

VMware vSphere Life Cycle Manager (vLCM) and Dell EMC integration

Abstract

This white paper describes how to use the new VMware vSphere Life Cycle Manager (vLCM) with Dell EMC add-on installation workflows. Also discussed are guidelines on how to use the Dell EMC OpenManage Integration for VMware vCenter (OMIVV) with vLCM to provide firmware updates to the server along with add-ons to configure a Desired State.

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Executive summary

vLCM (vSphere Lifecycle Manager) is a new software feature that is introduced in vSphere 7.0. It is an extended version to the existing VUM (vSphere Update Manager). In expanding lifecycle controls for clusters, vLCM helps in setting software baselines for clusters that contain an ESXi base image and an add-on image. vLCM allows coordinating these software updates with firmware through a hardware support manager (HSM). vSphere 7.0 and later versions support vLCM. For more information about vLCM, see [vSphere 7 – Lifecycle Management](#).

1 Introduction

vLCM is the new way to control lifecycle operations in vSphere 7. The legacy functions of vSphere Update Manager (VUM) are integrated with in vLCM and provides great new features and capabilities that extend beyond what VUM could do.

vLCM enables coordinated update of vSphere clusters, including firmware updates with the help of OEM plugins registered to vCenter server such as [Dell EMC OpenManage Integration for VMware vCenter](#). vLCM also includes software upgrades and installs for ESXi hosts, device drivers and third-party applications.

For more information about vSphere Lifecycle Manager (vLCM), see [Managing Host and Cluster Lifecycle](#).

1.1 Audience and Scope

The intended audience for this white paper includes system administrators who are familiar with data center operations and administrators working on virtual environments with multiple ESXi hosts. This white paper is helpful for administrators to understand the options that are provided by VMware and Dell EMC together to maintain a Desired State on all ESXi hosts for firmware and software across a given cluster.

1.2 vSphere Lifecycle Manager (vLCM) and VMware Update Manager (VUM)

The following table shows the similarities and differences between vSphere Lifecycle Manager (vLCM) and VMware Update Manager (VUM).

Table 1 Similarities and differences between vLCM and VUM.

| Feature | vSphere Lifecycle Manager (vLCM) | VMware Update manager (VUM) |
|---|--|---|
| Compatibility | vSphere 7.0 and later versions. | vSphere 6.x and older versions. |
| Installation | <p>Integrated with vCenter 7.0 by default.</p> <p>For information on how to install vCenter, see vCenter Server Installation and Setup.</p> <p>The windows installer is no longer supported. For more information, see VMware vSphere 7.0 Release Notes.</p> | Available as a plugin for vCenter. |
| Patch updates | <p>Old baseline concepts can be used to patch and update individual ESXi hosts.</p> <p>Provides Desired State experience at cluster level.</p> | <p>Current baselines are used to patch and update ESXi hosts.</p> <p>Does not provide Desired State concepts.</p> |
| Third-party software upgrade, installation and OEM plugin support | Software is packaged as components on the hosts. OEM add-ons available on selected hosts or cluster. (Creating the equivalent of an OEM custom ISO). | Software is packaged as offline bundles on the hosts. |

| Feature | vSphere Lifecycle Manager (vLCM) | VMware Update manager (VUM) |
|---------------|--|--|
| | Firmware stack can be installed or updated on all ESXi hosts in a cluster using OEM plugins. | |
| Functionality | Dependent on Hardware Support Manager (HSM) to update firmware of the servers in each cluster. | Independent of any OEM-specific tool for software stack updates. Firmware updates are not supported through VUM. |

1.3 Dell EMC OpenManage Integration for VMware vCenter (OMIVV)

VMware vCenter is used by IT administrators as their primary console to manage and monitor VMware vSphere ESXi hosts. Dell EMC provides a vCenter plugin called Dell EMC OpenManage Integration for VMware vCenter (OMIVV). It reduces complexity of managing the data center by streamlining the tasks associated with the management and monitoring of Dell EMC server infrastructure in the vSphere environment.

OMIVV serves as a HSM connected to vLCM to invoke firmware update workflows for supported Dell EMC PowerEdge servers. OMIVV 5.1 version released by Dell EMC supports VMware vSphere 7.0. For more information, see [OpenManage Integration for VMware vCenter](#). The following sections in this document will present use cases for vLCM.

2 Dell EMC Add-on and vLCM

In earlier releases of VMware vSphere, OEMs such as Dell EMC merged extensions with the base or native image that VMware provided. This created a custom image which was distributed as an ISO file and as an offline bundle (ZIP file). OEMs released custom images in accordance with major, update and patch releases on a regular cadence.

Starting with VMware vSphere 7.0, in addition to the usual custom ISO images and offline bundles, OEMs can release the vendor add-on, which is the delta between the custom image and the ESXi base image and an add-on image is provided to use with vLCM. The use case noted in the imminent section demonstrates converting hosts installed using a VMware native image to a Dell EMC customized image at the cluster level using the image concept of vLCM.

The base image is a collection of components that is complete and can boot up a server - the core ESXi installation. Base image and native image can be used interchangeably. An add-on is a collection of components that does not represent a complete bootable image – it is a collection of drivers released or changed since the base image was created. Vendor add-ons cannot be used as bootable image.

When combined with an ESXi base image, an add-on can add, update, or remove components that are a part of the ESXi base image. For the Dell EMC Add-ons, we add standalone packages and async drivers on top of the ESXi base image. Vendor add-ons can be configured independently to update the ESXi version of your hosts. For more information on add-ons, see [DellEMC Add-on for VMware vSphere 7.0](#).

2.1 Converting VMware native ESXi 7.0 image to customized Dell EMC image

The following use case performs the steps below to convert a native image installed on the hosts to a Dell EMC customized image using vLCM:

1. Download the native VMware ESXi 7.0 image from the product page of VMware's website and import the image into the vCenter server. For more information on importing updates, see [Import Updates to the vSphere Lifecycle Manager Depot](#).

Note: The native VMware ESXi 7.0 images are loaded into a vCenter Server 7.0 database by default through [vmware online depots](#).

2. Download the Dell EMC specific add-ons available on the [VMware download page](#).

Note: Dell EMC Add-ons are downloaded automatically to a vLCM patch database by default through [VMware online add-on depots](#).

3. Set up the image by selecting the imported VMware ESXi image and the Dell EMC Add-ons. For more information, see [Setting Up an Image](#).

Note: Hosts in the cluster are managed collectively. The created image will be applied to all hosts in this cluster.

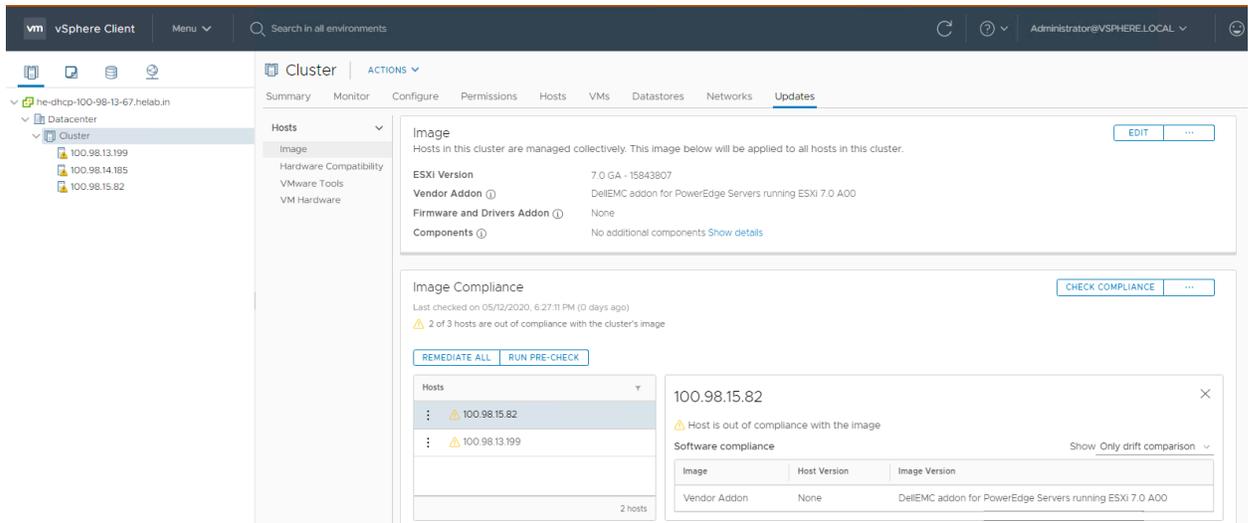


Figure 1 Hosts non-compliant with cluster image

4. Notice that two out of three hosts are noncompliant with the cluster image. The screenshot shows a cluster consisting three hosts. In this example, two hosts are installed with VMware ESXi native 7.0 image and Dell EMC customized VMware ESXi 7.0 image is installed on the third host. This causes the hosts to be noncompliant with the cluster image.

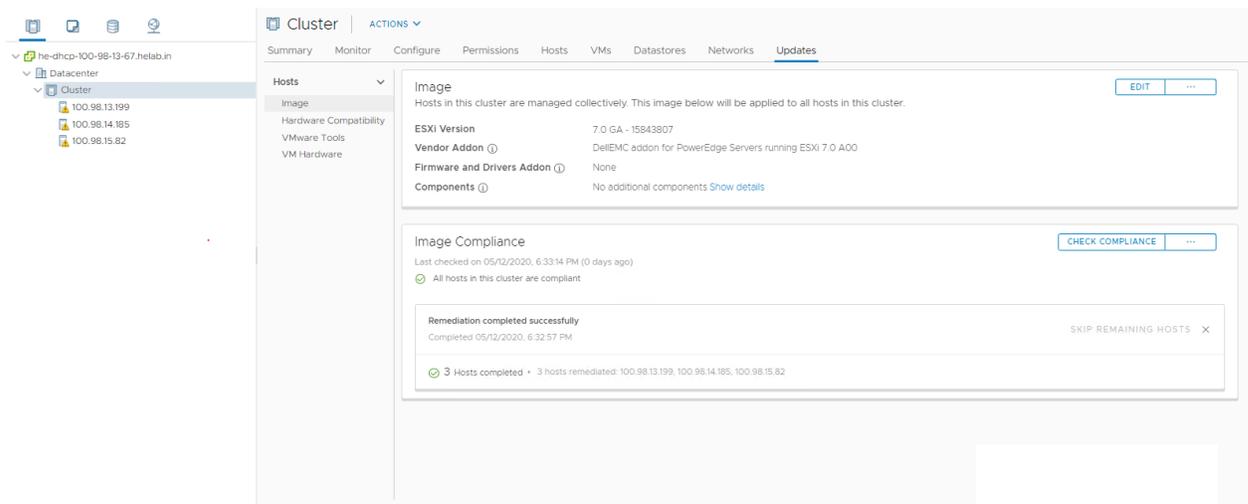


Figure 2 Hosts compliant with cluster image after remediation

5. Click **REMEDIATE ALL** to make the host image compliant with the cluster image.

3 Configuring vSphere Desired State for Dell EMC PowerEdge VMware cluster using vLCM

This section describes how to maintain a Desired State Configuration for the hosts within a cluster with the image concept of vLCM. Dell EMC regularly releases firmware catalogs for VMware ESXi (which can be subscribed to via the Dell EMC Repository Manager as well as the process outlined below). For more information, see [Firmware catalog for Dell customized VMware ESXi images](#).

Dell EMC also releases customized versions of ESXi images which includes the validated and certified driver versions integrated with it. When the firmware catalog for hardware testbed and the corresponding customized ESXi ISO image on a given server is used, a reference for a combined good vSphere state is achieved.

vSAN clusters will need an additional check on the storage controller versions that vLCM does as well. If an older version of vSAN is used, it may require a firmware downgrade of the storage control firmware from the base ESXi catalog. More information on customizing the baselines can be found with the Dell EMC Repository Manager documentation.

Note: The firmware catalog mentioned in the section below is compatible with vSphere and not compatible for vSAN.

The following components are required to create a Desired State configuration through vLCM:

- Base or native ESXi image.
- Dell EMC Add-ons which includes the async drivers.
- Firmware catalog for Dell customized VMware ESXi images.
- Dell EMC's OMIVV vCenter plugin as the Hardware Support Manager (HSM). See the OMIVV documentations to deploy and register the same to vCenter.

3.1 Set the Firmware Catalog from a Network Shared Folder (NFS or CIFS)

OMIVV provides an option to set the firmware catalog residing in a network share. Follow the steps below to set the firmware catalog from a local network shared folder:

1. Download the desired [Firmware catalog](#) from the direct links mentioned on the blog and place it in a shared folder (NFS or CIFS). For example, you may see that there is a firmware catalog posted for the A00 version of Dell EMC's customized version of VMware ESXi 7.0.
2. In vCenter Server, from the **Menu** tab select **OpenManage Integration > Compliance and Deployment > Profiles**.
3. Under the **Repository Profile** tab, click **Create New Profile**.

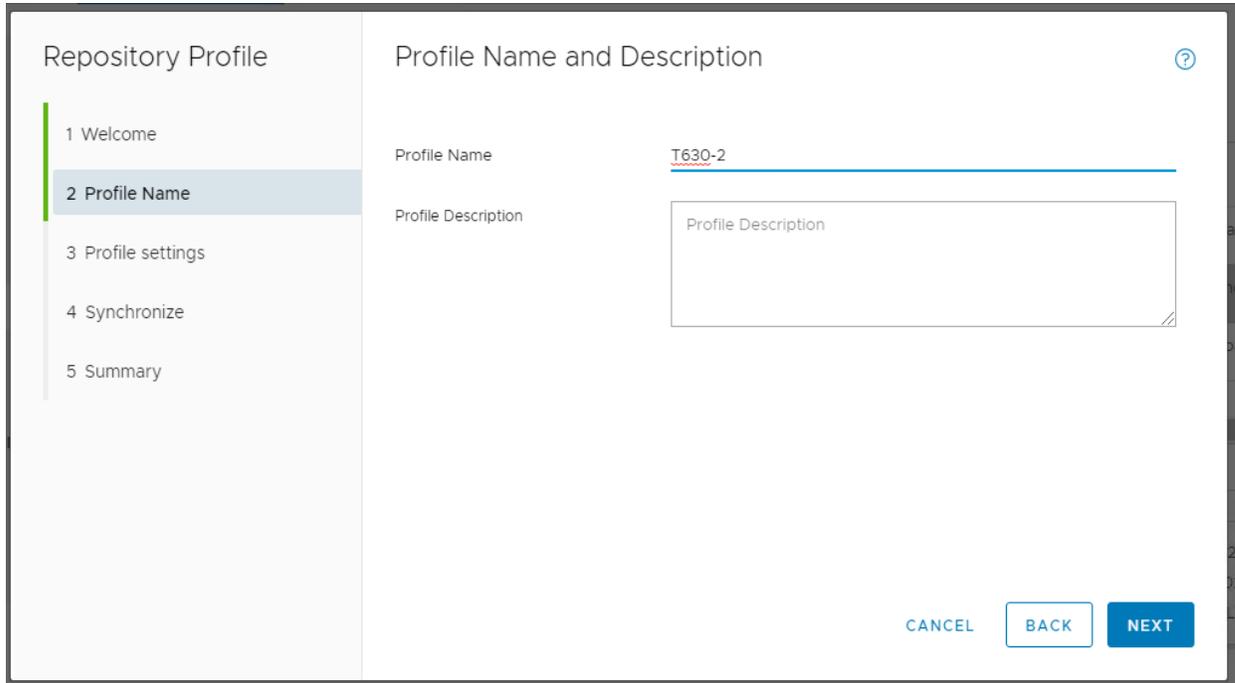


Figure 3 Setting a profile name

4. Under **Profile Name** and **Description** page, provide a name for the profile and click **Next**.

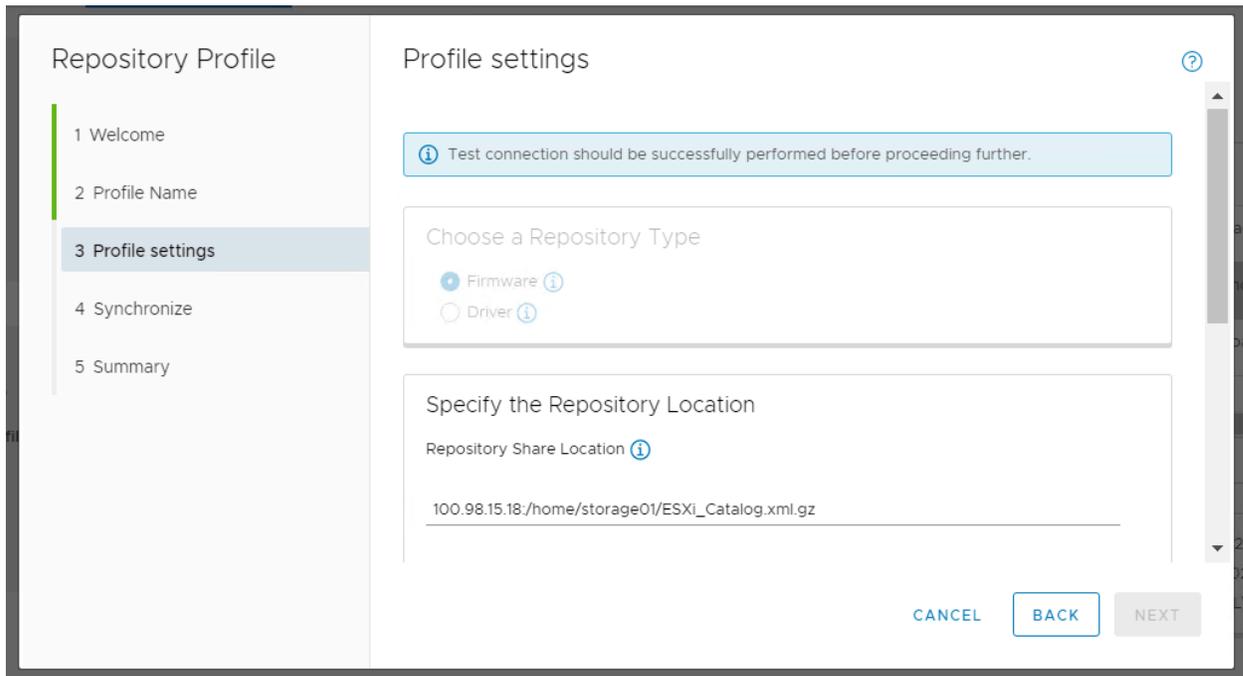


Figure 4 Repository share location

5. Under the **Profile Settings** tab, select **Firmware** and provide the share path folder address.

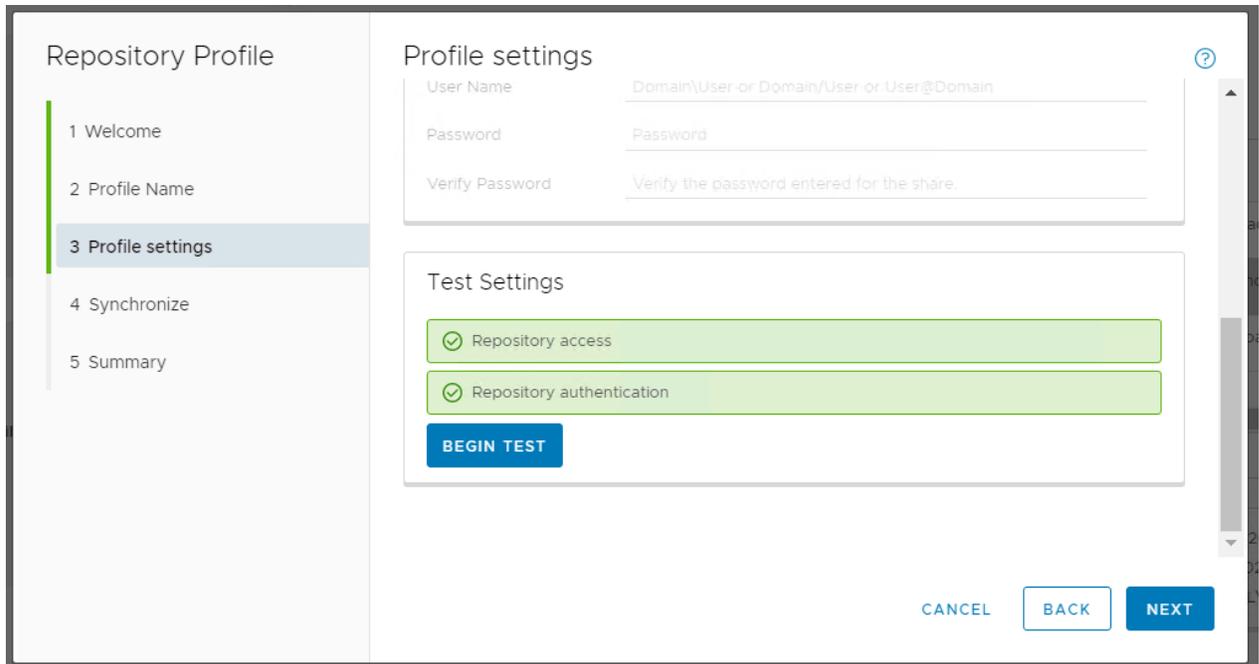


Figure 5 Test the connectivity to the shared folder by clicking on Begin Test

6. Scroll down and test the connectivity to the shared folder by clicking on **BEGIN TEST**.
7. Click **Next** and then, click **Finish**.

3.2 Set the Firmware Catalog from a custom webserver

OMIVV also provides an option to set a firmware catalog via a webserver. The use case demonstrated below describes a user creating a local webserver in a network environment and then download and maintain desired Firmware Catalog from the webserver.

Note: Prerequisite for this task is a simple webserver and a copy of both the catalog and corresponding signature file mentioned on the blog. Place both the catalog.xml.gz file and the signature file in the same folder on the local webserver. For more information, see [Dell Knowledge Base article SLN311042](https://www.dell.com/support/forums/post?post=SLN311042).

Follow the steps below in OMIVV to set the firmware catalog on a webserver:

1. From the **Menu** tab select **OpenManagement Integration > Compliance and Deployment > Profiles**.

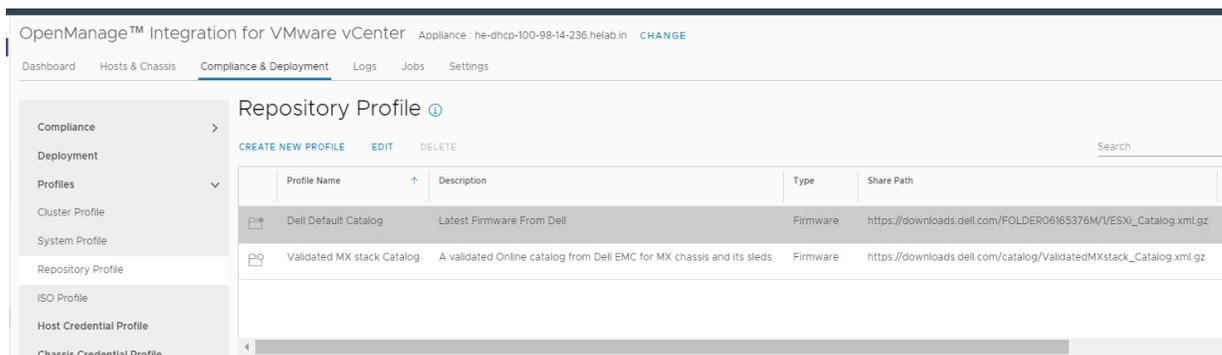


Figure 6 OMIVV Repository Profile

2. Select **Dell Default Catalog** and click **Edit**.
3. Do not edit the name of the repository (Dell Default Catalog). Click **Next**.

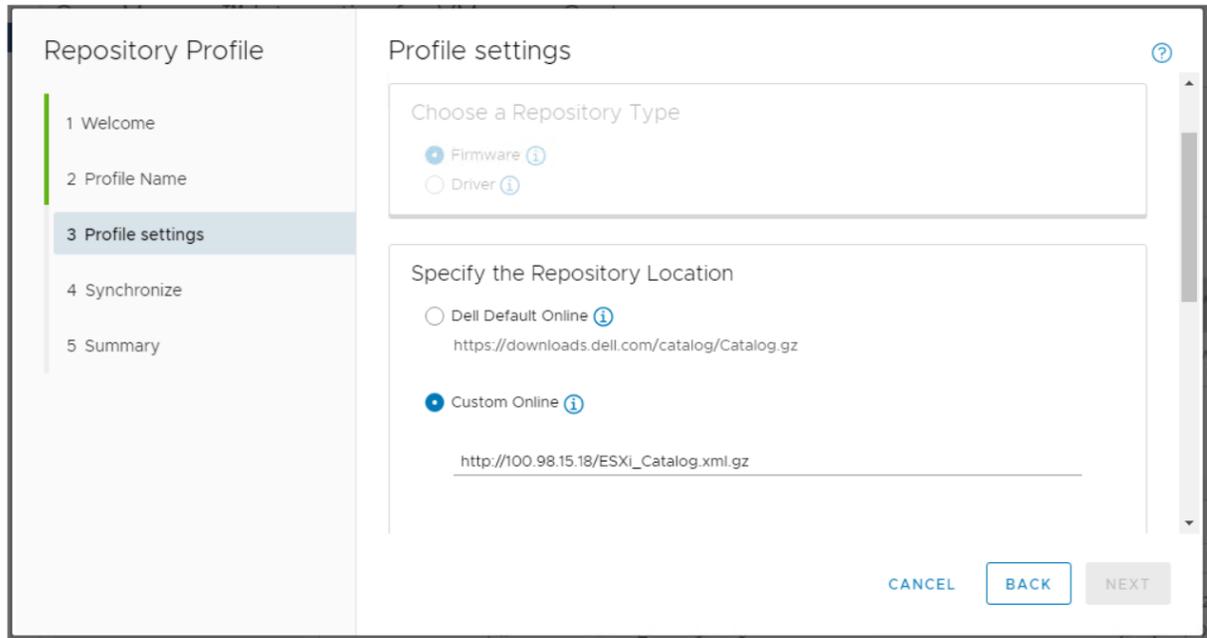


Figure 7 Link pointing to firmware catalog in a web server

4. Select the option **Custom Online** and enter the path of the catalog file on webserver, such as:
`http://<webserver IP_ADDR>/<PATH>/<FILE_NAME>`
5. Scroll down and click on **BEGIN TEST** to check the connectivity with the catalog.
6. Once the test for connectivity is complete, click **Next** and then, click **Finish**. The Dell Default Catalog link has been successfully set to point to the firmware catalog on the webserver.

3.3 Create a Cluster Profile and set up the image for the cluster

Once the firmware repository is set up, the next step is to create a Cluster Profile and to set up the image for the cluster which contains ESXi host(s):

1. Click on **Menu** and select **OMIVV > Compliance and Deployment tab > Cluster Profile**. Click **Create New Profile**.
2. Provide a name for the Cluster Profile and Associate Profiles (select a valid system profile, firmware repository profile, driver repository profile or its combinations). Select the cluster and click **Next** and then, click **Finish**.
3. Click on the **Menu** and select **Hosts and Clusters**. Choose a Cluster and click on the **Updates** tab.

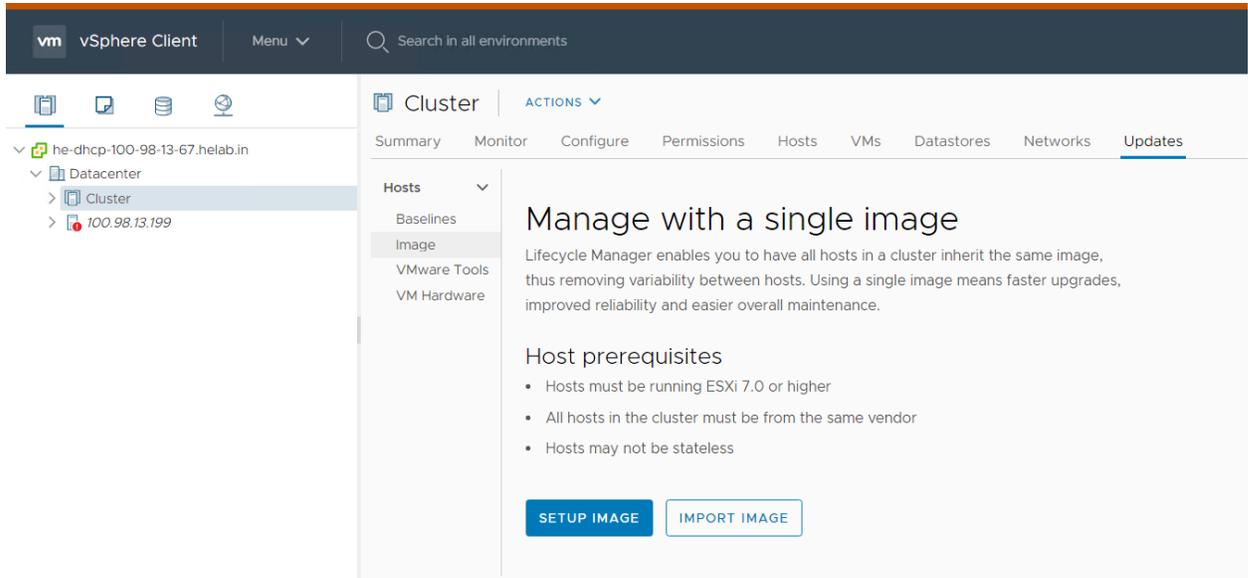


Figure 8 Setup Image for the cluster

4. From the left pane, select **Image** and click **SETUP IMAGE**.
5. Select the ESXi version and then, select the Dell EMC add-on as the **Vendor Add-on**.

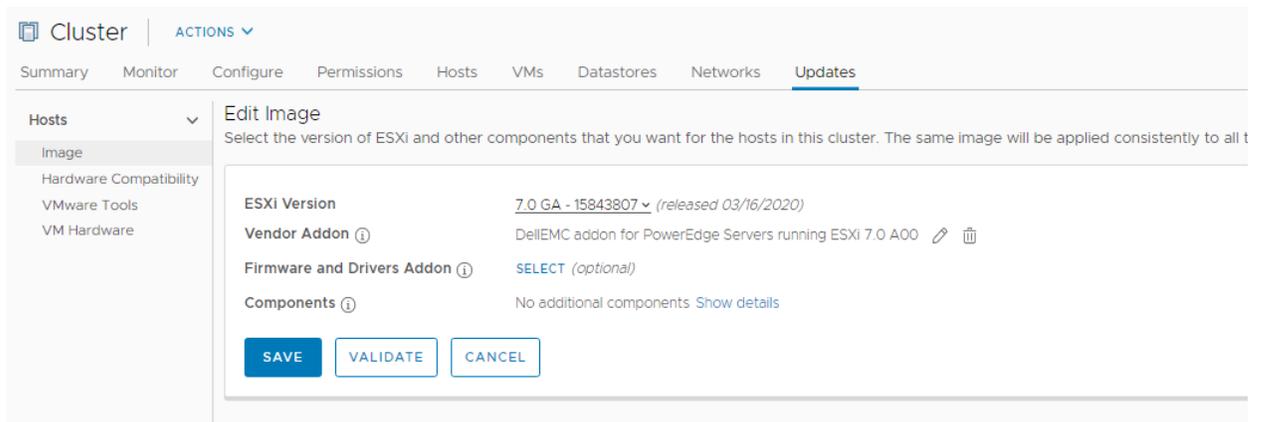


Figure 9 Options provided by Image to select ESXi base image, Vendor Add-on and firmware

6. From the **Firmware and Driver Add-ons** window, select **Dell EMC OMIVV**. A window indicating the Cluster profile will come up. Click on the **Cluster profile** and then, click **SELECT**.
7. Click **SAVE**. The image for the cluster has been set up.

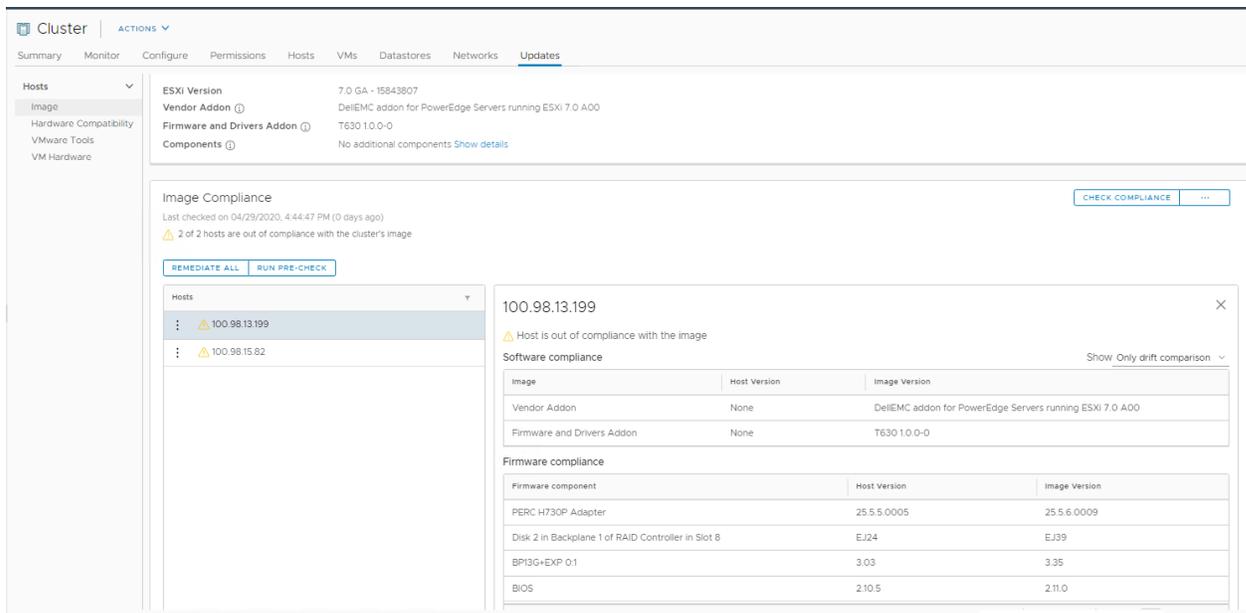


Figure 10 Difference in the firmware and software between the hosts and the image

8. Under the **Image Compliance** tab click **CHECK COMPLIANCE**.

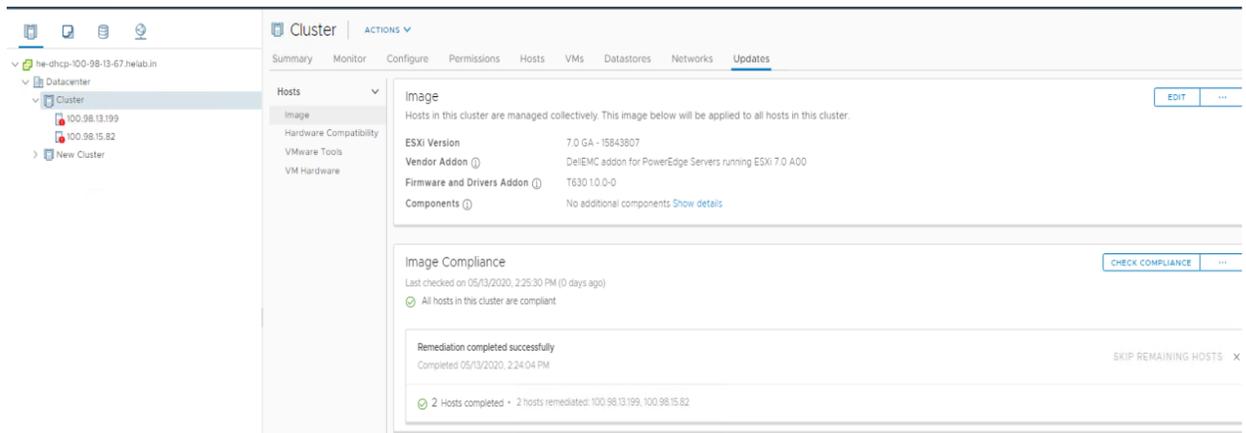


Figure 11 Host is compliant with the image created.

9. The difference in firmware and software between the hosts and the image is displayed. Click **REMEDIATE ALL** to remediate the hosts according to the image created. Once the remediation is successful, the host becomes compliant with the image created.

A Desired State is now configured for Dell EMC PowerEdge VMware cluster. Note that Dell EMC revises their customized version of ESXi images, add-ons, and firmware catalog on a quarterly basis. You can choose a specific add-on and firmware catalog to publish for use in the corresponding ISO image, and thereby derive the Desired State that is required.

4 Using vCenter 7.0 to manage previous versions of VMware ESXi

vCenter Server 7.0 supports monitoring and managing VMware ESXi 6.5.x (ESXi 6.5 Update 2 and later) and VMware ESXi 6.7.x hosts. Listed below are the high-level operations that are supported when vCenter Server 7.0 is used to manage previous VMware ESXi versions.

- VMware ESXi host patching operations.
- VMware ESXi host upgrade operations such as, vSphere Lifecycle Manager which works with VMware ESXi 6.5, VMware ESXi 6.7 and their respective update releases.
- VMware Tools and virtual machine hardware upgrade operations such as, vSphere Lifecycle Manager which works with VMware ESXi 6.5, VMware ESXi 6.7, and VMware ESXi 7.0.

4.1 Managing VMware ESXi 6.7 using vCenter 7.0

Note: vCenter 7.0 allows offline bundles to be installed on VMware ESXi 6.x hosts through baselines.

This section demonstrates a use case where in you can manage VMware ESXi 6.x hosts using vCenter 7.0 and VMware Update Manager (UM). The vLCM interface provides options to create baselines much as did earlier versions of vCenter. This section describes the workflow used when installing iSM on a VMware ESXi 6.7.x host with vCenter 7.0 and VUM through a vLCM user interface.

Follow the steps to manage VMware ESXi 6.7 using vCenter 7.0:

1. Download any offline bundle that is supported on a VMware ESXi 6.7 host. iDRAC Service Module (iSM) or Open Manage Server Administrator (OMSA) can be considered as an offline bundle. For information, see [Driver details](#).
2. Click on **Menu** and select **Lifecycle Manager > Actions > Import Updates**. Import the offline bundles into vCenter Server.

The screenshot shows the Lifecycle Manager interface with the 'Baselines' tab selected. A table lists several baselines, with 'ESXi70_ism' selected. Below the table, the details for the 'ESXi70_ism' baseline are shown, including its content.

| Baselines | Content | Type | ESXi version | Last Modified |
|--|-----------|------------|--|---------------|
| <input checked="" type="radio"/> ESXi70_ism | Extension | Custom | 6.* | 3 minutes ago |
| <input type="radio"/> Upgrade-6.5U2A00-7.0A01 | Upgrade | Custom | 7.0.0 | 1 day ago |
| <input type="radio"/> Non-Critical Host Patches (Predefined) | Patch | Predefined | 7.0, 7.*; 6.5.0, 6.7.0, 7.0.*; 7.0.0, 6.7.*; 6.* | 2 weeks ago |
| <input type="radio"/> Critical Host Patches (Predefined) | Patch | Predefined | 6.5.0, 6.7.0 | 2 weeks ago |
| <input type="radio"/> Host Security Patches (Predefined) | Patch | Predefined | 6.5.0, 6.7.0 | 2 weeks ago |

EXPORT 5 Baselines

Baseline ESXi70_ism
No description

Content

| Name | ID | Severity | Type | Category | ESXi Version | Impact | Vendor | Release Date |
|----------------------|----------------------|-----------|----------------|-------------|--------------|--------|-----------|-----------------------|
| Dell EMC iDRAC Se... | Dell_ISM_ESXi6_IS... | Important | Host Extension | Enhancement | 6.* | | Dell Inc. | 09/11/2019, 5:30:0... |

Figure 12 Baselines tab shows the baseline created

3. Create a baseline with the imported update. For more information, see [Creating and Working with Baselines and Baseline Groups](#). The baseline created will be listed under the **Baselines** tab.

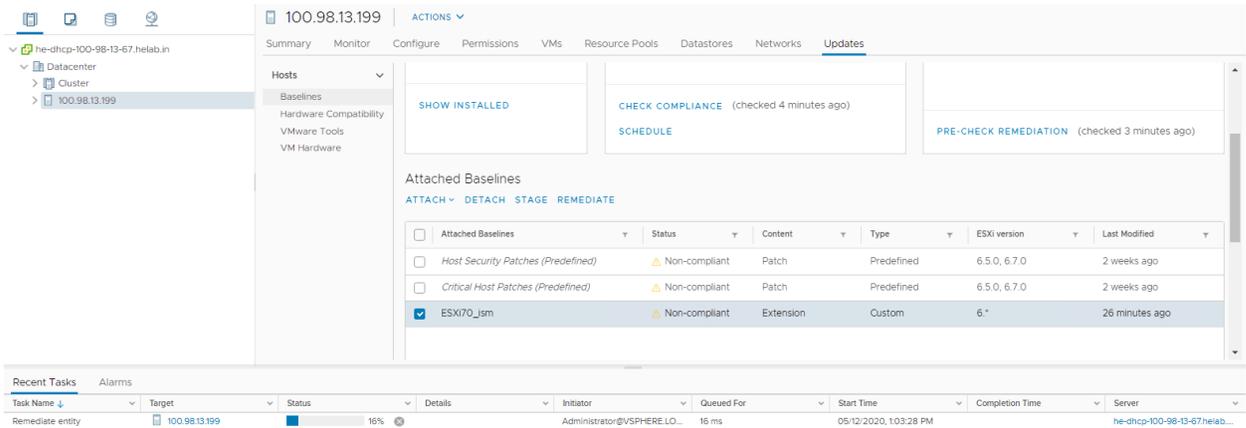


Figure 13 Select the created baseline from the Attached Baselines pane

4. Click on the **Updates** tab of the host and select the created baseline. Click **Attach**.
5. In the **Attached Baselines** pane, select the created baseline and then, click **Remediate**.

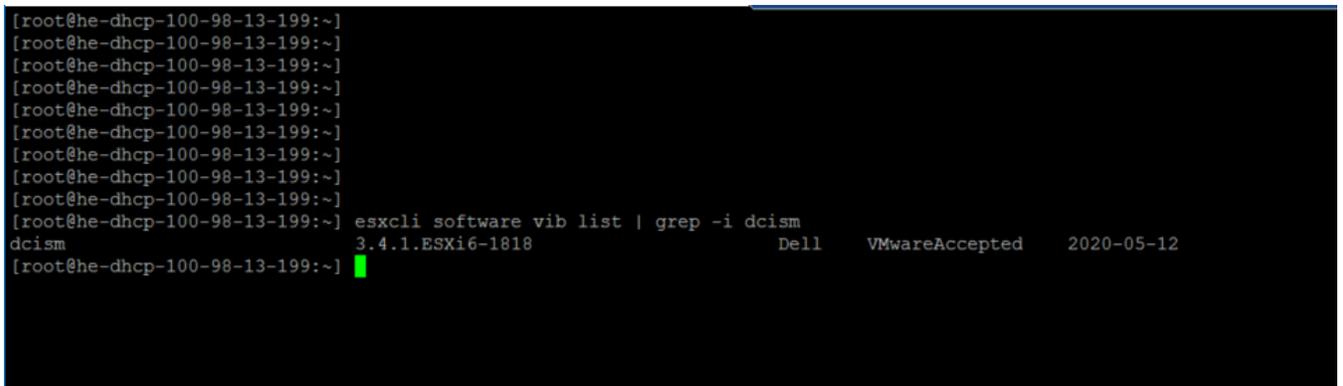


Figure 14 Verifying the installation using the command esxcli software vib list

6. Verify if the installation was successful by running the command: `esxcli software vib list`

5 Summary

vLCM provides a new and single scheduler that gives administrators and users more control when managing baselines in vCenter 7.0. It also leverages OMIVV to accomplish firmware updates in conjunction with software updates. This white paper is intended for users who want to use vCenter 7.0 to manage previous versions of ESXi releases such as 6.5.x and 6.7.x and includes instructions for configuration. Coincidentally, both vLCM and OMIVV can help users easily maintain compliance baselines for their vSphere clusters.

6 References

- [Dell EMC OpenManage Integration for VMware vCenter](#)
- [Managing Host and Cluster Lifecycle](#)
- [vSphere 7 – Lifecycle Management](#)
- [ESXi Base Images and Vendor Add-Ons](#)
- [DellEMC Add-on for VMware vSphere 7.0](#)