

Configuring stateless boot using Dell customized VMware ESXi 5.0

A Dell Technical White Paper

July 2012

Kiran Poluri (kiran_poluri@dell.com)

Nihad Nizar (nihad_nizar@dell.com)

Krishnaprasad K (krishnaprasad_k@dell.com)

Dell Hypervisor Engineering



THIS WHITE PAPER IS FOR INFORMATIONAL PURPOSES ONLY, AND MAY CONTAIN TYPOGRAPHICAL ERRORS AND TECHNICAL INACCURACIES. THE CONTENT IS PROVIDED AS IS, WITHOUT EXPRESS OR IMPLIED WARRANTIES OF ANY KIND.

© 2012 Dell Inc. All rights reserved. Reproduction of this material in any manner whatsoever without the express written permission of Dell Inc. is strictly forbidden. For more information, contact Dell.

Dell, the DELL logo are trademarks of Dell Inc. VMware, ESXi are trademarks of VMware, Inc. in the United States and/or other jurisdictions. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

July 2012

Table of Contents

Introduction	4
Audience and Scope.....	4
What’s VMware Auto Deploy?	4
What’s Dell Customization of VMware ESXi?	4
Pre requisites for creating Dell Customized VMware ESXi offline image depot.....	5
Steps to create Dell Customized offline image depot	5
Configuring Stateless boot using Dell Customized offline Image depot.....	6
Summary	8
References	8

Introduction

VMware vSphere 5 uses the power of virtualization to help transform data centers into simplified cloud infrastructures, using ESXi 5.0, the latest in the series of thin virtualization hypervisors introduced by VMware. Together, Dell and VMware deliver efficient virtual infrastructure solutions that are fast to deploy and easy to manage. Unlike prior versions, vSphere 5 supports only the ESXi hypervisor architecture. In order to benefit from the unique capabilities and features of vSphere 5, Dell recommends its customers to migrate existing ESX/ESXi deployments to ESXi 5 and upgrade deployments of vSphere 4.x or older to vSphere 5.

This document talks about creation of Dell customized VMware ESXi offline image depot from VMware online ESXi depot. This paper also covers configuring stateless boot of the thus created Dell customized VMware ESXi offline image depot using VMware vSphere Auto Deploy software.

Audience and Scope

The intended audience for this whitepaper includes IT Administrators and channel partners who plan to do stateless boot of VMware ESXi that includes Dell recommended customization. The offline Dell customized VMware ESXi Image depot created in this process will match the customizations included in Dell Customized VMware ESXi 5.0 Images posted at support.dell.com

What's VMware Auto Deploy?

VMware Auto Deploy is a feature introduced from vSphere 5.0 which allows rapid deployment and configuration of a large number of ESXi hosts without having the image installed on each and every server. This is the absolute fastest way to have a large vSphere Infrastructure up and running, in no time. Using Autodeploy, you can specify the image to deploy and the hosts to provision with the image. Optionally, you can specify host profiles to apply to the hosts, and a vCenter Server folder or cluster for each host. When a physical host set up for Auto Deploy is turned on, Auto Deploy uses a PXE boot infrastructure in conjunction with vSphere host profiles to provision and customize that host. Auto Deploy uses PXE to network boot servers and dynamically load and configure an ESXi image directly into the host's memory. When a server boots for the first time, the Auto Deploy server will identify the new server, assign an appropriate ESXi Image Profile and Host Profile, and place the server into the proper vCenter folder or cluster.

This document is intended to give users a good understanding on setting up stateless boot using Dell customized VMware ESXi offline image depot right from scratch. However this doesn't talk about creating host profiles as it's already covered in many VMware documents.

What's Dell Customization of VMware ESXi?

Dell's customized VMware ESXi image includes new or updated VMware IOVP certified drivers and specific third party CIM providers relevant for Dell hardware and supported peripherals. The Dell customized ESXi images are certified by Dell through VMware's program for OEM customization. In

addition to the drivers and CIM providers, Dell's technical support information is updated via OEM customization process. Currently, the Dell-customized VMware ESXi Embedded ISO images for ESXi 4.x and ESXi 5.0 do not include Dell OpenManage Server Administrator. To know more about Dell Customization of ESXi, Refer [Dell blog](#) or Dell support page.

Pre requisites for creating Dell Customized VMware ESXi offline image depot

The below information/packages are required for creating the Dell customized version of VMware ESXi offline image depot.

- ✓ vSphere PowerCLI for 5.0
- ✓ New or updated driver list carried in Dell customized VMware ESXi 5.0 ISO images

Steps to create Dell Customized offline image depot

1. Install PowerCLI on supported windows platform. Refer section 'Installing vSphere PowerCLI' at [PowerCLI documentation](#) for detailed steps. For additional details on PowerCLI, refer to [release notes](#).
2. Dell customized ISO images posted at Dell support site consist of new/updated drivers relevant for Dell hardware. Refer 'Additional Information' section of the latest Dell Customized VMware ESXi 5.0 ISO image to identify versions of added/updated drivers. Download these drivers from [VMware drivers download page](#) and copy it to a temporary folder.
3. Open PowerCLI shell and run the command
`PowerCLI> Set-ExecutionPolicy RemoteSigned`
4. Run the command to add the VMware base image as a local depot
`PowerCLI> Add-ESXSoftwareDepot -DepotUrl \`
`https://hostupdate.vmware.com/software/VUM/PRODUCTION/main/vmw-depot-index.xml`
5. Add all the drivers present in the temporary folder (step 2) to the depot using the below command
`PowerCLI> Add-ESXSoftwareDepot -DepotUrl <path to temporary folder>\<Driver Package>`
Example: `PowerCLI> Add-ESXSoftwareDepot -DepotUrl BCD-bfa-3.0.3.0-00000-564849.zip`
NOTE: Repeat the same for all the driver packages downloaded to the temporary folder.
6. Run the below commands to list Image Profiles available in VMware Online depot

```
PowerCLI> $channels = Get-ESXSoftwareChannel
PowerCLI> $profileList = Get-ESXImageProfile -SoftwareChannel $channels
PowerCLI> $profileList
```

```
PowerCLI C:\Program Files (x86)\VMware\Infrastructure\PowerCLI> $profile
List
-----
Name                                     Vendor                                     Last Modified                               Acceptance Level
-----
ESXi-5.0.0-20110904001-std... VMware, Inc. 8/26/2011 1:... PartnerSupported
ESXi-5.0.0-2011104001-no-t... VMware, Inc. 10/13/2011 3:... PartnerSupported
ESXi-5.0.0-20120302001-no-t... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20111204001-no-t... VMware, Inc. 10/31/2011 1:... PartnerSupported
ESXi-5.0.0-20120301001s-no... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20120504001-std... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20120504001-no-t... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20111104001-std... VMware, Inc. 10/13/2011 3:... PartnerSupported
ESXi-5.0.0-20120404001-std... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-469512-no-tools VMware, Inc. 8/19/2011 1:... PartnerSupported
ESXi-5.0.0-20111204001-std... VMware, Inc. 10/31/2011 1:... PartnerSupported
ESXi-5.0.0-20110904001-notools VMware, Inc. 8/26/2011 1:... PartnerSupported
ESXi-5.0.0-20120404001-no-t... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20120302001-std... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-20120301001s-std... VMware, Inc. 4/30/2012 9:... PartnerSupported
ESXi-5.0.0-469512-standard VMware, Inc. 8/19/2011 1:... PartnerSupported
```

NOTE:

- ✓ Refer [VMware patch portal](#) to select appropriate image profile. The above is a sample output retrieved from VMware online image depot.
- ✓ An Image Profile is the logical collection of VMware and third-party VIBs needed to install an ESXi host.

7. Run the below command to clone one of the above image profile to create your own customized imageprofile

```
PowerCLI> $IP= New-ESXImageProfile -CloneProfile <profileList> -Name "<profile-name>"
```

Where <profileList> is \$profileList[15] for ESXi-5.0.0-469512-standard image profile and <profile-name> is name given for the cloned image profile.

Example: - PowerCLI> \$IP = New-ESXImageProfile -CloneProfile \$profileList[15] -Name "Dell Customized ESXi-5.0.0-469512 Standard"

8. Run below command to add individual VIBs to the cloned Image profile

```
PowerCLI> Add-ESXSoftwarePackage -ImageProfile <image-profile-object> -SoftwarePackage <vib>, <vib>...
```

Where <vib> is the name of the VIB to be added to the image profile.

9. Run the below command to export the cloned image profile to an offline image depot file

```
PowerCLI> Export-ESXImageProfile -ImageProfile <image-profile-object> -FilePath <bundle-zip-file-path> -ExportToBundle
```

Where <image-profile-object> is \$IP, <bundle-zip-file-path> is the name of offline image depot zip file to be generated including the full path where the zip file is to be stored.

Example: - PowerCLI> Export-ESXImageProfile -ImageProfile \$IP -FilePath C:\temp\OEM_Bundle.zip -ExportToBundle.

Configuring Stateless boot using Dell Customized offline Image depot

The below are the pre-requisites/packages required to configure stateless boot of VMware ESXi 5.0.

- ✓ DHCP Server
- ✓ gPXE
- ✓ TFTP Server
- ✓ VMware vCenter Server package.
- ✓ vSphere PowerCLI for 5.0

Follow below detailed steps to setup the environment for stateless boot.

1. Install VMware vSphere Server on supported windows platform.
2. Install VMware vSphere Client on the same windows platform.
3. Install VMware vSphere Auto Deploy package on the same windows platform.
4. Configure TFTP server as below.
 - ✓ Download *deploy-tftp.zip* file
 - In a vSphere Client connected to the vCenter Server system that Auto Deploy is registered with, select *Home > Administration > Auto Deploy* tab to display the Auto Deploy page. Click *Download TFTP Boot ZIP* link to download the package.
 - ✓ Install TFTP server on the same windows platform. VMware also provides a vCenter server Appliance which comes with a pre-configured TFTP server.
 - ✓ Copy the contents of *deploy-tftp.zip* to the root path of the TFTP server.
5. Configure DHCP server as below.
 - ✓ You can use a DHCP server already available in the environment or install a DHCP server.
 - ✓ Modify the DHCP configuration file (*dhcpd.conf* in linux) with the TFTP server information as below.

```
next-server <TFTP server IPAddress>;
filename "undionly.kpxe.vmw-hardwired"; # File available as part of
deploy-tftp.zip available in TFTP root path.
```

6. Start DHCP, TFTP services
7. Download the Dell customized offline image depot file (*OEM_Bundle.zip*) to the windows platform where Auto Deploy software is installed. Let us assume that the offline image depot file is downloaded to the location *c:\temp*
8. Create a rule using PowerCLI to point to the Dell customized offline image depot as below.

- ✓ Open PowerCLI and execute the command below to establish a session to the vCenter server where the Auto deploy package is installed.


```
PowerCLI> Connect-VIServer <IP Address of the vCenter Server>
```
- ✓ Run the below command to add Dell customized offline image


```
PowerCLI> Add-EsxSoftwareDepot c:\temp\OEM_Bundle.zip
```
- ✓ Run the below commands to list Image Profiles available in VMware Online depot


```
PowerCLI> $Channel = Get-EsxSoftwareChannel
PowerCLI> $ip = Get-EsxImageProfile -SoftwareChannel $Channel
PowerCLI> $ip
```

The output of the above command will be similar to as below

Name	Vendor	Last Modified	Acceptance Level
-----	-----	-----	-----
Dell Customized ESXi-5.0.0...	VMware, Inc.	5/6/2011 12...	PartnerSupported

The above listed is the Dell customized VMware ESXi 5.0 image profile.

- ✓ Define a rule in which hosts with certain attributes, for example a range of IP addresses, are assigned an image profile.


```
PowerCLI> New-DeployRule -Name "RuleName" -Item $ip -Pattern
"vendor=Dell Inc.", "ipv4=<IP Address Range>"
Example: - PowerCLI> New-DeployRule -Name "RuleName" -Item $ip -
Pattern "vendor=Dell Inc.", "ipv4=10.10.16.1-10.10.16.25"
```

NOTE: If there more than one image profiles cloned for customization, then select each profile using \$ip[0], \$ip[1] etc.

✓ Add the rule to the working rule set.

PowerCLI> Add-DeployRule <Rule Name>

9. PXE boot the target servers. The servers should boot into ESXi specific image as per the rule set.

Summary

Dell recommends using Dell Customized VMware ESXi images as it contains updated driver versions and CIM providers relevant for Dell hardware & supported peripherals. Customers can further update the driver versions based on the requirement and availability at the VMware website. This guide helps end users to configure stateless boot using the Dell customized offline image depot that matches Dell Customized VMware ESXi 5.0 ISO image posted at support.dell.com

References

1. <http://pubs.vmware.com/vsphere-50/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-50-installation-setup-guide.pdf>
2. http://labs.vmware.com/wp-content/uploads/2010/08/autodeploy_fling.pdf
3. http://pubs.vmware.com/vsphere-50/index.jsp?topic=%2Fcom.vmware.vsphere.install.doc_50%2FGUID-980D9E38-633E-4557-9144-AC422FA239C5.html