

VMware Cloud Foundation Lifecycle Management

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VMware Cloud Foundation 4.1

You can find the most up-to-date technical documentation on the VMware website at:

<https://docs.vmware.com/>

VMware, Inc.
3401 Hillview Ave.
Palo Alto, CA 94304
www.vmware.com

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About VMware Cloud Foundation Lifecycle Management

1

The *VMware VMware Cloud Foundation Lifecycle Management* describes how to manage the lifecycle of a VMware Cloud Foundation environment. The information includes prerequisites, step-by-step configuration instructions, and suggested best practices.

Intended Audience

The *VMware Cloud Foundation Lifecycle Management* is intended for cloud architects, infrastructure administrators, and cloud administrators who are familiar with and want to use VMware software to quickly deploy and manage an SDDC. The information in this document is written for experienced data center system administrators who are familiar with:

- Concepts of virtualization, software-defined data centers, virtual infrastructure (VI), and virtual desktop infrastructure (VDI)
- VMware virtualization technologies, such as VMware ESXi™, the hypervisor
- Software-defined networking using VMware NSX®
- Software-defined storage using VMware vSAN™
- IP networks

Additionally, you should be familiar with these VMware software products, software components, and their features:

- VMware vSphere®
- VMware vCenter Server® and VMware vCenter Server® Appliance™
- VMware vRealize® Log Insight™
- VMware Horizon®
- VMware App Volumes™

Related Publications

The *Planning and Preparation Workbook* provides detailed information about the software, tools, and external services that are required for VMware Cloud Foundation.

The *VMware VMware Cloud Foundation Deployment Guide* contains detailed information about a VMware Cloud Foundation system, its components, and the network topology of a deployed system.

The *VMware VMware Cloud Foundation Operations and Administration Guide* provides information about managing a VMware Cloud Foundation™ system, including managing the system's virtual infrastructure, managing users, configuring and deploying service offerings, and upgrading and monitoring the system.

About Cloud Foundation Bundles

2

Lifecycle Management (LCM) enables you to perform the automated updates on the Cloud Foundation services (SDDC Manager and internal services) and the VMware software (vCenter Server, ESXi, NSX-T, and vRealize Suite Lifecycle Manager) in your environment. The update bundles can be downloaded and applied manually or scheduled within your maintenance window, allowing for flexibility in your application.

This chapter includes the following topics:

- [Bundle Types](#)
- [Download Bundles](#)
- [View Bundle Download History](#)

Bundle Types

Cloud Foundation includes two types of bundles.

Update or Upgrade Bundles

An update or upgrade bundle contains bits to update the appropriate Cloud Foundation software components in your management domain or VI workload domain. In most cases, an upgrade bundle must be applied to the management domain before it can be applied to workload domains.

Install Bundles

If you have updated the management domain in your environment, you can download an install bundle with updated software bits for VI workload domains and vRealize Suite Lifecycle Manager.

- A VI workload domain install bundle is used to deploy later versions of the software components rather than the versions in your original Cloud Foundation installation.
- An install bundle is required for deploying vRealize Suite Lifecycle Manager.

Download Bundles

If LCM is configured to work with your My VMware account, LCM automatically polls the depot to access the bundles. You receive a notification when a bundle is available and can then download the bundle.

If you do not have internet connectivity, you can either use a proxy server to access the depot, or download the bundles manually.

Online Bundle Download

You can either download bundles through the SDDC Manager dashboard or through a proxy server.

- [Download Bundles from SDDC Manager](#)

When upgrade bundles are available for your environment, a message is displayed on the SDDC Manager Dashboard. Available install bundles are displayed on the Bundle Management page.

- [Download Bundles With a Proxy Server](#)

If you do not have internet access, you can use a proxy server to download the LCM bundles. LCM only supports proxy servers that do not require authentication.

Download Bundles from SDDC Manager

When upgrade bundles are available for your environment, a message is displayed on the SDDC Manager Dashboard. Available install bundles are displayed on the Bundle Management page.

To download an install bundle, navigate to **Repository > Bundle Management** on the SDDC Manager Dashboard to view the available bundles. Then follow the instructions in step 4 below.

Prerequisites

Automatic polling of the manifest for bundles by SDDC Manager must be enabled (Default setting). If you have previously edited the application-prod.properties file on SDDC Manager VM to download upgrade bundles in an offline mode, you must edit it again before downloading bundles from SDDC Manager. Follow the steps below:

- 1 Using SSH, log in to the SDDC Manager VM with the following credentials:
Username: vcf
Password: use the password specified in the deployment parameter sheet
- 2 Enter su to switch to the root user.
- 3 Open the /opt/vmware/vcf/lcm/lcm-app/conf/application-prod.properties file.
- 4 Set lcm.core.enableManifestPolling=true.
- 5 Restart LCM service with the command below:

```
systemctl restart lcm
```

Procedure

- 1 Log in to your My VMware Account.

- a On the SDDC Manager Dashboard, click **Administration > Repository Settings**.
 - b Click **Authenticate**.

The My VMware Account Authentication page appears.

- c Type your user name and password.
 - d Click **Authorize**.
- 2 View available bundles by navigating to **Lifecycle Management > Bundle Management** on the SDDC Manager Dashboard.

The Bundles page displays the bundles available for download. The Bundle Details section displays the bundle version and release date.

If the bundle can be applied right away, the Bundle Details column displays the workload domains to which the bundle needs to be applied to, and the Availability column says Available. If another bundle needs to be applied before a particular bundle, the Availability field displays Future.

- 3 To view more information about the bundle, click **View Details**.

The Bundle Details section displays the bundle version, release date, and additional details about the bundle.

- 4 Click **Exit Details**.

- 5 Specify when to download the bundle.

- Click **Download Now** to start the download immediately.
- Click **Schedule Download** to set the date and time for the bundle download.

Results

The Download Status section displays the date and time at which the bundle download has been scheduled. When the download begins, the status bar displays the download progress.

Download Bundles With a Proxy Server

If you do not have internet access, you can use a proxy server to download the LCM bundles. LCM only supports proxy servers that do not require authentication.

Procedure

- 1 Using SSH, log in to the SDDC Manager VM with the user name vcf and password you specified in the deployment parameter sheet.
- 2 Type su to switch to the root account.
- 3 Open the /opt/vmware/vcf/lcm/lcm-app/conf/application-prod.properties file.
- 4 Update the following lines to the end of the file:

```
lcm.depot.adapter.proxyEnabled=true
lcm.depot.adapter.proxyHost=proxy IP address
lcm.depot.adapter.proxyPort=proxy port
```

- 5 Save and close the file.
- 6 Restart the LCM server by typing the following command in the console window:
`systemctl restart lcm`
- 7 Wait for 5 minutes and then download the bundles.

Offline Bundle Download for VMware Cloud Foundation

LCM polls the VMware depot to access update bundles. If you do not have internet connectivity in your VMware Cloud Foundation system, you can use the Bundle Transfer utility to manually download the bundles from the depot on your local computer and then upload them to SDDC Manager.

Prerequisites

Ensure you have access to a Windows or Linux computer with internet connectivity for downloading the bundles. The computer must have Java 8 or later.

Procedure

- 1 Using SSH, log in to the SDDC Manager VM with the user name vcf and password you specified in the deployment parameter sheet.
- 2 Change directories:

```
cd /opt/vmware/vcf/lcm/lcm-tools/bin
```

- 3 Download the required bundles using one of the commands below. For help on available options, type the following:

```
/opt/vmware/vcf/lcm/lcm-tools/bin/lcm-bundle-transfer-util --help
```

- Download all bundles for a release.

```
./lcm-bundle-transfer-util -download -outputDirectory Output-Dir -depotUser Username
-p releaseNumber
```

- Download a single bundle.

```
./lcm-bundle-transfer-util -download -outputDirectory Output-Dir -depotUser
Username -bundle bundle-name
```

- Download bundles by type (install or patch).

```
./lcm-bundle-transfer-util -download -outputDirectory Output-Dir -depotUser -
imageType INSTALL|PATCH
```

- Generate a marker file with all bundles that apply based on the software version in your environment.

```
./lcm-bundle-transfer-util --generateMarker
```

The marker file (named `markerFile`) is a JSON file that contains information on the current software versions running on SDDC Manager. It also contains the bundles IDs for bundles that were downloaded before this file was generated. The `markerFile.md5` contains the checksum for the markerFile. The output contains the directory where the marker file is generated.

- 4 Copy the `/opt/vmware/vcf/lcm/lcm-tools` directory, and the downloaded bundles (or marker file) from step 3 to a computer with internet access.

The `/opt/vmware/vcf/lcm/lcm-tools` directory includes the bundle transfer utility required for the next step.

- 5 On the computer with internet access, run the following command.

```
./lcm-bundle-transfer-util -download
    -outputDirectory ${absolute-path-output-dir}
    -depotUser ${depotUser}
    -markerFile ${absolute-path-markerFile}
    -markerMd5File ${absolute-path-markerFile.md5} -p ${vcf product version}
```

where

<i>absolute-path-output-dir</i>	Path to the directory where the bundle files are to be downloaded. This directory folder must have 777 permissions. If you do not specify the download directory, bundles are downloaded to the default directory with 777 permissions.
<i>depotUser</i>	User name for myVMware depot. You are prompted to enter the depot user password. If there are any special characters in the password, specify the password within single quotes.
<i>markerFile</i>	Absolute path to the marker file, as generated in the above step. This is required only if you generated a marker file in step 3. If you do not specify the path to the marker file, all update bundles on the depot are downloaded.
<i>markerMd5File</i>	Absolute path to the marker MD5 checksum file, as generated in the above step.

The utility generates a delta file (`deltaFileDownloaded`) in the download directory based on the software versions in the marker file and the update bundles available on the depot. The applicable bundles identified in the delta file are downloaded. Download progress for each bundle is displayed. Initially, only the SDDC Manager bundle will be available.

- 6 Copy the update bundle directory from the external computer to the SDDC Manager VM.

For example:

```
scp -pr /root/vcf372tovcf38Bundle vcf@SDDC_MANAGER_IP:/nfs/vmware/vcf/nfs-mount/
```

The `scp` command in the example above creates a directory named `vcf372tovcf38Bundle` in the `/nfs/vmware/vcf/nfs-mount/` directory.

- 7 In the SDDC Manager VM, change the ownership and permissions of the uploaded bundle.

```
chmod -R 0777 /nfs/vmware/vcf/nfs-mount/vcf372tovcf38Bundle
```

- 8 In the SDDC Manager VM, upload the bundle files to the internal LCM repository. You must upload the upgrade and install bundles.

```
cd /opt/vmware/vcf/lcm/lcm-tools/bin
./lcm-bundle-transfer-util -upload -bundleDirectory ${absolute-path-output-dir}
```

where *absolute-path-output-dir* is the directory where the bundle files have been uploaded, or `/nfs/vmware/vcf/nfs-mount/vcf372tovcf38Bundle` as shown in the previous step.

The utility uploads the bundles specified in the `deltaFileDownloaded` file. The console displays upload status for each bundle. Wait for all bundles to be uploaded before proceeding with the upgrade.

Download Specific Bundles

Bundle transfer utility is a command line tool used to identify bundles applicable to your environment, download the bundles from the VMware depot, and upload them to SDDC Manager.

Download Bundles for a Product Version

You can download bundles for a specific product version. Based on the command used, you can download only install bundles or both install and upgrade bundles.

Note The Bundle Transfer Utility and Skip Level Upgrade Tool is the only supported method for downloading bundles. Do not use third-party tools or other methods to download bundles.

- 1 Display the list of the applicable bundles along with the product version using the following command.

```
./lcm-bundle-transfer-util --depotUser ${depotUser} --listBundles --productVersion $
{product_version}
(OR)
./lcm-bundle-transfer-util -du ${depotUser} -l -p ${product_version}
```

For example:

Sample applicable bundle list

Below are applicable bundles:

```
*****
Bundle                Product Version      Bundle Size (in MB)  Patch/Install Softwares
*****
bundle-10668          3.7.1.0                432.0 MB             ESX_HOST-6.7.0-12871208-PATCH
*****
```

- 2 Download the applicable bundles based on the selected product version.

- Download applicable install bundles for the selected version.

```
./lcm-bundle-transfer-util --download --outputDirectory ${absolute-path-output-dir}
--depotUser ${depotUser} --productVersion ${product_version}
(OR)
./lcm-bundle-transfer-util -d -op ${absolute-path-output-dir} -du ${depotUser} -p $
{product_version}
```

For example, to download all the bundles released for the 3.10.1 version, run the tool as follows:

```
./lcm-bundle-transfer-util --download --depotUser 'test_depot_user@vmware.com'
--outputDirectory /Users/${userName}/downloadedBundle -p 3.10.1
```

- Download applicable install and update bundles for the selected version.

```
./lcm-bundle-transfer-util -download
-outputDirectory ${absolute-path-output-dir}
-depotUser ${depotUser}
-markerFile ${absolute-path-markerFile}
-markerMd5File ${absolute-path-markerFile.md5} -p ${product version}
```

3 Upload all the bundles specific to the product version.

```
./lcm-bundle-transfer-util --upload --bundleDirectory ${absolute-path-bundles-dir}
--productVersion ${product_version}
```

(OR)

```
./lcm-bundle-transfer-util --upload --bundleDirectory ${absolute-path-bundles-dir}
-p ${product_version}
```

For example, to upload all bundles released for the 3.10.1 version, run the tool as follows:

```
./lcm-bundle-transfer-util --upload --bundleDirectory
/nfs/vmware/vcf/nfs-mount/downloadedBundles -p 3.10.1
```

Download a Single Applicable Bundle

1 Download the single bundle.

```
./lcm-bundle-transfer-util --download --outputDirectory ${absolute-path-output-dir}
--depotUser ${depotUser} --bundle ${bundle_name}
```

(OR)

```
./lcm-bundle-transfer-util --download --outputDirectory ${absolute-path-output-dir}
--depotUser ${depotUser} -b ${bundle_name}
```

For example:

```
./lcm-bundle-transfer-util --download --outputDirectory
/nfs/vmware/vcf/nfs-mount/downloadedBundles
--depotUser 'test_depot_user@vmware.com' --bundle bundle-8203
```

2 Upload the single bundle to LCM.

```
./lcm-bundle-transfer-util --upload --bundleDirectory ${absolute-path-bundles-dir}
--bundle ${bundle_name}
```

(OR)

```
./lcm-bundle-transfer-util --upload --bundleDirectory ${absolute-path-bundles-dir}
-b ${bundle_name}
```

For example:

```
./lcm-bundle-transfer-util --upload --bundleDirectory
/nfs/vmware/vcf/nfs-mount/downloadedBundles -b bundle-8203
```

Note The above additional options can be run only on the SDDC Manager virtual machine. For these options on SDDC Manager, you should always run the tool as vcf user.

View Bundle Download History

The Bundle Download History page displays all bundles that have been downloaded.

Procedure

- ◆ In the SDDC Manager Dashboard, click **Repository > Bundle Management > Download History**.

All downloaded bundles are displayed. Click **View Details** to see bundle metadata details.

Upgrade Cloud Foundation

3

You can upgrade to VMware Cloud Foundation 4.1.0.1 or VMware Cloud Foundation 4.1.

Upgrades are applied on a workload domain basis. The management domain contains the core infrastructure, so you must upgrade the management domain before upgrading the other workload domains. You must upgrade all required components to keep your system in an optimum state.

This chapter includes the following topics:

- [Update Prerequisites](#)
- [Perform Update Precheck](#)
- [Upgrade to Cloud Foundation 4.1.0.1](#)
- [Upgrade to Cloud Foundation 4.1](#)
- [Skip-Level Upgrade](#)
- [Upgrade NSX-T Data Center](#)
- [Upgrade vCenter Server](#)
- [Upgrade ESXi](#)

Update Prerequisites

Ensure that the following prerequisites are met before starting an update.

- 1 Take a backup of the SDDC Manager VM. This is required since the SDDC Manager VM will be rebooted during the update.
- 2 Take a snapshot of relevant VMs in your management domain.
- 3 Do not run any domain operations while an update is in progress. Domain operations are creating a new VI domain, adding hosts to a cluster or adding a cluster to a workload domain, and removing clusters or hosts from a workload domain.
- 4 You must have downloaded the relevant bundles. See [Download Bundles](#).
- 5 Ensure that there are no failed workflows in your system and none of the Cloud Foundation resources are in activating or error state. If any of these conditions are true, contact VMware Support before starting the update.

- 6 Confirm that the passwords for all VMware Cloud Foundation components are valid.

Perform Update Precheck

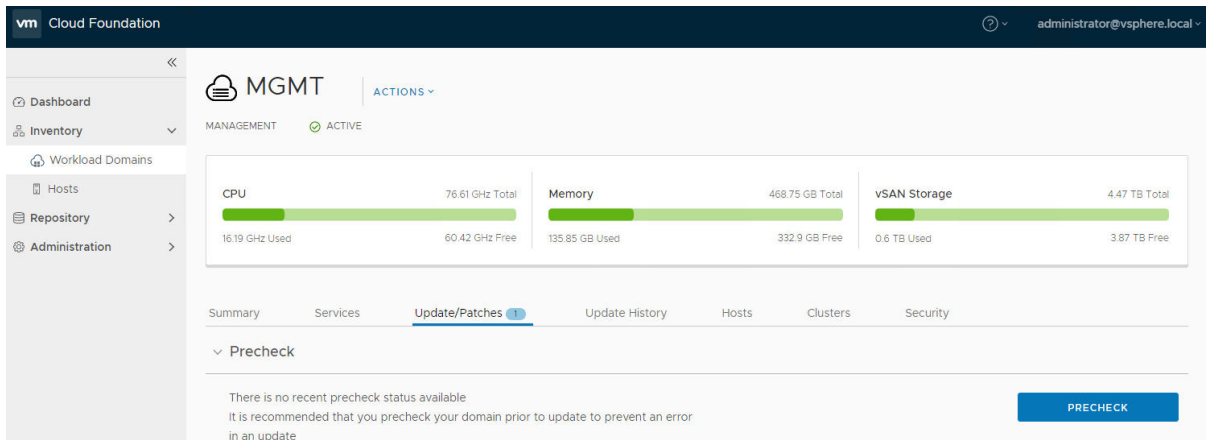
You must perform a precheck before applying a patch bundle to ensure that your environment is ready for the update. For an ESXi bundle, the system performs a bundle level precheck in addition to the environment precheck.

For VUM-based workload domains, the ESXi bundle precheck validates the following.

- Custom ISO is compatible with your environment.
- Custom ISO size is smaller than the boot partition size.
- Third party VIBs are compatible with the environment.

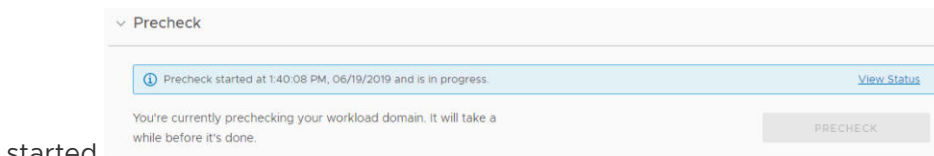
Procedure

- 1 Navigate to the Updates/Patches tab of the management domain or workload domain where you need to apply the bundle. The image below is a sample screenshot and may not reflect the correct product versions.



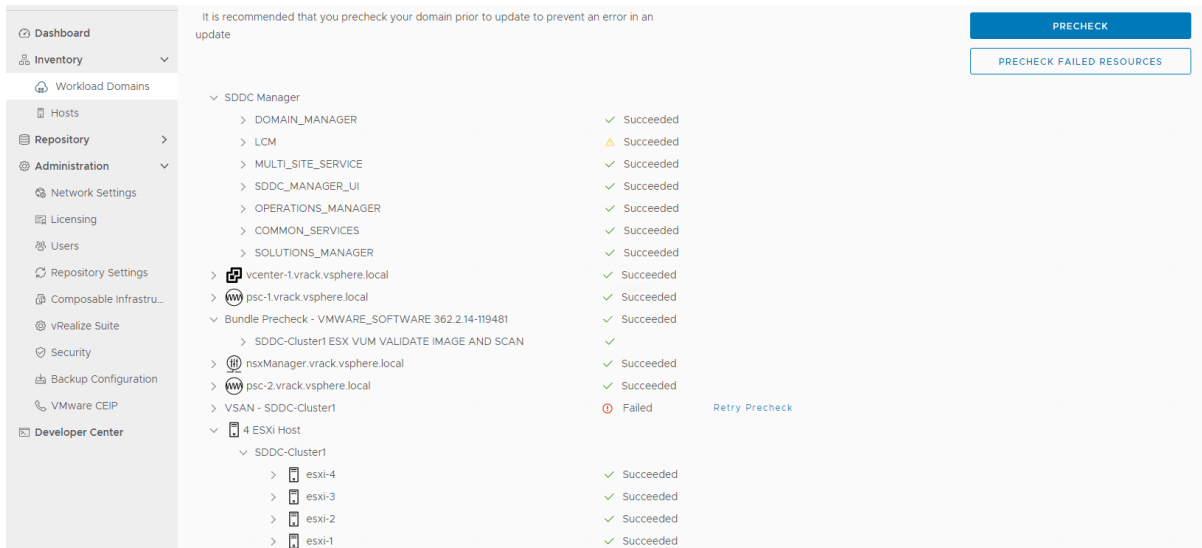
- 2 Click **Precheck** to validate that the environment is ready to be upgraded. If you run the precheck before upgrading ESXi and there are multiple ESXi bundles available (for example, during a cumulative upgrade), a dialog box appears asking you to select the bundle that you want to validate during the precheck.

Once the precheck begins, a message appears indicating the time at which the precheck was



started.

- 3 Click **View Status** to see detailed tasks and their status. The image below is a sample screenshot and may not reflect the correct versions.



- 4 To see details for a task, click the Expand arrow.

If a precheck task failed, fix the issue, and click **Retry Precheck** to run the task again. You can also click **Precheck Failed Resources** to retry all failed tasks.

If ESXi hosts display a driver incompatibility issue in a VUM-based workload domain update, perform the following steps:

- Identify the controller with the HCL issue.
- For the given controller, identify the supported driver and firmware versions on the source and target ESXi versions.
- Upgrade the firmware, if required.
- Upgrade the driver manually on the ESXi host and retry the task at which the upgrade failed.

For information on updating passwords, see "Updating SDDC Manager Passwords" in the *VMware Cloud Foundation Operations and Administration Guide*.

Results

The precheck result is displayed at the top of the Upgrade Precheck Details window. If you click **Exit Details**, the precheck result is displayed at the top of the Precheck section in the Updates/Patches tab.

Ensure that the precheck results are green before proceeding. A failed precheck may cause the update to fail.

Upgrade to Cloud Foundation 4.1.0.1

You can upgrade to VMware Cloud Foundation 4.1.0.1 only from VMware Cloud Foundation 4.1.

Upgrading to VMware Cloud Foundation 4.1.0.1 involves the following tasks.

- 1 Upgrade the management domain

Components in the management domain must be upgraded in the following order:

- a Cloud Foundation software. See [Apply Cloud Foundation Update Bundle](#).
- b ESXi. See [Upgrade ESXi](#).

- 2 Upgrade Workload Domains

Upgrade ESXi within each workload domain. See [Upgrade ESXi](#).

Upgrade to Cloud Foundation 4.1

You can perform a sequential upgrade to VMware Cloud Foundation 4.1 or a skip level upgrade.

For a sequential upgrade to VMware Cloud Foundation 4.1, your environment must be at VMware Cloud Foundation 4.0.1.1. You can perform a skip-level upgrade from an earlier version of VMware Cloud Foundation. See [Skip-Level Upgrade](#).

Upgrade the Management Domain to 4.1

You must upgrade the management domain before upgrading workload domains in your environment.

Components in the management domain must be upgraded in the following order:

- 1 SDDC Manager and VMware Cloud Foundation services. See [Upgrade Cloud Foundation Software](#).
- 2 vRealize Suite Lifecycle Manager. See [Upgrade vRealize Suite Lifecycle Manager](#).
- 3 vRealize Suite products.
- 4 NSX-T Data Center. See [Upgrade NSX-T Data Center](#).
- 5 vCenter Server and Platform Services Controllers. See [Upgrade vCenter Server](#).
- 6 ESXi. See [Upgrade ESXi](#).

Upgrade Cloud Foundation Software

To upgrade to VMware Cloud Foundation 4.1 from VMware Cloud Foundation 4.0.1.1, you apply two bundles to the management domain.

The bundles upgrade the following components:

- The VMware Cloud Foundation Update bundle upgrades SDDC Manager, LCM, and VMware Cloud Foundation services.
- The Configuration Drift bundle applies configuration drift on software components.

Apply Cloud Foundation Update Bundle

The VMware Cloud Foundation Update bundle upgrades LCM and VMware Cloud Foundation services.

Prerequisites

Download the bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the Updates/Patches tab of the management domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the VMware Cloud Foundation Update bundle.
- 4 If you selected **Schedule Update**, select the date and time for the bundle to be applied.

Schedule Update
×

The bundle will be scheduled based on your selected date and time.

Date

Time

CANCEL
SCHEDULE

The Cloud Foundation Update Status window displays the components that will be upgraded and the upgrade status. Click **View Update Activity** to view the detailed tasks.

After the upgrade is completed, a green bar with a check mark is displayed.

VMware Cloud Foundation Update Status

VMware Cloud Foundation Update 4.1.0.0
FINISH

Released 10/06/2020 11 GB
This VMware Cloud Foundation Upgrade 4.0.1.1 to 4.1.0.0 contains features, critical bugs and security fixes. For more information, see <https://docs.vmware.com/en/VMware-Cloud-Foundation/4.1/en/VMware-Cloud-Foundation-41-Release-Notes.html>

Update applied at 12:00 PM, 09/09/2020 - Elapsed Time : 01 hour 09 minutes 43 seconds
VIEW UPDATE ACTIVITY

<div> <div>SDCC MANAGER</div> <div> COMMON SERVICES OPERATIONS MANAGER DOMAIN MANAGER SDCC MANAGER UI LCM MULTI SITE SERVICE THIRD PARTY </div> </div>	<div> <div>Updated</div> <div>Updated</div> <div>Updated</div> <div>Updated</div> <div>Updated</div> <div>Updated</div> <div>Updated</div> <div>Updated</div> </div>	<div> <div>4.0.1.1-16662000</div> <div>→</div> <div>4.1.0.0-16851067</div> </div>
--	--	---

- 5 Click **Finish**.

What to do next

- If you are upgrading to VMware Cloud Foundation 4.1.0.1, see [Upgrade to Cloud Foundation 4.1.0.1](#).

- If you are upgrading to VMware Cloud Foundation 4.1, apply the Configuration Drift bundle. See [Apply Configuration Drift Bundle](#).

Apply Configuration Drift Bundle

The configuration drift bundle applies configuration changes required for 2nd party software components in the VMware Cloud Foundation Bill of Materials for the target release. Configuration changes are applied to the management domain and may also affect workload domains in your environment. However, there is no downtime on workload domains and they need not be in a maintenance window.

Prerequisites

You must have downloaded the configuration drift bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the Updates/Patches tab of the management domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the VMWare Cloud Foundation Configuration drift bundle.
- 4 If you selected **Schedule Update**, select the date and time for the bundle to be applied.
After the upgrade is completed, a green bar with a check mark is displayed.
- 5 Click **Finish**.

What to do next

Continue upgrading the management domain.

- For VMware Cloud Foundation 4.1.0.1, see [Upgrade to Cloud Foundation 4.1.0.1](#).
- For VMware Cloud Foundation 4.1, see [Upgrade the Management Domain to 4.1](#).

Upgrade vRealize Suite Lifecycle Manager and vRealize Suite Products

Depending on your pre-upgrade environment, follow the steps in this section to upgrade vRealize Suite products for VMware Cloud Foundation version 4.1.

Prepare for Upgrading vRealize Suite Products

VMware Cloud Foundation version 4.1 introduces the vRealize Suite Lifecycle Manager in VMware Cloud Foundation mode to deploy and manage vRealize Suite products. If you deployed vRealize Suite products manually in your pre-upgrade VMware Cloud Foundation environment, you must import vRealize Suite configuration and objects to VMware Cloud Foundation before starting the upgrade process.

Procedure

1 Retrieve the following objects names.

- Name of the standalone tier-1 router that was deployed for load-balancing the deployed vRealize products
- Name of the load balancer configured on the tier-1 router for vRealize products
- Interface name of the standalone tier-1 router, attached to the X-Region network
- Edge cluster name. This is required only if vRealize Suite products were deployed on VLAN instead of VXLAN-based AVNs

2 Import these object names to SDDC Manager.

- a Using SSH, log in to the SDDC Manager VM with the following credentials.

User name: vcf

Password: use the password specified in the deployment parameter workbook

- b Type `su` to switch to the root user.
- c Navigate to the `/opt/vmware/vcf/domainmanager/config` directory.
- d Edit the `application-prod.properties` file and replace parameter values with the object names you retrieved in step 1.

```
override.tier.interface.name=interface name of tier-1 router
default.standalone.t1.name=standalone tier-1 router name
vcf.vrealize.lb.name=load balancer on tier-1 router
```

- e Restart domain manager:

```
systemctl restart domainmanager
```

- 3 If the vRealize products in your pre-upgrade environment are deployed on a VLAN-backed network instead of application virtual networks (AVNs), you must import the VLAN networks to the AVN inventory. For more information, see [KB article 80864](#).
- 4 Download install bundles for the vRealize Suite products in your pre-upgrade environment. See [Install Bundles](#) . Install bundles are required for connecting the products to the management domain.
- 5 Delete manually configured adapters in vRealize Operations for vCenter Server, vSAN, vRealize Log Insight, vRealize Automation or cross-region instance of Workspace One.
vRealize Operations adapters are configured by SDDC Manager during the import process.
- 6 If you have vRealize Log Insight in your pre-upgrade environment, remove the syslog servers configured in NSX-T Managers.

Results

SDDC Manager is now aware of vRealize Suite products and their configuration in your environment.

What to do next

Upgrade vRealize Suite Lifecycle Manager

Upgrade vRealize Suite Lifecycle Manager

The upgrade vRealize Suite Lifecycle Manager process deploys a new appliance, the vRealize Suite Lifecycle Manager in VMware Cloud Foundation mode. After the new appliance is up and running, the old appliance is deleted.

For information on vRealize Suite Lifecycle Manager in VMware Cloud Foundation mode, refer to the *VMware Cloud Foundation Operations and Administration Guide*. The vRealize Suite Lifecycle Manager upgrade bundle needs to be applied only to the management domain. During the upgrade process, the old vRealize Suite Lifecycle Manager VM is powered off and renamed (the backup prefix is added to the VM name). The new appliance VM is then deployed with the same name. The FQDN, IP address, DNS, NTP, and password of the old VM are carried over to the new VM.

Prerequisites

Download the vRealize Suite upgrade bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the **Updates/Patches** tab of the management domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the vRealize Suite Lifecycle Manager upgrade bundle.
- 4 If you selected **Schedule Update**, click the date and time for the bundle to be applied.

The vRealize Suite Lifecycle Manager upgrade begins.

- 5 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).

If the upgrade fails, you can delete the new VM and rename the old VM to its original name. After you resolve the issue, you can retry the upgrade.

When vRealize Suite Lifecycle Manager is upgraded successfully, a message with a green background and check mark is displayed.

- 6 Click **Finish**.

A new user (vcfadmin@local) is created for the vRealize Suite Lifecycle Manager in VMware Cloud Foundation mode appliance. Your old password is preserved.


What to do next

Import Workspace ONE Access and the vRealize Suite products from your pre-upgrade environment to vRealize Suite Lifecycle Manager. See [Import Workspace ONE Access and vRealize Suite Products](#).

Import Workspace ONE Access and vRealize Suite Products

After vRealize Suite Lifecycle Manager has been upgraded, you must import Workspace ONE Access and the vRealize Suite products from your pre-upgrade environment to vRealize Suite Lifecycle Manager.

Procedure

- 1 From the navigation bar in SDDC Manager, click vRealize Suite.
- 2 Click  next to vRealize Suite Lifecycle Manager.
vRealize Suite Lifecycle Manager opens in a new tab.
- 3 Login with the following credentials:
User name: vcfadmin@local
Password: password you specified in the vRealize Suite Lifecycle Manager deployment wizard.
- 4 Navigate to **Lifecycle Operations > Create Environment**.
- 5 A default name appears for your environment. You can overwrite the default name.
- 6 Enter the administrator email and default password for the environment.
- 7 Select the datacenter created by SDDC Manager (**SDDC-Datacenter**) and click **Next**.
- 8 On the Select Product page, set the **Installation Type** to **Import** and select the checkbox next to VMware Identity Manager.
- 9 Click **Next**.
- 10 On the Import Identity Manager page, enter the load-balancer FQDN, API and root passwords, and the default password for the environment.
- 11 Enter the email for the configuration administrator.
- 12 User name/password
- 13 Select the vCenter Server and click **Next**
- 14 Review the summary and click **Submit**.
After the FQD and passwords are validated, Workspace ONE Access is imported to vRealize Suite Lifecycle Manager.
- 15 If you had vRealize Automation or vRealize Operations in your pre-upgrade environment, follow steps 8-10 to import these products to vRealize Suite Lifecycle Manager.

What to do next

If you had vRealize Automation or vRealize Operations in your pre-upgrade environment, upgrade these products. Refer to [Upgrade vRealize Automation](#) and [Upgrade vRealize Operations](#). If you have both products, upgrade vRealize Automation before vRealize Operations.

Upgrade vRealize Automation

If you had vRealize Automation in your pre-upgrade environment, you must upgrade it.

Prerequisites

Download the vRealize Automation upgrade bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the **Updates/Patches** tab of the management domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the vRealize Automation bundle.
- 4 If you selected **Schedule Update**, select the date and time for the bundle to be applied.
After the upgrade is completed, a green bar with a check mark is displayed.
- 5 Click **Finish**.

What to do next

Upgrade the management domain. See [Upgrade the Management Domain to 4.1](#).

Upgrade vRealize Operations

If you had vRealize Operations in your pre-upgrade environment, you must upgrade it.

Prerequisites

Download the vRealize Operations upgrade bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the **Updates/Patches** tab of the management domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the vRealize Operations bundle.
- 4 If you selected **Schedule Update**, select the date and time for the bundle to be applied.
After the upgrade is completed, a green bar with a check mark is displayed.
- 5 Click **Finish**.

What to do next

Continue upgrading the management domain. See [Upgrade the Management Domain to 4.1](#).

Upgrade Workload Domains to 4.1

The management domain in your environment must be upgraded before you upgrade a workload domain.

Within a workload domain, components must be upgraded in the following order.

- 1 NSX-T. See [Upgrade NSX-T Data Center](#).
- 2 vCenter Server and Platform Services Controllers. See [Upgrade vCenter Server](#).
- 3 ESXi. See [Upgrade ESXi](#).

Post Upgrade Steps for NFS-Based Workload Domains

After upgrading workload domains, you must add a static route for hosts to access NFS storage over the NFS gateway. This process must be completed before expanding the workload domain.

- 1 Identify the IP address NFS server for the workload domain.
- 2 Identify the network pool associated with the hosts in the cluster and the NFS gateway for the network pool.
 - a Log in to SDDC Manager.
 - b Click **Inventory > Workload Domains** and then click the workload domain you are performing the post upgrade steps on.
 - c Click the **Clusters** tab and then click an NFS-based cluster.
 - d Click the **Hosts** tab and note down the network pool for the hosts.
 - e Click the Info icon next to the network pool name and note down the NFS gateway.
- 3 Ensure that the NFS server is reachable from the NFS gateway. If a gateway does not exist, create it.
- 4 Identify the vmknics on each host in the cluster that is configured for NFS traffic.
- 5 Configure a static route on each host to reach the NFS server from the NFS gateway.


```
esxcli network ip route ipv4 add -g NFS-gateway-IP -n NFS-gateway
```
- 6 Verify that the new route is added to the host using the NFS vmknics


```
esxcli network ip route ipv4 list
```
- 7 Ensure that the hosts in the NFS cluster (nfs-cluster-1) can reach the NFS gateway (10.0.24.1) through the NFS vmkernel (vmk2) using the vmkping command.


```
vmkping -4 -I vmk2 -s 1470 -d -W 5 10.0.22.250
```
- 8 Repeat steps 2 through 7 for each cluster using NFS storage.

Skip-Level Upgrade

You can use the skip-level upgrade tool to upgrade to VMware Cloud Foundation 4.1.

The skip-level upgrade tool supports upgrading SDDC Manager and its services to VMware Cloud Foundation 4.1 from any of the following releases:

- VMware Cloud Foundation 4.0
- VMware Cloud Foundation 4.0.0.1
- VMware Cloud Foundation 4.0.1

The process involves downloading and applying multiple upgrade bundles as part of a single task. Once SDDC Manager and its services are at the correct version for VMware Cloud Foundation 4.1, you can apply updates to the other VMware Cloud Foundation components. Some components require only a single bundle to update to the latest software version:

- vCenter Server
- ESXi
- NSX-T Data Center

Other components may require multiple bundles:

- vRealize Suite components

Perform an Online Skip-Level Upgrade

If the computer on which you install the skip level upgrade tool has access to depot.vmware.com, you can perform an online skip-level upgrade to update SDDC Manager and its services to the correct version for VMware Cloud Foundation 4.1.

The skip-level upgrade tool downloads the bundles required to upgrade SDDC Manager and its services and applies those bundles to achieve the target version. It downloads, but does not apply, the bundles required to upgrade the other VMware Cloud Foundation components. You can apply those bundles from the SDDC Manager UI once SDDC Manager and its services are upgraded.

Note The skip-level upgrade tool does not download bundles for the vRealize suite components.

For information about which versions of VMware Cloud Foundation support skip-level upgrades, see [Skip-Level Upgrade](#).

For complete usage information for the VMware Cloud Foundation SDDC Skip-Level Upgrade Tool command line interface (CLI), see [Skip-Level Upgrade Tool CLI](#).

Prerequisites

The SDDC Manager skip-level upgrade tool is a CLI-based tool with support for both Windows and Linux platforms. You must have a Windows or Linux computer that meets the following requirements:

- Java 8 runtime environment, update 261 or later.
- Connectivity to depot.vmware.com.
- Connectivity to SDDC Manager over SSH and HTTPS.
- Free Space of 100 GB.

Additional prerequisites:

- Take a snapshot of the SDDC Manager VM. The skip-level upgrade tool takes this snapshot by default, unless you choose to skip it.
- Take a snapshot of the management VMs.
- Do not run any domain operations while an upgrade is in progress. Domain operations are creating a new VI domain, adding hosts to a cluster or adding a cluster to a workload domain, and removing clusters or hosts from a workload domain.
- Ensure that there are no failed workflows in your system and none of the Cloud Foundation resources are in activating or error state. If any of these conditions are true, contact VMware Support before starting the upgrade.
- Confirm that the passwords for all Cloud Foundation components are valid. Keep a record of the passwords in a secure location.

Procedure

- 1 Download the Bundle Transfer Utility for VMware Cloud Foundation 4.1 from [My VMware](#) to the Windows or Linux computer.
- 2 Extract the file `lcm-tools-prod.tar.gz`.
- 3 (Optional) To use a proxy server with the skip-level upgrade tool:

Note The skip-level upgrade tool only supports proxy servers that do not require authentication.

- a Open the `/conf/application-skiplevelupgrade.properties` file.
- b Modify the **Depot proxy properties** section:

```
lcm.depot.adapter.proxyEnabled=true
lcm.depot.adapter.proxyHost=<proxy IP address or FQDN>
lcm.depot.adapter.proxyPort=<proxy port>
```

- 4 Open a command line utility, change to the bin directory that contains the executables, and execute the following command:

For Windows:

```
sddcmanager-skip-level-upgrade.bat -d -u
```

For Linux:

```
./sddcmanager-skip-level-upgrade -d -u
```

- 5 Enter the following information:

- Fully-qualified domain name (FQDN) of the SDDC Manager VM
- SDDC Manager super user name (primary user), for example: **vcf**.
- SDDC Manager REST API user name (basic auth user), for example: **admin**.
- Password for the primary user.
- Password for the root user.
- Password for the basic auth user.
- VMware Depot (My VMware) username.
- VMware Depot (My VMware) password.
- Local directory for downloaded bundles.
- SDDC Manager VM Temporary IP (with gateway and subnet). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- Super user (primary user) name and password for new SDDC Manager VM (target VM). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- Root user password for the new SDDC Manager VM (target VM). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- REST API user (basic auth user) password for new SDDC Manager VM. This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.

When the upgrade is complete, you will see a message similar to the following:

```
2020-05-15 23:11:58.561-0800 INFO Successfully applied all required bundles
2020-05-15 23:11:58.561-800 INFO Enable VMWARE_SOFTWARE cumulative upgrade to VCF 4.1
2020-05-15 23:13:14.742-0800 INFO SDDC Manager skip level upgrade completed with success
```

What to do next

Upgrade the other VMware Cloud Foundation components required for VMware Cloud Foundation 4.1. The components that you need to upgrade and the order in which you upgrade them will vary based on the version of VMware Cloud Foundation from which you are upgrading.

- vCenter Server
- ESXi
- NSX-T Data Center
- vRealize Suite components

Note The skip-level upgrade tool does not download bundles for the vRealize suite components. To upgrade vRealize Suite components, see [Upgrade vRealize Suite Lifecycle Manager and vRealize Suite Products](#).

Perform an Offline Skip-Level Upgrade

If the computer on which you install the skip-level upgrade tool does not have access to depot.vmware.com, you can perform an offline skip-level upgrade to update SDDC Manager and its services to the correct version for VMware Cloud Foundation 4.1.

For information about which versions of VMware Cloud Foundation support skip-level upgrades, see [Skip-Level Upgrade](#).

Use the table below to determine which bundles you need to download based on the VMware Cloud Foundation version you are starting from.

Bundle ID	4.0	4.0.0.1	4.0.1.1
bundle-24282	✓		
bundle-25558	✓	✓	
bundle-25559	✓	✓	
bundle-27565	✓	✓	✓
bundle-30441	✓	✓	✓
bundle-30442	✓	✓	✓
bundle-29985	✓	✓	✓
bundle-29651	✓	✓	✓
bundle- 29988	✓	✓	✓

For example, if you are doing a skip-level upgrade from VMware Cloud Foundation 4.0.0.1 to 4.1, you would download the following bundles:

- bundle-25558
- bundle-25559
- bundle-27565
- bundle-30441
- bundle-30442
- bundle-29985
- bundle-29651
- bundle- 29988

For complete usage information for the VMware Cloud Foundation SDDC Skip-Level Upgrade Tool command line interface (CLI), see [Skip-Level Upgrade Tool CLI](#).

Prerequisites

The SDDC Manager skip-level upgrade tool is a CLI-based tool with support for both Windows and Linux platforms. You must have a Windows or Linux computer that meets the following requirements:

- Java 8 runtime environment, update 261 or later.
- Connectivity to SDDC Manager over SSH and HTTPS.
- Free Space of 100 GB.

Additional prerequisites:

- Take a snapshot of the SDDC Manager VM. The skip-level upgrade tool takes this snapshot by default, unless you choose to skip it.
- Take a snapshot of the management VMs.
- Do not run any domain operations while an upgrade is in progress. Domain operations are creating a new VI domain, adding hosts to a cluster or adding a cluster to a workload domain, and removing clusters or hosts from a workload domain.
- Ensure that there are no failed workflows in your system and none of the Cloud Foundation resources are in activating or error state. If any of these conditions are true, contact VMware Support before starting the upgrade.
- Confirm that the passwords for all Cloud Foundation components are valid. Keep a record of the passwords in a secure location.

You must have a computer that can access depot.vmware.com to download the upgrade bundles. Once you download the upgrade bundles, you copy them to the computer that has the skip-level upgrade tool.

Procedure

- 1 Download the Bundle Transfer Utility for VMware Cloud Foundation 4.1 from [My VMware](#) to a computer that can access depot.vmware.com.
- 2 Extract the file `lcm-tools-prod-new.tar.gz`.
- 3 Open a command line utility, change to the `bin` directory that contains the executables, and run the following command for each bundle you need to download:

```
./lcm-bundle-transfer-util --op <download directory> -d --du <my.vmware.com registered user ID/
name> -b <bundle-ID>
```

For example:

```
./lcm-bundle-transfer-util --op C:\Users\Administrator\Download\bundles -d --du
ffirth@rainpole.com -b bundle-8203
```

- 4 Enter your My VMware password when prompted.
- 5 Once you have downloaded all the bundles, copy them to the Windows or Linux machine from which you will run the skip-level upgrade.

Copy all the files for each bundle (`.tar`, `.manifest`, and `.manifest.sig`) to a single directory. For example, `C:\Users\Administrator\Downloads\downloaded_bundles`. You will need this location in step 8.

Note Do not change any of the file names.

- 6 Copy the folder `lcm-tools-prod` to the Windows or Linux machines.
- 7 Open a command line utility, change to the `bin` directory in `lcm-tools-prod`, and run the following command:

For Windows:

```
sddcmanager-skip-level-upgrade.bat -d -u
```

For Linux:

```
./sddcmanager-skip-level-upgrade -d -u
```

- 8 Enter the following information:
 - Fully-qualified domain name (FQDN) of the SDDC Manager VM.
 - SDDC Manager super user name (primary user), for example: **vcf**.
 - SDDC Manager REST API user name (basic auth user), for example: **admin**.
 - Password for the primary user.
 - Password for the root user.
 - Password for the basic auth user.

- Local directory for downloaded bundles. This is the location to which you copied the bundles in step 5.
- SDDC Manager VM Temporary IP (with gateway and subnet). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- Super user (primary user) name and password for new SDDC Manager VM (target VM). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- Root user password for the new SDDC Manager VM (target VM). This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.
- REST API user (basic auth user) password for new SDDC Manager VM. This may not be required depending on the version of VMware Cloud Foundation from which you are upgrading.

Results

When the upgrade is complete, you will see a message similar to the following:

```
2020-05-15 23:11:58.561-0800 INFO Successfully applied all required bundles
2020-05-15 23:11:58.561-800 INFO Enable VMWARE_SOFTWARE cumulative upgrade to VCF 4.1
2020-05-15 23:13:14.742-0800 INFO SDDC Manager skip level upgrade completed with success
```

What to do next

Upgrade the other VMware Cloud Foundation components required for VMware Cloud Foundation 4.1. The components that you need to upgrade and the order in which you upgrade them will vary based on the version of VMware Cloud Foundation from which you are upgrading.

- vCenter Server
- ESXi
- NSX-T Data Center
- vRealize Suite components

Note The skip-level upgrade tool does not download bundles for the vRealize suite components. To upgrade vRealize Suite components, see [Upgrade vRealize Suite Lifecycle Manager and vRealize Suite Products](#).

Skip-Level Upgrade Tool CLI

This section provides usage information for the VMware Cloud Foundation SDDC Skip-Level Upgrade Tool command line interface (CLI).

-d,--download-bundles	Download and copy required bundles to the specified directory on SDDC Manager VM. Use the -d option by itself to download required bundles without performing skip level upgrade. Combine the -d and -u options to download the required bundles and then perform skip level upgrade.
-e,--enable-cumulative-upgrades	Enable VMware software cumulative upgrades. Use only -e option to enable VMware software cumulative upgrades on a Cloud Foundation environment that is already at the target version. -e is a standalone option, it cannot be combined with any other option.
-h,--help	Help.
-p,--skip-prevalidation	Skip pre-validation before upgrade.
-s,--skip-snapshot	Skip creating a snapshot of the SDDC Manager VM before upgrade.
-u,--perform-upgrade	Perform SDDC Manager skip level upgrade. Use the -u option by itself to perform skip level upgrade if all required bundles are already downloaded. Combine the -d and -u options to download the required bundles and then perform skip level upgrade.
-v,--version	Version of the skip-level upgrade tool.

Upgrade NSX-T Data Center

Upgrade NSX-T Data Center in the management domain before you upgrade VI workload domains.

Upgrading NSX-T Data Center involves the following components:

- Upgrade Coordinator
- Edge clusters (if deployed)
- Host clusters
- NSX Manager cluster

NSX-T VI workload domains can share the same NSX Manager cluster and NSX Edge clusters. When you upgrade these components for one NSX-T VI workload domain, they are upgraded for all NSX-T VI workload domains that share the same NSX Manager or NSX Edge cluster. You cannot perform any operations on the NSX-T workload domains while NSX-T is being upgraded.

The upgrade wizard provides some flexibility when upgrading NSX-T Data Center for VUM-based workload domains. By default, the process upgrades all Edge clusters in parallel, and then all host clusters in parallel. Parallel upgrades reduce the overall time required to upgrade your environment. You can also choose to upgrade Edge clusters and host clusters sequentially. For vLCM-based workload domains, all Edge clusters and hosts clusters are upgraded sequentially.

If you have multiple Edge or host clusters in an NSX-T workload domain, you can select which clusters to upgrade. The ability to select clusters allows for multiple upgrade windows and does not require all clusters to be available at a given time.

Note The NSX Manager cluster is not upgraded until all host clusters in the workload domain are upgraded. New features introduced in the upgrade are not configurable until the NSX Manager cluster is upgraded.

Prerequisites

- Download the NSX-T Data Center upgrade bundle. See [Download Bundles](#).
- Use the vSphere Client to check for and resolve any active alarms on hosts in the host clusters that you are upgrading.

Procedure

- 1 Navigate to the **Updates/Patches** tab of the management domain or a workload domain.

You must upgrade the management domain before upgrading workload domains.

When you upgrade NSX-T components for a selected workload domain, those components are upgraded for all NSX-T VI workload domains that share the NSX Manager cluster.

- 2 Run the upgrade precheck. See [Perform Update Precheck](#).

The NSX-T precheck is run on all NSX-T workload domains in your environment that share the NSX Manager cluster.

- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the VMware Software NSX-T bundle.

The Schedule Update dialog box appears.

- 4 Select the NSX-T Edge clusters to be upgraded.

By default, all Edge clusters are upgraded. To select specific Edge clusters, click **Enable edge selection**. To upgrade only the Edge clusters, select **Upgrade NSX-T Edge clusters only**.

- 5 Click **Next**.

- 6 Select the NSX-T host clusters to be upgraded.

If you want to upgrade all host clusters across all workload domains, enable the **Upgrade all host clusters** setting.

Note Host clusters are upgraded after all Edge clusters have been upgraded.

- 7 Click **Next**.

- 8 Select the upgrade options. This option applies to VUM-based workload domains only.

By default, VUM-based workload domains upgrade Edge clusters and host clusters in parallel.

Option	Description
Enable sequential upgrade of NSX-T Edge clusters	Upgrades Edge clusters sequentially, instead of in parallel.
Enable sequential upgrade of NSX-T hosts clusters	Upgrades host clusters sequentially, instead of in parallel.

These options are not available for vLCM-based workload domains, where Edge clusters and host clusters are upgraded sequentially.

- 9 If you had selected the **Schedule Upgrade** option, specify the date and time for the NSX-T bundle to be applied.

- 10 Click **Next**.

- 11 Review the settings and click **Finish**.

The NSX-T upgrade begins and the upgrade components are displayed. The upgrade view displayed here pertains to the workload domain where you applied the bundle. Click the link to the associated workload domains to see the components pertaining to those workload domains.

- 12 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).

If a component upgrade fails, the failure is displayed across all associated workload domains. Resolve the issue and retry the failed task.

Results

When all NSX-T components are upgraded successfully, a message with a green background and check mark is displayed.

What to do next

- If you are upgrading the management domain, see [Upgrade the Management Domain to 4.1](#) for information on the next component to be upgraded.
- If you are upgrading a workload domain, see [Upgrade Workload Domains to 4.1](#) for information on the next component to be upgraded.

Upgrade vCenter Server

The vCenter bundle upgrades vCenter Server. Upgrade the management domain before upgrading any workload domains.

Prerequisites

Download the VMware vCenter upgrade bundle. See [Download Bundles](#).

Procedure

- 1 Navigate to the **Updates/Patches** tab of the domain you are upgrading.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** next to the vCenter upgrade bundle.
- 4 If you selected **Schedule Update**, click the date and time for the bundle to be applied.
- 5 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).

If a component upgrade fails, the failure is displayed across all associated workload domains. Resolve the issue and retry the failed task.

What to do next

- If you are upgrading the management domain, see [Upgrade the Management Domain to 4.1](#) for information on the next component to be upgraded.
- If you are upgrading a workload domain, see [Upgrade Workload Domains to 4.1](#) for information on the next component to be upgraded.

Upgrade ESXi

By default, the upgrade process upgrades the ESXi hosts in all clusters in a domain in parallel. If you have multiple clusters in the management domain or in a VI workload domain, you can select which clusters to upgrade. You can also choose to update the clusters in parallel or sequentially.

If you want to skip any hosts while applying an ESXi update to the management domain or a VI workload domain, you must add these hosts to the `application-prod.properties` file before you begin the update. See [Chapter 5 Skip Hosts During ESXi Update](#).

To perform ESXi upgrades with custom images and async drivers, see [Chapter 4 Upgrade ESXi with Custom ISO or Async Drivers](#).

If you are using external (non-vSAN) storage, the following procedure updates the ESXi hosts attached to the external storage. However, updating and patching the storage software and drivers is a manual task and falls outside of SDDC Manager lifecycle management. To ensure supportability after an ESXi upgrade, consult the vSphere HCL and your storage vendor.

Prerequisites

- Download the ESXi bundle. See [Download Bundles](#).
- Ensure that the domain for which you want to perform cluster-level upgrade does not have any hosts or clusters in an error state. Resolve the error state or remove the hosts and clusters with errors before proceeding.

- For clusters in a vSphere Lifecycle Manager (vLCM)-enabled workload domain, you must have a cluster image set up that includes the ESXi version that you want to upgrade to. The ESXi version must match the version in the bundle you downloaded. See [Cluster Image Management](#).
- To add or upgrade the firmware on clusters in a vLCM-enabled workload domain, you must have the vendor Hardware Support Manager installed. See [Adding Firmware and Components to a Cluster Image](#).

Procedure

- 1 Navigate to the **Updates/Patches** tab of the domain.
- 2 Run the upgrade precheck. See [Perform Update Precheck](#).
- 3 In the Available Updates section, click **Update Now** or **Schedule Update** for the ESXi bundle.
- 4 If you selected **Schedule Update**, specify the date and time for the bundle to be applied.
- 5 Select the clusters to upgrade and click **Next**.

The default setting is to upgrade all clusters. To upgrade specific clusters, click **Enable cluster-level selection** and select the clusters to upgrade.

You can upgrade a maximum of five clusters in parallel. If you select more than five clusters, the additional clusters are upgraded sequentially.

- 6 If you are upgrading a vLCM-enabled VI workload domain, the **Assign Images** tab appears.
 - a In Step 1, select one or more clusters. If you select multiple clusters, they must include hosts from the same vendor.

Schedule Update

- 1 Select Clusters
- 2 Assign Images
- 3 Schedule Update
- 4 Review

Assign Images

Select clusters to apply images and firmware/driver addons. All Clusters must be assigned a new image before proceeding.

You must assign a cluster image to all selected clusters before proceeding.

Step 1 Select a cluster or multiple clusters of the same vendor to assign a cluster image.

Selected Clusters	Target Image	Hardware Vendor	Current HSP	Target HSP
<input checked="" type="checkbox"/> SDDC-Cluster1		com.dell.plugin.Open Manager_HWSupport Manager	System Update 2019-06 - 2.3.2-0	

☒ 1 Cluster per page 10 1 - 10 of 0 cluster

Step 2 Select a cluster image to assign to the selected clusters. If there are no applicable cluster images, go to Image Management to import or create a new cluster image.

Cluster Image Select Cluster Image

APPLY IMAGE

- b In Step 2, select the image to be assigned to the selected clusters. The ESXi version, vendor add-ons, components, and Firmware and Drivers Addons for the selected image are displayed.

Schedule Update

- 1 Select Clusters
- 2 Assign Images
- 3 Schedule Update
- 4 Review

Assign Images

Select clusters to apply images and firmware/driver addons. All Clusters must be assigned a new image before proceeding.

You must assign a cluster image to all selected clusters before proceeding.

Step 1 Select a cluster or multiple clusters of the same vendor to assign a cluster image.

Selected Clusters	Target Image	Hardware Vendor	Current HSP	Target HSP
<input checked="" type="checkbox"/> SDDC-Cluster1		com.dell.plugin.Open Manager_HWSupport Manager	System Update 2019-06 - 2.3.2-0	

☒ 1 Cluster per page 10 1 - 10 of 0 cluster

Step 2 Select a cluster image to assign to the selected clusters. If there are no applicable cluster images, go to Image Management to import or create a new cluster image.

Cluster Image Personality1

Firmware and Drivers Addon (Optional) Select Firmware and Drivers Addon

ESXi Version
7.0.0-15384316

Vendor Addon
esx-no-tools-1

Components
2 Components
[Show Details](#)

Firmware/Driver Addon
No Firmware Addon

- c Select the Firmware and Drivers Addon for the selected clusters (optional).

Note that the cluster image is not updated with the firmware.

- d Click **Apply Image** and then click **Next**.

7 Select the upgrade options and click **Next**.

By default, all clusters are upgraded in parallel. To upgrade clusters sequentially, select **Enable sequential cluster upgrade**.

Click **Enable Quick Boot** if desired. Quick Boot for ESXi hosts is an option that allows Update Manager to reduce the upgrade time by skipping the physical reboot of the host.

8 Click **Finish**.

9 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).

What to do next

- For VMware Cloud Foundation 4.1.0.1, see [Upgrade to Cloud Foundation 4.1.0.1](#).
- For VMware Cloud Foundation 4.1:
 - If you are upgrading the management domain, see [Upgrade the Management Domain to 4.1](#) for information on the next component to be upgraded.
 - If you are upgrading a workload domain, see [Upgrade Workload Domains to 4.1](#) for information on the next component to be upgraded.

Upgrade ESXi with Custom ISO or Async Drivers

4

For clusters in VUM-based workload domains, you can perform ESXi upgrades with custom images and async drivers.

This chapter includes the following topics:

- [Upgrade ESXi with Custom ISO](#)
- [Upgrade ESXi with VMware Cloud Foundation Stock ISO and Async Drivers](#)

Upgrade ESXi with Custom ISO

You can upgrade ESXi with a custom ISO from your vendor.

Prerequisites

Download the appropriate vendor-specific ISO on a computer with internet access.

Procedure

- 1 Download the ESXi upgrade bundle. See [Download Bundles from SDDC Manager](#).
- 2 Using SSH, log in to the SDDC Manager VM.
- 3 Create a directory for the vendor ISO under the `/nfs/vmware/vcf/nfs-mount` directory. For example, `/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries`.
- 4 Copy the vendor-specific ISO to the directory you created on the SDDC Manager VM. For example, you can copy the ISO to the `/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries` directory.
- 5 Change permissions on the directory where you copied the ISO. For example,
`chmod -R 775 /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries/`
- 6 Change owner to vcf.
`chown -R vcf_lcm:vcf /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries/`
- 7 Create an ESX custom image JSON using the following template.

```
{
  "esxCustomImageSpecList": [{
    "bundleId": "ID",
```

```
"targetEsxVersion": "version",
"useVcfBundle": false,
"customIsoAbsolutePath": "Path_to_ISO"
}]
}
```

where

Parameter	Description and Example Value
bundleId	<p>ID of the ESXi upgrade bundle you downloaded. You can retrieve the bundle ID by navigating to the Lifecycle Management > Bundle Management page and clicking View Details to view the bundle ID.</p> <p>For example, 8c0de63d-b522-4db8-be6c-f1e0ab7ef554.</p> <p>Note If an incorrect bundle ID is provided, the upgrade will proceed with the VMware Cloud Foundation stock ISO and replace the custom VIBs in your environment with the stock VIBs.</p>
targetEsxVersion	ESXi version in the custom image to be applied.
useVcfBundle	<p>Specifies whether the VMware Cloud Foundation ESXi bundle is to be used for the upgrade.</p> <p>Note If you want to upgrade with a custom ISO image, ensure that this is set to false.</p>
customIsoAbsolutePath	<p>Path to the custom ISO file on the SDDC Manager VM. For example, /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries/VMware-VMvisor-Installer-7.0.0.update01-17325551.x86_64-DellEMC_Customized-A01.iso</p>

Here is an example of a completed JSON template.

```
{
  "esxCustomImageSpecList": [{
    "bundleId": "8c0de63d-b522-4db8-be6c-f1e0ab7ef554",
    "targetEsxVersion": "6.7.0-10302608",
    "useVcfBundle": false,
    "customIsoAbsolutePath":
      "/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-binaries/VMware-VMvisor-
      Installer-7.0.0.update01-17325551.x86_64-DellEMC_Customized-A01.iso"
  }]
}
```

- 8 Save the JSON file as esx-custom-image-upgrade-spec.json in the /nfs/vmware/vcf/nfs-mount.

Note If the JSON file is not saved in the correct directory, the stock VMware Cloud Foundation ISO is used for the upgrade and the custom VIBs are overwritten.

- 9 Set the correct permissions on the /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json file:

```
chmod -R 775 /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json
```

```
chown -R vcf_lcm:vcf /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json
```

- 10 Open the `/opt/vmware/vcf/lcm/lcm-app/conf/application-prod.properties` file.
- 11 In the `lcm.esx.upgrade.custom.image.spec=` parameter, add the path to the JSON file.
For example, `lcm.esx.upgrade.custom.image.spec=/nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json`
- 12 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.
- 13 Click the management domain and then click **Updates/Patches**.
- 14 Schedule the ESXi upgrade bundle.
- 15 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).
- 16 After the upgrade is complete, confirm the ESXi version by clicking **Current Versions**. The ESXi hosts table displays the current ESXi version.

Upgrade ESXi with VMware Cloud Foundation Stock ISO and Async Drivers

You can apply the stock ESXi upgrade bundle with specified async drivers. This feature is available for VMware Cloud Foundation version 3.5.1 and later.

Prerequisites

Download the appropriate async drivers for your hardware on a computer with internet access.

Procedure

- 1 Download the VMware Cloud Foundation ESXi upgrade bundle. See [Download Bundles from SDDC Manager](#).
- 2 Using SSH, log in to the SDDC Manager VM.
- 3 Create a directory for the vendor provided async drivers under the `/nfs/vmware/vcf/nfs-mount` directory. For example, `/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers`.
- 4 Copy the async drivers to the directory you created on the SDDC Manager VM. For example, you can copy the drivers to the `/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers/drivers` directory.
- 5 Change permissions on the directory where you copied the drivers. For example,

```
chmod -R 775 /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers
```
- 6 Change owner to vcf.

```
chown -R vcf_lcm:vcf /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers
```

7 Create an ESX custom image JSON using the following template.

```
{
  "esxCustomImageSpecList": [{
    "bundleId": "ID",
    "useVcfBundle": true,
    "esxPatchesAbsolutePaths": [
      "Path_to_Drivers"
    ]
  }]
}
```

where

Parameter	Description and Example Value
bundleId	ID of the ESXi upgrade bundle you downloaded. You can retrieve the bundle ID by navigating to the Lifecycle Management > Bundle Management page and clicking View Details to view the bundle ID. For example, 8c0de63d-b522-4db8-be6c-f1e0ab7ef554. VMware Cloud Foundation
targetEsxVersion	ESXi version in the custom image to be applied.
useVcfBundle	Specifies whether the ESXi bundle is to be used for the upgrade. Set this to true.
esxPatchesAbsolutePaths	Path to the async drivers on the SDDC Manager VM. For example, /nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers/VMW-ESX-6.7.0-smartpqi-1.0.2.1038-offline_bundle-8984687.zip

Here is an example of a completed JSON template.

```
{
  "esxCustomImageSpecList": [{
    "bundleId": "8c0de63d-b522-4db8-be6c-f1e0ab7ef554",
    "useVcfBundle": true,
    "esxPatchesAbsolutePaths": [
      "/nfs/vmware/vcf/nfs-mount/esx-upgrade-partner-drivers/drivers/VMW-ESX-6.7.0-smartpqi-1.0.2.1038-offline_bundle-8984687.zip"
    ]
  }]
}
```

- 8 Save the JSON file as esx-custom-image-upgrade-spec.json in the /nfs/vmware/vcf/nfs-mount.

Note If the JSON file is not saved in the correct directory, the stock VMware Cloud Foundation ISO is used for the upgrade and the custom VIBs are overwritten.

- 9 Set the correct permissions on the /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json file:

```
chmod -R 775 /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json
```

```
chown -R vcf_lcm:vcf /nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json
```

- 10 Open the `/opt/vmware/vcf/lcm/lcm-app/conf/application-prod.properties` file.
- 11 In the `lcm.esx.upgrade.custom.image.spec=` parameter, add the path to the JSON file.
For example, `lcm.esx.upgrade.custom.image.spec=/nfs/vmware/vcf/nfs-mount/esx-custom-image-upgrade-spec.json`
- 12 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.
- 13 Click the management domain and then click **Updates/Patches**.
- 14 Schedule the ESXi upgrade bundle.
- 15 Monitor the upgrade progress. See [Chapter 6 Monitor Updates](#).
- 16 After the upgrade is complete, confirm the ESXi version by clicking **Current Versions**. The ESXi hosts table displays the current ESXi version.

Skip Hosts During ESXi Update

5

You can skip hosts while applying an ESXi update to the management domain or a VI workload domain. The skipped hosts are not updated.

You cannot skip hosts that are part of a workload domain that is using vSphere Lifecycle Manager (vLCM) images, since these hosts are updated at the cluster-level and not the host-level.

Procedure

- 1 Using SSH, log in to the SDDC Manager VM with the user name vcf and password you specified in the deployment parameter sheet.
- 2 Type su to switch to the root account.
- 3 Retrieve the host IDs for the hosts you want to skip.

```
curl 'https://SDDC_MANAGER_IP/v1/hosts' -i -u 'username:password' -X GET -H 'Accept: application/json' |json_pp
```

Replace the SDDC Manager IP address, user name, and password with the information for your environment.

- 4 Copy the ids for the hosts you want to skip from the output. For example:

```
...
    "fqdn" : "esxi-2.vrack.vsphere.local",
    "esxiVersion" : "6.7.0-16075168",
    "hardwareVendor" : "VMware, Inc.",
    "cpu" : {
      "cpuCores" : [
        {
          "model" : "intel",
          "frequencyMHz" : 2394.375,
          "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        },
        {
          "frequencyMHz" : 2394.375,
          "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
          "model" : "intel"
        },
        {
```

```

        "model" : "intel",
        "frequencyMHz" : 2394.375,
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
    },
    {
        "model" : "intel",
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        ",
        "frequencyMHz" : 2394.375
    },
    {
        "model" : "intel",
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        ",
        "frequencyMHz" : 2394.375
    },
    {
        "frequencyMHz" : 2394.375,
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        ",
        "model" : "intel"
    },
    {
        "frequencyMHz" : 2394.375,
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        ",
        "model" : "intel"
    },
    {
        "model" : "intel",
        "manufacturer" : "Intel(R) Xeon(R) Platinum 8260 CPU @
2.40GHz
        ",
        "frequencyMHz" : 2394.375
    }
],
"frequencyMHz" : 19155,
"usedFrequencyMHz" : 1892,
"cores" : 8
},
"physicalNics" : [
    {
        "deviceName" : "vmnic0",
        "macAddress" : "00:50:56:a1:cf:47"
    },
    {
        "deviceName" : "vmnic1",
        "macAddress" : "00:50:56:a1:8b:71"
    }
],
"bundleRepoDatastore" : "lcm-bundle-repo",
"hybrid" : false,
"memory" : {
    "totalCapacityMB" : 79995.421875,

```

```

        "usedCapacityMB" : 22571
    },
    "id" : "b318fe37-f9a8-48b6-8815-43aae5131b94",
    ...

```

In this case, the id for `esxi-2.vrack.vsphere.local` is `b318fe37-f9a8-48b6-8815-43aae5131b94`.

- 5 Open the `/opt/vmware/vcf/lcm/lcm-app/conf/application-prod.properties` file.
- 6 At the end of the file, add the following line:


```
esx.upgrade.skip.host.ids=host id1,host id2
```

 Replace *host id1* and any other host ids with the information from step 4.
- 7 Save and close the file.
- 8 Restart the LCM server by typing the following command in the console window:


```
systemctl restart lcm
```

Results

The hosts added to the `application-prod.properties` are not updated when you update the workload domain.

Monitor Updates

6

Monitor the update progress for your workload domain

Procedure

- 1 In the In-Progress Updates section, click **View Status** to view the high-level update progress and the number of components to be updated.
- 2 Details of the component being updated is shown below that. The image below is an example and may not reflect the actual versions.

VMware Cloud Foundation Update Status

VMware Cloud Foundation Update 4.0.1.0 0 / 8 Resources Updated [CANCEL](#)

Released 06/23/2020 11 GB
This VMware Cloud Foundation Upgrade 4.0.0.1 to 4.0.1.0 contains features, critical bugs and security fixes. For more information, see <https://docs.vmware.com/en/VMware-Cloud-Foundation/4.01/en/VMware-Cloud-Foundation-401-Release-Notes.html>

Updating COMMON SERVICES VIEW UPDATE ACTIVITY

> SDDC MANAGER	In Progress	4.0.0.1-16221345	→	4.0.1.0-16308622
----------------	-------------	------------------	---	------------------

- 3 Click the arrow to see a list of tasks being performed to update the component. As the task is completed, it shows a green check mark.

VMware Cloud Foundation Update Status

VMware Cloud Foundation Update 4.0.1.0 1 / 8 Resources Updated [CANCEL](#)

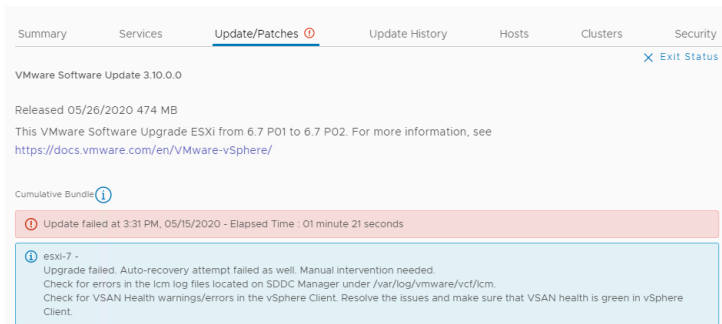
Released 06/23/2020 11 GB
This VMware Cloud Foundation Upgrade 4.0.0.1 to 4.0.1.0 contains features, critical bugs and security fixes. For more information, see <https://docs.vmware.com/en/VMware-Cloud-Foundation/4.01/en/VMware-Cloud-Foundation-401-Release-Notes.html>

Updating OPERATIONS MANAGER VIEW UPDATE ACTIVITY

▼ SDDC MANAGER	In Progress	4.0.0.1-16221345	→	4.0.1.0-16308622
> COMMON SERVICES	✓ Updated			
> OPERATIONS MANAGER	In Progress			
DOMAIN MANAGER	Queued			
SOLUTIONS MANAGER	Queued			
SDDC MANAGER UI	Queued			
LCM	Queued			
MULTI SITE SERVICE	Queued			

- 4 When all tasks to update a component have been completed, the update status for the component is displayed as Updated.

- 5 If a component fails to be updated, the status is displayed as Failed. The reason for the failure as well as remediation steps are displayed. The image below is an example and may not reflect the actual versions in your environment.



- 6 After you resolve the issues, you can retry the update.

What to do next

Once all upgrades have completed successfully:

- 1 Remove the VM snapshots you took before starting the update.
- 2 Take a backup of the newly installed components.

View Update History

7

The Update History page displays all updates applied to a workload domain.

Procedure

- 1 In the SDDC Manager Dashboard, click **Inventory > Workload Domains..**
- 2 Click the name of a workload domain and then click the **Updates History** tab.

All updates applied to this workload domain are displayed. If an update bundle was applied more than once, click **View Past Attempts** to see more information.

Access Upgrade Log Files



- 1 Log in to the SDDC Manager VM with the vcf user name and the password you specified in the deployment parameter sheet.
- 2 To access upgrade logs, navigate to the `/var/log/vmware/vcf/lcm` directory.
 - `lcm-debug` log file contains debug level logging information.
 - `lcm.log` contains information level logging.
- 3 To create an sos bundle for support, see Supportability and Serviceability (SoS) Utility in the *VMware Cloud Foundation Operations and Administration Guide*.