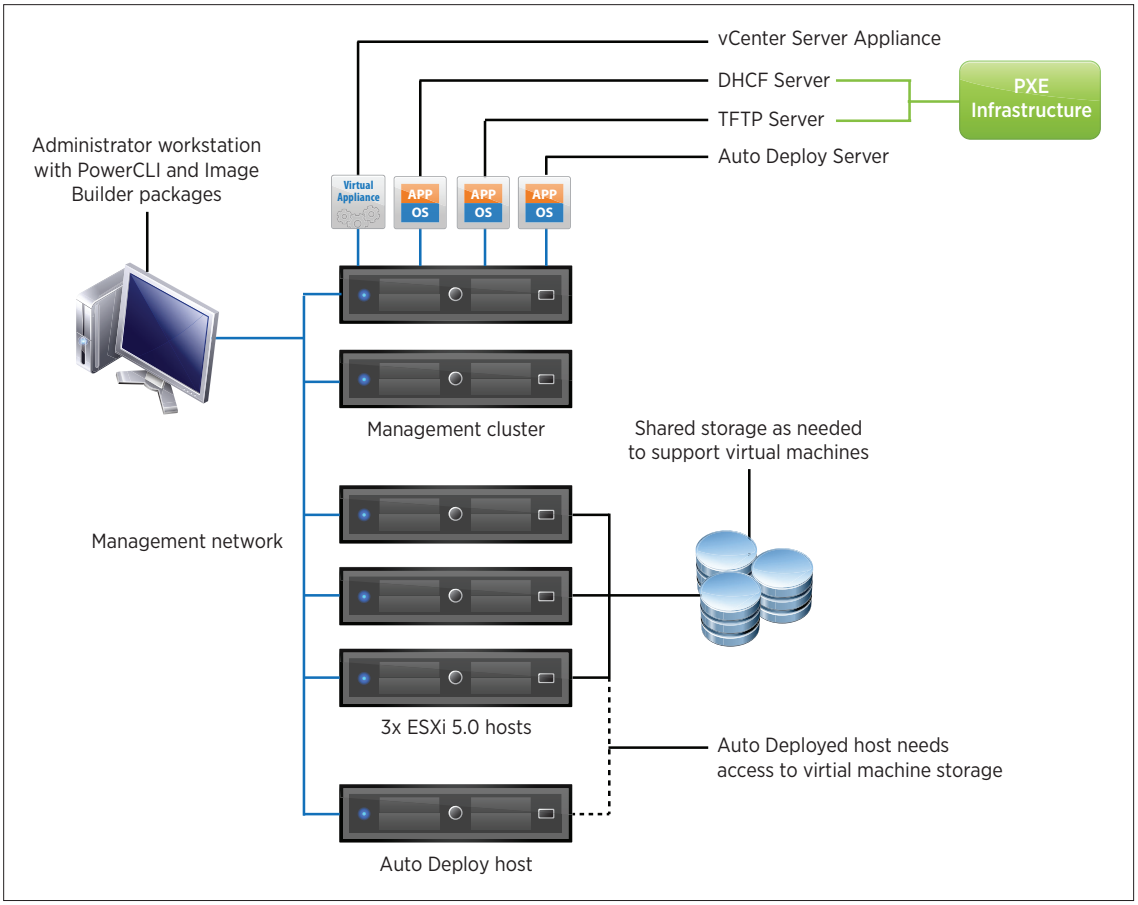
The environment for *VMware vSphere 5.0 Evaluation Guide, Volume Four,* is configured to use a separate management cluster. This pair of ESXi hosts is home for virtual machines hosting various management components. These include the VMware vCenter Server Appliance (VCSA), a DHCP server, TFTP server and the Auto Deploy server. It is expected that in most environments the PXE infrastructure, consisting of the DHCP and TFTP servers, already exists, and that the evaluator will simply configure the correct parameters to support Auto Deploy.

The Auto Deploy components can be installed on a Windows server (including a Windows server hosting VMware vCenter Server™) or as a part of the VCSA. The following picture shows Auto Deploy installed on a standalone Windows virtual machine. See the following installation details for more information on configuring Auto Deploy.

ESXi Host Configuration

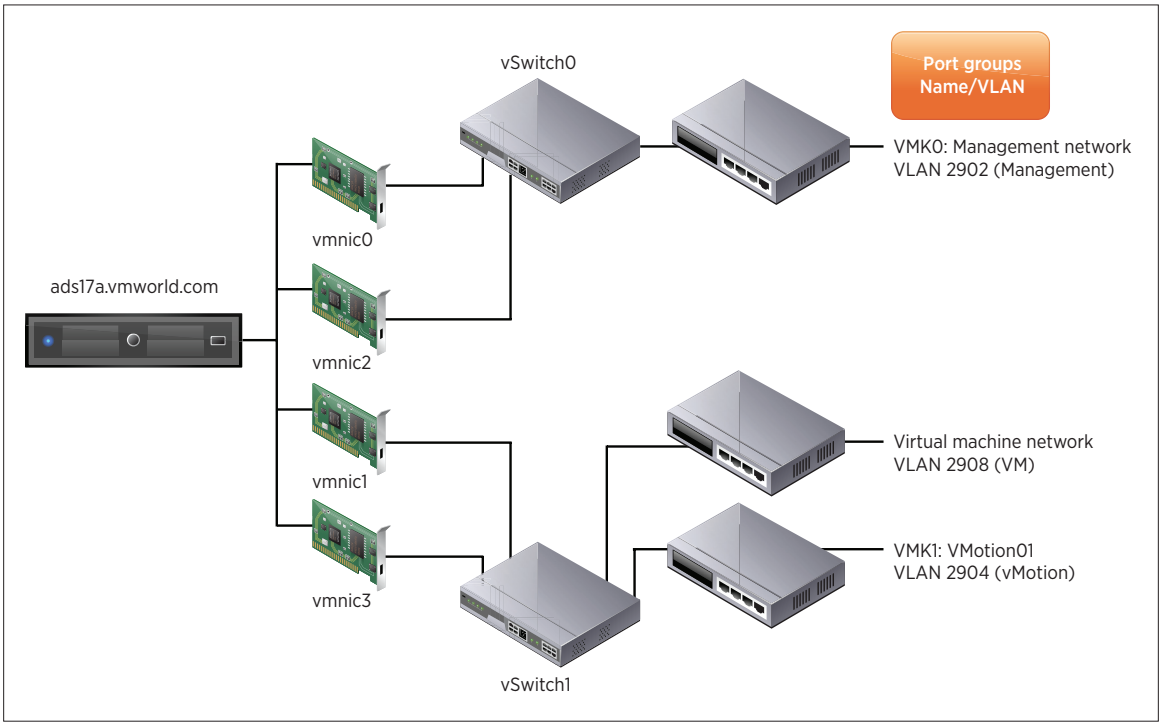
The *VMware vSphere 5.0 Evaluation Guide, Volume Four,* uses a total of four server class systems with adequate processors and memory to run ESXi and several minimally configured virtual machines. The servers used for this evaluation do not need to be overly powerful, just reliable, and they must be on the *VMware vSphere 5.0 Hardware Compatibility List* (HCL).

Each server must have at least 1 x 1GB or 1 x 10GB network adaptor. The following diagram summarizes the evaluation guide test-bed configuration.

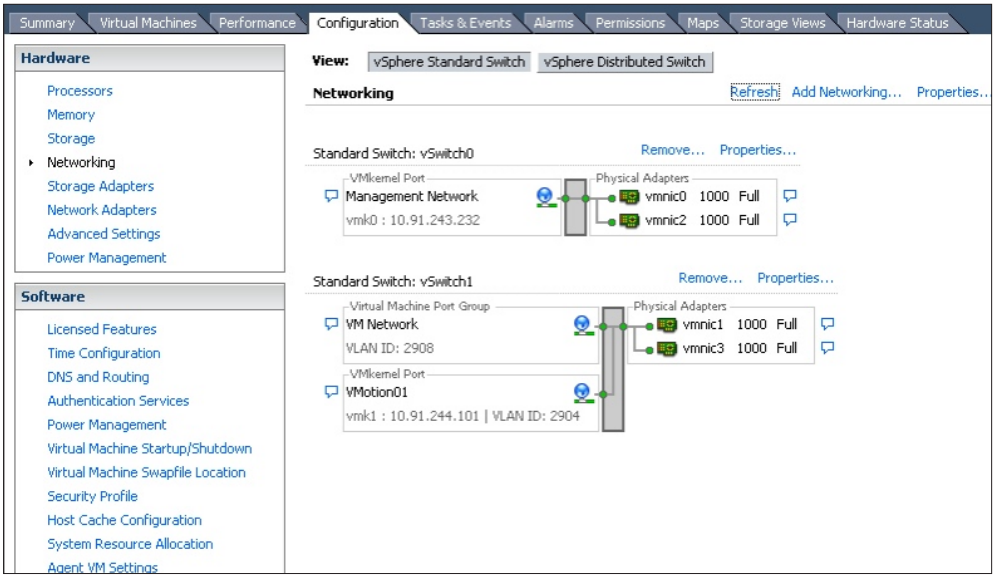


Logical Network Setup

The *VMware vSphere 5.0 Evaluation Guide, Volume Four,* uses a very simple network configuration consisting of three logical networks. The first is for vSphere management traffic. (The management network is also used when a host powers up to connect with the PXE infrastructure to get its boot information.) The second is for vMotion, and the third is for virtual machine traffic. Each logical network is configured as a port group on a standard switch, with a corresponding VLAN configured to provide physical isolation of the network traffic.



On the vSphere side, the network configuration matches the following figure.

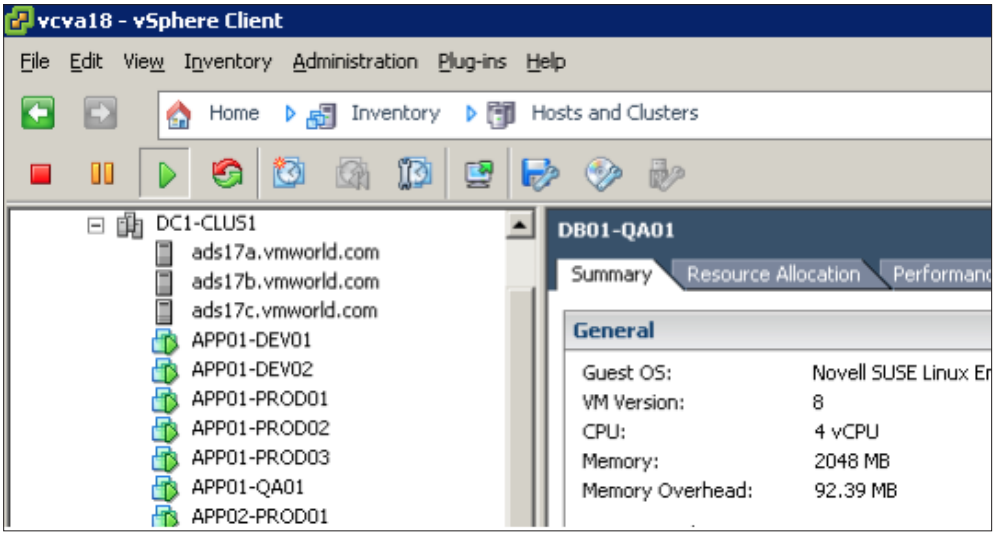


Storage Setup

This volume of the *VMware vSphere 5.0 Evaluation Guide* does not have any specific storage requirements, other than what the evaluator must have for creating one or more simple virtual machines to test moving them to the newly deployed ESXi host.

Virtual Machine Setup

This volume of the *VMware vSphere 5.0 Evaluation Guide* uses several virtual machines to allow the movement of virtual machines to the newly deployed host. The actual virtual machines used are left to the evaluator. The following diagram shows the virtual machines, configured in the technical marketing test lab, that were used in building this section of the evaluation guide:



Evaluating Auto Deploy

Introduction

Auto Deploy can provision hundreds of physical hosts with ESXi software. You can specify the image to deploy and the hosts to provision with the image. Optionally, you can also specify a host profile to apply and a vCenter Server location (folder or cluster).

When a physical host that is configured for Auto Deploy is powered on, Auto Deploy utilizes a PXE boot infrastructure in conjunction with vSphere ESXi™ Image Builder CLI and vCenter Server host profiles to automatically provision and customize that host. No host-state information is stored on the host itself. Instead, the vCenter Server manages state information for each hosts.

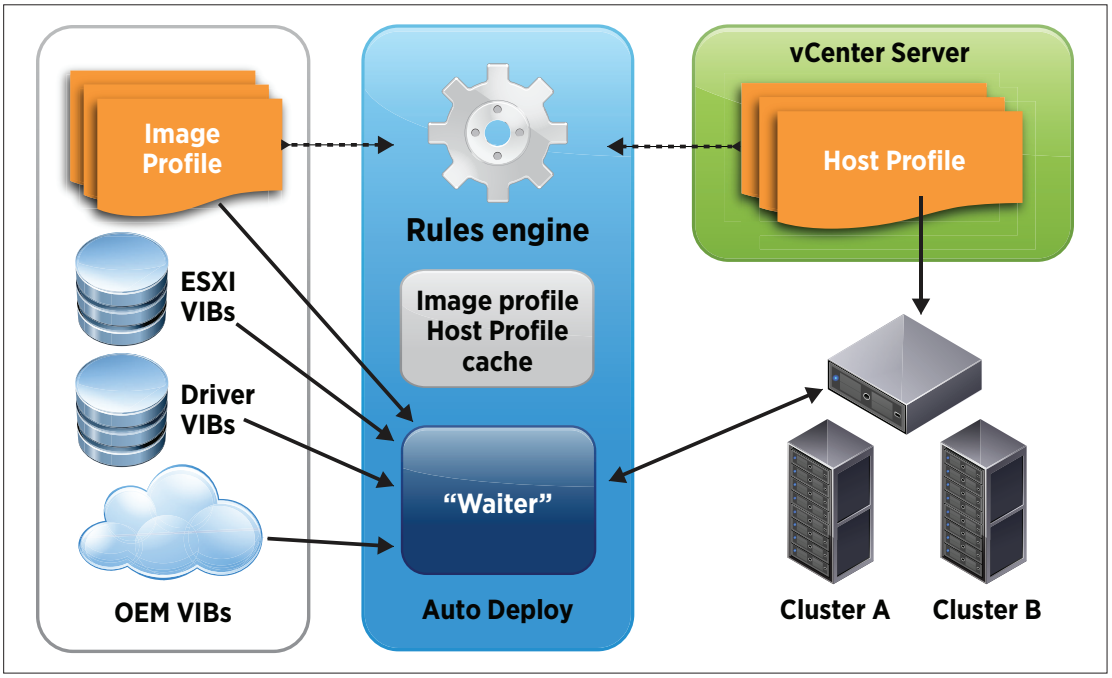


Figure 1. Auto Deploy Overview

Auto Deploy Requirements

The following components are required for Auto Deploy:

- PXE boot infrastructure (DHCP/TFTP)
- VMware vSphere® PowerCLI 5.0
- ESXi installation image (from Image Builder CLI)
- vCenter Server 5.0

The following components are optional:

- vCenter cluster
- Host profile

Preparation Tasks

Prior to beginning your evaluation of Auto Deploy 5.0, you must configure the PXE boot infrastructure, install vSphere PowerCLI, and create an image profile using Image Builder CLI. In addition, you may optionally choose to create a vSphere folder or cluster in vCenter and set up a host profile to be used to configure the ESXi hosts.

Set Up the PXE Boot Infrastructure

Auto Deploy uses a PXE to network boot ESXi hosts. The PXE requires a DHCP and TFTP server.

TFTP Server

Auto Deploy can utilize any standard TFTP infrastructure. You will need to copy the Auto Deploy gPXE boot files from your vCenter server into the TFTP home directory (the steps to do this are discussed later).

The following example shows the contents of the TFTP home directory on a Linux server that has been configured for Auto Deploy:

```
vcva18:/tftpboot # ls -al
total 508
drwxr-xr-x  2 root root  4096 Jun 14 20:46 .
drwxr-xr-x 24 root root  4096 Jun 14 19:01 ..
-rw-r--r--  1 root root 75584 May 15 03:39 snponly32.efi
-rw-r--r--  1 root root 75616 May 15 03:39 snponly32.efi.vmw-hardwired
-rw-r--r--  1 root root 91840 May 15 03:39 snponly64.efi
-rw-r--r--  1 root root 91840 May 15 03:39 snponly64.efi.vmw-hardwired
-rw-r--r--  1 root root   108 May 25 05:19 tramp
-rw-r--r--  1 root root 68298 May 15 03:39 undionly.kpxe
-rw-r--r--  1 root root 68330 May 15 03:39 undionly.kpxe.vmw-hardwired
```

Figure 2. TFTP Home Directory Contents – Linux

DHCP Server

Any DHCP server can be used. Ensure that the DHCP server is configured both to provide an IP address and to update the DNS, to include setting up reverse pointer records. It is recommended that you use static IP reservations for Auto Deploy hosts, because this will facilitate IP address tracking and troubleshooting. Within the DHCP configuration, you must set the Boot Server (DHCP option 66) to the IP address of your TFTP server and the Bootfile Name (DHCP option 67) to the file name of the gPXE boot file – undionly.kpxe.vmw-hardwired (this file is included in the files copied from the vCenter to the TFTP server).

The following example shows the DHCP settings for a windows DHCP server (version 5.2):

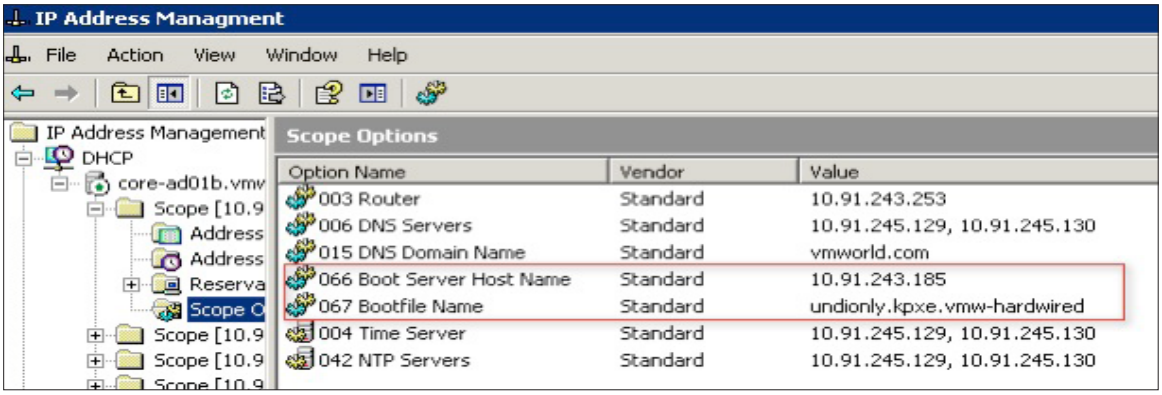


Figure 3. DHCP Server Configuration

Install vSphere PowerCLI

The Auto Deploy user interface is based on vSphere PowerCLI. Download and install the vSphere 5.0 PowerCLI on your administrator workstation from www.vmware.com. You can use the same vSphere 5.0 PowerCLI installation that is used with Image Builder CLI. Refer to the "vSphere PowerCLI by Example" section of the *VMware vSphere 5.0 Evaluation Guide, Volume One,* for information on installing vSphere PowerCLI.

Create an ESXi Image Profile

Use Image Builder CLI to prepare the ESXi image profiles used with Auto Deploy. Refer to the "PowerCLI by Example" section of the *VMware vSphere 5.0 Evaluation Guide, Volume One,* for information on how to install and configure Image Builder CLI and how to create image profiles. With Auto Deploy, you can choose to use the default image profiles provided with the 5.0 offline bundle, or you can choose to create your own image profile. Multiple image profiles can be created and maintained, enabling you to use different images for the different types of servers used in your datacenter.

Choose a Destination vCenter Folder or Cluster

When Auto Deploy adds an ESXi host to vCenter, you can optionally specify a target folder or cluster to which to add the host. Multiple folders/clusters can be created in vCenter to which Auto Deploy can assign different servers.

Choose a vCenter Host Profile

By default, when an Auto Deploy host is added to vCenter, it will be placed into maintenance mode until the administrator manually finishes the host configuration. You can automate the host configuration by assigning a host profile to be applied to the host after it has been provisioned using Auto Deploy. If you would like ESXi hosts to be configured as part of the Auto Deploy process, then ensure that a valid host profile has been created from a reference host matching the configuration of the hosts being auto deployed. Multiple host profiles can be created in vCenter and assigned to account for the various hardware profiles in your environment.

Install the Auto Deploy Server

Complete the following steps to install the Auto Deploy server, and register it with vCenter Server. The actual installation steps will vary depending on whether you will run Auto Deploy on a Windows server or as part of the VCSA.

Windows

If you are running vCenter Server on a Windows server, install the Auto Deploy server on a supported Windows system. For evaluation purposes, you can install the Auto Deploy server on the same system as your vCenter server. However, for production environments, it is recommended that you install the Auto Deploy server on a separate system.

The Auto Deploy Windows Installer is included with the vCenter installation media. From the main installation menu, choose the option to install the Auto Deploy server.

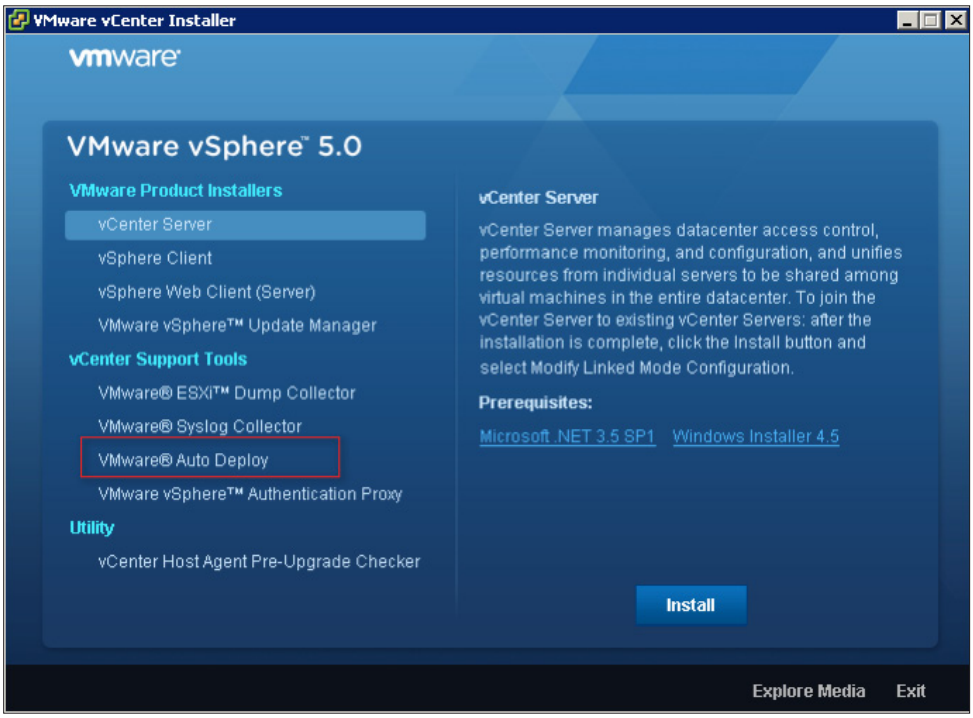


Figure 4. Auto Deploy Installation

During the installation, you will be prompted to provide the login credentials for your vCenter server. This is required in order to allow the installer to register the Auto Deploy server and enable the plug-in.

vCenter Server Appliance

The Auto Deploy server also comes bundled with the VCSA. The Auto Deploy plug-in is automatically configured and registered during the VCSA installation.

Verify the Auto Deploy Server Installation

After you have installed the Auto Deploy server, or deployed the VCSA, log in to your vSphere Client and verify that the Auto Deploy plug-in is successfully registered by selecting **`Plug-ins -> Manage Plug-ins…`** from the menu bar. Verify that the Auto Deploy plug-in is listed and is enabled.

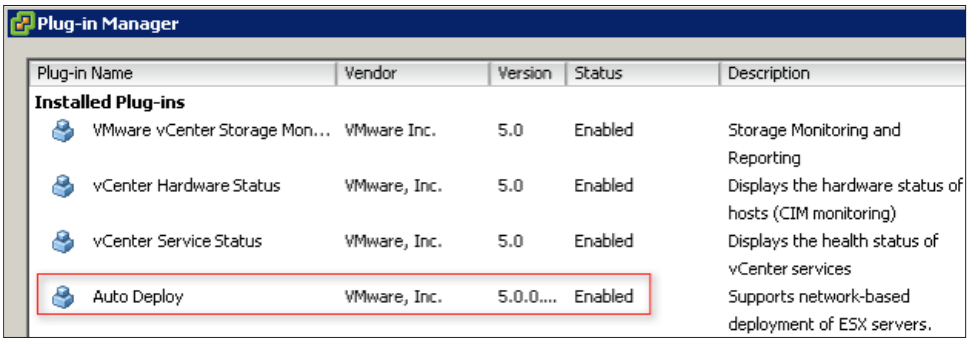


Figure 5. Auto Deploy Plug-in View

If the Auto Deploy plug-in is not listed or is not enabled, verify that the installation was successful. Refer to the *vSphere Installation and Setup Guide* for more information on installing and configuring the Auto Deploy server.

Copy the gPXE Boot Image to Your TFTP Server

During PXE boot, the DHCP server provides the ESXi hosts with the IP address of the TFTP server along with the gPXE file name **`(undionly.kpxe.vmw-hardwired).`** This gPXE boot file needs to be manually copied from the vCenter server to the TFTP home directory on your TFTP server. Use the following steps to copy the gPXE files to your TFTP server.

NOTE: If you are using the TFTP server provided with the VCSA, you can skip this step, because the gPXE files are copied to the TFTP home directory during the installation.

From the vCenter home page, click the Auto Deploy icon. From the Auto Deploy screen, click the Download TFTP Boot Zip link to download the **`deploy-tftp.zip`** file, as in the following figure:

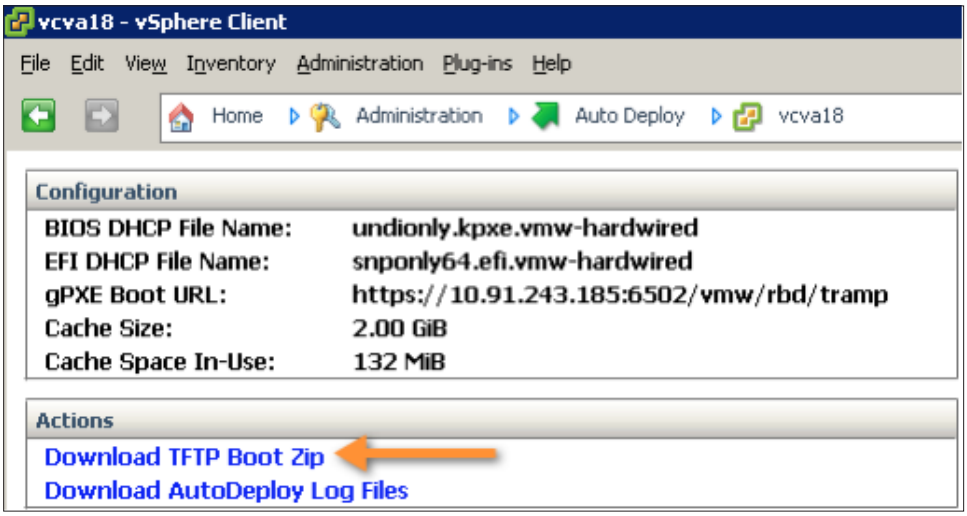


Figure 6. Download TFTP Boot Zip

Save the `deploy-tftp.zip` file, as in Figure 7:

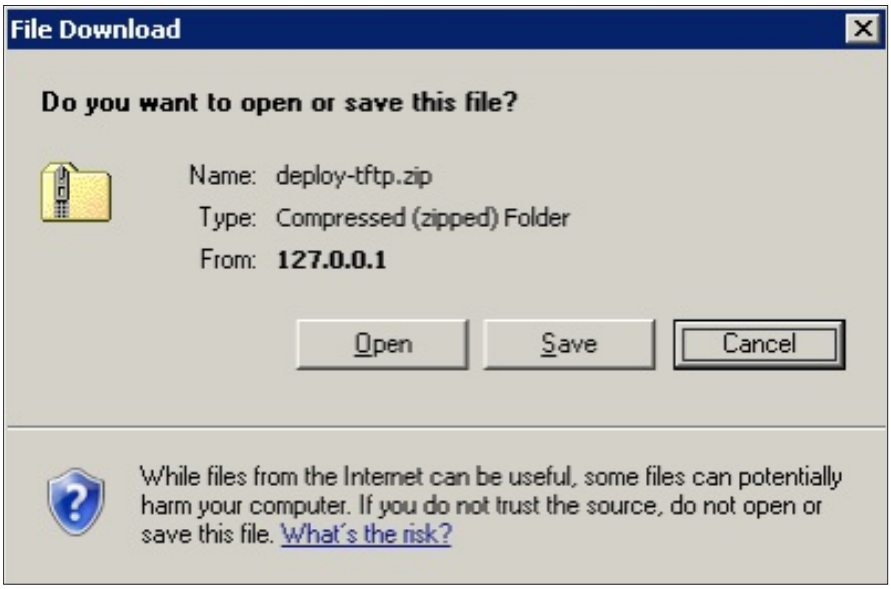


Figure 7. Save Boot Zip

Copy the `deploy-tftp.zip` file to the root directory of your TFTP server and extract the contents. The following screen shot provides an example of the files that should reside in the TFTP root directory. The `undionly.kpxe.vmw-hardwired` file specified as the gPXE file name on the DHCP server is included.

Name	Size	Type	Date Modified	Attributes
snponly64.efi	90 KB	EFI File	6/14/2011 2:38 PM	A
snponly64.efi.vmw-hardwired	90 KB	VMW-HARDWIRED ...	6/14/2011 2:38 PM	A
tramp	1 KB	File	6/14/2011 2:38 PM	A
undionly.0	67 KB	0 File	6/14/2011 2:38 PM	A
undionly.kpxe	67 KB	KPXE File	6/14/2011 2:38 PM	A
undionly.kpxe.debug	74 KB	DEBUG File	6/14/2011 2:38 PM	A
undionly.kpxe.debugmore	78 KB	DEBUGMORE File	6/14/2011 2:38 PM	A
undionly.kpxe.vmw-hardwired	67 KB	VMW-HARDWIRED ...	6/14/2011 2:38 PM	A

Figure 8. TFTP Home Directory Contents – Windows

Start a vSphere PowerCLI Session

With the PXE boot infrastructure in place, you are ready to configure your Auto Deploy server. The user interface to Auto Deploy is vSphere PowerCLI. To create the rules used by Auto Deploy, start a vSphere PowerCLI session. Start vSphere PowerCLI by either double-clicking the VMware vSphere PowerCLI icon on the desktop or selecting the following:

```
Start -> Program -> VMware vSphere PowerCLI -> VMware vSphere PowerCLI
```

Connect your vSphere PowerCLI session to your vCenter server (you may be prompted to enter the vCenter user name and password) as follows:

```
PowerCLI C:\> Connect-VIServer <vCenter IP address>
```

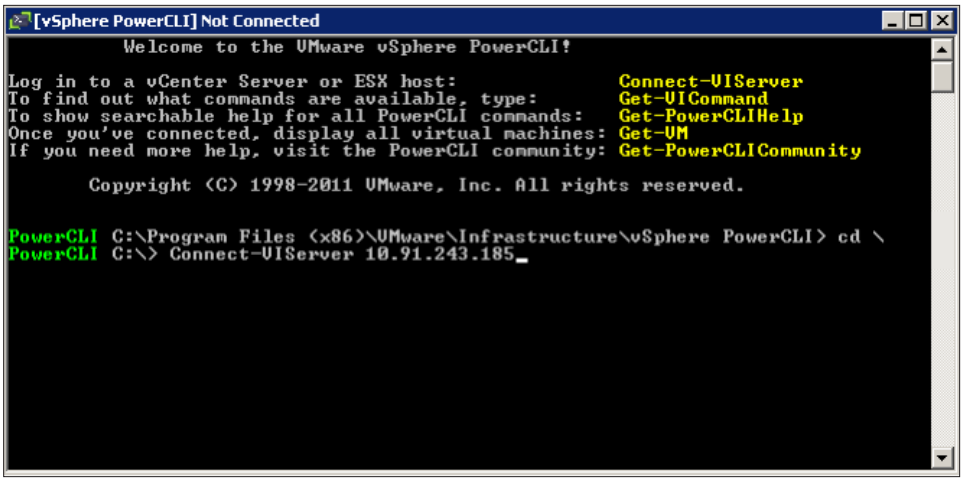


Figure 9. Auto Deploy vSphere PowerCLI Connect-VIServer Screen

To view the available Auto Deploy cmdlets, run Get-DeployCommand as follows:

```
PowerCLI C:\> Get-DeployCommand
```

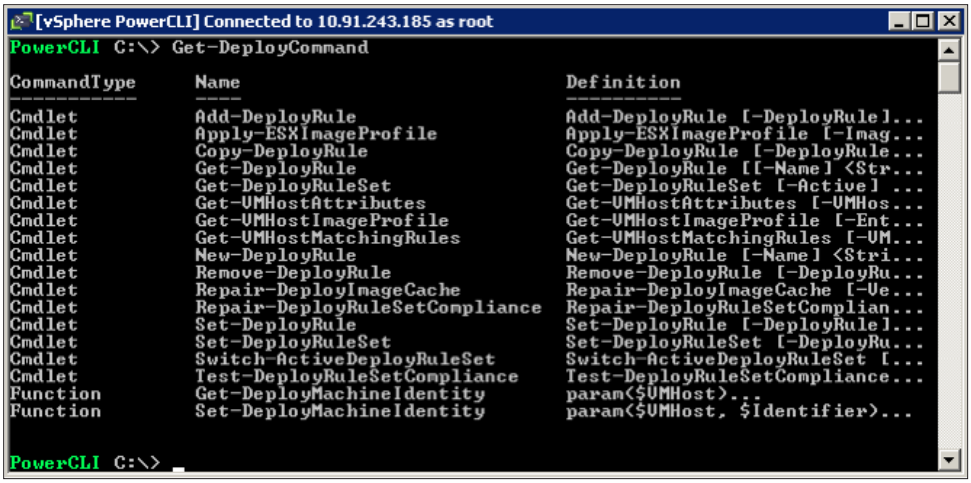


Figure 10. vSphere PowerCLI Get-DeployCommand

To get additional help for an individual cmdlet, use the Get-Help cmdlet. See, for example, the following:

```
PowerCLI C:\> Get-Help Add-DeployRule
```

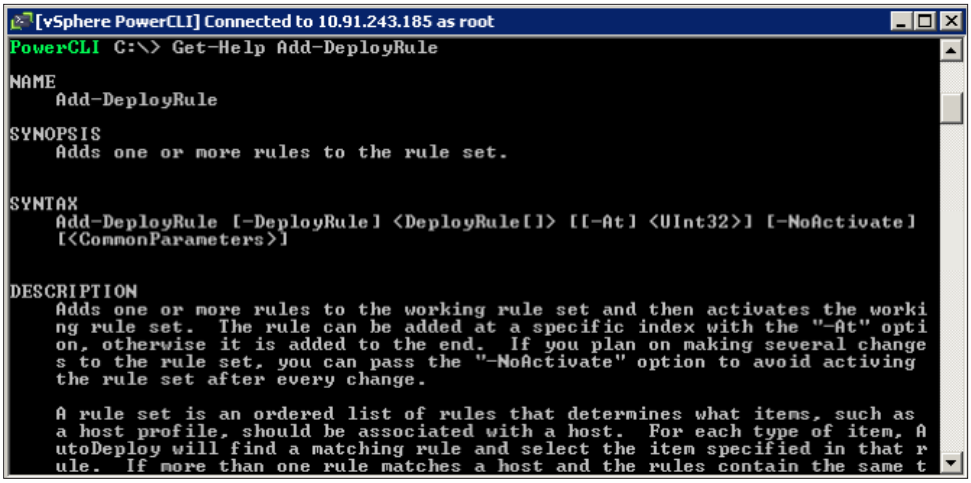


Figure 11. vSphere PowerCLI Get-Help

Create Auto Deploy Rules

From the vSphere PowerCLI shell you will create the rules to identify the image profile and host profile to use and where in vCenter to place the auto deployed host. The rules use pattern matching to compare the attributes of the host being deployed against the predefined rules. There are a number of attributes that can be used. The following figure shows the list of available attributes that can be used for pattern matching in Auto Deploy.

Figure 12. Machine Attributes

At a minimum, each host needs at least one rule to identify the image profile to install. Additional rules can then be created to optionally apply host profiles and place the host in vCenter.

Create an Image Profile Rule

Use the following steps to create an image profile rule. Prior to creating an image profile rule, you must have first created an image profile using vSphere 5.0 Image Builder CLI. Refer to the "Image Builder CLI" section of the *VMware vSphere 5.0 Evaluation Guide, Volume One* for steps to do this. Additional information can be found in the *vSphere Installation and Setup Guide.*

Start by listing the available image profiles as follows:

```
PowerCLI C:\> get-esximageprofile
```

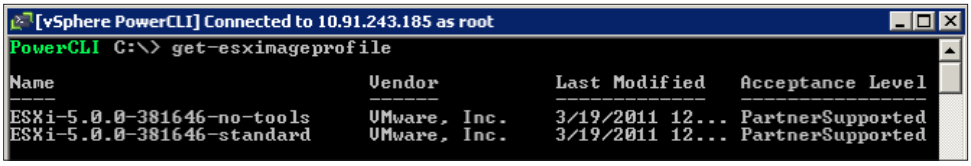


Figure 13. get-esximageprofile

In this example, we see the two default profiles included with the ESXi offline bundle provided by VMware. Identify the image profile to be used for the Auto Deploy host. In this example, we will use the `ESXi-5.0.0-381646-standard` image profile.

Next, identify the IP subnet for the hosts that will be deployed using Auto Deploy. In this example, all the ESXi hosts are on the `10.91.243.0` subnet.

With the image profile and IP subnet, we can create an Auto Deploy rule to assign the image profile `ESXi-5.0.0-381646-standard` to any hosts that boot on the `10.91.243.0` IP subnet.

```
PowerCLI C:\> New-DeployRule –Name “AssignImageRule” –Item “ESXi-5.0.0-381646-standard” –Pattern “ipv4=10.91.243.1-10.91.243.254”
```

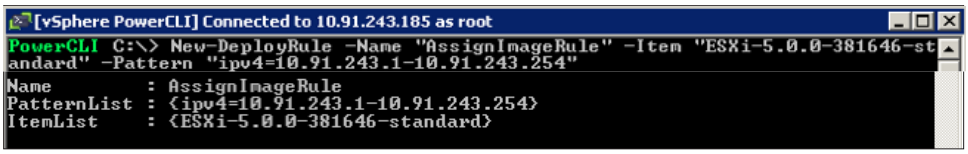


Figure 14. New-DeployRule – Assign Image Profile

After Auto Deploy rules are created, they must be activated. This is done by moving the rule into the active rule set with the `Add-DeployRule` cmdlet.

```
PowerCLI C:\> Add-DeployRule AssignImageRule
```

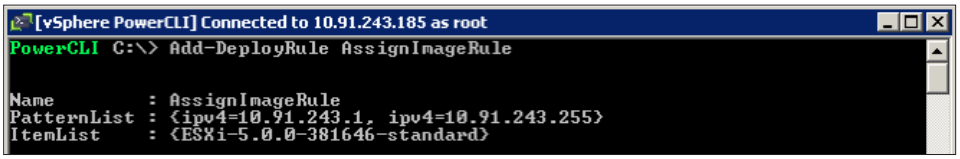


Figure 15. Add-DeployRule – Activate Image Profile Rule

Create a vCenter Folder/Cluster Rule

As mentioned earlier, Auto Deploy can optionally place the ESXi host into a vCenter folder or cluster. Follow these steps to create a rule to place a host in a vCenter cluster:

List the available vCenter clusters using the `Get-Cluster` cmdlet, as follows:

```
PowerCLI C:\> Get-Cluster
```

Figure 16. Get-Cluster

In the preceding example, there is a single cluster named `DC1-CLUS1.` Create an Auto Deploy rule to provision new hosts on the subnet `10.91.243.0` into the cluster `DC1-CLUS1.`

```
PowerCLI C:\> New-DeployRule –Name “AssignClusterRule” –Item “DC1-CLUS1” –Pattern “ipv4=10.91.243.1-10.91.243.254”
```

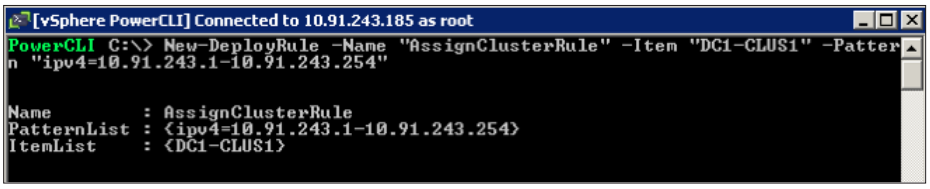


Figure 17. New-DeployRule – Assign Cluster

Next, we activate the rule by moving it into the active rule set.

```
PowerCLI C:\> Add-DeployRule AssignClusterRule
```

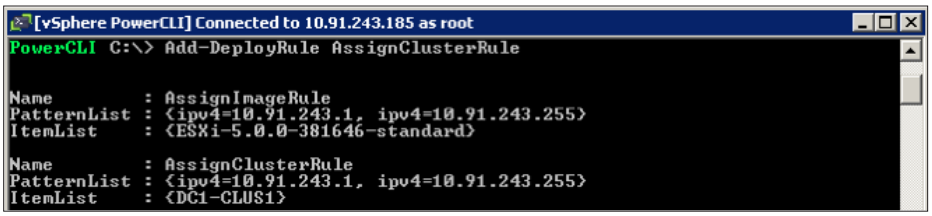


Figure 18. Add-DeployRule – Activate Cluster Rule

Create a Host Profile Rule

By default, when a new host is provisioned using Auto Deploy, the host will be put into maintenance mode. This requires that the administrator connect to the vCenter to finish the host's configuration. Auto Deploy can optionally perform the host configuration by applying a predefined host profile. Follow these steps to create a rule to apply a host profile to a newly deployed host.

List the host profiles defined on the vCenter server as follows:

```
PowerCLI C:\> Get-VMHostProfile
```

Figure 19. Get-VMHostProfile

In the preceding example, there is a single host profile **ADS-Host-Profile-1.** Create an Auto Deploy rule to apply the host profile **ADS-Host-Profile-1** to hosts provisioned on the **10.91.243.0** subnet as follows:

```
PowerCLI C:\> New-DeployRule –Name “AssignHostProfileRule” –Item “ADS-Host-Profile-1” –Pattern “ipv4=10.91.243.1-10.91.243.254”
```

Figure 20. New-DeployRule – Assign Host Profile

Activate the rule by moving it into the active rule set.

```
PowerCLI C:\> Add-DeployRule AssignHostProfileRule
```

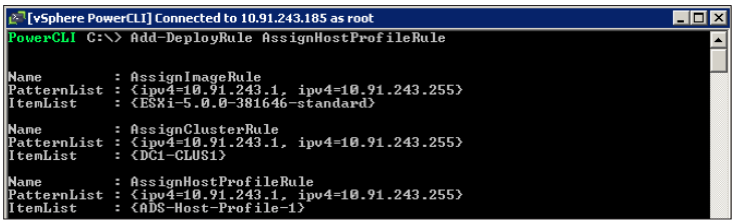


Figure 21. Add-DeployRule – Activate Host Profile Rule

At this point, we have created the following three Auto Deploy rules:

- **AssignImageRule** assigns the ESXi image profile **ESXi-5.0.0-381646-standard** to hosts in the **10.91.243.0** subnet.
- **AssignClusterRule** places hosts in the **10.91.243.0** subnet into the **DC1-CLUS1** cluster.
- **AssignHostProfileRule** applies the host profile **ADS-Host-Profile-1** to hosts in the **10.91.243.0** subnet.

All of these rules have been activated by moving them into the active rule set with the **Add-DeployRule** cmdlet. At this point, you are ready to provision ESXi hosts using Auto Deploy.

Deploy a Host Using Auto Deploy

With the PXE environment in place, Image Builder CLI installed and image profiles created, the Auto Deploy server installed, and the rules created, you are ready to provision hosts using Auto Deploy. Follow these steps to provision a new host using Auto Deploy.

The following figure shows that there are currently three hosts in the vSphere cluster **DC1-CLUS1.** We will use Auto Deploy to provision a fourth host named **ads17d.vmworld.com.**

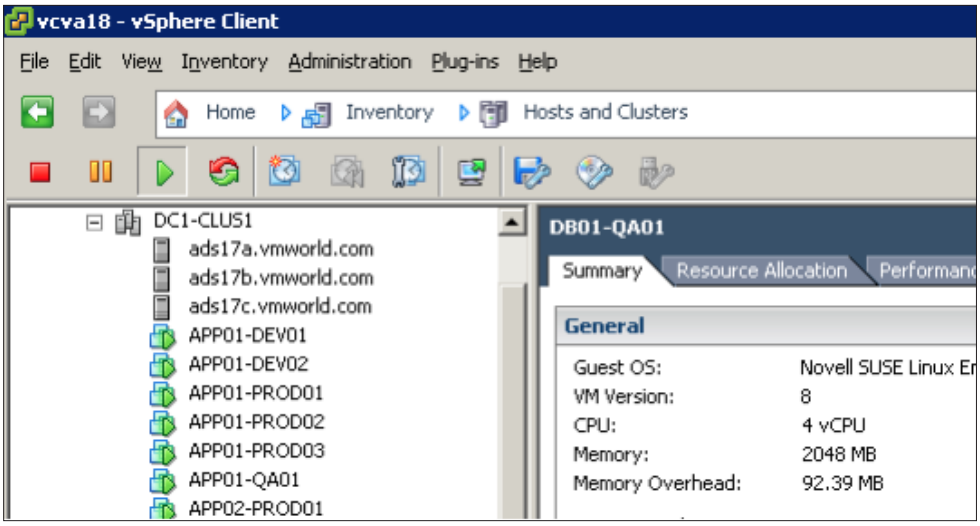


Figure 22. DC1-CLUS1 Members – Before

Start by viewing the active rule set on the Auto Deploy server and verify that the host being provisioned matches the defined rule criteria.

```
PowerCLI C:\> Get-DeployRuleSet
```

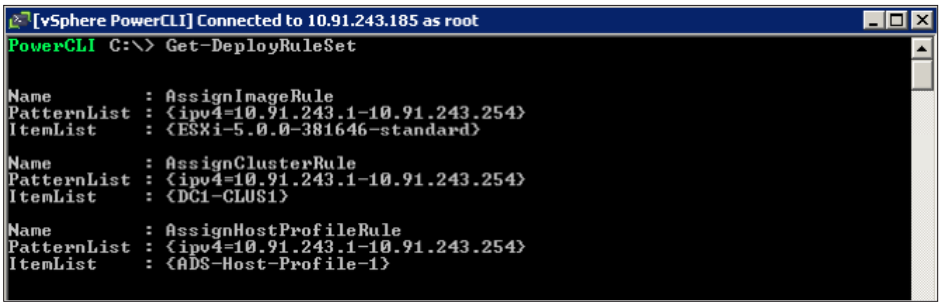


Figure 23. Get-DeployRuleSet

In this example, all hosts on the subnet `10.91.243.0` will be provisioned with the image profile `ESXi-5.0.0-381646-standard`, configured using the host profile `ADS-Host-Profile-1` and placed in the cluster `DC1-CLUS1`.

PXE boot the host by powering it on. On boot, the host will contact the DHCP server and get assigned an IP address. The DHCP server will also provide the host with the IP address of the TFTP server and the name of the gPXE boot file. The gPXE boot file will provide the host with the information necessary to initiate an HTTP boot from the Auto Deploy server.

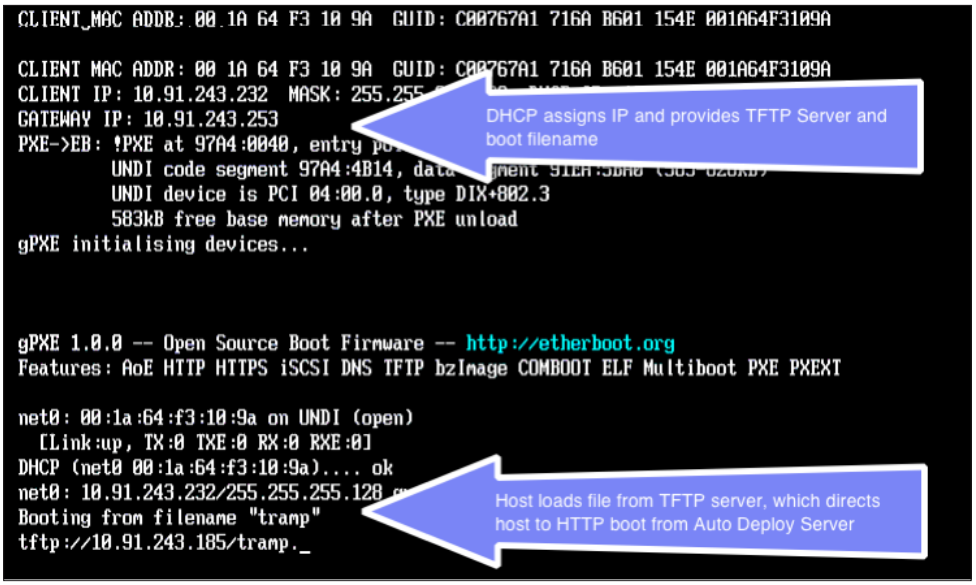


Figure 24. PXE Boot Results

Once this is complete, the server compares the host information against the rules in the active rule set to determine which image profile to install on the host, which host profile to use to configure the host, and where in vCenter to place the host after it is installed.

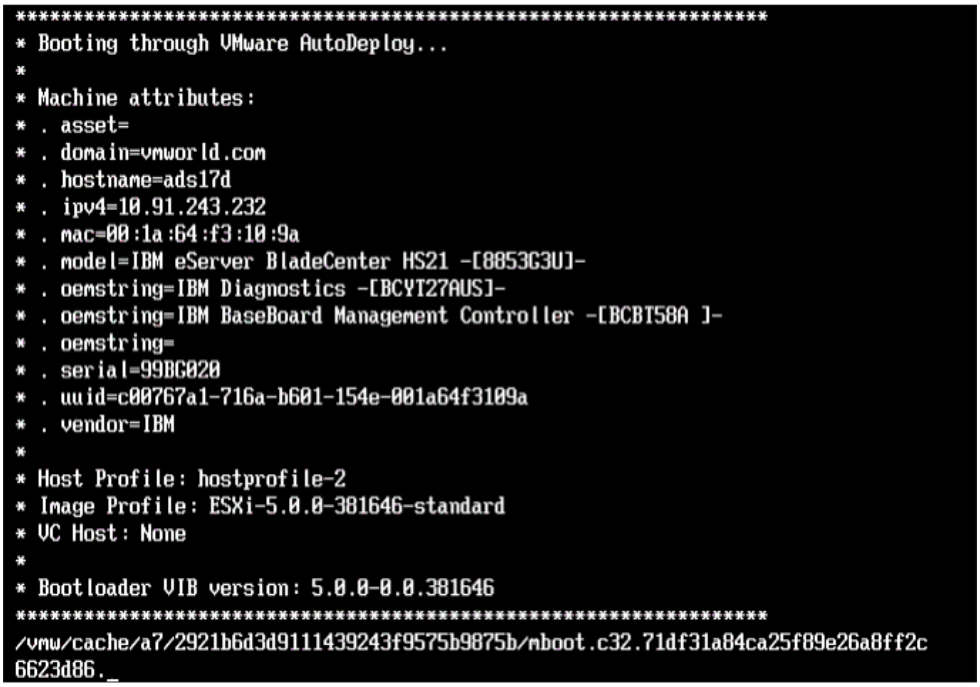


Figure 25. Auto Deploy Assignments

The chosen image profile is then copied over the network, where it is loaded directly into the host's memory.

Figure 26. ESXi Boot

After the ESXi installation is completed and the host boots, it is added to vCenter. If a rule was defined to apply a host profile, the host profile will also be applied. If there is not a rule identifying the host profile, the host will be placed into maintenance mode.

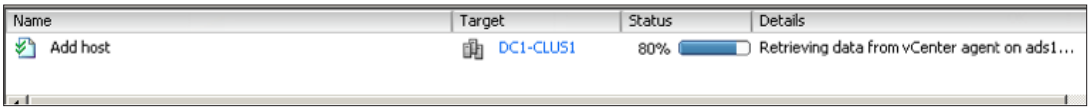


Figure 27. vCenter Add Host View

If a rule was defined to place the host into a vSphere cluster, the host will be placed in the cluster and vSphere High Availability (HA) configured.

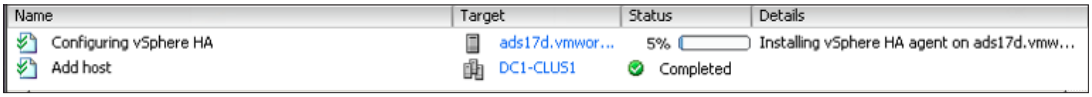


Figure 28. vCenter Configuring vSphere High Availability View

At this point, the host is now part of the vCenter cluster and is capable of hosting virtual machines.

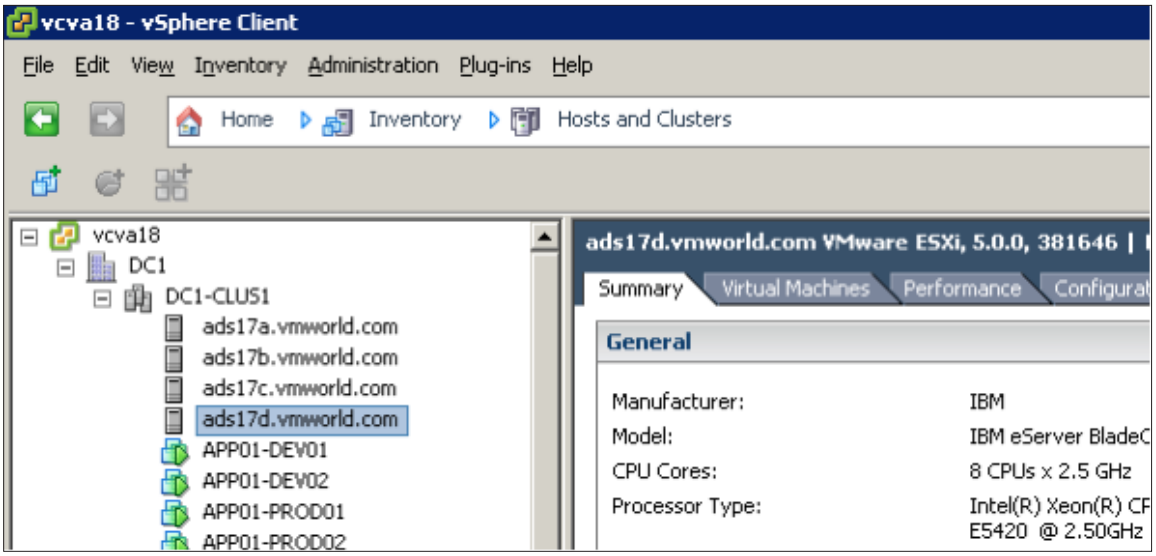


Figure 29. DC1-CLUS1 Members – After

Auto Deploy Best Practices

The following best practices will help ensure success using Auto Deploy 5.0.

- **Use static IP reservations for your ESXi hosts.**
  On your DHCP server, reserve a pool of IP addresses for your ESXi hosts. This will help facilitate IP management and troubleshooting.
- **Configure the DNS reverse pointer records for your ESXi hosts.**
  When adding ESXi hosts to vCenter, Auto Deploy uses reverse DNS lookups to identify the host name. If reverse pointer records do not exist in the DNS, Auto Deploy is unable to determine the hosts' host names and will add the hosts in vCenter using the IP addresses.
- **Use the vCenter Virtual Server Appliance (VCSA).**
  Auto Deploy is included with the VCSA. Using the VCSA will simplify the setup and configuration, helping to facilitate your evaluation of Auto Deploy.
- **Identify a reference host.**
  Using host profiles to configure auto deployed hosts requires a reference host, from which you can create and maintain the host profile. Before evaluating Auto Deploy, manually configure an ESXi 5.0 host that can be used as the reference host from which you will create the host profile. Use this host profile to then configure the hosts deployed using Auto Deploy.

Product Documentation

For detailed information regarding installation, configuration, administration, and usage of Auto Deploy and its related components, as well as any other vSphere features, refer to the online documentation: http://www.vmware.com/support/pubs/vs_pubs.html.

Help and Support During the Evaluation

This guide provides an overview of the steps required to ensure a successful evaluation of Image Builder CLI. It is not meant to substitute for product documentation. Refer to the online product documentation for more detailed information. You may also consult the online Knowledge Base if you have any additional questions. Should you require further assistance, please contact a VMware sales representative or channel partner.

vSphere and vCenter Server Resources:

- Product documentation
  http://www.vmware.com/support/pubs/
- Online support
  http://www.vmware.com/support/
- Support offerings
  http://www.vmware.com/support/services
- Education services
  http://mylearn1.vmware.com/mgrreg/index.cfm
- Support knowledge base
  http://kb.vmware.com

VMware Contact Information

For additional information or to purchase VMware vSphere, VMware's global network of solutions providers is ready to assist you. If you would like to contact VMware directly, you can reach a sales representative at 1-877-4VMWARE (650-475-5000 outside North America) or email sales@vmware.com. When emailing, include the state, country, and name of the company from which you are inquiring. You can also visit http://www.vmware.com/vmwarestore/.

Providing Feedback

We appreciate your feedback on the material included in this guide. In particular, we would be grateful for any guidance on the following topics:

- How useful was the information in this guide?
- What other specific topics would you like to see covered?
- Overall, how would you rate this guide?

Please send your feedback to the following address: tmdocfeedback@vmware.com, with "VMware vSphere Auto Deploy Evaluation Guide" in the subject line. Thank you for your help in making this guide a valuable resource.

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