Hewlett Packard Enterprise

Technical White Paper

Upgrading VMware Cloud Foundation from 4.0.1 to 4.2.1 on HPE Servers

Method for upgrading in offline mode

CONTENTS

EXECUTIVE SUMMARY

VMware® Cloud Foundation™ (VCF) is an integrated hybrid cloud platform that delivers a complete set of software-defined services for compute, storage, networking, security, and cloud management for the private and public cloud. VCF brings together VMware vSphere®, VMware vSAN™, VMware NSX®, and optionally, VMware vRealize® Suite components, into a natively integrated stack to deliver enterprise-ready cloud infrastructure. Further, VCF automates bring up, configuration, provision, and life cycle management (LCM) of the stack with SDDC Manager. VMware releases a new version of general availability (GA) on a quarterly cadence and users are automatically notified from the SDDC Manager when upgrades become available.

Hewlett Packard Enterprise and VMware have collaborated to help customers accelerate the journey to hybrid cloud, bringing the promise of the software-defined data center to life. The VMware Cloud Foundation on HPE Servers solution dramatically improves both the value and business outcomes of the customers, thus delivering a simplified and secure private cloud with industry-first integrated composability for VCF. This solution is flexible, easy to deploy, seamless to manage, simple to operate, and runs all your enterprise apps—both traditional and containerized—in cloud environments.

Hewlett Packard Enterprise brings out technical papers that describe the best practices in deploying solutions on this combination that are based on the VCF version available at the time of publication. Also, it is observed that enterprise customers, to ensure secure operations, often deploy VCF management domain without internet access. So this requires a methodology to perform an upgrade in offline mode. This technical paper provides validated and comprehensive details—including prerequisites, step-by-step configuration, and best practices—for the customers to upgrade to the latest version of VCF along with the compatible infrastructure management software, drivers, and firmware for HPE Servers in offline mode.

This technical paper shows the method to upgrade VCF 4.0.1 to 4.2.1 on HPE Servers, based on the solution upgrade tests performed in July 2021.

OVERVIEW

This technical paper describes the method to upgrade VMware Cloud Foundation (VCF) from 4.0.1 to 4.2.1 on HPE Servers. The method described is unique to VMware Cloud Foundation upgrade on the HPE platform from VCF 4.0.1 to VCF 4.2.1 and is not a generally applicable method for VCF upgrades. For the component firmware versions of VCF 4.2.1 on HPE Servers, see HPE Firmware and Software Compatibility Matrix For VMware Cloud Foundation on HPE Synergy and HPE ProLiant Servers. This paper describes the method to upgrade the VMware Cloud Foundation components when the SDDC Manager VM does not have access to the internet, which is also known as Dark Site.

VMware Cloud Foundation (VCF) 4.2.1 requires VMware vSphere v7.0U1d as a prerequisite hypervisor version for initial deployments. Hewlett Packard Enterprise releases new OEM Custom Images whenever there is a need to update critical components of the image. The VMware vSphere v7.0U1d update meets the criteria for Hewlett Packard Enterprise to release a new OEM Custom Image. Hewlett Packard Enterprise recommends customers use the HPE OEM Custom image for VMware vSphere v7.0U1d (May 2021) to upgrade to VCF 4.2.1. The upgrade from VCF 4.0.1 to VCF 4.2.1 requires a sequential upgrade from VCF 4.0.1 to VCF 4.1.0, and VCF 4.1.0 to VCF 4.2.0 before completing the sequence to VCF 4.2.1.

PATCHING AND UPGRADING VMWARE CLOUD FOUNDATION

SDDC Manager internally has Lifecycle Management (LCM) enabled, which performs automated updates on VMware Cloud Foundation components such as SDDC Manager and its internal services and VMware components such as NSX® for vSphere®, vCenter Server®, VMware ESXi™, vRealize® Suite, NSX-T, and VMware vRealize Suite Lifecycle Manager™ (vRLCM). SDDC Manager is configured to communicate with the VMware software repository provided the SDDC Manager VM has internet access, and the VMware depot credentials are valid. High-level update workflow is as follows:

1. Receive notification of update availability.
2. Download update bundle.
3. Select update targets and schedule updates.

This paper is intended to help administrators to understand how to perform VMware Cloud Foundation upgrades when SDDC Manager does not have access to the internet.

VMWARE CLOUD FOUNDATION UPGRADE FROM 4.0.1 TO 4.2.1

Table 1 shows the VCF components version with each VCF version upgrade as defined in this document specific to HPE Servers.

TABLE 1. VCF upgrade path from 4.0.1 to 4.2.1

VCF Version	SDDC Version	NSX-T Manager	vCenter Server	ESXi Host
4.0.1.0	4.0.1.0	3.0.1.0.0.16404613	7.0.0.10600-16386292	7.0.0-16324942
4.0.1.1	4.0.1.1	3.0.1.0.0.16404613	7.0.0.10600-16620007	7.0.0-16324942
4.1.0.0	4.1.0.0	3.0.2.0.0.16887200	7.0.1.00000-16860138	7.0.0-16324942
4.1.0.1	4.1.0.1	3.0.2.0.0.16887200	7.0.1.00000-16860138	7.0.0-16324942
4.2.0.0	4.2.0.0	3.1.0.0.0.17107167	7.0.1.00200-17327517	7.0.1-17551050
4.2.1.0	4.2.1.0	3.1.2.0.0.17883596	7.0.1.00301-17956102	7.0.1-17551050

See the Release Notes for more information about VCF 4.2 at https://docs.vmware.com/en/VMware-Cloud-Foundation/4.2/rn/VMware-Cloud-Foundation-42-Release-Notes.html.

OFFLINE VMWARE CLOUD FOUNDATION UPDATE

This paper describes how to upgrade your VMware Cloud Foundation system if the SDDC Manager VM does not have internet access. It utilizes the Bundle Transfer utility to manually download the bundles from the VMware depot on your local computer with internet access and then upload them to SDDC Manager VM to perform the upgrade of the VMware Cloud Foundation system.

When to perform an offline update

VMware Cloud Foundation update needs to be performed only after verifying the underlying HPE Infrastructure including drivers and firmware is compatible with the version that is going to be installed. See the HPE Firmware and Software Compatibility Matrix For VMware Cloud Foundation on HPE Synergy and HPE ProLiant Servers technical paper to check if the VCF version is listed as compatible along with the drivers and firmware.

Bundle transfer utility included as part of the SDDC Manager VM does not work as expected

The SDDC Manager VM includes version 1696170 of the utility. This version of the utility fails to download or list bundles when you specify the product version (`-p` or `--productVersion`).

Workaround: Download version 17209083 of the Bundle Transfer Utility and Skip Level Upgrade Tool from My VMware.

BUNDLE TYPES

Upgrade bundle

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

Some upgrade bundles are cumulative. With a cumulative upgrade bundle, you can directly upgrade the appropriate software in your workload domain to the version contained in the cumulative bundle rather than applying sequential upgrades to reach the target version. Cumulative bundles are available only for the vCenter Server, and ESXi.

NOTE

You can apply a cumulative bundle to a workload domain only if the target release in the bundle is lower than or at the same version as the management domain. If the cumulative bundle is available for both the management domain and virtual infrastructure (VI) workload domains, you must apply it to the management domain before applying it to VI workload domains.

Install bundle

VMware Cloud Foundation includes the following install bundles:

- VI workload domain install bundle is used to deploy later versions of the software components instead of the versions in your original VMware Cloud Foundation installation. It includes software bits for vCenter Server and NSX for vSphere.
- Individual install bundles for vRealize products are used for deploying vRealize components.
- NSX-T install bundle is used for deploying an NSX-T based VI workload domain.
- Horizon 7 install bundle is used for creating a Horizon domain.

UPGRADE SEQUENCE

You must upgrade the management domain before upgrading the workload domain. SDDC Manager makes each component available appropriately for upgrade only if the bundle is compatible and in sequence.

SDDC Manager bundle includes LCM and the SDDC UI update. Following components become available after the SDDC Manager update is completed. The components are:

1. vCenter Server is available to upgrade for both management and workload domains.
2. NSX manager is available to upgrade for both management and workload domains.
3. ESXi bundle becomes available to update on the domains.
4. VRealize Suite Lifecycle Manager (vRLCM) is available for update only if it is deployed in your existing VCF environment.

NOTE
ESXi upgrade needs to be performed using HPE Custom ISO and can be download from https://www.hpe.com/us/en/servers/hpe-esxi.html. See the HPE Firmware and Software Compatibility Matrix For VMware Cloud Foundation on HPE Synergy and HPE ProLiant Servers technical paper for compatibility. ESXi should only be upgraded after the domain is successfully upgraded to VCF 4.2.0.

UPGRADE PREREQUISITES

It is recommended that the following prerequisites are met before upgrading the system:

1. Back up of the SDDC Manager VM.
2. Take a snapshot of all the VMs in the Cloud Foundation system.
3. No other domain operations are to be performed during the upgrade.
4. Verify there are no failed workflows in the SDDC Manager.
5. Verify there are no VMware Cloud Foundation resources in error or activating state.

For more information on the upgrade prerequisites, refer to https://docs.vmware.com/en/VMware-Cloud-Foundation/4.2/vcf-42-lifecycle/GUID-409447A2-FF47-4B64-BAE8-1C00943CB6A8.html.

PRECHECK – HPE SERVERS

This section describes the procedure to validate the HPE Servers hardware's firmware and software with the compatibility matrix.

1. Validate existing HPE Servers firmware and software versions with HPE Firmware and Software Compatibility Matrix For VMware Cloud Foundation on HPE Synergy and HPE ProLiant Server.
2. Validate the VCF version that you are upgrading to is supported by relevant drivers and firmware.
3. Update the HPE servers firmware as per the VCF 4.0 firmware and software matrix.

4. After the firmware update, do the following:
    a. Check the firmware inventory to make sure that the firmware version matches.
    b. Evaluate any critical alerts and warnings that might have been raised on the resources suggesting any recommended actions.

For more information on updating firmware, refer to https://www.hpe.com/in/en/servers/smart-update.html.

PRECHECK - VMWARE

SDDC Manager allows to precheck the state of the domains to ensure that the system is ready to be upgraded. All the errors must be cleared before running the upgrade of the VMware Cloud Foundation system to ensure the workflow does not fail.

1. Navigate to the **Updates/Patches** tab of the management domain and click **PRECHECK.**

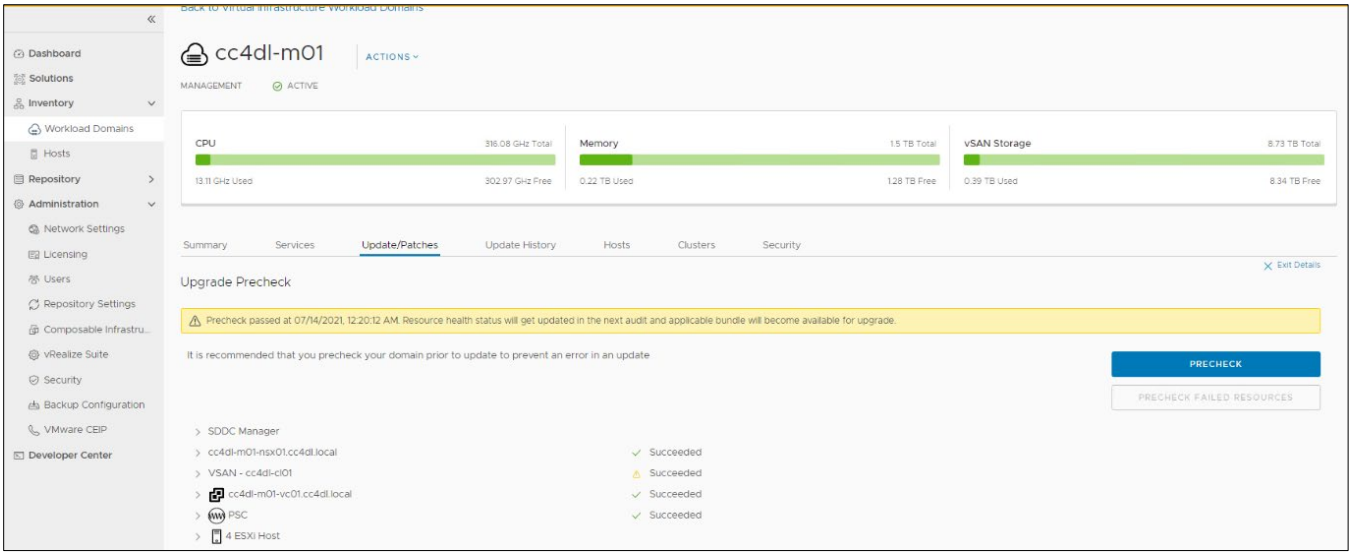

FIGURE 1. VCF Management Domain user interface for upgrade precheck

2. Detailed tasks and their status can be seen by expanding each of the listed status checks. vRealize Suite Lifecycle Manager is required to upgrade VMware vRealize Log Insight™, VMware vRealize Automation™, and VMware vRealize Operations™. If you do not plan to use any of the vRealize products in your Cloud Foundation environment, you can ignore precheck failures related to vRealize Suite Lifecycle Manager not being present.

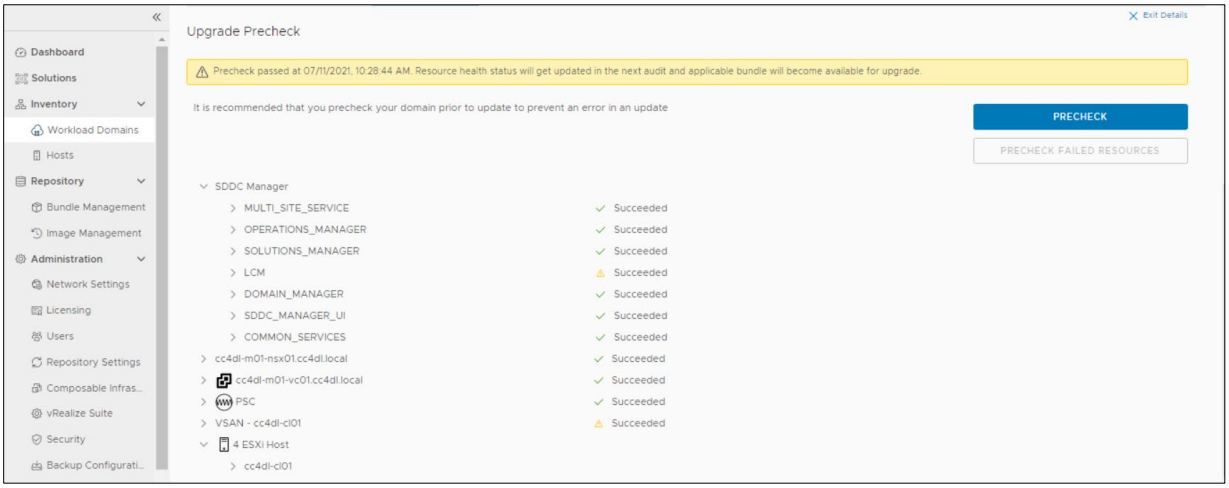

FIGURE 2. Precheck results in VCF SDDC Manager

Figure 3 indicates the HPE Smart array controller P204i-c SR Gen10 driver is out of date. To clear the error, download and install the compatible driver with the current vSphere version on the host from VMware Compatibility Guide https://www.vmware.com/resources/compatibility/search.php for the affected controller. Click **Retry Precheck** to run the task again once the issue has been fixed.

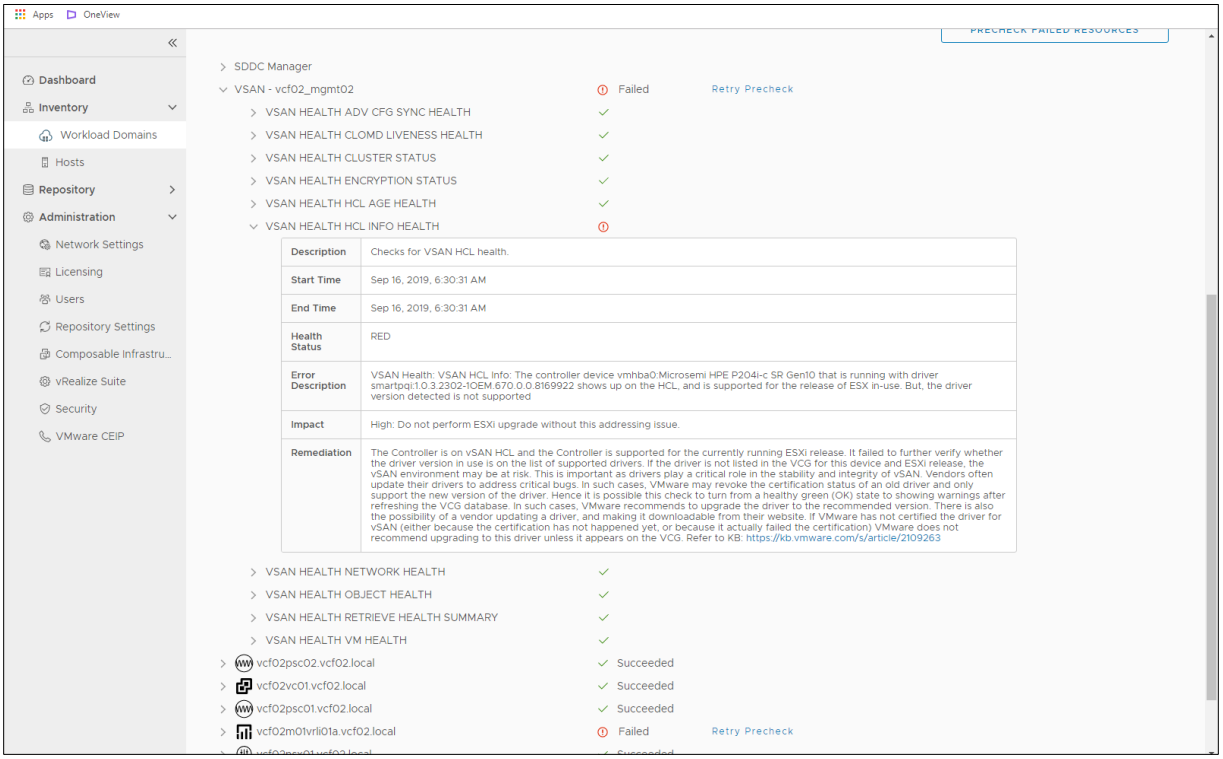

FIGURE 3. VCF SDDC Manager expanded error message

ESXi third-party VIBs check error, as shown in Figure 4, can be ignored for the hosts as this error indicates that the servers contain third-party VIBs which were installed as part of imaging HPE servers with HPE VMware custom ISO.

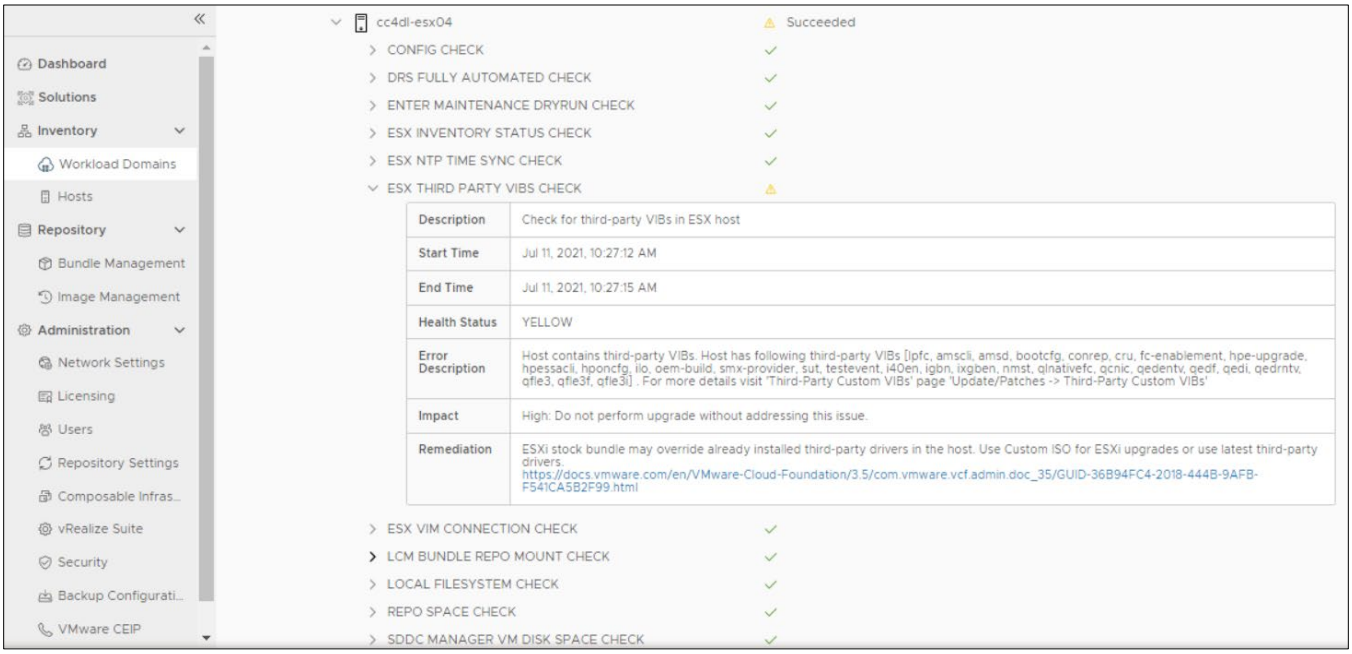

FIGURE 4. VCF SDDC Manager displaying the alerts for hosts with third-party VIBs

UPGRADE VCF 4.0.1 TO VCF 4.1

Upgrade steps are broken down into two sections, VCF 4.0.1 to VCF 4.1, and the next section describes upgrading VCF 4.1 to VCF 4.2.1 and eventually upgrading HPE ESXi custom iso which completes the VCF Upgrade sequence.

Offline bundles download for VCF 4.0.1.0 and 4.1.0.1

Use the VMware Skip Level Upgrade CLI Tool to upgrade SDDC Manager from VCF v4.0.0.0 or v4.0.1.0 to VCF v4.1. If you are on VCF v4.0.1.1, you can upgrade SDDC Manager to VCF v4.1.0.0 from the SDDC Manager UI or public API.

NOTE
Do not upgrade the vSphere (ESXi) with the upgrade bits that become available under the SDDC bundles repository.

1. Generate a marker file on the existing VMware Cloud Foundation 4.0.1 system:
   a. Using SSH, log in to the SDDC Manager VM with the username `vcf` and password you specified in the deployment parameter sheet.
   b. Change directories:
   ```
   cd /opt/vmware/vcf/lcm/lcm-tools/bin
   ```
   c. Generate a marker file:
   ```
   ./lcm-bundle-transfer-util --generateMarker
   ```
   The marker file (`markerFile`) is a JSON file that contains information on the current software versions running on SDDC Manager. It also contains the bundle IDs for bundles that were downloaded before this file was generated. The `markerFile.md5` contains the checksum for the marker file.

2. Copy the marker file to a computer with internet access.

   Copy the `/opt/vmware/vcf/lcm/lcm-tools` directory and the `markerFile` and `markerFile.md5` files from the location displayed in the output of step 1 to a computer with internet access. The `/opt/vmware/vcf/lcm/lcm-tools` directory includes the bundle transfer utility required for the next step.

3. Download bundles using the marker file:

   On the computer with internet access, run the following command:

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

TABLE 2. Bundle transfer utility parameters and values

Parameter	Description and example values
absolute-path-output-dir	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.
Sku	Optional. SKU or service provider of the index file.
depotUser	User name for my VMware depot. You are prompted to enter the depot user password. If there are any special characters in the password, specify the password within a single quote.
markerFile	Absolute path to the marker file, as generated in the above step. If you do not specify the path to the marker file, all update bundles on the depot are downloaded.
markerMd5File	Absolute path to the marker MD5 checksum file, as generated in the above step.
P	Used to download bundles only for the specific product version. When run with the upload option, the tool uploads the bundles specific to the product.

Figure 5 shows the list of bundles that are being downloaded.

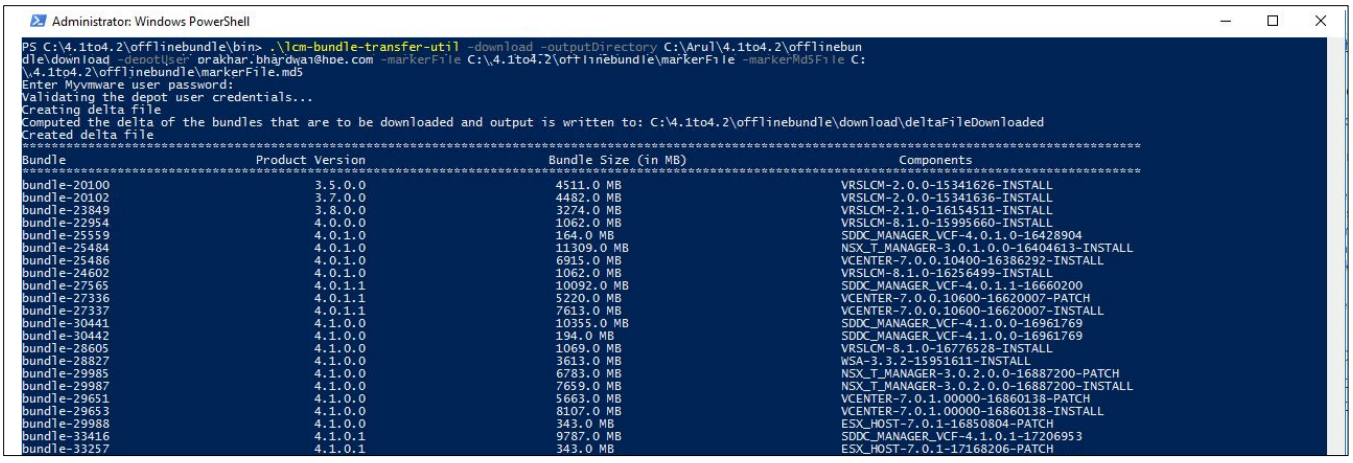

FIGURE 5. VCF upgrade bundles being downloaded

The Bundle Transfer 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.

4. Copy the downloaded bundles to the SDDC Manager VM:
   - Copy the update bundle directory from the external computer to the SDDC Manager VM as follows:

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

     OR
   - Use WINSCP software to move the bundles to the SDDC Manager VM:

     The `scp` command in the example above creates a directory named `vcfupgradebundle` in the `/nfs/vmware/vcf/nfs-mount/` directory.
5. In the SDDC Manager VM, change the ownership and permissions of the uploaded bundle:

   ```
   chmod -R 0777 /nfs/vmware/vcf/nfs-mount/vcfupgradebundle
   ```
6. 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/vcfupgradebundle
   ```

   As shown in the previous step. The utility uploads the bundles specified in the deltaFileDownloaded file. The console displays the upload status for each bundle.

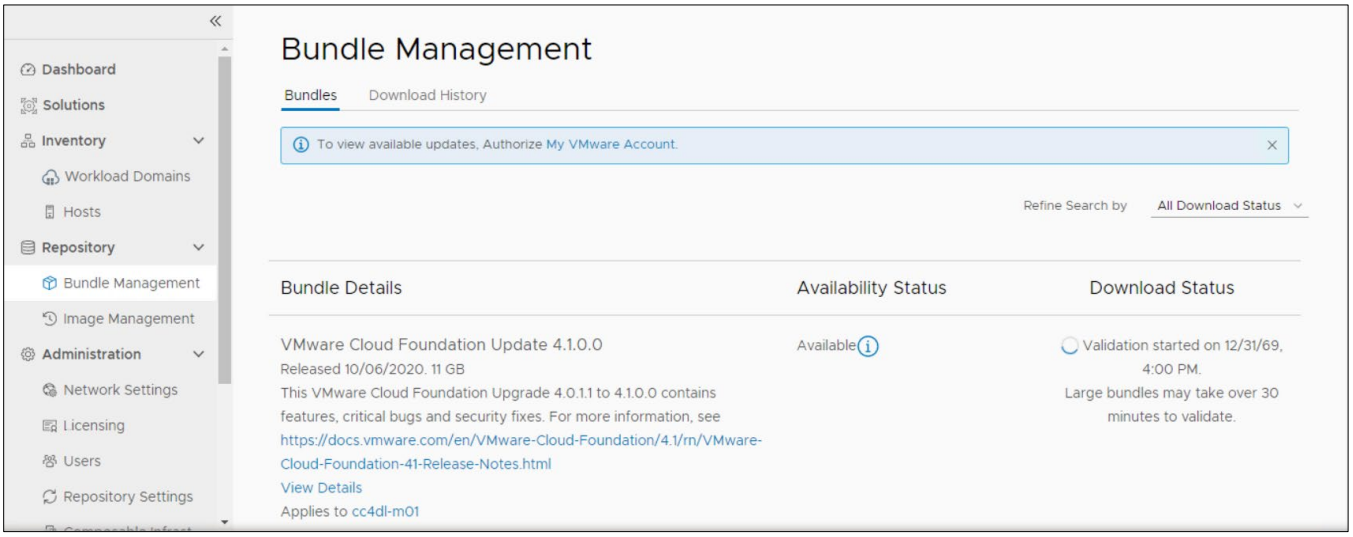

FIGURE 6. Upload and validation of the VCF upgrade bundles in progress

VMware Cloud Foundation update 4.1 bundles are available to update as shown in Figure 7.

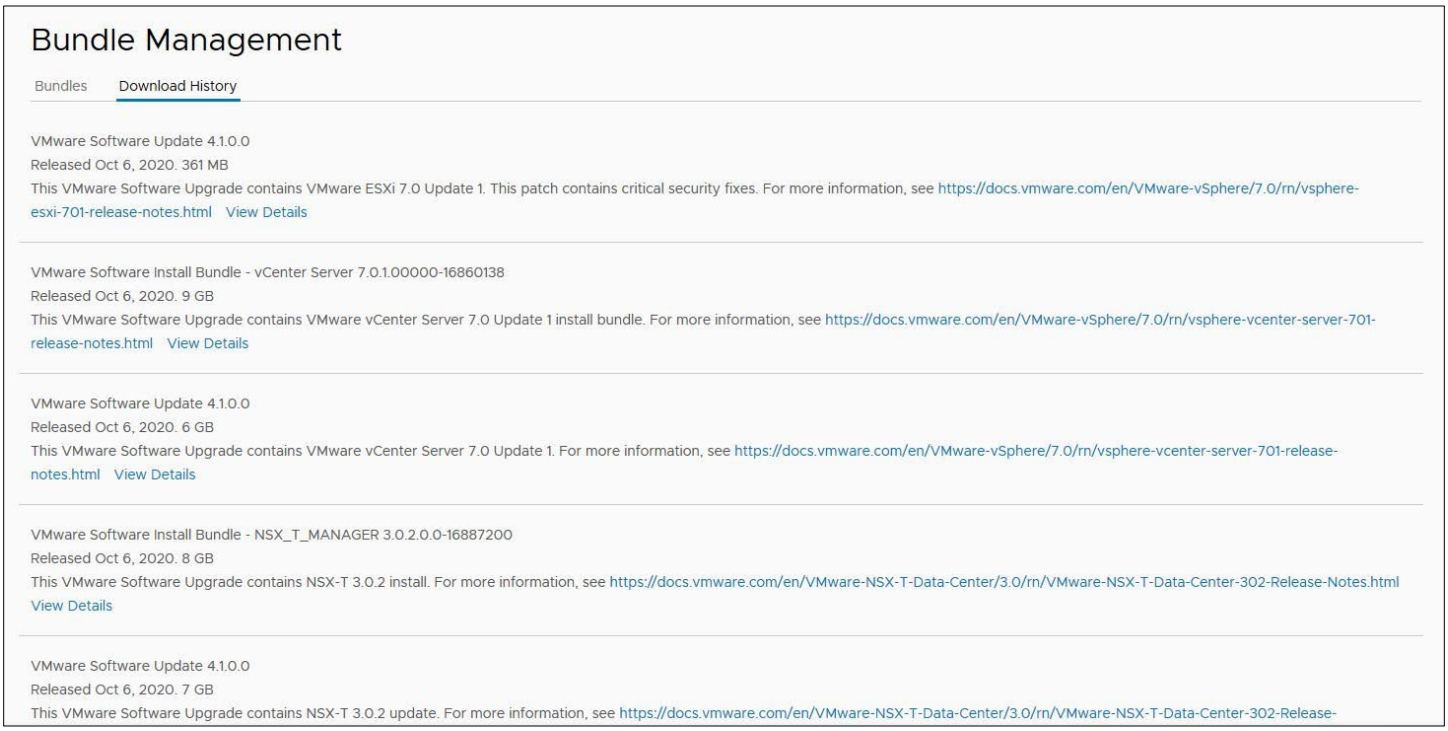

FIGURE 7. Uploaded upgrade bundles listed in the SDDC Manager repository

Download bundles with a proxy server

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

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 for upgrade bundles to populate under the SDDC bundle repository and then download the bundles.

Apply the updates via SDDC Manager

This section describes how to apply the SDDC Manager bundle. For more information, refer to the Upgrade Sequence section. SDDC Manager makes each component available appropriately for upgrade only if the bundle is compatible and in sequence.

Update SDDC Manager

1. Navigate to the **Updates/Patches** tab of the management domain to confirm the available update. Run the PRECHECK For more information, refer to the Precheck - VMware section within this document.
2. The **Available Updates** section displays the offline bundle that you uploaded to SDDC Manager before starting the upgrade.

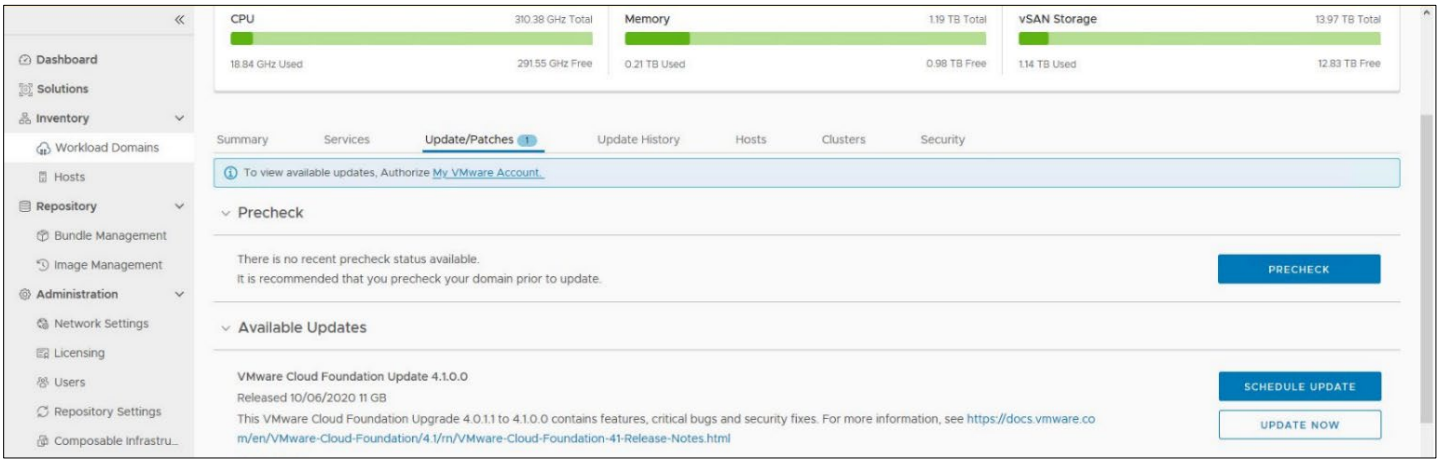

FIGURE 8. SDDC manager displaying available updates

3. Click **UPDATE NOW** or **SCHEDULE UPDATE** and select the date and time for the bundle to be applied. The first available update would always be the SDDC Manager update. The update can be either scheduled or can be initiated immediately.
4. Click **VIEW UPDATE ACTIVITY** to view the detailed tasks.
5. After the upgrade is completed, a green bar with a checkmark is displayed. Click **Finish**.

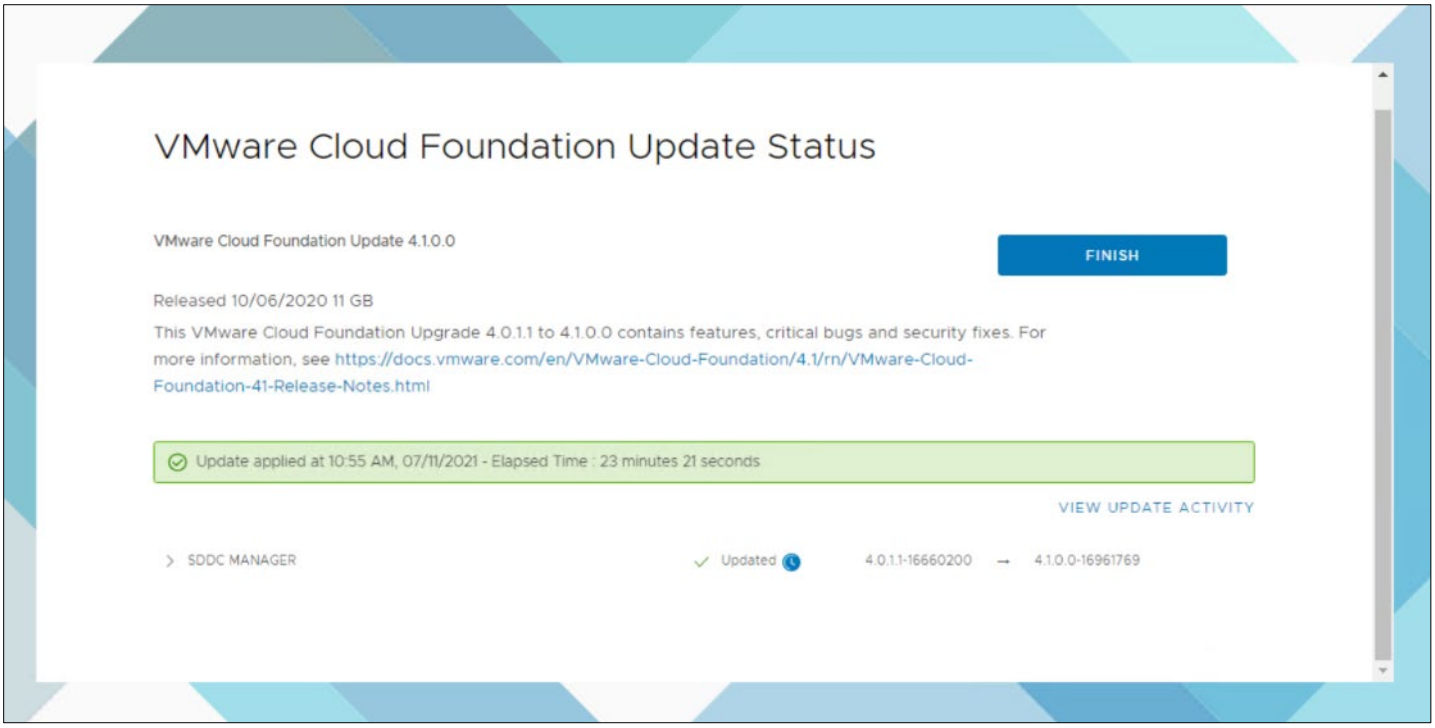

FIGURE 9. SDDC Manager successfully updated to 4.1.0

6. Confirm that the SDDC Manager is updated to 4.1.0.

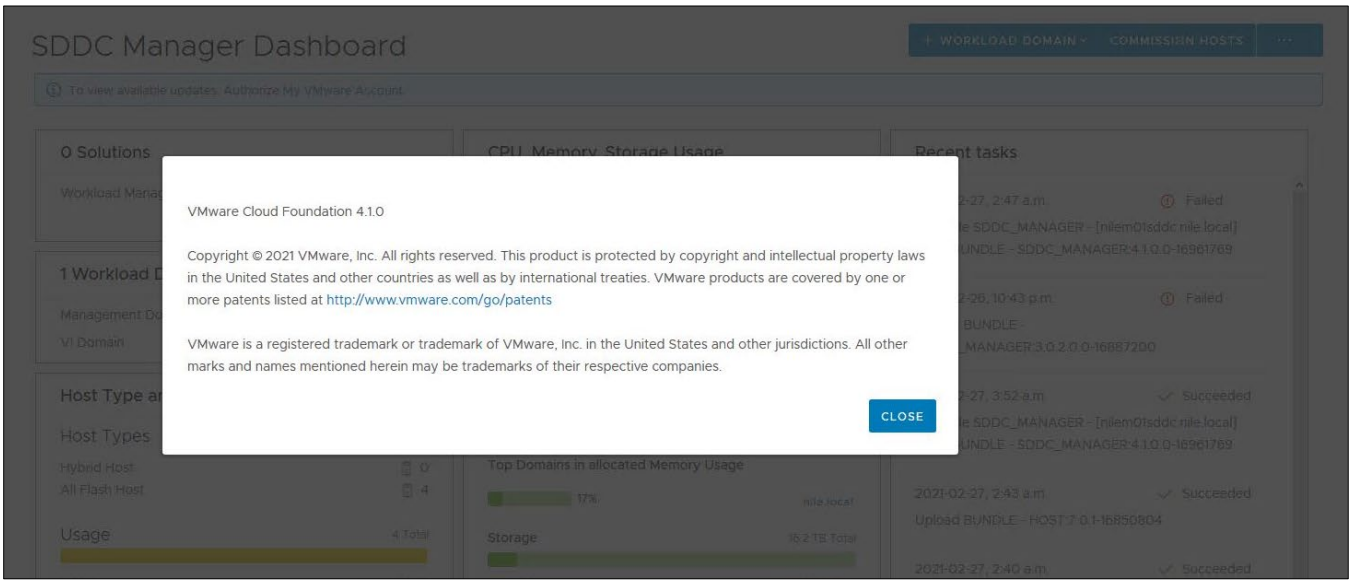

FIGURE 10. SDDC Manager current versions

7. Once the SDDC Manager upgrade is completed, update the SDDC drift bundle as shown in Figure 11.

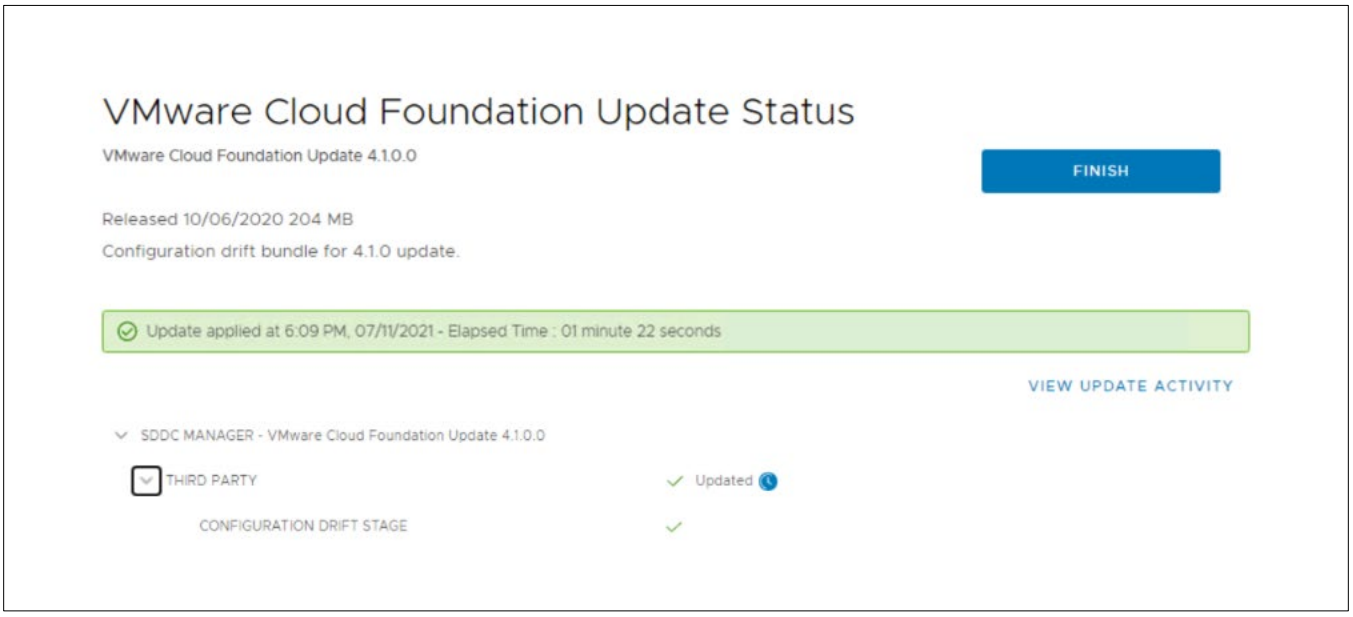

FIGURE 11. SDDC Manager drift bundle update in progress

NOTE

Once the SDDC Manager and drift update are completed, restart the SDDC manager UI service **`systemctl restart lcm`**.

Update vCenter Server

The next available update in SDDC Manager is for the vCenter Server.

1. vCenter Server update becomes available after the NSX-T Manager is successfully updated.

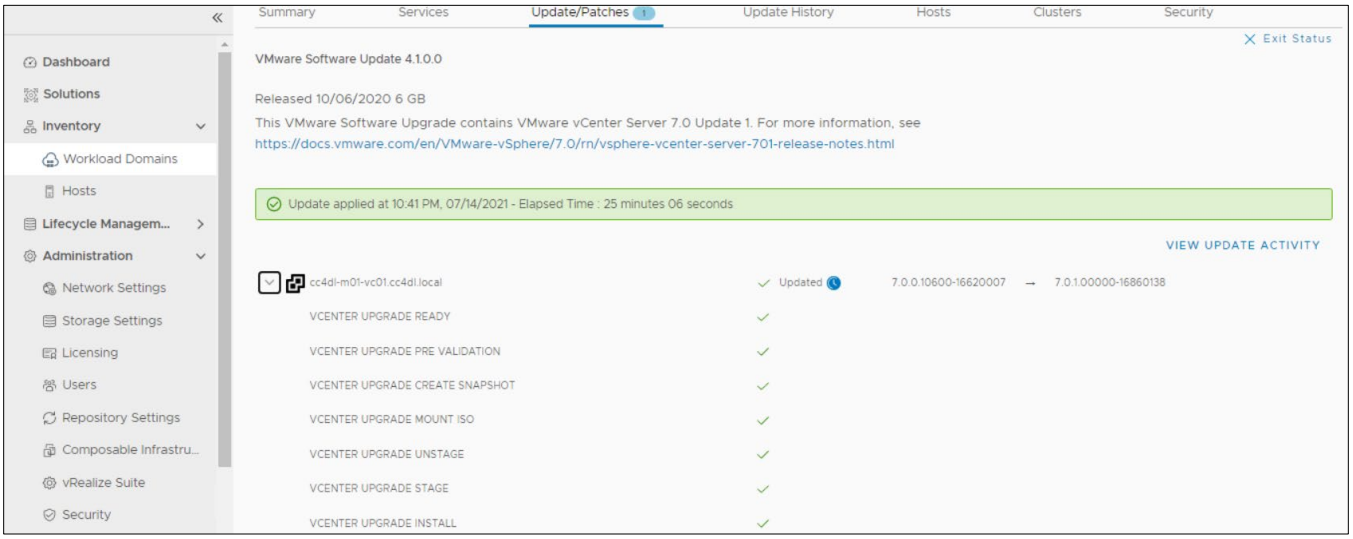

FIGURE 12. vCenter Server update in progress

Update NSX-T Manager

NSX-T Manager update becomes available after the SDDC Manager is successfully updated. Follow the same SDDC Manager update process to complete the NSX-T Manager upgrade as shown in Figure 13.

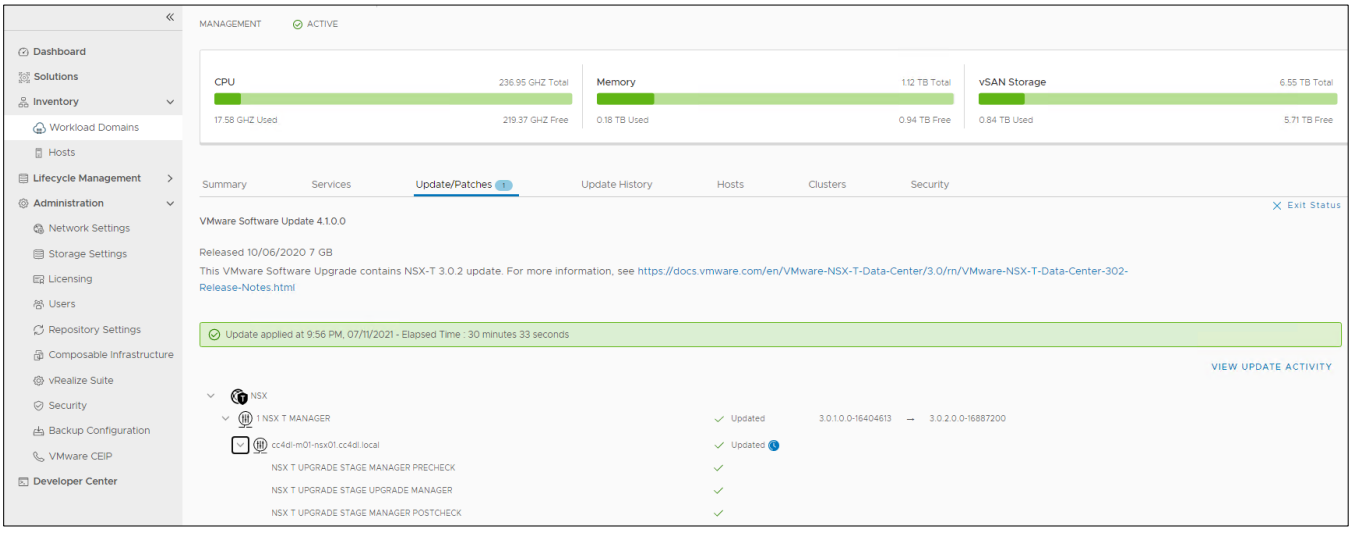

FIGURE 13. NSX-T Manager update in progress

Skip ESXi upgrade and update version Aliases

Once the VCF is upgraded to the 4.1.0.0 version including SDDC Manager, vCenter Server, and NSX-T Manager, the vSphere ESXi upgrade to 7.0u1 can be skipped.

NOTE

The HPE OEM image based on vSphere v7.0u1c (Jan2021) is not a supported release version for the VCF v4.1.x bill of materials from VMware.

To skip the vSphere ESXi upgrade to v7.0u1 on the SDDC manager, use the process below in the SDDC manager VM using the CURL command to indicate the current vSphere 7.0 build meets the criteria to continue to the next upgrade step.

1. Generate an authentication token. SSH to the SDDC Manager VM run following command, where the SSO User ID and Password are the credentials used for the SDDC Manager VM:

```
curl '<SDDC Manager FQDN>/v1/tokens' -i -X POST -H 'Content-Type:application/json'-H 'Accept:
application/json' -d '{"username":"<SSO User ID>","password":"<SSO Password>"}'
```

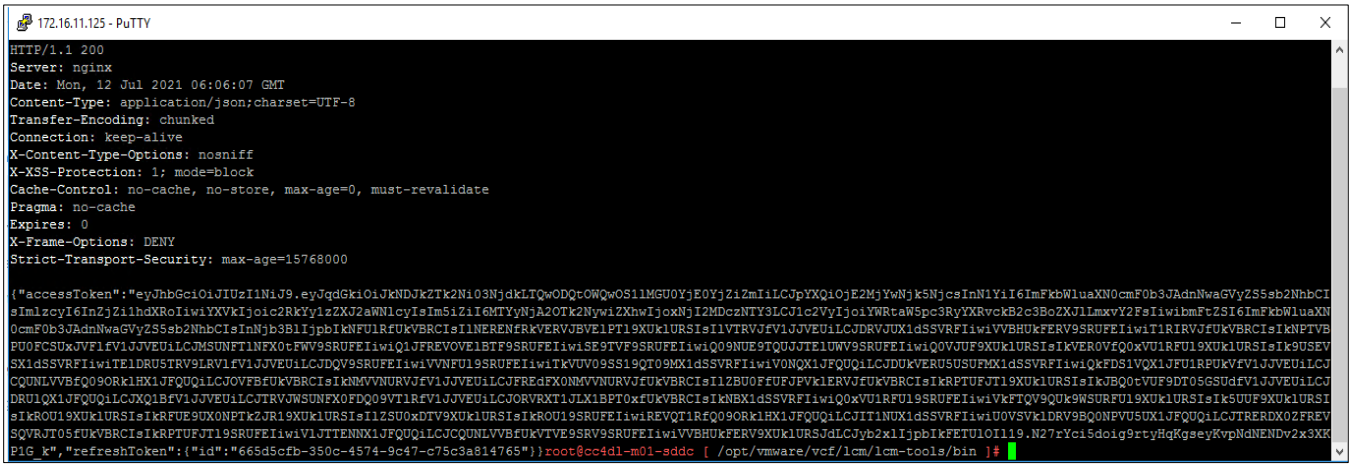

FIGURE 14. SDDC access token

2. The vSphere upgrade from VCF 4.0 to VCF 4.1 step needs to be skipped in the SDDC manager. Set the alias vSphere 7.0 build to get to 7.0u1 using SDDC CURL Command.

```
curl -k '<SDDC Manager FQDN>/v1/system/settings/version-aliases/ESX_HOST/7.0.1-16850804'-X PUT -H 'Content-
Type: application/json' -H 'Authorization: Bearer <ACCESS TOKEN>'-H 'Accept: application/json'-d
'{"aliases":["7.0.0-15843807","7.0.0-16324942"], "forceUpdate" :true}'
```

FIGURE 15. Aliases set for ESXi image

Verify the VCF 4.1.0.0 upgrade bill of materials

Once all the VCF 4.1.0.0 components upgrade is completed, verify the VCF 4.1.0.0 current versions in the SDDC manager **Update/Patches** as shown in Figure 16.

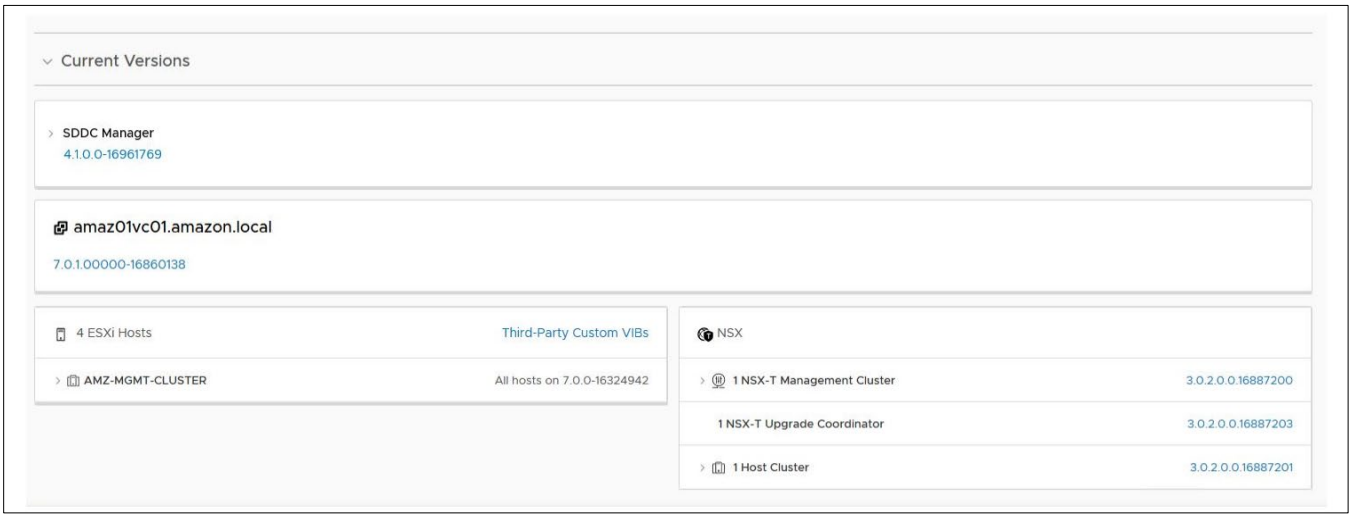

FIGURE 16. VCF 4.1.0.0 bill of material

NOTE
Repeat the previous steps to update the SDDC Manager and vCenter Server from VCF 4.1.0 to 4.1.0.1.

UPGRADE VCF 4.1.0.1 TO VCF 4.2.0

After verifying all the components are updated as per VCF 4.1.0.1 BOM, start downloading the VCF 4.2.0 bundles via the bundle transfer utility.

Offline bundle downloads for VCF 4.2.0

Once the VCF 4.1.0.0 and 4.1.0.1 upgrade is completed, use the bundle transfer utility to generate 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.

1. Download the Bundle Transfer utility on a computer with internet access.
   a. Log in to My VMware and click **Product Downloads**.
   b. In the VMware Cloud Foundation row, click **Drivers and Tools**.
   c. In the **Select Version** field, select **4.2.0**.
   d. Expand VMware Cloud Foundation Tools and click **Go to Downloads**.
   e. In the Bundle Transfer Utility cell, click **Download Now**.
2. Navigate to the `utility_downloaded_directory/bin/` and confirm that you have the execute permission on all folders.
3. Validate that the utility version matches the target release. Run the following command to display the utility version:

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

4. In the same directory, download the LCM 2.0 manifest file. This is a structured metadata file that contains information about the VMware product versions included in the release Bill of Materials.

```
./bin/lcm-bundle-transfer-util --download -manifestDownload --depotUser Username -depotUserPassword Password
```

5. Upload the manifest file to the SDDC Manager VM.

```
./lcm-bundle-transfer-util --update --sourceManifestDirectory /root/workspace/glcm/lcm/lcm-
integration/sourceManifestDir --sddcMgrFqdn FQDN --sddcMgrUser Username
```

   Use your vSphere SSH credentials for the `--sddcMgrUser` parameter.

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

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

8. Generate a marker file:

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

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

9. Copy the marker file to a computer with internet access.

   Copy the **/opt/vmware/vcf/lcm/lcm-tools** directory and the **markerFile** and **markerFile.md5** files from the location displayed in the output of step 1 to a computer with internet access. The **/opt/vmware/vcf/lcm/lcm-tools** directory includes the bundle transfer utility required for the next step.

10. Download bundles using the marker file:

    On the computer with internet access, run the following command:

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

outputDirectory ${absolute-path-output-dir}
sku ${sku}
depotUser ${depotUser}
markerFile ${absolute-path-markerFile}
markerMd5File ${absolute-path-markerFile.md5}
p ${specific product version}
```

TABLE 3. Bundle transfer utility parameters and values

Parameter	Description and Example Values
absolute-path-output-dir	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.
Sku	Optional. SKU or service provider of the index file.
depotUser	User name for my VMware depot. You are prompted to enter the depot user password. If there are any special characters in the password, specify the password within the single quote.
markerFile	Absolute path to the marker file, as generated in the above step. If you do not specify the path to the marker file, all update bundles on the depot are downloaded.
markerMd5File	Absolute path to the marker MD5 checksum file, as generated in the above step.
P	Used to download bundles only for the specific product version. When run with the upload option, the tool uploads the bundles specific to the product

Use the following command to download the VCF 4.2.0.0 bundles specifically as shown in Figure 17.

```
.\lcm-bundle-transfer-util -download -outputDirectory <DIRECTORY PATH> -depotUser <VMWARE DEPOT USERNAME> -
markerFile <MARKER FILE DIRECTORY>\markerFile -markerMd5File <MARKER MD5 FILE DIRECTORY >\markerFile.md5 -p
4.2.0.0
```

```
A subdirectory or file C:\Users\ADMINI~1\AppData\Local\Temp\2\lib\security already exists.
        1 file(s) copied.
VMware Cloud Foundation LCM Bundle Transfer Tool, Version: 4.2.0-vcf4200RELEASE-17559390
VMware Cloud Foundation LCM Tools version : 4.2.0-vcf4200RELEASE-17559390
Validating the depot user credentials...
Creating delta file
Computed the delta of the bundles that are to be downloaded and output is written to: C:\4.2.0.0\deltaFileDownloaded
Created delta file
********************************************************************************************************************************************************
Bundle Id                               Bundle                  Product Version         Bundle Size (in MB)             Components
********************************************************************************************************************************************************
906c8d8f-c28d-4122-8720-43be7af2cbfd    bundle-37979            4.2.0.0                 10070.0 MB                      SDDC_MANAGER_VCF-4.2.0.0-17559673
e53edad7-26df-4282-8874-d1724e63ac5b    bundle-37982            4.2.0.0                 209.0 MB                        SDDC_MANAGER_VCF-4.2.0.0-17559673
5db30ee0-8b78-495b-82ac-45d6ac9784b8    bundle-32076            4.2.0.0                 947.0 MB                        VRSLCM-8.2.0-17513665-PATCH
b0fdae11-c9d7-4345-8b74-9297bc63cc5c    bundle-32074            4.2.0.0                 1138.0 MB                       VRSLCM-8.2.0-17513665-INSTALL
be94dc01-f299-4362-b91e-cf36535ad686    bundle-32078            4.2.0.0                 4115.0 MB                       WSA-3.3.4-17498518-INSTALL
9a143bf8-160f-42e5-9fd3-fd7bc780db1d    bundle-32927            4.2.0.0                 1325.0 MB                       VRLI-8.2.0-16957702-INSTALL
9ba4109a-f426-4397-a54f-62567d8c03f5    bundle-30919            4.2.0.0                 2861.0 MB                       VROPS-8.2.0-16949153-INSTALL
cb736115-15ab-4acf-9943-928e20664b19    bundle-30921            4.2.0.0                 6515.0 MB                       VRA-8.2.0-16980951-INSTALL
ff249395-d58a-4d3d-8111-9237fe6a6a45    bundle-32810            4.2.0.0                 7057.0 MB                       NSX_T_MANAGER-3.1.0.0.0-17107167-PATC
H
1cce3a86-7292-4c91-b0db-20274f2c741d    bundle-32811            4.2.0.0                 8427.0 MB                       NSX_T_MANAGER-3.1.0.0.0-17107167-INST
ALL
a9938c7e-d30c-4ce9-adab-831f835e6c12    bundle-35321            4.2.0.0                 5140.0 MB                       VCENTER-7.0.1.00200-17327517-PATCH
9d272a97-9a55-492e-b661-0a8f3f2dfd4a    bundle-35322            4.2.0.0                 7749.0 MB                       VCENTER-7.0.1.00200-17327517-INSTALL
e7ee206d-069f-4982-8271-38e7970dcf9a    bundle-37983            4.2.0.0                 368.0 MB                        ESX_HOST-7.0.1-17551050-PATCH
********************************************************************************************************************************************************
Total applicable bundles: 13
Do you want to continue [y/n]?
```

FIGURE 17. VCF 4.2.0 upgrade bundles being downloaded

11. Copy the downloaded bundles to the SDDC Manager VM:

    Copy the update bundle directory from the external computer to the SDDC Manager VM as follows:

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

    OR

    Use **WINSCP** software to move the bundles to the SDDC Manager VM:

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

12. In the SDDC Manager VM, change the ownership and permissions of the uploaded bundle:

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

13. 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/vcfupgradebundle
    ```

Apply the updates via SDDC Manager

This section describes how to apply the SDDC Manager bundle. For more information, see the Upgrade Sequence section within this document. SDDC Manager makes each component available appropriately for upgrade only if the bundle is compatible and in sequence.

Update SDDC Manager

1. Navigate to the **Updates/Patches** tab of the management domain to confirm the available update. Run the PRECHECK. For more information, refer to the Precheck - VMware section.
2. The **Available Updates** section displays the offline bundle that you uploaded to SDDC Manager before starting the upgrade.

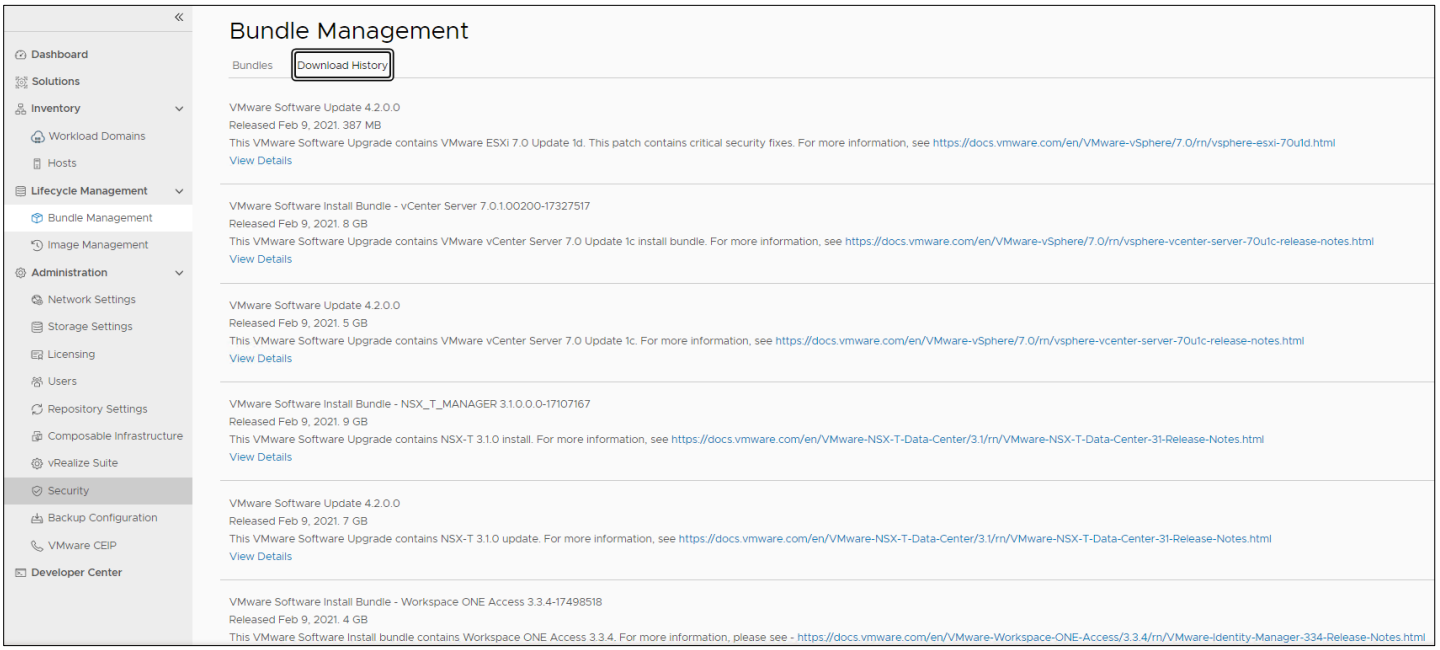

FIGURE 18. SDDC Manager displaying available updates

3. Click **UPDATE NOW** or **SCHEDULE UPDATE** and select the date and time for the bundle to be applied. The first available update would always be the SDDC Manager update. The update can be either scheduled or can be initiated immediately as shown in Figure 19.

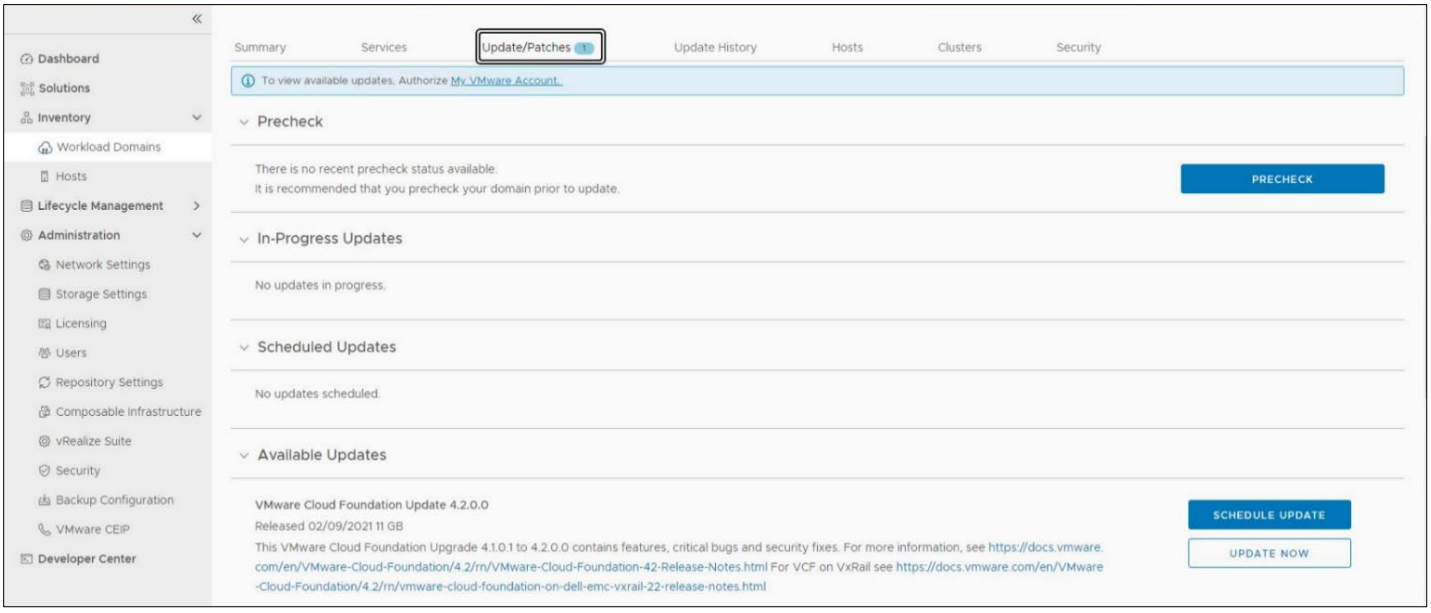

FIGURE 19. SDDC Manager update/patch

4. Click **View Update Activity** to view the detailed tasks.
5. After the upgrade is completed, a green bar with a checkmark is displayed. Click **Finish**.
6. Confirm that the SDDC Manager is updated to 4.2.0 as shown in Figure 20.

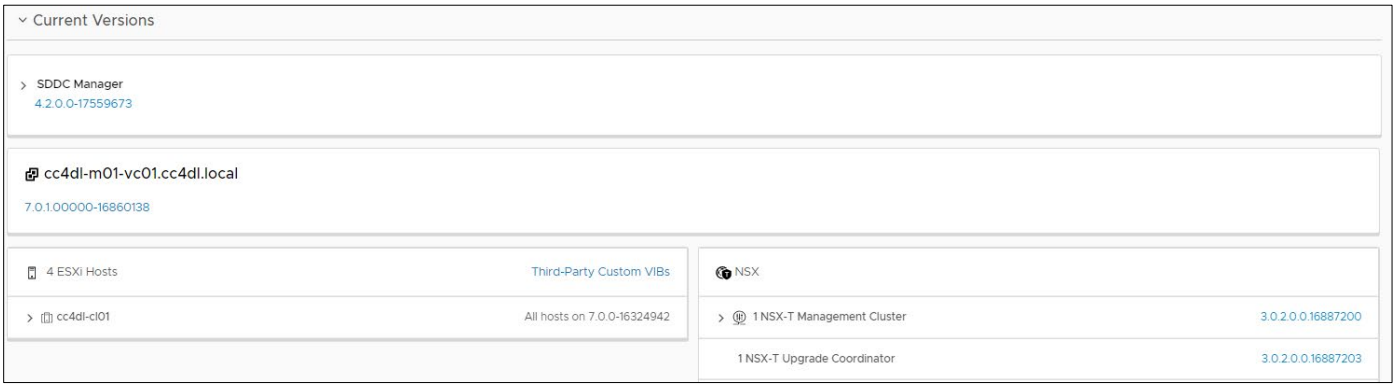

FIGURE 20. SDDC Manager current versions

NOTE
Once the SDDC Manager update is completed restart the SDDC Manager UI service using `systemctl restart lcm`.

Once the SDDC Manager is upgraded with 4.2.0, the upgrade bundles for NSX-T and vCenter Server will not show in the "Update/Patches" drop-down list. Clean up all the uploaded bundles in the SDDC Manager VM and re-upload VCF 4.2.0 downloaded bundles and follow the upgrade process again.

See Appendix A: VCF bundle clean-up procedure section to clean up the VCF bundles from the SDDC Manager.

Update vCenter Server

The next available update in SDDC Manager is for the vCenter Server.

1. vCenter Server update becomes available after the SDDC Manager is updated automatically.

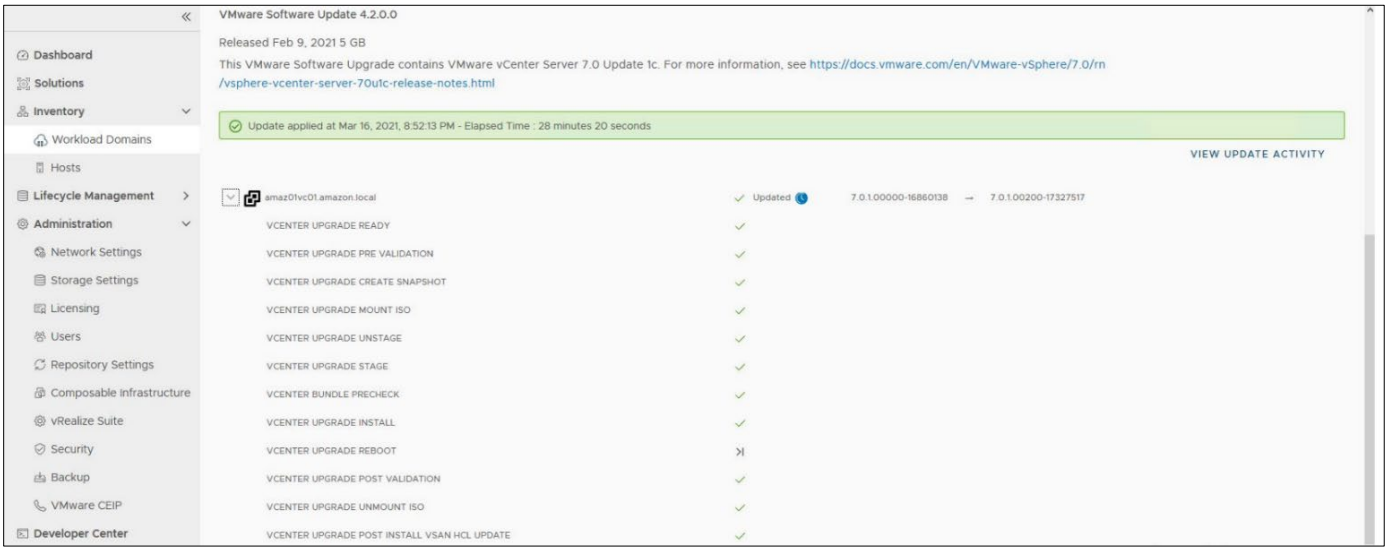

FIGURE 21. vCenter Server update progress

Update NSX-T Manager

1. NSX-T Manager update becomes available after the SDDC Manager is updated automatically. Follow the same SDDC Manager update process to complete the NSX-T Manager upgrade as shown in Figure 22.

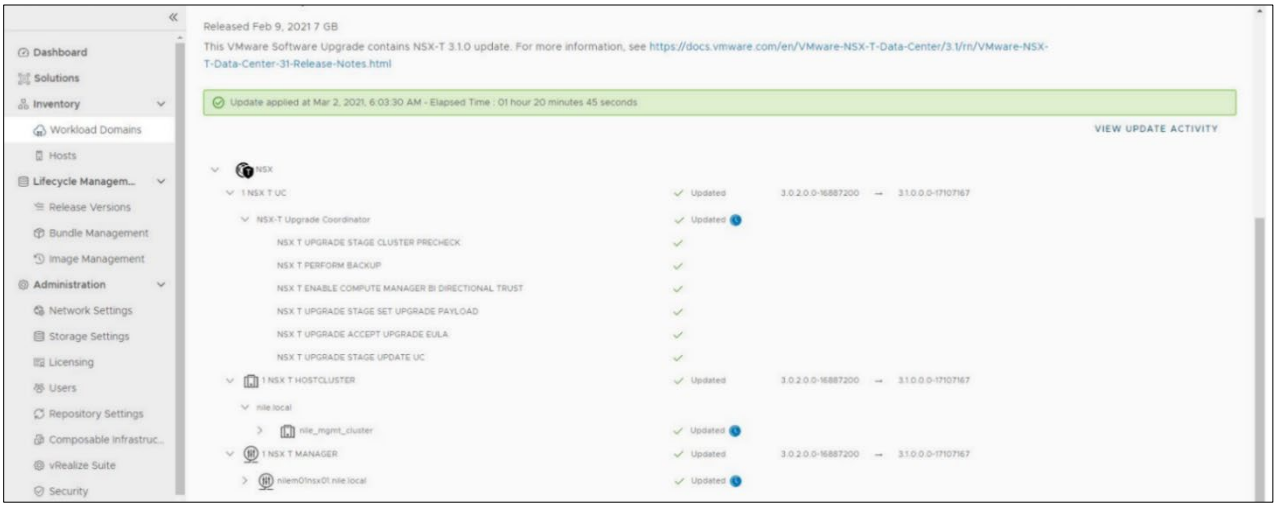

FIGURE 22. NSX-T Manager update in progress

Upgrade VMware ESXi host

Once the SDDC Manager, vCenter Server, and NSX-T are upgraded, the vSphere ESXi upgrade should be done through the VMware HPE OEM-based custom images.

Download VMware HPE OEM based custom image

1. Download the HPE Custom OEM Image for the HPE servers platform from https://www.hpe.com/us/en/servers/hpe-esxi.html or download from https://my.vmware.com/en/web/vmware/downloads/details?downloadGroup=OEMESXI70U1-HPE&productId=974 as shown in Figure 23.

   HPE ProLiant Servers: VMware-ESXi-7.0.1-17551050-HPE-701.0.0.10.7.0.71-May2021.iso

   HPE Synergy Servers: VMware-ESXi-7.0.1-17551050-HPE-701.0.0.10.7.5.16-May2021-Synergy.iso

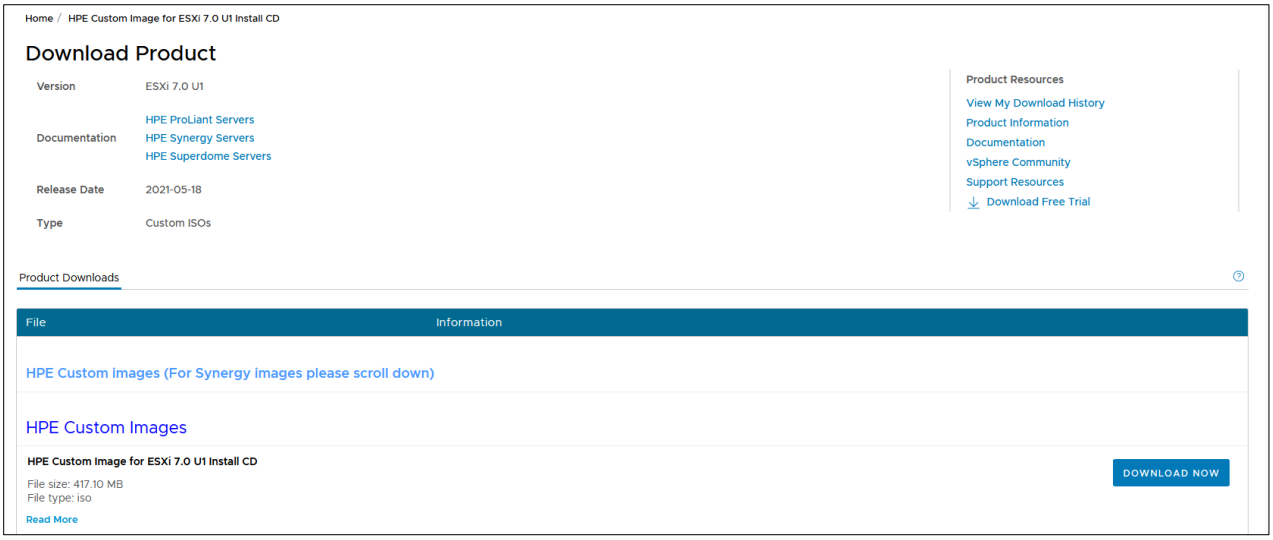

FIGURE 23. HPE Servers custom ISO download

Deploy VMware HPE custom OEM based ISO image

Use the vSphere 7.0 build to satisfy the 7.0u1 build requirement information to allow the upgrade to 7.0u1d.

1. Generate an authentication token. SSH to the SDDC Manager VM run following command, where the SSO User ID and Password are the credentials used for the SDDC Manager VM:

```
curl '<SDDC Manager FQDN>/v1/tokens' -i -X POST -H 'Content-Type: application/json' -H 'Accept: application/json' -d '{"username": "<SSO User ID>", "password": "<SSO Password>"}'
```

2. Call the "Update Version Aliases" API with the following inputs, providing the fully qualified domain name of the SDDC Manager and access token you generated in the previous step.

```
curl -k '<SDDC Manager FQDN>/v1/system/settings/version-aliases/ESX_HOST/7.0.1-17168206' -X PUT -H 'Content-Type:application/json' -H 'Authorization:Bearer <ACCESS TOKEN>' -H 'Accept: application/json' -d '{"aliases":["7.0.0-15843807","7.0.0-16324942"], "forceUpdate": true}'
```

3. Follow the steps outlined in the VMware documentation section, Upgrade ESXi with Custom ISO https://docs.vmware.com/en/VMware-Cloud-Foundation/4.2/vcf-lifecycle/GUID-B639896D-B4F0-4758-A02B-AA94FA6FEF1F.html to upgrade the hosts with the HPE OEM custom image.
4. Now the VMware ESXi update option is available in **Update/Patches** as shown in Figure 24.

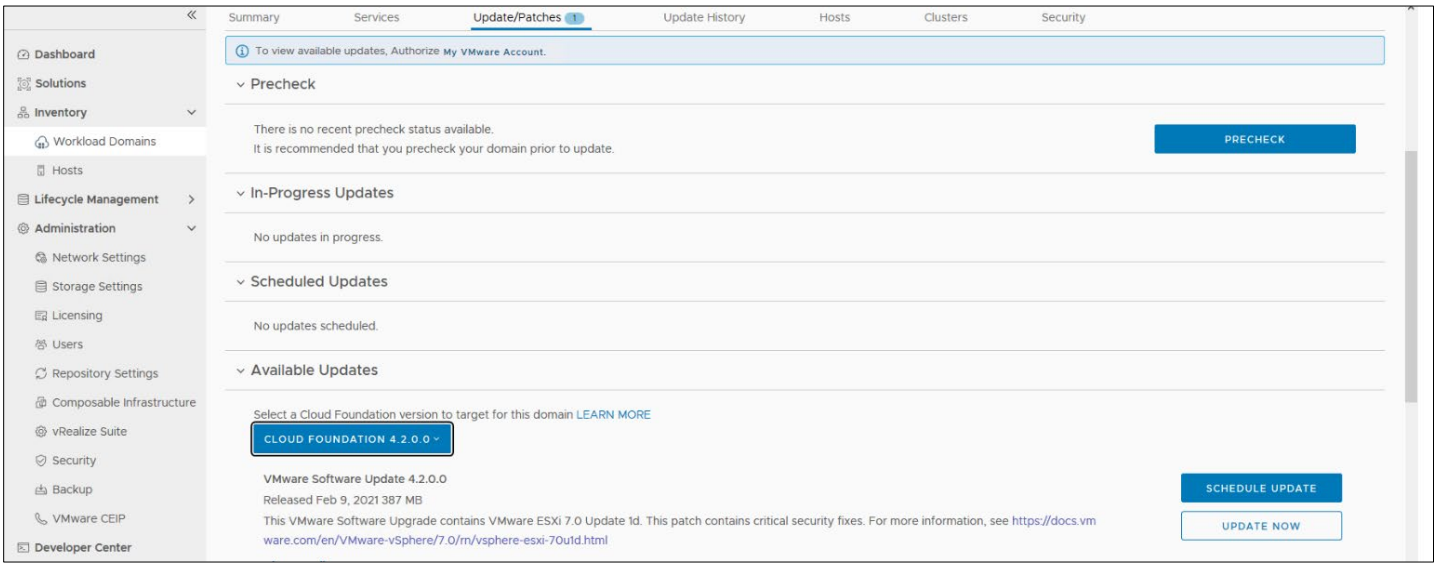

FIGURE 24. VMware HPE ESXi custom ISO update bundle

5. Once the VMware HPE ESXi v7.0U1d image upgrade starts, the upgrade status can be viewed as shown in Figure 25.

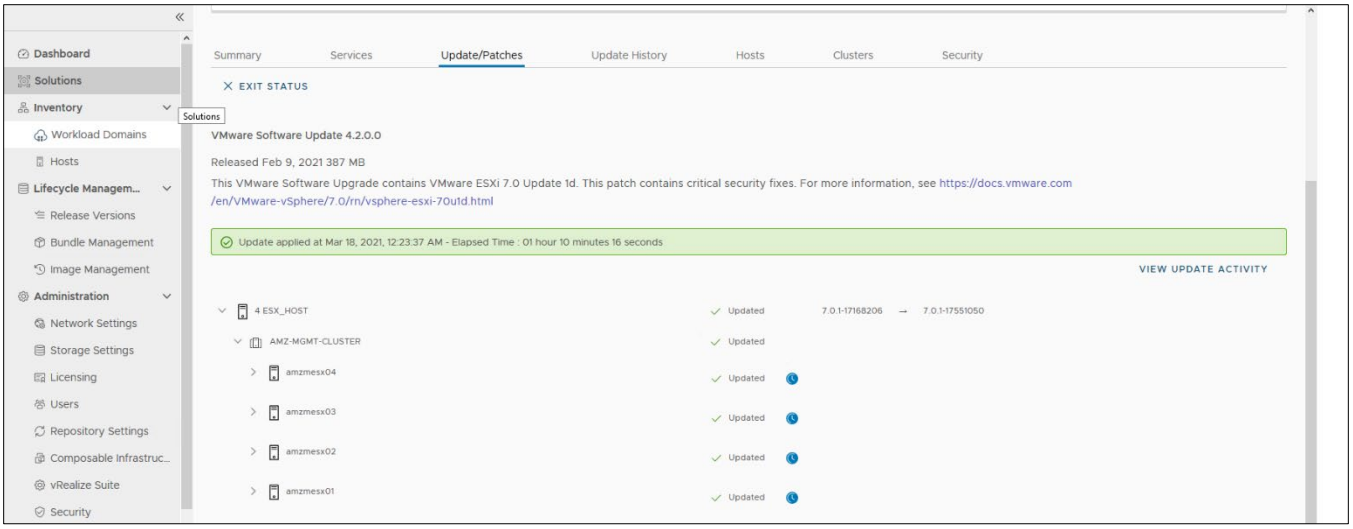

FIGURE 25. VMware HPE ESXi custom ISO update status

6. Once the VMware HPE ESXi custom image upgrade is completed, verify the bill of material for VCF 4.2.0 in the SDDC Manager release versions as shown in Figure 26.

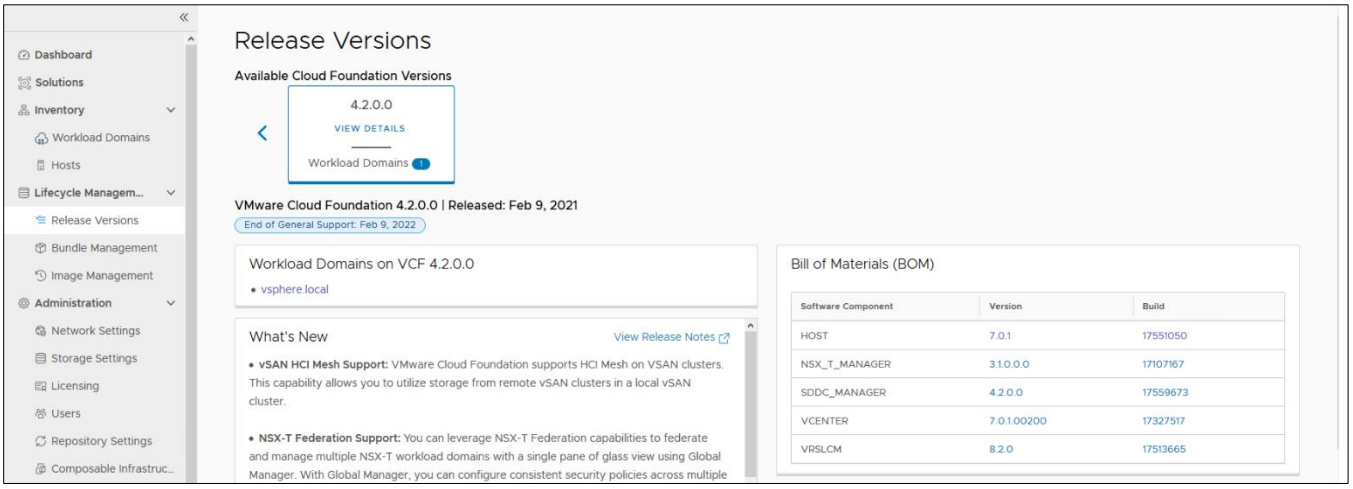

FIGURE 26. SDDC Manager 4.2.0 verification on the Release Versions

UPGRADE VCF 4.2 TO VCF 4.2.1

After verifying all the components are updated as per VCF 4.2.1 BOM, start downloading the VCF 4.2.1 bundles via the bundle transfer utility.

For upgrading the SDDC Manager, vCenter Server, and the NSX-T Manager sequence, see the "Upgrade VCF 4.1.0.1 TO VCF 4.2.0" section.

Verify the bill of material for VCF 4.2.1 in the SDDC Manager release versions as shown in Figure 27.

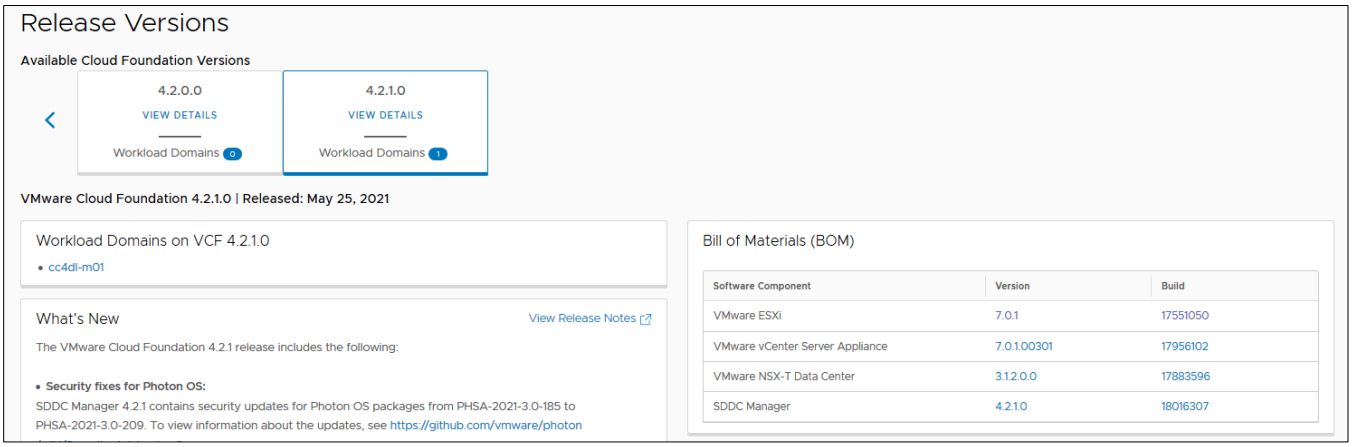

FIGURE 27. SDDC manager 4.2.1 verification on the Release Versions

SUMMARY

Hewlett Packard Enterprise and VMware together deliver a software-defined solution running on modular infrastructure across compute, storage, network, security, and cloud management. This technical paper demonstrates the method to upgrade the VMware Cloud Foundation from version 4.0.1 to 4.2.1 on HPE Servers when the SDDC Manager VM does not have access to the internet.

APPENDIX A: VCF BUNDLE CLEAN-UP PROCEDURE

Once the SDDC Manager is upgraded to 4.2.x, the upgrade bundles for NSX-T and vCenter Server may not show in the "Update/Patches" drop-down list. Clean up all the uploaded bundles in the SDDC Manager VM and re-upload VCF 4.2.x downloaded bundles and follow the upgrade process.

If it is necessary to remove the previously uploaded bundles in the SDDC Manager VM. Follow these steps for the clean-up process:

Go to the **Bundles** or **Download History** and get the **Bundle ID** in the Additional Bundle Details of vCenter Server and NSX-T as shown in Figure A1.

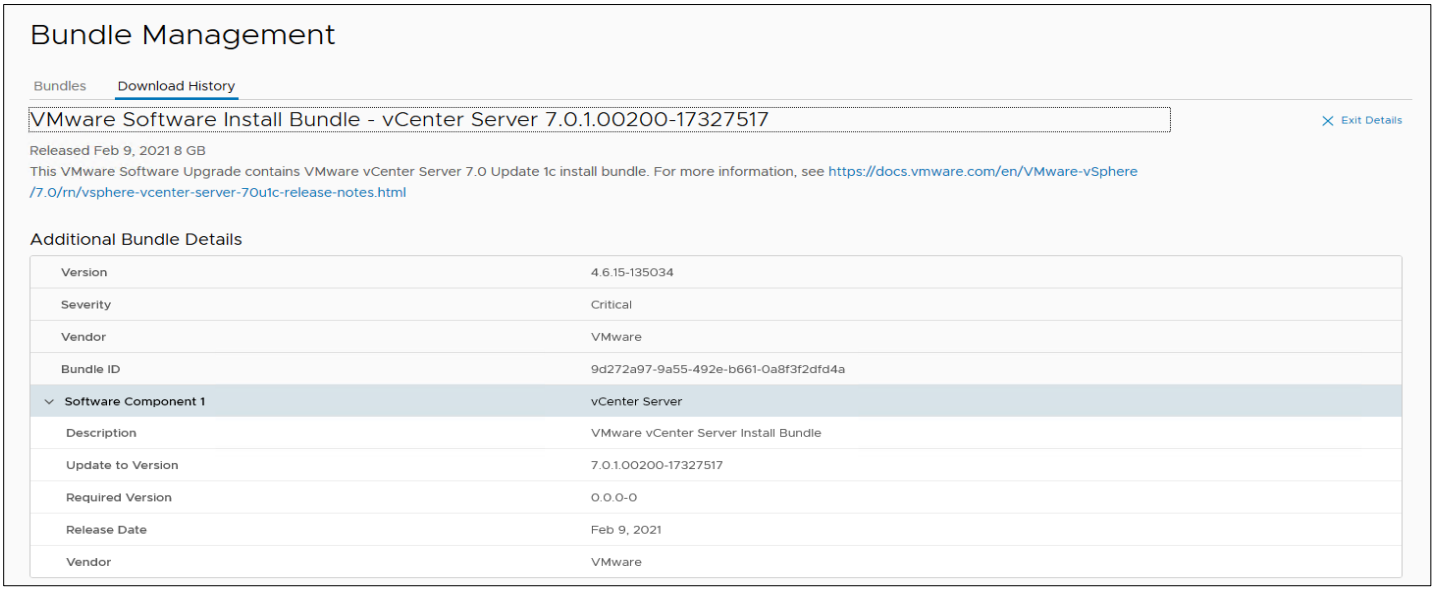

FIGURE A1. Get the Bundle ID

SDDC Manager VM

1. Log in to the SDDC Manager VM.
2. Run `/opt/vmware/vcf/lcm/lcm-app/bin/bundle_cleanup.py <BUNDLE ID FROM THE STEP1>.`
3. Upload the downloaded VCF 4.2 offline bundles to the SDDC Manager VM under `/nfs/vmware/vcf/nfs-mount/<DIRECTORY>`.
4. Now both the NSX-T and vCenter Server bundles will be shown in **Update/Patches**.

RESOURCES AND ADDITIONAL LINKS

HPE Servers Firware and Software Compatibility Matrix for VMware Cloud Foundation, https://www.hpe.com/psnow/doc/a50004851enw

HPE Server Support Matrix, https://techlibrary.hpe.com/us/en/enterprise/servers/supportmatrix/vmware.aspx

HPE Recommended VMware Lifecycle Manager Desired Image Combinations, HPE ProLiant Servers, http://vibsdepot.hpe.com/ProLiant/Valid-vLCM-Combos-ProLiant.pdf

HPE Software Delivery Repository with compatible HPE Bundles for VMware Image Builder, Update Manager and ESXCLI, http://vibsdepot.hpe.com/

HPE VMware ESXi 7.0 U1 Upgrade Pack 1.4.1.1, https://support.hpe.com/hpesc/public/swd/detail?swItemId=MTX-64dd56ccb3ef4c8bbd5d51e62f

VMware PowerCLI User's Guide, https://vdc-download.vmware.com/vmwb-repository/dcr-public/9bac297b-50a4-4e24-8c80-fc14239ebe04/cc9d550d-4ee8-4d09-8ed3-b3b14b72d18f/vmware-powercli-12-user-guide.pdf

HPE Reference Architectures, hpe.com/info/ra

HPE Servers, hpe.com/servers

HPE Storage, hpe.com/storage

HPE Networking, hpe.com/networking

HPE Technology Consulting Services, hpe.com/us/en/services/consulting.html

To help us improve our documents, please provide feedback at hpe.com/contact/feedback.

a50004561enw, September 2023

Hewlett Packard Enterprise