Technical white paper

Upgrading to Dell EMC vSphere and vSAN version 7.0

This technical white paper detail about some of the guidelines Dell EMC provides prior to upgrade to vSphere 7.0 from the previous branches of vSphere and vSAN versions.

Abstract

This paper detail on the relevant prerequisites the customers should be aware of prior to upgrade to vSphere and vSAN 7.0.

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Author: DhanaSrihari Kouru, Thiru Navukkarasu, Krishnaprasad K, Hypervisor team

Support: Ramya D R, Sherry Keller, IDD team

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Executive summary

This guide elaborates the prerequisites to consider before migrating from Dell EMC customized versions of VMware ESXi 5.x or 6.x branches to version 7.0.

1 Introduction

This document elaborates the guidelines for the users who plan to upgrade from earlier versions of vSphere and vSAN to 7.0 for Dell EMC PowerEdge Servers. The objective of this document is to take you through the prerequisites, steps to be executed prior invoking upgrade 7.0. The intent of this document is to avoid the obvious problems of an upgrade procedure by improving user awareness of known issues and facilitating better planning by VMware administrators.

1.1 Audience and scope

The intended audience for this white paper includes IT administrators and channel partners who intend to upgrade their VMware infrastructure to version 7.0-based releases. This paper helps the users or administrators to understand the general guidelines and definite prerequisites prior upgrading to 7.0.

1.2 Hardware requirements

Dell EMC supports all yx4x and yx5x servers for vSphere version 7.0 as well as support selected server models from the yx3x series PowerEdge servers.

The following lists the reference documents:

- See *VMware vSphere 7.x on Dell EMC PowerEdge Compatibility Matrix* and *VMware Compatibility Guide* links to know the supported Dell EMC PowerEdge platforms list for ESXi 7.0.
- Dell EMC does not support Broadcom 5719 and 5720 family of adapters for vSphere 7.0. For more information, see *Dell EMC VMware vSphere 7.0 release notes*.
- Dell EMC does not support NVMe hot unplug, or “Surprise removal”, for vSphere and vSAN 7.0 at present. For more information, see *Dell EMC VMware vSphere 7.0 release notes*.
- For information on generic hardware requirements, see the VMware ESXi Upgrade guide.
- To check the System storage requirements and supported boot media for ESXi 7.0, see *VMware vSphere 7.x on Dell EMC PowerEdge Compatibility Matrix*.

1.3 Software requirements

The following software is required before you can begin your upgrade to vSphere and vSAN version 7.0:

- VMware native image of version 7.0 or a Dell EMC customized ESXi version 7.0 image. Find these at VMware download and Dell EMC support.
- vSphere Life Cycle Manager, if you use this utility to upgrade your servers.
- Offline depot files for upgrading existing 6.5.x or 6.7.x servers to 7.0.

Note: The latest ESXi 7.0 images will be available at VMware download. The earlier versions of the ESXi images will be available at Dell EMC support.

For additional reference documents, see the following:

- The blog on Dell customization of VMware ESXi and its advantages.
- If you use VMware vanilla 7.0 image, you can convert that into a Dell EMC customized image by installing Dell EMC add-on. See the VMware documentation to understand an add-on and Dell EMC add-on details.

2 Upgrading prerequisites and scenarios

This section describes the scenarios the following common upgrade scenarios:

- Upgrading from Dell EMC customized revisions of 5.x
- Upgrading from Dell EMC Customized revisions of 6.0.x
- Upgrading from Dell EMC Customized revisions of 6.5.x
- Upgrading from Dell EMC Customized revisions of 6.7.x
- Upgrading from VMware native 6.x with async drivers installed manually
- Upgrading from Dell EMC customized revisions installed with systems management components
- Upgrading hosts with third-party custom VIBs.

The following lists the specific issues encountered during the upgradation:

- When you attempt to upgrade to Dell EMC customized ESXi 7.0 A00 image, the 2.3, 2.4, 2.5, and 2.6 sections are applicable. The Dell customized ESXi 7.0 A01 image resolve the issues mentioned in 2.3, 2.4, and 2.5 sections.
- However, due to other outstanding issues, Dell EMC do not recommend using A01 image for customers who intend to upgrade from previous versions of ESXi. This is due to a known issue mentioned in section 2.7.
- There are workarounds to unblock upgrade if you want to use A00 or A01 image for upgrade. Refer to the respective sections below.
- Dell EMC strongly recommend customers to use Dell customized ESXi version A02 for upgrades.

Note: The A00 or A01 image can be used as a new install and the limitations mentioned in the below sections are specific to upgrade.

2.1 Upgrading from Dell EMC customized versions of 5.x

VMware and Dell EMC do not support direct upgrade of vSphere 5.x version to 7.0. Upgrade in stages from 5.x to 6.x and then to 7.0.

For information on which path to follow, see VMware vSphere upgrade path before upgrading to vSphere 7.0. Also note that support for vSphere 5.5 is no longer supported. See VMware Knowledge Base article 51491.

To upgrade Dell EMC customized vSphere 5.x to vSphere 7.0:

1. Upgrade to latest Dell EMC customized version of the 6.5.x image. For information on Dell EMC customized 6.5.x image, VMware vSphere ESXi 6.5.x on Dell EMC PowerEdge Systems Image Customization Information details.
2. Follow the Upgrade from Dell EMC Customized revisions of 6.5.x section proceed further.

2.2 Upgrade from Dell EMC customized versions of 6.0.x

VMware and Dell EMC do not support direct upgrade of vSphere 6.0.x versions to 7.0. Upgrade in stages, from 6.0.x to 6.5.x or 6.7.x and then to 7.0.

To upgrade Dell EMC customized vSphere 5.x to vSphere 7.0:

1. Upgrade to the latest Dell EMC customized version of 6.7.x. For information on Dell EMC customized 6.7.x image, see VMware vSphere ESXi 6.7.x on Dell EMC PowerEdge Systems Image Customization Information details.
2. Follow the Upgrade from Dell EMC Customized revisions of 6.7.x section below to proceed further.

Note: If you use Dell EMC customized 7.0 A01 image ,the errors mentioned in section 2.3 and 2.4 will not be encountered**.** The Dell EMC customized images can be downloaded from VMware download page.

2.3 Issues encountered when upgrading from Dell EMC customized versions of 6.5.x

Some 6.5.x and 6.7.x async drivers integrated with the Dell EMC customized images block the upgrade process. This is a known issue.

Note: These errors are not specific to Dell EMC.

This section and the next section specifically call out issues you might encounter during the upgrade process and the actions that needs to be taken to resolve them.

The following driver packages fail when you attempt to upgrade Dell EMC customized 6.5.x to 7.0.

- igbn
- ixgben
- qfle3f
- qedf
- sfvmk
- scsi-qedil

Below is an example screenshot of the upgrade failure when you attempt to upgrade from a Dell EMC customized 6.5.x image to 7.0 using ISO/CD based method.

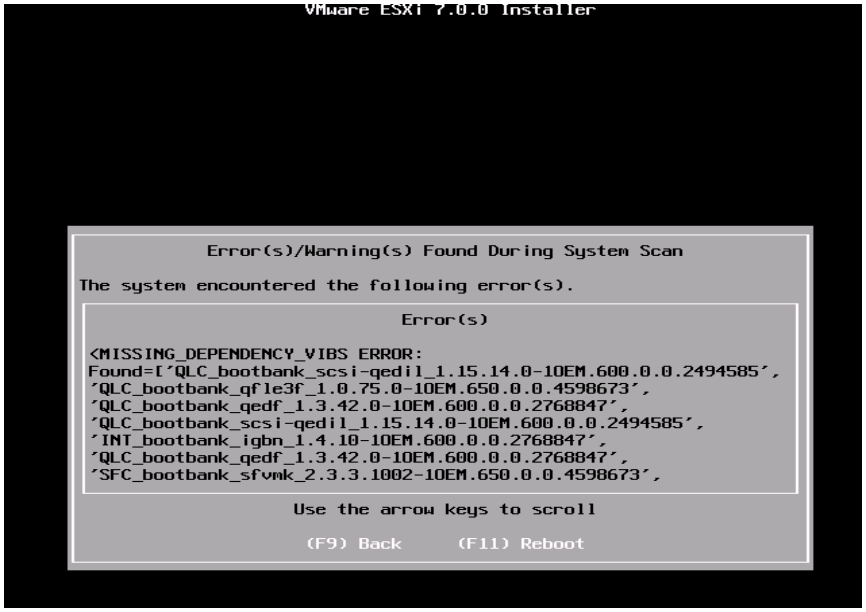

Figure 1 Upgrade failure from 6.5.x to 7.0 using ISO/CD

Below is an example screenshot of the upgrade failure when you attempt to upgrade Dell EMC customized 6.5.x image to 7.0 using VMware Update Manager (VUM).

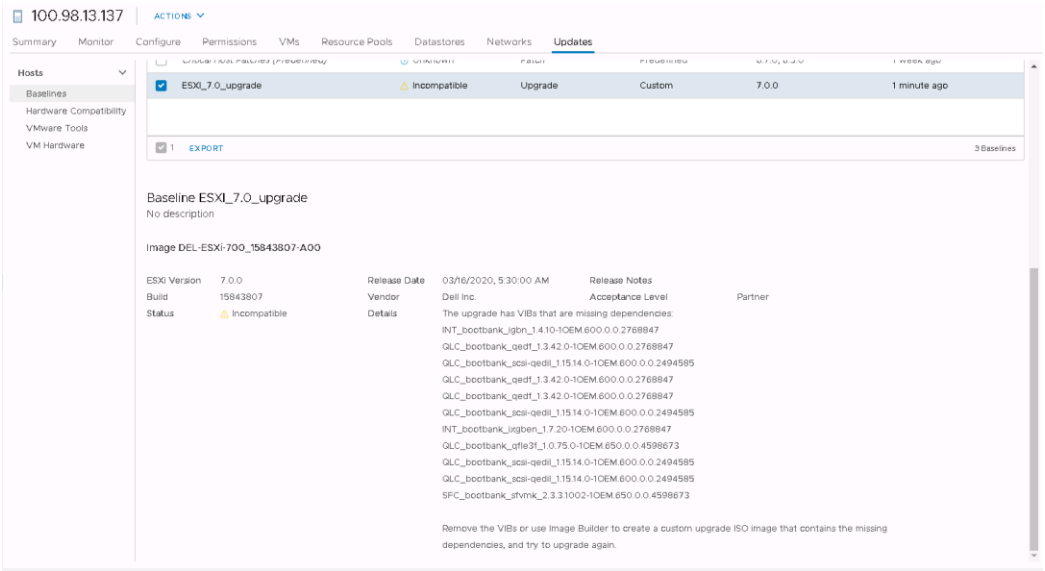

Figure 2 Upgrade failure from 6.5.x to 7.0 using VUM

Below is an example screenshot of the upgrade failure when one attempt to upgrade from a Dell EMC customized 6.5.x image to 7.0 using esxcli profile update.

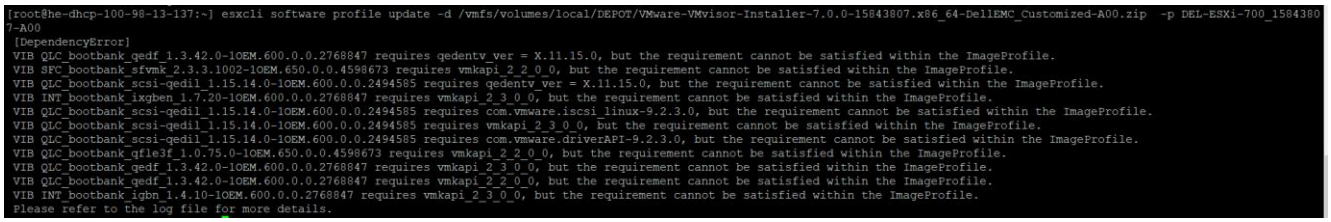

Figure 3 Upgrade failure from 6.5.x to 7.0 using esxcli

Note: In the above all three cases, the failure error or symptoms are same, it is just that the three different interpretation of the failures using three different methods.

2.3.1 Solution

You must remove the above-mentioned driver packages prior attempting an upgrade using the command: `esxcli software vib remove -n igbn -n ixgben -n qfle3f -n qedf -n sfvmk -n scsi-qedil`.

Before upgrading, the ESXi needs to be gracefully rebooted to complete the driver packages removal. See the VMware Knowledge Base article 78389.

Note: If you are dependent upon these drivers for use cases such as NIC Ethernet functions, boot from iSCSI/FC/FCoE targets, then ensure that you perform the upgrading using ISO-based upgrade options after removal of these drivers. VUM-based upgrades do not work, in case, the management network of ESXi hosts were using these drivers before, and you uninstalled them as part of prerequisites.

2.4 Issues encountered when upgrading from Dell EMC customized versions of 6.7.x to version 7.0

This section describes on the errors you might observe when you attempt to upgrade Dell EMC customized vSphere 6.7.x to 7.0. The following driver packages fail when you attempt to upgrade from a Dell EMC customized 6.7.x to 7.0:

- qedf
- qfle3f
- sfvmk
- qedi

Below is an example screenshot of the upgrade failure when one attempt to upgrade Dell EMC customized 6.7.x image to 7.0 using ISO/CD method.

Figure 4 Upgrade failure from 6.7.x to 7.0 using ISO/CD Method

Below is an example screenshot of the upgrade failure when you attempt to upgrade Dell EMC customized 6.7.x image to 7.0 using VMware Update Manager (VUM).

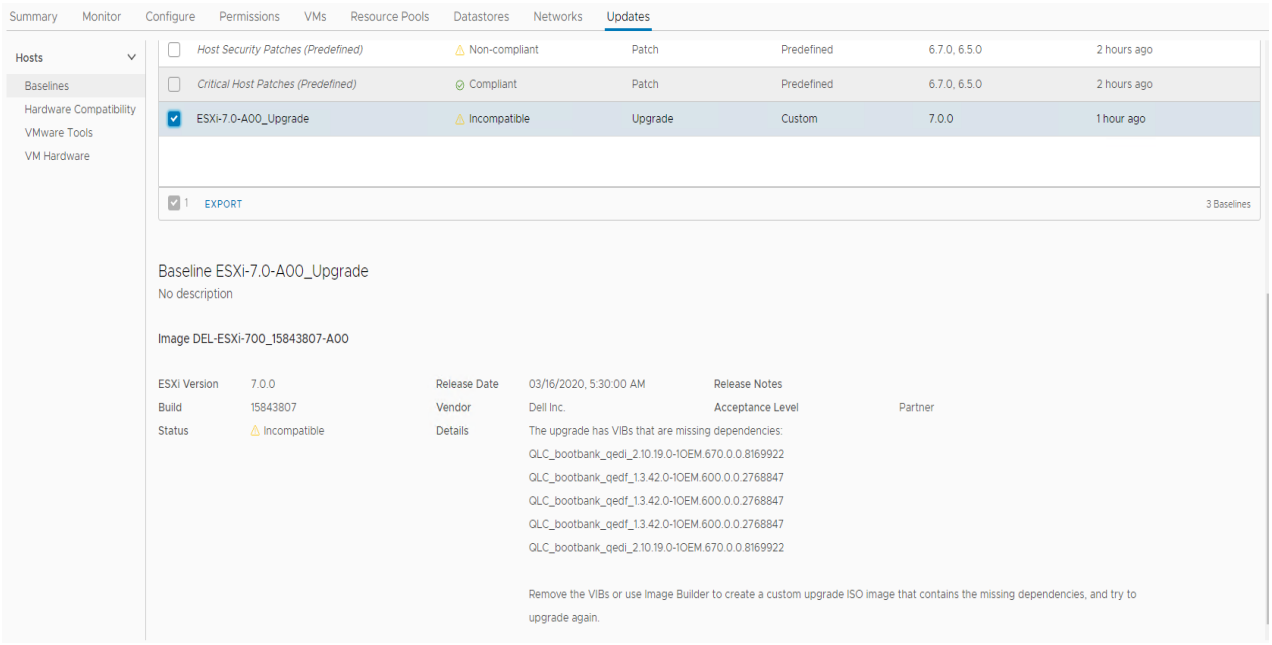

Figure 5 Upgrade failure from 6.7.x to 7.0 using VUM

Below is an example screenshot of the upgrade failure when one attempt to upgrade from a Dell EMC customized 6.7.x image to 7.0 using esxcli profile update.

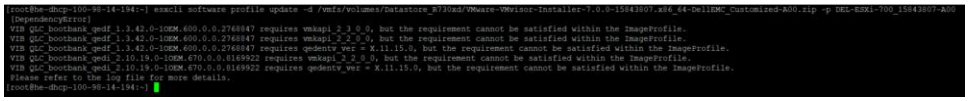

Figure 6 Upgrade failure from 6.7.x to 7.0 using esxcli

Note: In the above all three cases, the failure errors or symptoms are same, it is just that the three different interpretation of the failures using three different methods.

2.4.1 Solution

You must remove the above-mentioned driver packages prior attempting an upgrade using the command: `esxcli software vib remove -n qedf -n qfle3f -n sfvmk -n qedi`.

Before upgrading, the ESXi needs to be gracefully rebooted to complete the driver packages removal. See the VMware Knowledge Base article 78389.

Note: If you are dependent upon these drivers for use cases such as NIC Ethernet functions, boot from iSCSI/FC/FCoE targets, then ensure that you perform the upgrading using ISO-based upgrade options after removal of these drivers. VUM-based upgrades do not work in case the management network of ESXi hosts were using these drivers before and you uninstalled them as part of prerequisites.

2.5 Upgrading from VMware native 6.x with async drivers installed manually

The failed driver scenarios described in the previous sections are not Dell EMC specific as it can be observed for the users who use VMware ESXi native images as well provided, they use async drivers from VMware. Similar errors observed in the above sections are applicable in this case as well.

2.6 Upgrading from Dell EMC customized versions installed with systems management components

Dell EMC supports variety of in-band systems management packages (CIM providers) on customized versions of ESXi. However, CIM providers are not integrated into the customized image by default. Some of the in-band CIM provider packages supported on ESXi are OpenManage Server Administrator (OMSA) and iDRAC Service Module (iSM) on ESXi. These software packages are posted at Dell support page and the download instructions are documented in the OMSA and iSM documentation.

Note: Dell EMC CIM providers are migrated to 64-bit architecture for 7.0 sfcb compatibility. The CIM providers support Dell EMC customized vSphere 6.x branch of 32 bit. For a customer who wants to upgrade vSphere 5.x, 6.x to vSphere 7.0, it is required to uninstall the incompatible packages prior to upgrade. See the respective system management guides for details and download instructions for the compatible versions.

When the prerequisites are not followed, an upgrade task fails with the error shown below.

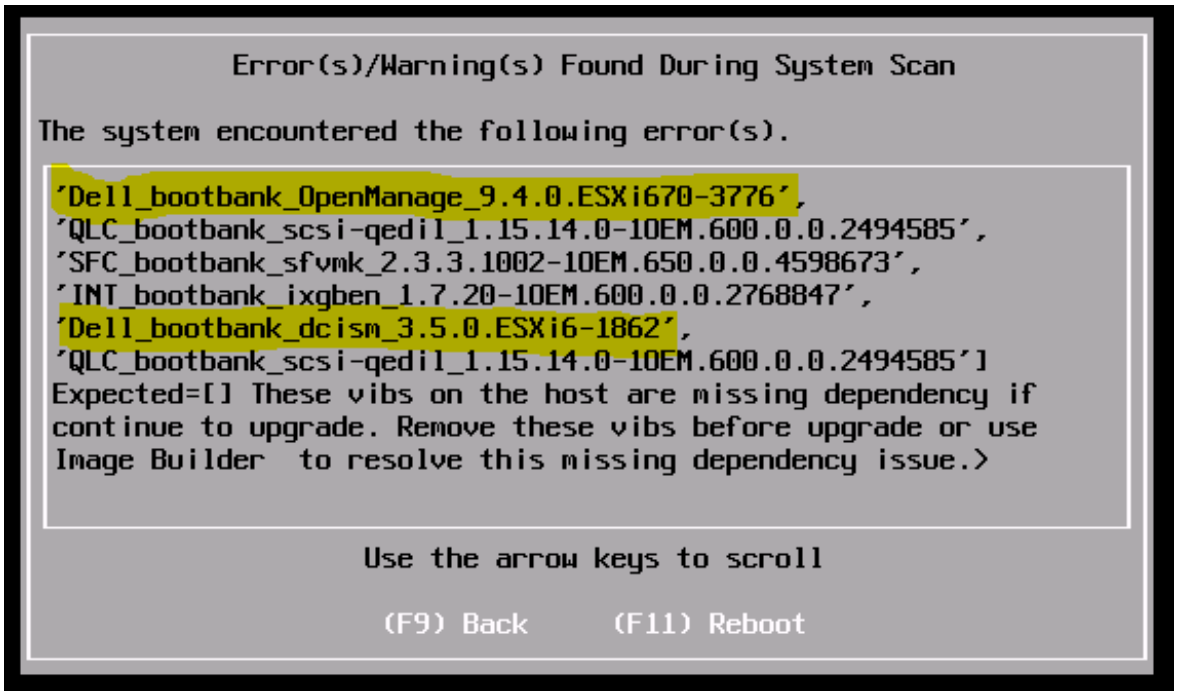

Figure 7 Upgrade failure with incompatible systems management software installed

2.7 Issues encountered while upgrading to 7.0 using VMware Update Manager (VUM)

Upgrading from Dell EMC customized ESXi 6.5.x host to Dell EMC customized ESXi 7.0 A01 using VUM might fail when one of the below Converged Network Card is present in the system with FCoE or iSCSI enabled. Upon invoking upgrade, the system fails to boot and reports the following error message during the reboot cycle post upgrade:

```
Fatal error: 15 (Not found)
```

Following are the impacted NIC:

- Qlogic 51xxx series cards
- Qlogic 41xxx series cards
- Emulex OneConnect OCM14xxx Series of cards

Note: This specific issue is resolved in Dell EMC ESXi 7.0 A02 image. For more information, see VMware Knowledge Base article 79694.

2.8 Upgrading from Dell EMC customized versions installed with stand-alone tools & utilities

Dell EMC provides the below stand-alone tools & utilities supported for ESXi release. These utilities & tools can be installed with ESXi.

- PERCCLI
- Dell EMC iDRAC Tools

The following are specific to stand-alone tools and utilities:

- All these packages are available at Dell support page for various ESXi releases.
- Dell EMC utilities and tools are not migrated to 64-bit user world.
- These tools and utilities are not bundled with the Dell EMC custom-ISO releases.

Use the following commands to remove PERC CLI and Dell EMC iDRAC tools VIB:

- `esxcli software vib remove -n vmware-perccli`
- `esxcli software vib remove -n racadm`

It is required to uninstall the respective VIBs from vSphere 6.x versions prior attempting to upgrade, failing to do this and attempting to upgrade results in a failure mentioned in the following screenshot.

Below is a snapshot indicating the specific upgrade error when the standalone utility packages are installed on 6.x branch of ESXi prior performing 7.0 upgrade.

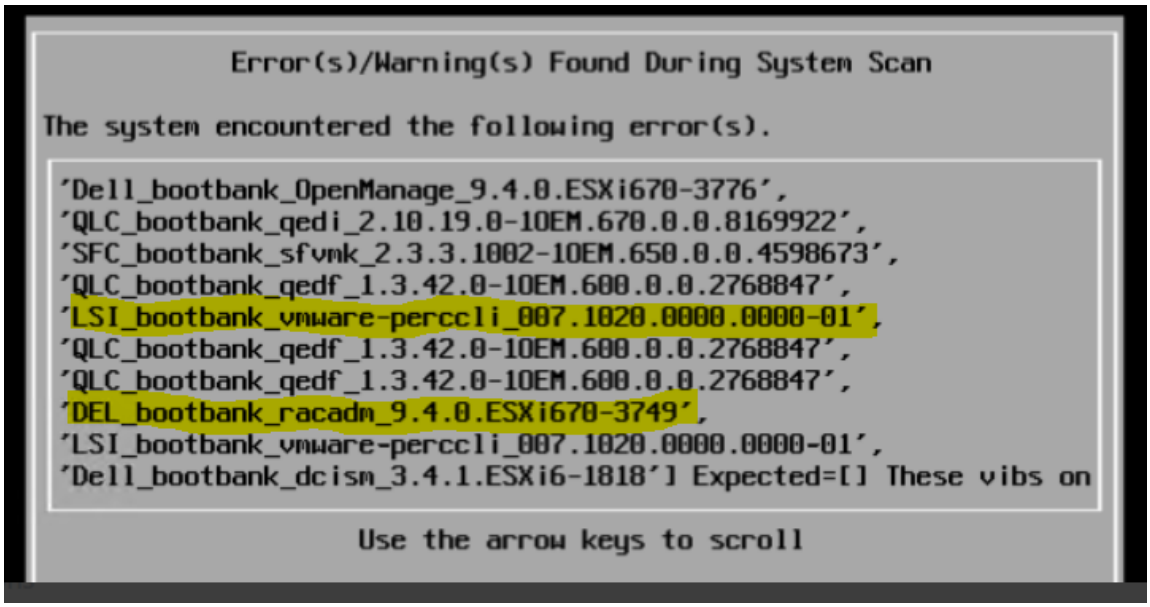

Figure 8 Upgrade error when the standalone utility packages are installed

2.9 Upgrading to Dell EMC customized ESXi 7.0 from VMware native ESXi 7.0 using Dell EMC add-ons

A VMware *add-on* is a collection of components that is not a bootable image on its own, but instead a collection of independent components that can be applied to a base-bootable ESXi image. Components are enhanced bulletins that include new metadata fields for the VIBs incorporated. These fields are meant to be consumed by vSphere Life Cycle Manager (vLCM).See the ESXi Base Images and Vendor Add-On section of *Managing Host and Cluster Lifecycle*.

Find the first version of the Dell EMC add-on, published with VMware vSphere 7.0, on the VMware download page and the Dell EMC support page. Add-ons are released in a regular cadence together with their customized ISO and ZIP file releases. For more information, see Locating Dell EMC Add-On.

For information on downloading the Dell EMC add-on, see *VMware vSphere ESXi 6.5.x on Dell EMC PowerEdge Systems Image Customization Information*.

An `esxcli software addon get` command executes a summary of the add-on installed on a running ESXi machine, as the sample here demonstrates:

```
:~] esxcli software addon get
DEL-ESXi-700:15843807-A00
   Name: DEL-ESXi-700
   Version: 15843807-A00
   Display Version: A00
   Vendor: Dell Inc.
   Category: bugfix
   Acceptance Level: partner
   Description: DellEMC addon to install components dell-configuration-vib,
   dellemc-osname-idrac-component for PowerEdge Servers. This addon is
   compatible with ESXi 7.0
   Release Date: 04-02-2020
```

```
   Release Type: addon
   docURL: https://www.dell.com/support/home/us/en/19/product-
   support/product/vmware-esxi-7.x/docs
   Components: dell-configuration-component 7.0.0-A00, dellemc-osname-idrac-
   component 7.0.0-A00
   Removed Component Names:
:~]
```

2.10 Upgrading hosts that have third-party custom VIBs

A host can have custom vSphere installation bundles (VIBs) installed. For example, VIBs can be a third-party drivers or management agents. When you upgrade an ESXi host to version 7.0, all supported custom VIBs are migrated, regardless of whether the VIBs are included in the installer ISO.

If the host or the installer ISO image contains a VIB that creates a conflict and prevents the upgrade, an error message identifies the VIB that created the conflict. To upgrade the host, do one of the following:

Remove the VIB that created the conflict from the host and retry the upgrade. You can also remove the VIB that created the conflict from the host by using esxcli following command:

```
esxcli software vib remove -n "vib name". The "vib name" can be retrieved using
'esxcli software vib list
```

2.11 vCenter Server upgrade

Starting with vSphere 7.0, a Microsoft Windows-supported installer is not available for vCenter 7.0. vCenter Server Appliance (VCSA) is the only supported option for vCenter 7.0. See the VMware vSphere blogpost, *vSphere 7 – vCenter Server 7 Migration & Upgrades*.

3 ESXi host upgrade methods

VMware provides several ways to upgrade ESXi version 6.5.x and version 6.7.x hosts to ESXi 7.0.

3.1 ISO-based upgrade (manual and automated)

There are multiple ways to upgrade your ESXi clusters using an ISO-based upgrade method.

Dell EMC provides iDRAC vMedia options to connect an ISO image. You can then boot from it and upgrade manually by following on-screen options.

In the screenshot below, the options are provided to the user where you can preserve the existing VMFS datastore to retain the data and VMs stored in the datastore during migration.

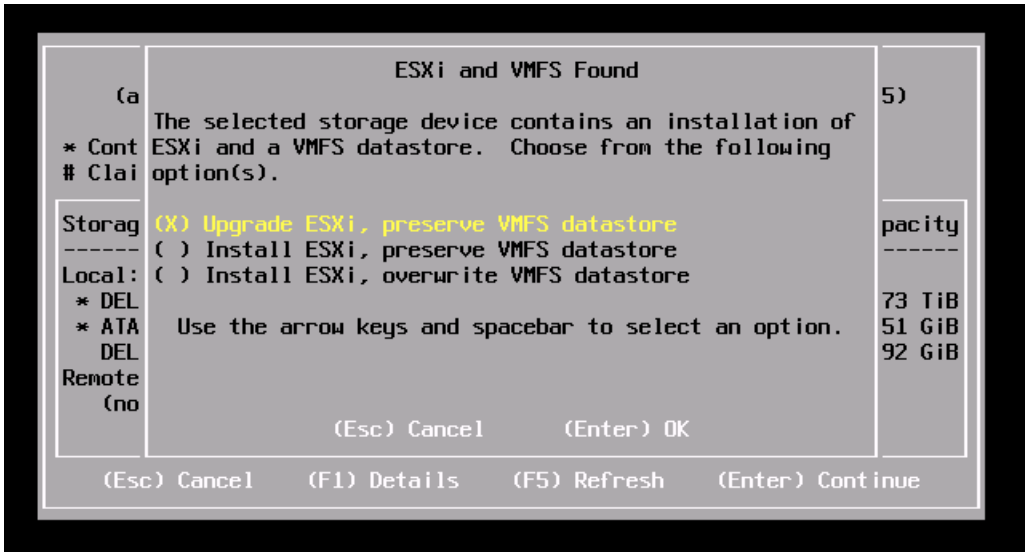

Figure 9 ISO-based upgrade options

For an automated upgrade procedure, see the *Installing or Upgrading Hosts by Using a Script*.

3.2 vSphere Life Cycle Manager (vLCM)

In vSphere 7.0, vLCM encompasses the functionality that Update Manager provided in previous vSphere releases and enhances it by adding new features and possibilities for ESXi lifecycle management at a cluster level.

vLCM is a service that runs in vCenter Server. Upon deploying the vCenter Server appliance, the vLCM user interface becomes automatically enabled in the HTML5- based vSphere Client.

Follow these steps to upgrade the ESXi image:

1. Before upgrading the ESXi image from 6.5.x or 6.7.x to 7.0, download the ESXi image from www.dell.com/support.
2. After downloading the latest 7.0 image, select the Update Manager tab in the menu under vSphere Client and import the image under the ESXi images tab under Lifecycle Manager.
3. Click **Browse** to find the downloaded ESXi 7.0 ISO image downloaded from VMware and click **Import**.

4. The ESXi 7.0 ISO image will be uploaded and added to the vSphere Update Manager.
5. After uploading the file, select the image, and click **New Baseline**. The baseline is the actual upgrade template you apply to your ESXi host.
6. When Create Baseline wizard launches, enter a name for the ESXi 7.0 upgrade baseline. Click **Next**.
7. The image will already be selected. Click **Next**.
8. After the baseline has been created, attach the baseline to the ESXi 6.5X or 6.7X host that you want to upgrade to 7.0. Click the host, click **Updates**, and then click the **Attach drop-down** option under Attached Baselines.
9. Click the ESXi 7.0 upgrade baseline and click **REMEDIATE**.
10. The host upgrade to ESXi 7.0 begins.
11. Remediate the ESXi 6.5.x or 6.7.x host by applying the ESXi 7.0 upgrade baseline.

The host reboots during the process, and the overall upgrade process completes.

3.3 Upgrade or update a host with an image profile

Dell EMC supports an upgrade to 7.0 using an `esxcli` profile update. The depot file to support this method is available at the VMware download page as well as www.dell/support. Follow the steps documented at Upgrade or Update a Host with Image Profiles to perform an upgrade using `esxcli`.

The CLI to be used for this upgrade method is similar to the following.

```
esxcli software profile update --depot=depot_location --profile=profile_name
```

Check whether the update requires the host to be in maintenance mode. If necessary, place the host in maintenance mode.

The following output is displayed during an upgrade using CLI:

```
:~] esxcli software sources profile list -d /vmfs/volumes/datastore1/ISO/VMware-
VMvisor-Installer-7.0.0-16324942.x86_64-DellEMC_Customized-A02.zip
Name Vendor Acceptance Level Creation Time Modification Time
------------------------ --------- ---------------- ------------------- -------
------------
DEL-ESXi-700_16324942-A02 Dell Inc. PartnerSupported 2020-03-19T10:40:06 2020-
03-19T10:40:06
:~] esxcli software profile update -d /vmfs/volumes/datastore1/ISO/VMware-
VMvisor-Installer-7.0.0-16324942.x86_64-DellEMC_Customized-A02.zip -p DEL-ESXi-
700_16324942-A02
Update Result
Message: The update completed successfully, but the system needs to be rebooted for
the changes to be effective.
Reboot Required: true
```

3.4 Post upgrade verification

To complete a host upgrade, ensure that the host is reconnected to its managing vCenter Server system, and reconfigured if necessary, and check that the host is licensed correctly. Verify the following:

- All the VIBs are updated properly.

- The management VIBs are migrated properly. In this case none of the 6.x based management packages are supported on 7.0
- The VMs are powered on after successful upgradation.

3.5 vSAN Upgrade

VMware and Dell EMC support upgrading to vSAN 7.0 from previous branches of vSAN revisions. Follow the steps documented at Upgrading the vSAN Cluster for a successful upgrade.

4 Conclusion

This upgrade guide briefs about the specific prerequisites to be followed for users who want to upgrade from earlier versions of ESXi. This whitepaper provides details about specific upgrade scenarios, the support stances of software packages supported on ESXi 7.0. This paper also provides specific solutions and recommendations to the user with the right and supported steps that must be followed prior to vSphere and vSAN during upgrade use cases.

5 References

Upgrading ESXi hosts

Dell EMC VMware ESXi 7.x documentation

OMSA 9.4.0 and earlier versions are unsupported and will not allow install or upgrade to VMware ESXi 7.0

Dell EMC iDRAC Service Module (iSM) supported version for ESXi 7.0

vSphere 7 Upgrade Best Practices - Dell Knowledge Base article 78205

vmkapi Dependency error while Installing/upgrading to ESXi 7.0 – Dell Knowledge Base article 78389

Important information before upgrading to vSphere 7.0 -Dell Knowledge Base article 78487

Dell Knowledge Base article on upgrade failures