

Administering VMware Cloud Foundation

SDDC Manager
VMware Cloud Foundation 2.1.3



vmware®

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About Administering VMware Cloud Foundation

Administering VMware Cloud Foundation provides information about managing a VMware Cloud Foundation™ environment, including managing the environment's physical and virtual infrastructure, managing users, configuring and deploying service offerings, and upgrading and monitoring the environment.

Intended Audience

The *Administering VMware Cloud Foundation* is intended for data center system administrators who manage their organization's Cloud Foundation environment. The information in this guide 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 Virtual SAN™
- 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 Platform Services Controller™
- VMware vRealize® Operations™
- VMware vRealize® Log Insight™
- The View components from the VMware Horizon® 6 product
- VMware App Volumes™

Related Publications

The *VMware Cloud Foundation Overview and Bring-Up Guide* contains detailed information about a Cloud Foundation installation, its components, and the network topology of a deployed environment.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to <http://www.vmware.com/support/pubs>.

About the Screen Shots Used in this Guide

The screen shots used in this guide typically show only that portion of the overall user interface screen that corresponds to the text at which point the screen shot appears, and not necessarily the full user interface.

Note Some screen shots are taken at a higher resolution than others, and might look grainy when the PDF is viewed at 100%. However, if you zoom to 200%, the image looks clear and readable.

Administering Cloud Foundation Environments

1

Cloud Foundation enables deployment of a private cloud environment based on VMware's software-defined data center (SDDC) architecture. A Cloud Foundation installation is a turnkey private cloud instance that is easily deployed in a corporate network. In this environment, SDDC Manager enables the ability for streamlined and automated data center operations and the delivery of service offerings, such as virtual infrastructure (VI) and virtual desktop infrastructure (VDI) environments, based on a VMware SDDC architecture.

Virtual compute, storage and networking capabilities are provided with corresponding management capabilities, and SDDC Manager makes those capabilities available as a single logical environment, the virtual rack. This logical aggregation of the physical racks and their associated resources allows for easier management of all of the resources across the infrastructure and gives your organization the ability to rapidly provision virtual infrastructure environments and related services. When you provision VI or VDI environments and have licensed use of the deployed vRealize Log Insight and vRealize Operations instances, SDDC Manager configures the vRealize Log Insight and vRealize Operations instances for those environments, to provide performance management, capacity optimization, and real-time log analytics. Cloud Foundation installations can scale to meet the increasing demands on your data center.

See the *VMware Cloud Foundation Overview and Bring-Up Guide* for an in-depth introduction to the architecture, components, and physical topology of a Cloud Foundation installation, along with detailed descriptions of the software that is deployed in the environment.

As an SDDC administrator, you use the information in the *Administering VMware Cloud Foundation* to understand how to administer and operate your installed Cloud Foundation environment. An administrator of an Cloud Foundation environment performs tasks such as:

- Manage users, roles, and permissions
- Manage physical and logical resources
- Configure and provision the environments, the workload domains, that are used to provide service offerings
- Manage provisioned workload domains
- Monitor alerts and the health of the installation
- When the deployed vRealize Log Insight instance is licensed for use in your Cloud Foundation installation, use the auditing and log analytics capabilities of the vRealize Log Insight instance to troubleshoot issues and prevent problems across the physical and virtual infrastructure

- When the deployed vRealize Operations Manager instance is licensed for use in your Cloud Foundation installation, use the centralized monitoring capabilities of the vRealize Operations instance to manage performance and gain insight into the health of the environment across the physical and virtual infrastructure
- Perform life cycle management on the Cloud Foundation software components

This chapter includes the following topics:

- [VMware Software Components Deployed in a Typical Cloud Foundation Environment](#)
- [Client Web Interfaces Used When Administering Your Cloud Foundation Environment](#)

VMware Software Components Deployed in a Typical Cloud Foundation Environment

In a typical Cloud Foundation environment, you will encounter specific VMware software that SDDC Manager deploys in the environment.

Licensed for use by the base Cloud Foundation license:

- The SDDC Manager, the Hardware Management Services, and their subcomponents that provide centralized management of the Cloud Foundation software stack
- The VMware software stack that implements a software-defined data center and which are deployed by SDDC Manager are:
 - vSphere
 - Platform Services Controller, used as the identity provider
 - Virtual SAN
 - NSX for vSphere

Separately licensed software components that are deployed by SDDC Manager are:

- vCenter Server
- vRealize Operations
- vRealize Log Insight
- VMware Horizon that provides virtual desktop infrastructure (VDI) environments
- App Volumes

Note For information about which specific editions of each VMware product are licensed for use with the Cloud Foundation license, use the information resources at the Cloud Foundation product information page at <http://www.vmware.com/products/cloud-foundation.html>.

For the exact version numbers of the VMware products that you might see in your Cloud Foundation environment after the initial bring-up process, see the *Release Notes* document for your Cloud Foundation version. If the environment has been updated after the initial bring-up process using the Life Cycle Management features, see [View Inventory Component Versions](#) for details on how to view the versions of the VMware software components that are within your environment.

Caution Do not manually change any of the settings that SDDC Manager sets automatically by default. If you change the generated settings, like names of VMs, unpredictable results might occur. Do not change settings for the resources that are automatically created and deployed during workflows, the workload domain processes, assigned IP addresses or names, and so on.

Some of the default configuration settings can be customized using the SDDC Manager client. See [Chapter 8 Settings Configuration Using the SDDC Manager Client](#).

You can find the documentation for the following VMware software products and components at www.vmware.com/support/pubs:

- vSphere
- Platform Services Controller, used as the identity provider
- vCenter Server
- Virtual SAN
- NSX for vSphere
- vRealize Operations
- vRealize Log Insight
- View, a component of the VMware Horizon product
- App Volumes

About the Primary Rack and the SDDC Manager Virtual IP Address

In a multirack Cloud Foundation installation, the primary rack is the one that:

- Was the rack that went through the bring-up process first, the initial one in the installation
- Has its ToR switches configured with uplink ports to carry traffic to your corporate network
- Has the environment's three ISVM VMs and two Platform Services Controller VMs deployed on ESXi hosts in that rack

An instance of SDDC Manager is deployed on each physical rack as part of a managed cluster of services provided by the three ISVM VMs on the primary rack. Each of the SDDC Manager instances connects to those three ISVM VMs to read and write data. Even though each of those SDDC Manager instances has its own management IP address, a virtual IP (VIP) address is assigned to a network subinterface on one of the SDDC Manager instances. This VIP provides the convenience of having a single DNS name and IP address to connect to the SDDC Manager client.

Usually, the primary rack's SDDC Manager instance is assigned the VIP address because the VIP address gets created during the bring-up process on the initial rack in an installation. However, there are situations in which you will find the VIP address is assigned to one of the other racks' SDDC Manager instances. Whenever the `vrn-tcserver` service is stopped in the SDDC Manager instance having the VIP address, the VIP address is automatically reassigned to the next rack's SDDC Manager instance. For example, if the instance that has the VIP address is rebooted, the VIP address is automatically reassigned to another SDDC Manager instance. As a result, the primary rack is not always the same rack having the SDDC Manager instance with the VIP address.

When you view the domain details for any of the management domains using the SDDC Manager client, the SDDC Manager VIP address is displayed in the domain details screens, in the table labeled VMware Cloud Foundation Management Components. For the SDDC Manager instance on a given rack, you can determine if the VIP is assigned to it by logging in to that rack's SDDC Manager instance using the root account and issuing the `ifconfig` command:

```
rack-1-vrm-1:~ # ifconfig
```

When the VIP is assigned to that instance, the `ifconfig` commands output lists an `eth0:1000` subinterface with the VIP address assigned to the subinterface's `inet` addr.

For a description of SDDC Manager in a multirack setup, see the *VMware Cloud Foundation Overview and Bring-Up Guide*.

Client Web Interfaces Used When Administering Your Cloud Foundation Environment

You use the SDDC Manager client loaded in a browser for the single-point-of-control management of your Cloud Foundation environment. This user interface provides centralized access to and an integrated view of the physical and virtual infrastructure of your environment.

SDDC Manager does not mask the individual component management products. Along with the SDDC Manager client, for certain tasks, you might also use the following Web interfaces for administration tasks involving their associated VMware software components that are part of a VMware SDDC. All of these interfaces run in a browser, and you can launch many of them from locations in the SDDC Manager client.

Launch links are typically identified in the user interface by the launch icon: .

VMware SDDC Web Interfaces	Description	Launch Link Location in SDDC Manager Client
vSphere Web Client	This interface provides direct management of resources managed by the vCenter Server instances, for identity management, and for management of the NSX resources that provide the software-defined networking capabilities of the SDDC.	The General Info screen of the Domain Details page for management and workload domains has a launch link labeled vCenter .
vRealize Log Insight Web interface	When the vRealize Log Insight instance is licensed for use in the environment, this interface provides direct access to the logs and event data collected and aggregated in vRealize Log Insight for troubleshooting, trend analysis, and reporting.	The Management Info screen of the Domain Details page for management domains has launch links labeled Log Insight , for the IP and virtual IP instances. The Analysis links in the Events and Audit Events listings also open the vRealize Log Insight Web interface.
vRealize Operations Manager Web interface	When the vRealize Operations Manager instance is licensed for use in the environment, this interface provides direct access to the event and alert data collected in vRealize Operations Manager for analysis.	The Management Info screen of the Domain Details page for management domains has a launch link labeled vROPS .

If a VDI workload domain is deployed and licensed for use in your environment, you might also use the following Web interfaces for administration tasks involving the associated VMware software components in such a VDI environment:

- View Administrator Web interface
- App Volumes Manager Console

Launch links are not provided in the SDDC Manager client for those VDI-related interfaces. To use those interfaces, use the **vCenter** launch link on the VDI workload domain's details screen to open the vSphere Web Client and locate the virtual machine for the View Server or App Volumes Manager Server and its DNS name. A virtual machine's DNS name is typically displayed on the virtual machine's **Summary** tab in the vSphere Web Client. After locating the DNS name for the virtual machine, open a browser tab and point it to:

- <https://View-Server-VM-DNS-name/admin>, for the View Administrator Web interface, where View-Server-VM-DNS-name is the View Connection Server VM's DNS name.
- <https://App-Volumes-VM-DNS-name>, for the App Volumes Manager Console, where App-Volumes-VM-DNS-name is the App Volumes Manager VM's DNS name.

Getting Started with the SDDC Manager Client

2

You use the SDDC Manager client to perform administration tasks on your Cloud Foundation environment. This user interface provides an integrated view of the physical and virtual infrastructure and centralized access to manage the physical and logical resources.

You work with the SDDC Manager client by loading it in an industry-standard Web browser. For the list of supported Web browser types and versions, see the *Release Notes*.

Note When performing out-of-band (OOB) troubleshooting of hardware using the Java-based consoles, the Firefox browser is typically used instead of the Chrome browser because of the Firefox browser's support of the Java-based console.

This chapter includes the following topics:

- [Log in to the SDDC Manager Client](#)
- [Tour of the SDDC Manager User Interface](#)
- [Log out of the SDDC Manager Client](#)

Log in to the SDDC Manager Client

You access the SDDC Manager client using a standard Web browser.

Prerequisites

Verify that you have the following information:

- A user name and password for an account that is configured for accessing the SDDC Manager client. Your installation uses role-based access control (RBAC) to determine what operations a user can perform, including logging in. For details about SDDC Manager and RBAC, see [Role-Based Access Control](#).

During the Cloud Foundation bring-up process, a name and password are entered to create a superuser account. If this is the first time you are logging in after running the bring-up process, you can use those superuser account credentials to log in and then authorize other users for access. The superuser account's domain is the SSO domain that was entered during the bring-up process, for example `vsphere.local`, and you log in using the form `superuser-name@domain` and the superuser password.

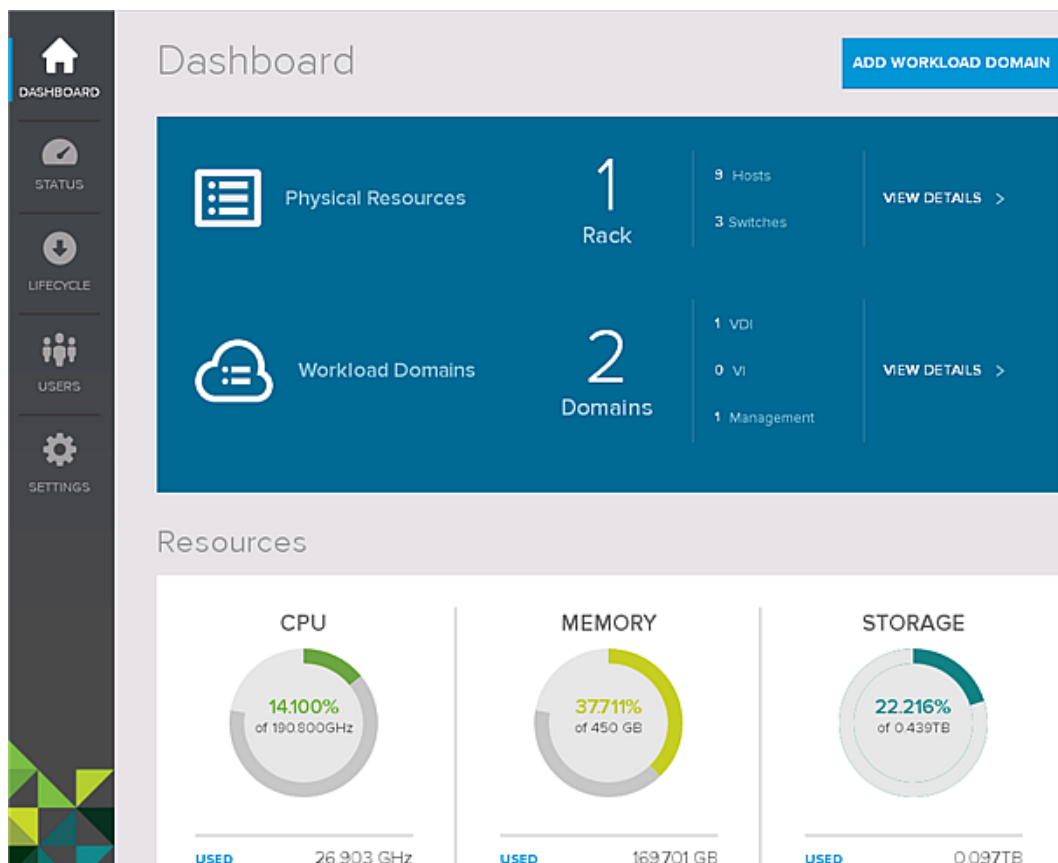
- The Fully Qualified Domain Name (FQDN) for the SDDC Manager virtual IP address (VIP). This name typically has a form like `vrn.sddc.example.com`, where `sddc.example.com` is the value that was specified for the subdomain in the bring-up process wizard. During the bring-up process on the initial rack in a Cloud Foundation environment, this FQDN and VIP address are created and the VIP address is assigned to a network subinterface of the SDDC Manager instance that is deployed in that initial rack.

See the *VMware Cloud Foundation Overview and Bring-Up Guide* for details about the IP addresses that are assigned during the bring-up process. For a description of the SDDC Manager VIP address, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

Procedure

- 1 In a Web browser, open the login screen by navigating to `https://VIP-FQDN/vrm-ui`
For example, point your browser to `https://vrn.sddc.example.com:8443/vrm-ui`
- 2 Log in using the user name and password for an account that is configured for access.

You are logged in to the SDDC Manager client and the Dashboard page appears in the browser.




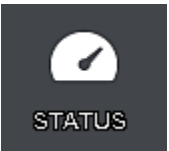



Tour of the SDDC Manager User Interface

The SDDC Manager client provides the user interface for your single point of control for managing and monitoring your Cloud Foundation installation and for provisioning virtual environments.

In the client loaded in your browser, you use the Navigation bar to move between the main areas of the user interface.

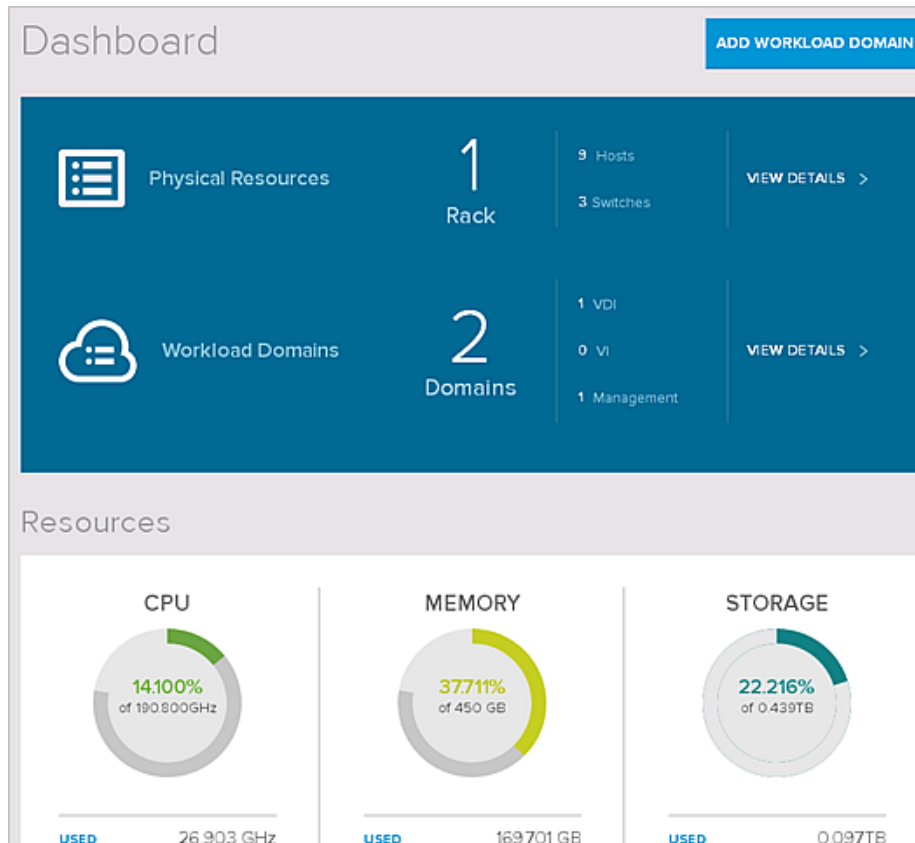
Navigation Bar

On the left side of the interface is the Navigation bar. The Navigation bar provides icons for navigating to the corresponding pages.

Navigation Bar Icon	Label	Functional Area
	Dashboard	Dashboard
	Status	System status
	Lifecycle	Life cycle management
	Users	User management
	Settings	System settings

Dashboard

The Dashboard page is the home page that provides the overall administrative view of your Cloud Foundation environment. The Dashboard page provides a top-level view of the physical and logical resources across all of the physical racks in the environment, including available CPU, memory, and storage capacity. From this page, you can start the process of creating a workload domain.

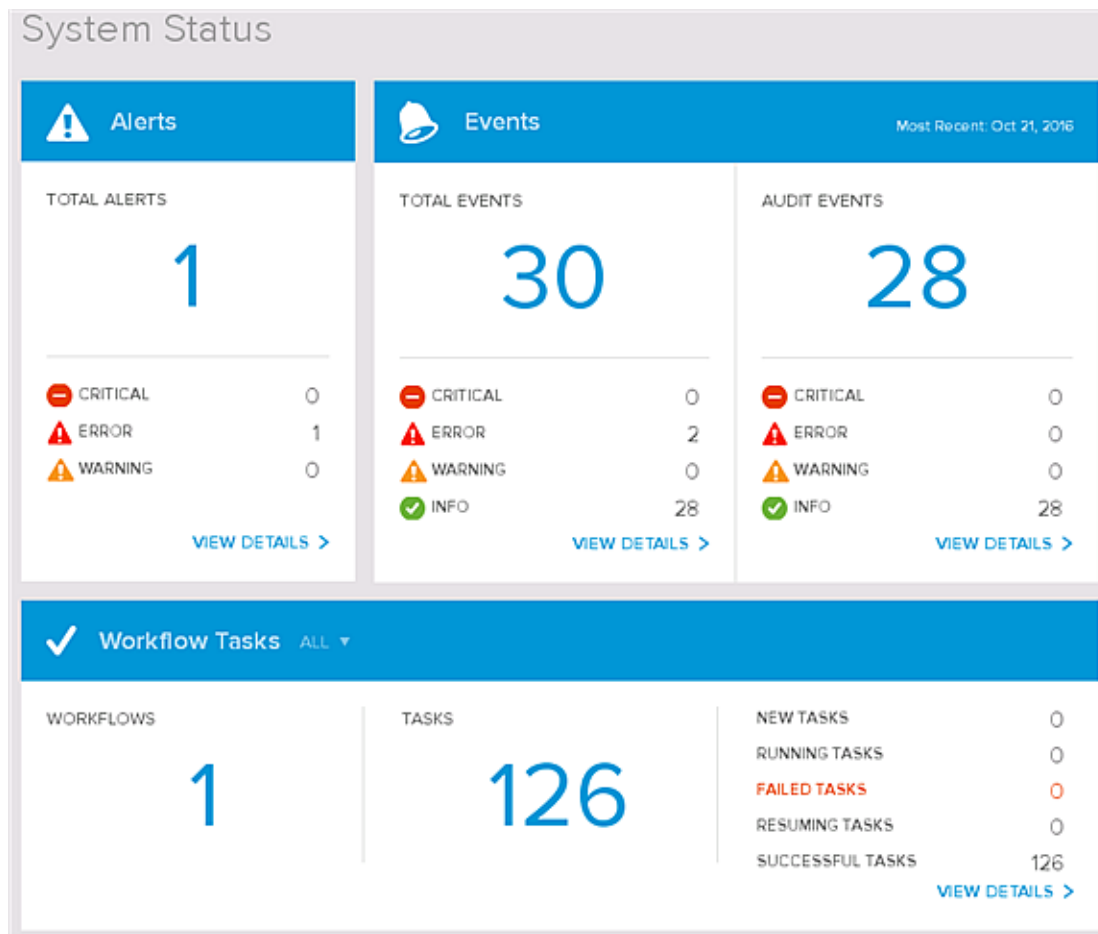


You use the links on the dashboard to drill-down and examine details about the physical resources and the virtual environments that are provisioned for the management and workload domains. For more information about each area, see:

- [Chapter 5 Managing Physical Resources](#)
- [Chapter 6 Working with the Management Domain and Workload Domains](#)

System Status

Use this page to check on the health of the environment. You can view SDDC Manager alerts, examine historical and current information about the workflows running in the environment, and examine the events and audit events that are raised by the SDDC Manager problem detection and monitoring components. From these event lists, you can access the Event Catalog to see descriptions of the pre-configured events that are generated through SDDC Manager. From the alerts listing, you can access the Alert Catalog to see descriptions of the SDDC Manager alerts that can be raised.



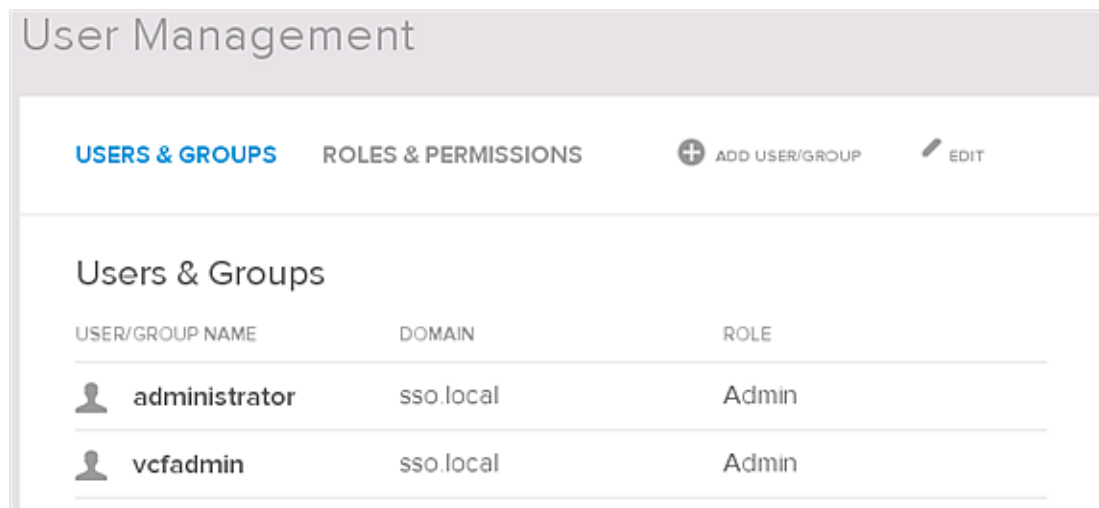
Your Cloud Foundation environment has event-driven problem detection. The software records an event for environment conditions that are potentially significant or interesting to you, such as a degradation, a failure, or a user-initiated configuration change. The software raises an alert when it determines a problem, based on an analysis of the event or combination of events.

See [Chapter 7 Monitoring Capabilities in the Cloud Foundation Environment](#) for the information about using alerts and events to monitor the health of your Cloud Foundation environment.

User Management

Use this page to perform tasks related to access to the environment, such as:

- In the Users & Groups screen, grant or revoke the ability for users and groups to use the SDDC Manager client.
- In the Roles & Permissions screen, examine the roles that provide the privileges associated with the available operations. SDDC Manager uses role-based access control (RBAC).

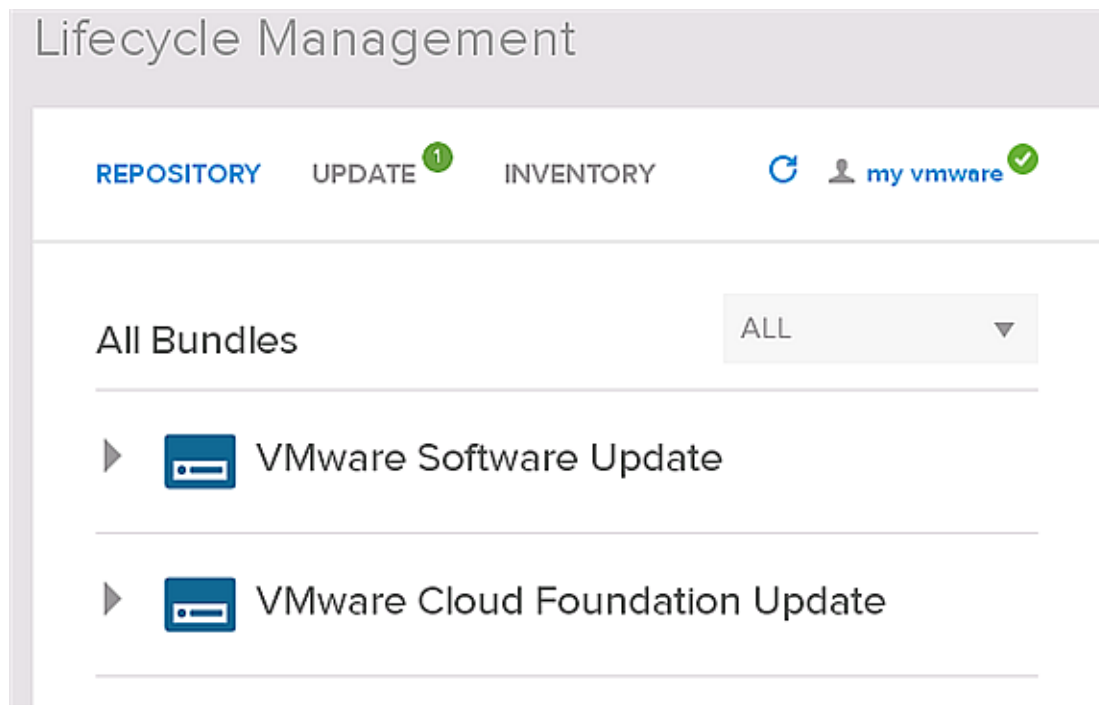


Two roles are defined by default. One is an administrator-level role that provides full administrative privileges. The other provides read-only privileges.

See [Chapter 4 Managing Users and Groups](#).

Life Cycle Management

Use this page to manage the patching and maintenance of the software components that are installed in the environment. The software notifies you when an update is available and provides the ability to download the bundles and begin the update process. For details, see [Chapter 14 Patching and Upgrading Cloud Foundation](#).



Settings

Use the page to access screens in which you perform tasks that involve customizing VDI infrastructure settings, adding a new physical rack, working with network settings, and managing license keys.

PHYSICAL RACK SETTINGS NETWORK SETTINGS LICENSING

Physical Rack Settings

VDI SETTINGS ADDITIONAL RACK

EDIT RESTORE DEFAULTS

VDI INFRASTRUCTURE

Internal AD Name <i>i</i>	horizon.local
AD VM Name prefix <i>i</i>	ad-
Domain Net BIOS Name <i>i</i>	HORIZON
Domain Controller Name <i>i</i>	DC1

From the Settings page, you can navigate to screens in which you perform tasks such as:

- Configure default settings for the VDI environments that you can provision in your Cloud Foundation installation. For details about setting defaults used for VDI environments, see [Customize Default Values Used When Creating VDI Workload Domains](#).
- Initiate the process for adding a new rack to the environment.
- Work with network settings, such as editing uplink connectivity settings, reviewing the IP address distribution in the environment, excluding IP addresses, entering data center network configurations, and associating those configurations with workload domains.
- Manage product license keys.

Log out of the SDDC Manager Client

Log out of the SDDC Manager client when you have completed your tasks.

Procedure

- 1 In the SDDC Manager client, open the logged-in account menu by clicking the down arrow next to the account name in the upper right corner.

- 2 Click the menu choice to log out.

On-Demand Password Rotation in Your Cloud Foundation Installation

3

To ensure security in your installation, you can rotate the passwords for the built-in accounts that are used by the installation's physical and logical entities using the `vrn-cli` tool. Rotating these passwords periodically or when certain events occur, such as an administrator leaving your organization, reduces the likelihood of security vulnerabilities occurring.

Many of the physical and logical entities in your Cloud Foundation installation have built-in accounts. Those accounts' passwords are managed by the SDDC Manager software's `vrn-cli` tool. At the end of the bring-up process on a physical rack, you are required to rotate the account passwords by logging in to that rack's SDDC Manager virtual machine, stopping the `vrn-watchdogserver` and `vrn-tcserver` services, and running the `./vrn-cli.sh rotate-all` command. At any time, you can use the `./vrn-cli.sh lookup-password` command to get a listing of the account names and current passwords for these built-in accounts.

The types of accounts for which the passwords are rotated using the `vrn-cli` tool are:

- Accounts used for service consoles, for example the ESX root account
- Single sign-on account
- Default administrative user account used by virtual appliances
- Cumulus Account used by switches running Cumulus Linux, for example, the management switches
- Network-admin roles used by switches not running Cumulus Linux
- Root accounts for the LCM and LCM Backup virtual machines
- Service accounts, such as the `backupuser` account for the LCM Backup virtual machine
- Internal database service accounts, such as the JDBC account

To rotate IPMI passwords, you run the `./vrn-cli.sh rotate-password-ipmi` command.

The rotation process generates randomized passwords for the accounts.

Important Always modify these passwords using the `vrn-cli` tool. Do not manually modify the passwords for the accounts that are managed by the `vrn-cli` tool. Manually modifying these passwords outside of the `vrn-cli` tool breaks the SDDC Manager software's ability to manage the physical and logical entities.

When you rotate passwords on-demand in a steady-state installation, you must run the `./vrn-cli.sh rotate-all` command in turn on each physical rack in the installation. When the command is run on the Cloud Foundation environment's primary rack, the passwords for entities local to that rack, such as the ESXi hosts and switches, are rotated as well as the entities that cross physical racks, such as the vRealize Operations Manager cluster nodes. After running the command on the primary rack, you run the command on the subsequent racks, which changes the passwords for entities local to that rack.

Note For a description of which rack in a Cloud Foundation installation is the primary rack, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

You run the `vrn-cli.sh rotate-all` command by logging in to a rack's SDDC Manager VM using the root account credentials. The `vrn-cli.sh` script is located in the `/home/vrack/bin` directory. For information about the SDDC Manager VM's root account, see [Credentials for Logging In To the SDDC Manager \(vrn\) Virtual Machine](#).

Important Before performing on-demand password rotation, ensure:

- No failed workflows exist in your installation. Use the Workflows area of the System Status page to verify there are no workflows in a failure state.
 - No active workflows, such as creating or deleting workload domains, are running or are expected to run during the password rotation process. Before performing on-demand password rotation, schedule a window of time in which you expect no running workflows to occur.
 - The services `vrn-watchdogserver` and `vrn-tcserver` are stopped in the SDDC Manager virtual machine in which you are running the `vrn-cli` tool.
-

This chapter includes the following topics:

- [Credentials for Logging In To the SDDC Manager \(vrn\) Virtual Machine](#)
- [Look Up Account Credentials Using the Lookup-Password Command](#)
- [Rotate All Passwords On-Demand for the Managed Physical and Logical Entities](#)
- [vrn-cli Command Reference](#)

Credentials for Logging In To the SDDC Manager (vrn) Virtual Machine

To log in to a rack's SDDC Manager (vrn) virtual machine to perform operations using the `vrn-cli` tool, you log in using the root account credentials.

When the hardware for a rack is imaged, a randomized password is generated for the root account for that rack's SDDC Manager virtual machine. That generated password is obtained at the end of the imaging process, as described in the *Cloud Foundation VIA User's Guide*.

The `./vrm-cli.sh rotate-all` command does not change the password of the SDDC Manager virtual machine's root account, and the `./vrm-cli.sh lookup-password` command does not report this password. Therefore, it is strongly recommended that you change the password for the SDDC Manager virtual machine's root account and for the virtual machine's vrack service account at the first opportunity to passwords that you can easily keep track of and manage in your organization.

Note When you change the passwords for the SDDC Manager virtual machine's root and vrack accounts, they are not retrievable from your Cloud Foundation environment or from the SDDC Manager virtual machine. You must retain the passwords that you set.

Look Up Account Credentials Using the Lookup-Password Command

To look up the account credentials for the built-in accounts that are managed and rotated by SDDC Manager, you log in to the SDDC Manager virtual machine using the root account credentials and run the `vrm-cli.sh lookup-password` command using the `vrm-cli` tool located in the `/home/vrack/bin` directory.

Prerequisites

You must have the root account credentials to log in to the SDDC Manager VM and run the `vrm-cli.sh lookup-password` command. See [Credentials for Logging In To the SDDC Manager \(vrm\) Virtual Machine](#).

Procedure

- 1 Using the root account, connect and log in, for example by SSH, to the SDDC Manager VM.
- 2 Change to the `/home/vrack/bin` directory.
- 3 Stop the `vrm-watchdogserver` and `vrm-tcserver` services.

```
service vrm-watchdogserver stop
service vrm-tcserver stop
```

Note Even though the `./vrm-cli.sh lookup-password` command can run without stopping the services, it is a best practice to stop the services before running any `vrm-cli.sh` command.

- 4 Obtain the account credentials list by typing the command:

```
./vrm-cli.sh lookup-password.
```

The output displays the account credentials and IP addresses for the physical and logical entities on which the `vrm-cli` tool operates. The username and password for each account is displayed.

- 5 (Optional) Save the command output to a secure location so that you can access it later and use it to log in to the components as needed.

- 6 If you are not going to run any other `vrn-cli.sh` commands, restart the `vrn-watchdogserver` service, which also restarts the `vrn-tcserver` service.

```
service vrn-watchdogserver start
```

If you are going to run other `vrn-cli.sh` commands, leave the services stopped until you are finished running those commands and then start them.

Rotate All Passwords On-Demand for the Managed Physical and Logical Entities

On each rack in turn, you run the `./vrn-cli.sh rotate-all` command in each rack's SDDC Manager virtual machine to rotate all of the passwords that are managed by SDDC Manager.

First run the `./vrn-cli.sh rotate-all` command on the primary rack. After running it on the primary rack, run the `./vrn-cli.sh rotate-all` command on the second rack, then on the third rack, and so on. For a description of which rack is the primary rack in the environment, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

Note Before running any `vrn-cli.sh` command, it is a best practice to stop both the `vrn-watchdogserver` and `vrn-tcserver` services in the SDDC Manager VM. However, if you omit explicitly stopping these services prior to running the `./vrn-cli.sh rotate-all` command, the command will attempt to stop the services automatically before it starts the rotation process. Then, at the end of the rotation process, if the command has automatically stopped the services, it will attempt to restart the `vrn-watchdogserver` service, which also restarts the `vrn-tcserver` service.

Prerequisites

Verify the following prerequisites are met:

- No failed workflows exist in the environment. Use the Workflows area of the System Status page to verify the environment has no workflows in a failure state.
- No active workflows, such as creating or deleting workload domains, are running or are expected to run during the password rotation process. Schedule a window of time when you expect to have no running workflows before performing on-demand password rotation.
- You have the root account credentials to log in to each rack's SDDC Manager VM. For details, see [Credentials for Logging In To the SDDC Manager \(vrn\) Virtual Machine](#).

Procedure

- 1 For the primary rack, using the root account, connect and log in, for example by SSH, to the rack's SDDC Manager VM.
- 2 Change to the `/home/vrack/VMware/vRack` directory.
- 3 Save a copy of the `/home/vrack/VMware/vRack/vrn.properties` file to a secure location where you can access it later if necessary.

- 4 Change to the `/home/vrack/bin` directory.
- 5 Stop the `vrn-watchdogserver` and `vrn-tcserver` services.

```
service vrn-watchdogserver stop
service vrn-tcserver stop
```

Note Even though the `./vrn-cli.sh lookup-password` command can run without stopping the services, it is a best practice to stop both services before running any `vrn-cli.sh` command.

- 6 At the prompt, use the `vrn-cli` tool's `lookup-password` command to obtain the listing of the current account credentials so that you can compare it to the post-rotated listing.

```
./vrn-cli.sh lookup-password
```

The output displays the account credentials and IP addresses for the physical and logical entities that are managed by the `vrn-cli` tool. The username and password for each account is displayed.

- 7 Save the output to a secure location.
- 8 Rotate this rack's passwords by typing the following command

```
./vrn-cli.sh rotate-all
```

This command changes the passwords of the physical and logical components on the rack. Because this first run is performed on the primary rack, this step also changes the passwords of entities used across the racks.

Note The `rotate-all` command does not change the IPMI passwords.

- 9 To rotate the IPMI passwords, run the command `./vrn-cli.sh rotate-ipmi`.

```
./vrn-cli.sh rotate-password-ipmi
```

- 10 Obtain the listing of the updated account credentials and save a copy.

```
./vrn-cli.sh lookup-password
```

- 11 Compare the output file you saved prior to rotation with the output file you saved now and verify that all passwords are changed.
- 12 Restart the `vrn-watchdogserver` service, which also restarts the `vrn-tcserver` service.

```
service vrn-watchdogserver start
```

- 13 For the next physical rack, using the root account, connect and log in, for example by SSH, to the rack's SDDC Manager VM.

- 14** Stop the vrm-watchdogserver and vrm-tcserver services:

```
service vrm-watchdogserver stop
service vrm-tcserver stop
```

- 15** Change to the /home/vrack/VMware/vRack directory.
- 16** Save a copy of the /home/vrack/VMware/vRack/vrm.properties file to a secure location where you can access it later if necessary.
- 17** Change to the /home/vrack/bin directory.
- 18** At the prompt, use the vrm-cli tool's lookup-password command to obtain the listing of the current account credentials.

```
./vrm-cli.sh lookup-password
```

The output displays the account credentials and IP addresses for the physical and logical entities that are managed by the vrm-cli tool. The username and password for each account is displayed.

- 19** Save the output to a secure location so that you can compare it to the post-rotated listing.
- 20** Rotate this rack's passwords by typing the following command

```
./vrm-cli.sh rotate-all
```

This command changes the passwords of the physical and logical components local to this rack.

- 21** To rotate the IPMI passwords, run the command ./vrm-cli.sh rotate-ipmi.

```
./vrm-cli.sh rotate-password-ipmi
```

- 22** Obtain the listing of the updated account credentials and save a copy.

```
./vrm-cli.sh lookup-password
```

- 23** Compare the output file you saved prior to rotation with the output file you saved now and verify that all passwords are changed.
- 24** Restart the vrm-watchdogserver service, which also restarts the vrm-tcserver service.

```
service vrm-watchdogserver start
```

- 25** Repeat the steps to rotate the passwords for each physical rack in your installation.

vrn-cli Command Reference

The vrm-cli tool is a command-line utility to perform tasks primarily related to looking up and rotating passwords and syncing properties between racks. You can also perform some configuration tasks using this tool.

The vrm-cli tool is located in /home/vrack/bin in the SDDC Manager virtual machine's file system. Only the root account can run the vrm-cli tool. To run a command, change to the /home/vrack/bin directory and type ./vrn-cli.sh followed by the command.

```
./vrn-cli.sh <command>
```

To list the available vrm-cli tool commands, use the following command.

```
./vrn-cli.sh help
```

Important You should stop the vrm-watchdogserver and vrm-tcserver services before running these commands. Even though some of the vrm-cli tool's commands can run without you explicitly stopping the services, it is a best practice to stop both services before running any vrm-cli.sh command. Then when you are done running the commands, restart the vrm-watchdogserver service, which will also restart the vrm-tcserver service.

```
rack-1-vrm-1:/home/vrack/bin # service vrm-watchdogserver stop
Stopping watchdog
rack-1-vrm-1:/home/vrack/bin # service vrm-tcserver stop
Instance is running as PID=21972, shutting down...
Instance is running PID=21972, sleeping for up to 10 seconds waiting for shutdown
Instance shut down gracefully
rack-1-vrm-1:/home/vrack/bin # ./vrn-cli.sh
all credentials for all hosts:
...
...
rack-1-vrm-1:/home/vrack/bin # service vrm-watchdogserver start
Starting watchdog
Successfully started watchdog.
```

Lookup Commands

Use these commands to look up information about entities managed by SDDC Manager.

Table 3-1. vrm-cli Lookup Commands

Command	Subcommands and Input	Description
lookup-esxi	None	Lists the IP addresses of the ESXi hosts that are visible in-band to the rack's HMS agent, for the rack on which the command is run.
lookup-domains	None	Queries the environment's logical inventory for the management and workload domains and lists their names.

Table 3-1. vrm-cli Lookup Commands (Continued)

Command	Subcommands and Input	Description
lookup-history	store latest timestamp yyyy-mm-dd.hh:mm:ss	Manages and retrieves the password history recorded in Zookeeper. ./vrm-cli.sh lookup-history store records the local rack's current password state into Zookeeper. ./vrm-cli.sh lookup-history latest lists the account information from the most recent history recorded in Zookeeper. ./vrm-cli.sh lookup-history timestamp yyyy-mm-dd.hh:mm:ss lists the password-rotation history associated with the specified timestamp.
lookup-password	None	Retrieves and lists the account credentials for the built-in accounts that are managed and rotated by SDDC Manager. See also Look Up Account Credentials Using the Lookup-Password Command .
lookup-password-sso	None	Lists the SSO domains, users, and passwords that are managed by the vrm-cli tool.
lookup-psc	None	Lists information about the Platform Services Controller instances that are visible in the logical inventory.
lookup-rack	None	Lists the physical racks currently visible in the inventory, by UUID and name.
lookup-vcenter	None	Lists the IP addresses of the vCenter Server instances that are visible in the inventory.
lookup-vrm	None	Lists information about the SDDC Manager virtual machines that are visible in the inventory.

Password Rotation, Set Up, and Generation Commands

Use these commands to rotate passwords to software-generated randomized passwords for the accounts that are managed by SDDC Manager, set up ESXi host passwords, and generate passwords that adhere to the SDDC Manager password policies.

Note Because some items in your installation's inventory are managed across all racks in the installation while other inventory items can only be managed from their controlling rack, the command's behavior is based on whether it is run in the first rack's SDDC Manager virtual machine or on subsequent racks. In the table, the term visible is used to indicate those inventory items that are visible to the command and to the HMS agent for the SDDC Manager in which the command is run. When run from a specific rack's SDDC Manager virtual machine, the resources in that rack are the ones visible to the command. See [Chapter 3 On-Demand Password Rotation in Your Cloud Foundation Installation](#)

Table 3-2. vrm-cli Password Rotation, Set Up, and Generation Commands

Command	Subcommands and Input	Description
rotate-all	None	Rotates passwords for all inventory items that are visible and safe to automatically rotate, except for the IPMI passwords. The IPMI passwords are rotated using rotate-password-ipmi.
rotate-password-esx	None	Rotates passwords for the service console accounts for all of the visible ESXi hosts.
rotate-password-ipmi	None	Rotates IPMI passwords, for all of the visible ESXi hosts.
rotate-password-isvm	None	Rotates passwords of the visible ISVM virtual appliances.
rotate-password-lcm	None	Rotates passwords on resources identified as LCM.
rotate-password-lcm-backup	None	Rotates passwords on resources identified as LCM-Backup resources.
rotate-password-li-api	None	Rotates the vRealize Log Insight API password.
rotate-password-li-ssh	None	Rotates the vRealize Log Insight virtual appliance's console user password.
rotate-password-nsx	None	Rotates the NSX Manager virtual appliances' SSH password using the NSX Manager REST API.
rotate-password-nsx-controller	None	Rotates passwords for the visible NSX controllers using the NSX Manager REST API.
rotate-password-postgres	None	Rotates the password for Postgres.
rotate-password-psc	None	Rotates passwords for the visible Platform Services Controller appliances.
rotate-password-sso	host user host user old-password new-password	Rotates the password for a specified SSO user on a specified Platform Services Controller appliance. If no host and user are specified, then all visible SSO users have their password credentials rotated. You can optionally supply the old password and a new password for a specific user.
rotate-password-switch	None	Rotates passwords for the visible switches.
rotate-password-tor-switch	None	Rotates passwords for the visible ToR switches.
rotate-password-vcenter	None	Rotates passwords for the visible vCenter Server appliances' console user password for the visible virtual appliances.
rotate-password-vrops-api	None	Rotates the vRealize Operations Manager API password.
rotate-password-vrops-ssh	None	Rotates the vRealize Operations Manager virtual appliance's console user password.

Table 3-2. vrm-cli Password Rotation, Set Up, and Generation Commands (Continued)

Command	Subcommands and Input	Description
setup-password-esx	host-ip current-password	Used by SDDC Manager when you add or replace a server. Manual use of this command is not generally needed.
generate-password	length	Used by SDDC Manager. Manual use of this command is not generally needed. Generates a password and prints it to the command line. The generated passwords conform to the environment's password policies.
decrypt	encrypted-text	Decrypts the input text and prints the output to the command line. Primarily used by SDDC Manager. Manual use of this command is not generally needed.
encrypt	plain-text	Encrypts the input text and prints the output to the command line.

Configuration-Related Commands

Use these commands for special configuration operations.

Table 3-3. vrm-cli Configuration-Related Commands

Command	Subcommands and Input	Description
configure-snmp	full-path-to-input-json-file	<p>Configures use of an external SNMP management server for the ToR and spine switches for the rack in which the command is run. With this command, you can use your existing network monitoring tools to monitor the switches on a rack using SNMP. Each rack in your installation has two ToR switches. Additionally, the second rack in a multirack installation has the two spine switches for the installation. SNMP v3 provides secure communication between the switches and your SNMP management server.</p> <p>The input to this command is the full absolute path to a JSON file, including the file name. In the JSON file, the required JSON input is</p>

```
{
  "enabled": true,          # if enabled is true,
                             turn on SNMP on switches; if enabled is false
                             or omitted, disable SNMP on switches
  "serverIp": "nnn.nnn.nnn.nnn", # SNMP server
                             IP address or hostname
  "serverPort": nnn,        # (optional)
                             SNMP server port (default = 162)
  "users": [                # User accounts SDDC
                             Manager uses to connect to the SNMP server
    {
      "username": "snmpuser1",
      "authType": "SHA",    # (optional) either
                             SHA or MD5
      "authPassword": "auth password", #
                             (optional) Passphrase for authentication
      "privType": "AES",    # (optional) either
                             AES or DES
      "privPassword": "priv password" #
                             (optional) Passphrase for privacy
    }
    {
      "username": "snmpuser1",
      "authType": "SHA",    # (optional) either
                             SHA or MD5
      "authPassword": "auth password", #
                             (optional) Passphrase for authentication
      "privType": "AES",    # (optional) either
                             AES or DES
      "privPassword": "priv password" #
                             (optional) Passphrase for privacy
    }
  ]
}
```

Where:

- serverIP is your SNMP management server's IP address or host name
- serverPort is that server's SNMP port. If not specified, port 162 is used as the default.
- Specified users that are used for the connection to your SNMP management server, as configured in its management software.

Table 3-3. vrm-cli Configuration-Related Commands (Continued)

Command	Subcommands and Input	Description
		<p>To disable SNMP on the switches, set "enabled": false in the JSON, or omit the "enabled" line.</p> <p>You must provide the full path to the JSON file, even if the JSON file resides in the same /home/vrack/bin directory from which you are running the <code>./vrm-cli.sh configure-snmp</code> command.</p> <p>As an example, if you copy a JSON file named <code>enablesnmp.json</code> into the VRM VM's /home/vrack/bin directory where the <code>vrm-cli.sh</code> file is located, log in to the VRM VM, change directories to <code>home/vrack/bin</code>, then to perform the configure SNMP operation, you type:</p> <pre>./vrm-cli.sh configure- snmp /home/vrack/bin/enablesnmp.json</pre>
<code>configure-syslog</code>	None	Configures syslog on the switches for the rack in which the command is run. See Configure Syslog from the Switches to vRealize Log Insight .
<code>sync-properties</code>	None	<p>Syncs properties between the primary rack and a new rack that you are adding to the environment.</p> <p>See the <i>VMware Cloud Foundation Overview and Bring-Up Guide</i> for details about running the command when adding a new rack. See About the Primary Rack and the SDDC Manager Virtual IP Address for the definition of the primary rack.</p>

Managing Users and Groups

You can manage users and groups using the User Management page of the SDDC Manager client. SDDC Manager provides role-based access control.

For an overview of the User Management page, see [Tour of the SDDC Manager User Interface](#).

Authentication to the SDDC Manager client uses the VMware vCenter® Single Sign-On authentication service that is installed with the Platform Services Controller feature during the bring-up process for your Cloud Foundation installation. This authentication service constructs an internal security domain based on the values entered during the bring-up process, and the SDDC Manager is registered in that domain. The service can authenticate users from a set of users and groups that you manually configure in the environment or it can connect to trusted external directory services such as Microsoft Active Directory. Using roles, authenticated users are given permissions to operate within SDDC Manager, according to the assignments you specify using the SDDC Manager client.

SDDC Manager uses roles, and their associated rights, to determine which users and groups can perform which operations. System administrators can assign roles to users and groups.

This chapter includes the following topics:

- [Active Directory and the Cloud Foundation Environment](#)
- [Add Local Users and Groups](#)
- [Assign Permissions to Users and Groups](#)
- [Add System Administrators](#)
- [Role-Based Access Control](#)
- [User Passwords in Your Cloud Foundation Environment](#)

Active Directory and the Cloud Foundation Environment

To allow the users and groups in your Microsoft Active Directory domain to use their Active Directory credentials to log in to the SDDC Manager client as well as the vCenter Server instances that are deployed in your Cloud Foundation environment, you configure your Microsoft Active Directory domain as an identity source for the authentication services.

The Platform Services Controller component provides the single sign-on capability for the vCenter Server Single Sign-On authentication service. During the environment's initial bring-up process, you enter your root domain, domain name server (DNS) subdomain, and Platform Services Controller single sign-on domain information in the configuration wizard. When you intend to use your Active Directory domain as identity sources for logging into SDDC Manager and to the vCenter Server instances, you typically enter **vsphere.local** in the configuration wizard as the Platform Services Controller single sign-on domain. Once the software stack is deployed, you can log in using the administrator@vsphere.local account that is generated by the bring-up process, and then configure your Active Directory domain as an identity source.

After you configure your Active Directory domain as an identity source, the users and groups in the joined Active Directory domain become available to grant permissions to users and groups for logging in to the Web interfaces using their Active Directory credentials:

- You grant permissions for logging in to the SDDC Manager client by assigning roles provided by the SDDC Manager role-based access control capabilities. See [Assign Permissions to Users and Groups](#) and [Role-Based Access Control](#).
- You can grant permissions for logging in to the vSphere Web Client and to access all of the software components that are integrated with vSphere in Cloud Foundation by assigning roles using the Global Permissions feature in the vSphere Web Client. See [Grant Permission to Active Directory Users and Groups to Log in to the vSphere Web Client in Your Cloud Foundation Installation](#).

Configure an Active Directory Domain as an Identity Source for your Cloud Foundation Environment

Use the vSphere Web Client to log in to the management domain's vCenter Server Appliance and configure your Active Directory domain as an identity source used by the authentication service. When your Active Directory domain is configured as an identity source, you can grant permissions to those users and groups to log in to the SDDC Manager client and access the environment, as well as grant permissions to log in to the vSphere Web Client using their Active Directory credentials.

Prerequisites

Verify that you are logged in to the SDDC Manager client as an administrator. You can launch the vSphere Web Client from the SDDC Manager client.

Verify that you have the information for joining the management domain's Platform Services Controller component to your Active Directory domain:

- The Active Directory domain name, such as example.com.
- A user name in User Principal Name (UPN) format, such as User1@example.com, of a user that has a minimum of read access in the Active Directory domain.

If your Active Directory is Windows 2008 and you will be using the Administrator account here, ensure that the Administrator account properties has the domain selected for the user logon name on the **Account** tab in the account's properties.

- Password of that user.

Procedure

- 1 Open the view of the management domain's vCenter Server resources in the vSphere Web Client.
 - a In the SDDC Manager client, navigate from the Dashboard page to view the management domain details.

You drill down into the management domain details from the Workload Domains area on the dashboard.
 - b On the General Info page of the management domain's Domain Details screen, locate the **vCenter** launch link used to open the view of the domain's vCenter Server resources in the vSphere Web Client.

One way to navigate to the management domain's General Info page from the Workload Domains page is to click **List View** and click the active link that is the name of the management domain.
 - c Launch the vSphere Web Client by clicking the **vCenter** launch link.

The vSphere Web Client appears in a new browser tab, authenticated and accessing the management domain's vCenter Server resources.
- 2 In the vSphere Web Client, navigate to **Administration > Deployment > System Configuration > Nodes**.
- 3 Select the node for the psc-1 node.
- 4 On the **Manage** tab, navigate to **Settings > Advanced > Active Directory**.
- 5 Click **Join**.
- 6 Type your Active Directory details.

Option	Description
Domain	Active Directory domain name, for example, example.com. Do not provide an IP address in this field.
Organizational unit	Optional. The canonical name of the organizational unit, for example, mydomain.com/MyOrganizationalUnit/mycomputer. Important Use this field only if you are familiar with LDAP.
User name	User name in User Principal Name (UPN) format, for example, jchin@mydomain.com. This user must have a minimum of read access. Important Down-level login name format, for example, DOMAIN\UserName, is unsupported. Ensure the Active Directory account's properties has the @domain format specified for the login name.
Password	Password of the user.

- 7 Click **OK** to join the psc-1 Platform Services Controller to the Active Directory domain.

The operation silently succeeds and you can see that the **Join** button turned to **Leave**.

- 8 Right-click the node you edited and select **Reboot** to restart the psc-1 Platform Services Controller so that the changes are applied.

Important If you do not restart the appliance, you might encounter problems in the vSphere Web Client.

- 9 Select the node for the psc-2 node.
- 10 Repeat the steps to join the psc-2 node to the Active Directory domain.
- 11 Navigate to **Administration > Single Sign-On > Configuration**.
- 12 On the **Identity Sources** tab, click the **Add Identity Source** icon.
- 13 Select **Active Directory (Integrated Windows Authentication)**, enter the identity source settings of the joined Active Directory domain

For example, type the joined Active Directory name in the **Domain name** field and select **Use machine account**.
- 14 Click **OK**.

On the **Identity Sources** tab, you can see the joined Active Directory domain.

What to do next

- Use the SDDC Manager client to grant the appropriate permissions to the Active Directory domain's users and groups for accessing your environment using their Active Directory credentials. See [Assign Permissions to Users and Groups](#).
- Use the vSphere Web Client to grant the appropriate permissions to the users and groups from the joined Active Directory domain to use their Active Directory credentials to log in to the vSphere Web Client. Otherwise, those users and groups are not able to log in to the vSphere Web Client and the products that integrate with it using their Active Directory credentials. For information about managing permissions and user management in vCenter Server, see *vSphere 6.0 Security Guide* located at <https://www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-6-pubs.html>.

Grant Permission to Active Directory Users and Groups to Log in to the vSphere Web Client in Your Cloud Foundation Installation

To allow your Active Directory users and groups to log in to the vSphere Web Client using their Active Directory credentials and access the vCenter Server objects and the objects from the vSphere products that integrate with the vSphere Web Client, you can use the Global Permissions area in the vSphere Web Client to grant them the appropriate permissions.

The ability to log in to the vSphere Web Client, access inventory objects, and perform operations on those objects is granted by the rights associated with the role that is assigned to the user or group.

Prerequisites

Add the Active Directory as an identity source by following the steps in [Configure an Active Directory Domain as an Identity Source for your Cloud Foundation Environment](#).

Procedure

- 1 Open the view of the management domain's vCenter Server resources in the vSphere Web Client.
 - a In the SDDC Manager client, navigate from the Dashboard page to view the management domain details.

You drill down into the management domain details from the Workload Domains area on the dashboard.
 - b On the General Info page of the management domain's Domain Details screen, locate the **vCenter** launch link used to open the view of the domain's vCenter Server resources in the vSphere Web Client.

One way to navigate to the management domain's General Info page from the Workload Domains page is to click **List View** and click the active link that is the name of the management domain.
 - c Launch the vSphere Web Client by clicking the **vCenter** launch link.

The vSphere Web Client appears in a new browser tab, authenticated and accessing the management domain's vCenter Server resources.
- 2 Navigate to **Administration > Access Control > Global Permissions > Manage**.
- 3 On the **Manage** tab, add a user or group to the list by clicking the add (+) icon.
- 4 In the Global Permission Root - Add Permission window, select the users and groups to which you want to grant permissions.
 - a At the bottom of the Users and Groups column, click **Add**.

The Select Users/Groups window appears.
 - b Select your Active Directory domain in the **Domain** drop-down list.
 - c Use the selection list and the **Add** button to add the names of users and groups to the **Users** and **Groups** fields.
 - d Click **OK** to complete adding the selected users and groups to the Users and Groups column in the Global Permission Root - Add Permission window.
- 5 Assign a role to users and groups.
 - a Select the users and groups in the Users and Groups column.
 - b In the Assigned Role column, select the role that you want to assign to the selected users and groups.
 - c Select the **Propagate to children** checkbox.
- 6 When you have assigned the desired roles to the users and groups, click **OK**.

The users and groups are listed on the **Manage** tab and show their assigned roles.

For more information about managing permissions and user management in vCenter Server, see the *vSphere 6.0 Security Guide* located at <https://www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-6-pubs.html>.

Add Local Users and Groups

Use the vSphere Web Client to add local users and groups. These users and groups are internal to the vCenter Single Sign-On authentication service in the Cloud Foundation software stack.

The Platform Services Controller component provides the single sign-on capability in the software stack, including SDDC Manager. Before you can authorize users and groups to perform operations using the SDDC Manager client, you must include them into the set of users and groups authorized by the Platform Services Controller component by either adding your Active Directory domain as an identity source or adding them as users and groups to the internal identity source. The internal identity source is the internal single sign-on domain. When added to the internal single sign-on domain, these users and groups are local to your Cloud Foundation installation.

Prerequisites

Verify that you are logged in to the SDDC Manager client as an administrator. You access the user interface to add local users and groups by launching the vSphere Web Client from the SDDC Manager client.

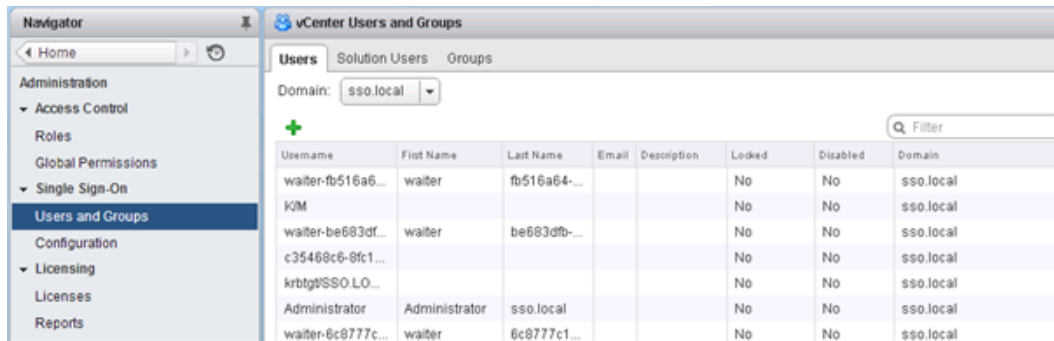
Procedure

- 1 Open the view of the management domain's vCenter Server resources in the vSphere Web Client.
 - a In the SDDC Manager client, navigate from the Dashboard page to view the management domain details.

You drill down into the management domain details from the Workload Domains area on the dashboard.
 - b On the General Info page of the management domain's Domain Details screen, locate the **vCenter** launch link used to open the view of the domain's vCenter Server resources in the vSphere Web Client.

One way to navigate to the management domain's General Info page from the Workload Domains page is to click **List View** and click the active link that is the name of the management domain.
 - c Launch the vSphere Web Client by clicking the **vCenter** launch link.

The vSphere Web Client appears in a new browser tab, authenticated and accessing the management domain's vCenter Server resources.
- 2 Navigate to **Administration > Single Sign-On > Users and Groups**.



3 Perform one of the following actions.

Option	Description
Add a local user	<p>On the Users tab, select your rack's local single sign-on domain and click Add. Type in the user's information, such as the user name and password, and click OK.</p> <p>The password must meet the password policy requirements for the software stack.</p> <p>Important Because you cannot change the user name after you create a user, make sure the user name is typed in correctly before clicking OK.</p>
Add a local group	<p>On the Groups tab, select your rack's local single sign-on domain and click Add. Type in a name for the group and optionally a description, and click OK.</p> <p>Important Because you cannot change the group name after you create a group, make sure the name is typed in correctly before clicking OK.</p>

What to do next

When you add a user, that user initially has no privileges to perform management operations in your installation. Perform one of the following next steps.

- Add the local user to a group using the Platform Services Controller Web interface. When users are added to a group, you can assign permissions to the group so that all of the users in the group receive the same permissions for performing operations in your installation. Then use the User Management page in the SDDC Manager client to assign a role to that group.
- Use the User Management page to authorize the local user for performing operations in your installation by assigning an appropriate role to that user. See [Assign Permissions to Users and Groups](#).

Assign Permissions to Users and Groups

SDDC Manager uses roles, and their associated rights, to determine which users and groups can perform which operations using the SDDC Manager client.

System administrators assign roles to users and groups using the Permissions area of the User Management page. The ability to perform operations is granted by the rights associated with the role that is assigned to the user or group.

Prerequisites

Verify the user or group is present and enabled for access in the management domain's identity sources. Only such users and groups can be assigned permissions to access the SDDC Manager client. See [Active Directory and the Cloud Foundation Environment](#), [Configure an Active Directory Domain as an Identity Source for your Cloud Foundation Environment](#), and [Add Local Users and Groups](#).

Procedure

1 In the SDDC Manager client, navigate to **User Management > Users & Groups**.

2 Click **Add User/Group**.

The window displays fields to select users and groups that are known to SDDC Manager.

3 Select **User** or **Group** according to which type you are assigning permissions.

4 Select the domain that the user or group belongs to.

5 Use the filter field to display a list of users or groups.

- To display users or groups that match a set of characters, type those characters in the filter field and press Enter on your keyboard.
- To display all users or all groups, set your cursor in the filter field and press Enter on your keyboard.

A list of matching users or groups appears, according to your selections.

6 For each user or group, assign a role to the user or group.

Each role grants set of associated rights. The rights determine what operations can be performed using the SDDC Manager client. When you assign a role to a user or group, that user or group is granted that role's associated rights.

7 Click **Save** to save the changes.

The users and groups to which you assigned a role now have permissions to perform the operations governed by their assigned roles.

Add System Administrators

You can add system administrators for your Cloud Foundation installation by giving user accounts the Admin role in SDDC Manager.

Giving a user account the Admin role gives that user the privileges to perform all of the operations that are performed using the SDDC Manager client.

Prerequisites

Verify the user is present and enabled for access in the management domain's identity sources. Only such users and groups can be assigned permissions to log in to the SDDC Manager client. See [Active Directory and the Cloud Foundation Environment](#), [Configure an Active Directory Domain as an Identity Source for your Cloud Foundation Environment](#), and [Add Local Users and Groups](#).

Procedure

- 1 In the SDDC Manager client, navigate to **User Management > Users & Groups**.
- 2 Assign the Admin role to the user.
 - If the user name is listed on the Users & Groups page, because the user is already assigned a role, edit the Users & Groups page to change the user's role to the Admin role. Enable the page for editing by clicking the edit icon, change the user's role to the Admin role, and save the changes.
 - If the user name is not listed on the Users & Groups page, because the user is not yet assigned a role, click Add User/Group to locate the user, assign the role, and save the changes.

Note The Admin role has the description Super Admin.

The user can now log in to the SDDC Manager client and perform system administrator operations.

Role-Based Access Control

SDDC Manager uses roles and rights to determine what operations a user can perform using the SDDC Manager client. SDDC Manager includes a number of predefined roles with specific rights.

System administrators must assign a role to each user or group before that user or group can log in to the SDDC Manager client and access operations.

Two predefined roles are provided by default: an administrator-level role and a read-only role. The administrator-level role grants all rights to perform SDDC Manager operations. The read-only role grants read-only rights.

An auditor can use the predefined read-only role to view security and non-security configurations and logs.

The predefined roles cannot be modified.

To view the rights granted by one of the predefined roles, navigate to **User Management > Roles & Permissions** and select the role name that is displayed.

User Passwords in Your Cloud Foundation Environment

The password restrictions, lockout, and expiration for a user's password in your Cloud Foundation environment depend on the user's domain, on who the user is, and the policy settings.

The vCenter Single Sign-On authentication service manages authentication for all users who log in to the SDDC Manager client and various other SDDC components' Web interfaces that you use to perform administrative tasks in your SDDC, such as the vSphere Web Client and the vRealize Operations Manager Web interfaces.

Local Users

The passwords for users of the installation's single sign-on (SSO) domain's internal identity source that is created during the software stack's bring-up process must follow the restrictions set by the vCenter Single Sign-On password policy and lockout policy. In the vSphere Web Client, use the **Policies** tab of Configuration page to view the current settings. These passwords expire 90 days by default, though system administrators can change the expiration as part of the password policy.

Users Provided by Other Identity Sources

For users that are provided to the SSO domain by identity sources such as your joined Active Directory domain, the password restrictions, lockout, and expiration are determined by the domain to which the user can authenticate. In the vSphere Web Client, use the **Identity Sources** tab of the Configuration page to view the current identity sources. When users log in as a user in one of these domains, they include the domain name in the log in name, such as `user@domain`. The domain's password parameters apply in this situation.

Modify Password Policy for Users

For users in the single sign-on (SSO) domain's internal identity source, the password policy for accessing various Web interfaces that you use to perform SDDC tasks in your Cloud Foundation installation is governed by the vCenter Single Sign-On password policy. The vCenter Single Sign-On password policy is a set of rules and restrictions on the format and expiration of vCenter Single Sign-On user passwords.

The vCenter Single Sign-On password policy applies only to users in the single sign-on (SSO) domain that was created during your installation's bring-up process. If you have configured your installation to use another identity provider, the password policy of that identity provider applies instead. The name of the SSO domain was specified in the bring-up wizard. See *VMware Cloud Foundation Overview and Bring-Up Guide* for details about the fields in the bring-up wizard.

By default, vCenter Single Sign-On passwords expire after 90 days. You can reset an expired password if you know the old password.

Note Password policies apply only to user accounts, not to system accounts in the domain.

Prerequisites

Verify that you are logged in to the SDDC Manager client as an administrator. You access the internal identity source by launching the vSphere Web Client from the SDDC Manager client.

Procedure

- 1 Open the view of the management domain's vCenter Server resources in the vSphere Web Client.
 - a In the SDDC Manager client, navigate from the Dashboard page to view the management domain details.

You drill down into the management domain details from the Workload Domains area on the dashboard.

- b On the General Info page of the management domain's Domain Details screen, locate the **vCenter** launch link used to open the view of the domain's vCenter Server resources in the vSphere Web Client.

One way to navigate to the management domain's General Info page from the Workload Domains page is to click **List View** and click the active link that is the name of the management domain.

- c Launch the vSphere Web Client by clicking the **vCenter** launch link.

The vSphere Web Client appears in a new browser tab, authenticated and accessing the management domain's vCenter Server resources.

- 2 Navigate to **Administration > Single Sign-On > Configuration > Policies > Password Policies**.

The Password Policies tab displays the current settings. After the bring-up process, the default password policy parameters are:

Option	Description
Maximum lifetime	Password must be changed every 90 days
Restrict re-use	Users cannot reuse any previous 5 passwords
Maximum length	20
Minimum length	8
Character requirements	<ul style="list-style-type: none"> ■ At least 1 special character ■ At least 2 alphabetic characters ■ At least 1 uppercase character ■ At least 1 lowercase character ■ At least 1 numeric character ■ Identical adjacent characters: 3

- 3 Click **Edit**.
- 4 Edit the password policy parameters.

Option	Description
Description	Password policy description.
Maximum lifetime	Maximum number of days that a password can exist before the user must change it.
Restrict reuse	Number of the user's previous passwords that cannot be selected. For example, if a user cannot reuse any of the last six passwords, type 6.
Maximum length	Maximum number of characters that are allowed in the password.

Option	Description
Minimum length	Minimum number of characters required in the password. The minimum length must be no less than the combined minimum of alphabetic, numeric, and special character requirements.
Character requirements	<p>Minimum number of different character types that are required in the password. You can specify the number of each type of character:</p> <ul style="list-style-type: none">■ Special characters, such as & # %■ Alphabetic characters, such as A b c D■ Uppercase characters, such as A B C■ Lowercase characters, such as a b c■ Numeric characters, such as 1 2 3 <p>The minimum number of alphabetic characters must be no less than the combined uppercase and lowercase requirements.</p>
Identical adjacent characters	Maximum number of identical adjacent characters that are allowed in the password. The number must be greater than 0. For example, if you enter 1, the following password is not allowed: p@\$\$word.

5 Click **OK**.

Managing Physical Resources

From the Dashboard page of the SDDC Manager, you can work with the physical resources in your Cloud Foundation installation.

The Dashboard page displays high-level information about your installation's physical resources, such as the number of physical racks.






From the Dashboard page, you drill-down to the level of the hosts and switches by using the **View Details** button.

The List view displays the list of physical racks that are in your installation. To see detailed information about the physical switches and hosts for a particular rack in the list, click the rack's name. For an alternative view of the physical rack information, you can use the Map view.

The details page for a specific rack lists the switches and hosts in that rack. In the rack's details page, you can click the name of a switch or host to view its details or to perform operations on it.

- [Switch Details and Operations](#)
- [ESXi Host Details and Operations](#)

SDDC Manager monitors the hardware health of the switches and hosts and reports each one's health status using these icons. On the rack's details page, the icons in the Status column indicate the hardware health state of each resource, each switch and host. The hardware health state of the resource is calculated based on the current set of alerts that SDDC Manager has raised for that hardware resource and the severities of those alerts, including any alerts on the hardware Field Replaceable Units (FRUs) contained within that resource.

Status Icon	Description
	The resource has no SDDC Manager alerts reported of warning, error, or critical severity.
	The resource has SDDC Manager alerts reported with warning severity.
	The resource has SDDC Manager alerts reported with error severity.
	The resource has SDDC Manager alerts reported with critical severity.
	The resource's health state cannot be determined, for example the resource is powered off.

To see the list of current alerts sorted by severity on a particular resource, open the resource's details page by clicking on its name and then clicking on **View Alerts** in its details page.

For information about the hardware-related alerts raised by SDDC Manager and information about the built-in monitoring capabilities, see:

- [SDDC Manager Alerts Raised During Ongoing Operations](#)
- [Chapter 7 Monitoring Capabilities in the Cloud Foundation Environment](#)

ESXi Host Details and Operations

Access an ESXi host's detailed information and the available operations you can perform on it by clicking its name.

The types of host information you can see in a host's details include:

- Host CPU, memory, storage
- Whether the host is powered on or off
- Management IP address of the host
- Network information
- Which management or workload domain the host is assigned to, if currently part of one
- Which rack the host is in
- Which vCenter Server instance is managing that host, if the host is currently part of a management or workload domain
- Hardware health status

The hardware health status reflects the severities of the SDDC Manager alerts currently raised on the ESXi host's underlying server and its hardware components. To examine the sorted-by-severity alert list, click **View Alerts**.

The available operations you can perform on a host are represented by the icons in the upper right corner and you can invoke an operation by clicking its icon.

Switch Details and Operations

In the Rack Details screen for a physical rack, you can see the role for each switch in that rack, whether the switch is a management, ToR, or spine switch. By clicking a switch's name, you can drill down to see that switch's detailed information.

Note Spine switches are available in an installation that has two or more racks. Spine switches are installed when a second rack is added to the first rack in an installation.

The types of switch information you can see in a switch's details are:

- Management information, such as the switch's management IP address

- Firmware information
- Network information
- Hardware health status

The hardware health status reflects the severities of the SDDC Manager alerts currently raised on the switch and its components. To examine the sorted-by-severity alert list, click **View Alerts**.

Working with the Management Domain and Workload Domains

6

Your Cloud Foundation system's management domain and deployed workload domains are logical units that carve up the compute, network, and storage resources of the entire system. The logical units are groups of ESXi hosts managed by vCenter Server instances with specific characteristics for redundancy and VMware SDDC best practices.

By default, the management domain and workload domains include these VMware capabilities:

VMware vSphere® High Availability (HA)

In a VMware virtual environment, this feature supports distributed availability services for a group of ESXi hosts, to provide rapid recovery from outages and cost-effective high availability for applications running in virtual machines. When DRS is configured and one of the hosts in the group becomes unavailable, all virtual machines on that host are immediately restarted on another host in the group. For more information about vSphere HA, see the *vSphere Availability* documentation at <https://docs.vmware.com/en/VMware-vSphere/>.

VMware vSphere® Distributed Resource Scheduler™ (DRS)

In a VMware virtual environment, this feature dynamically allocates and balances computing capacity across a group of hardware resources aggregated into logical resource pools. DRS continuously monitors uses across resource pools and allocates available resources among the virtual machines based on predefined rules that reflect business needs and changing priorities. When a virtual machine experiences an increased load, vSANDRS automatically allocates additional resources by redistributing virtual machines among the physical servers in the resource pool. For more information about DRS, see the *vSphere Resource Management* documentation at <https://docs.vmware.com/en/VMware-vSphere/>.

VMware

In a VMware virtual environment, this component aggregates local and direct-attached storage disks in a group of ESXi hosts to create a storage pool shared across all hosts in that group. For more information about vSAN, see the *VMware vSAN* documentation at <https://docs.vmware.com/en/VMware-vSAN/>.

By default, each physical rack has a management domain to manage the hosts in that rack. The management domain is automatically provisioned on each physical rack using some of the rack's ESXi hosts when the rack is configured by the bring-up process. The bring-up process chooses the appropriate number of hosts required to accommodate redundancy capabilities and VMware SDDC best practices. When the bring-up process deploys a management domain, it automatically provisions and configures the management domain with the Cloud Foundation software stack. For more information about the management domain, see the *VMware Cloud Foundation Overview and Bring-Up Guide*.

The two pre-packaged environments you can deploy are named Virtual Infrastructure (VI) and Virtual Desktop Infrastructure (VDI). To deploy one of these pre-packaged environments, you use a workflow to carve a pool of capacity out of the available capacity, and the SDDC Manager provisions the environment, called the workload domain, using that carved-out pool of capacity. The software automatically determines the required amount of capacity to carve out based on your input for:

- Resources (CPU, memory, and storage)
- Performance
- Availability

The SDDC Manager software provides this policy-driven approach to capacity deployment. Based on the levels you specify, the necessary hardware resources are reserved out of the available physical infrastructure. Then using those reserved hardware resources, the workflow deploys the appropriate software stack, applies storage policies, and automatically provisions and configures the virtual environment with the software required for the VMware SDDC stack and the elements required for the selected workload type. The workflow automatically:

- Deploys the vSphere environment and configures it for vSAN and enables vSphere HA and DRS, if required by your selected availability policy
- Configures the virtual networks, including the appropriate NSX for vSphere elements, as appropriate for the specified workload domain configuration
- Integrates the workload domain's resources with the appropriate pieces in the Cloud Foundation software stack

The result is a workload-ready SDDC environment.

Each Cloud Foundation instance is one SSO domain to which all vCenter Servers are joined. The maximum number of supported workload domains and vCenter Servers per Cloud Foundation instance depends on the vSphere version in the management cluster. For more information, see the *Configuration Maximums vSphere* document.

Note All of the instances for the VDI environment's servers — the vCenter Server, View Connection Server, View Composer, and so on — are created within a management domain.

The Dashboard page displays high-level information about the management and workload domains that are deployed in your system. From the Dashboard page, you can drill-down to details on each management and workload domain by using the **View Details** button.

Note You cannot create a workload domain or make any changes to a workload domain while an update is in progress.

This chapter includes the following topics:

- [Creating and Provisioning Workload Domains](#)
- [Utilize Capacity on Management Domain](#)
- [Expanding Management and Workload Domains](#)
- [Delete a Workload Domain](#)
- [Enabling vSAN Space Efficiency Features in All-Flash Installations](#)
- [Manually Update the Credentials for the vRealize Operations for Horizon Broker Agent When Account Credentials Change for the Connection Server Administrator Account](#)

Creating and Provisioning Workload Domains

The flexibility of the software-defined data center provided by Cloud Foundation gives you the ability to offer virtual infrastructure to your consumers with minimal overhead. You can deploy pre-packaged environments on which you can base service offerings.

The two pre-packaged environments you can deploy are named Virtual Infrastructure (VI) and Virtual Desktop Infrastructure (VDI).

Create a Virtual Infrastructure Workload Domain

You create a Virtual Infrastructure (VI) workload domain using the SDDC Manager Dashboard. When you create a VI workload domain, SDDC Manager reserves the necessary pool of capacity from the available resources and deploys the VMware software stack appropriate for that VI environment.

When the creation workflow deploys the VI workload domain, it deploys one or more vCenter Server Appliance instances, associates the ESXi hosts with those instances, and performs the appropriate configuration of the hosts and virtual networks.

SDDC Manager uses the information you provide in each step of the VI workload domain creation wizard to determine the virtual environment to provision. After providing the requested information in a particular step, proceed to the next step by clicking **Next**.

Prerequisites

Using the root account, SSH in to the SDDC Manager Controller VM and run the `./sos --health-check` to ensure that the system is running correctly. Fix any issues that are discovered and clear the corresponding alerts.

command to verify that everything works correctly.

Decide on a name for your VI workload domain. The name can be three to twenty characters long and can contain any combination of the following:

- Lowercase alphabetic characters
- Uppercase alphabetic characters
- Numbers
- Hyphens
- Underscores

Note Spaces are not allowed in any of the names you specify when creating a VI workload domain.

Verify that you have the networking information to use for the workload domain's access to your corporate network. In the wizard, this network is called the Data Center connection. This network is used for access to the workloads that you run in the VI workload domain. You can use either the network configuration that was configured during your rack's bring-up process or enter a new configuration at that step in the wizard. A VLAN ID is required.

If you are planning not to use the existing default configurations for this workload domain's vMotion, vSAN, and VXLAN network connections, verify that you have the networking information you want to use for those network configurations.

Note As you progress through the wizard, if you select to use the defaults for one of these networks, but the software detects that the IP address space in the existing network configuration is inadequate to fulfill the needs of the workload domain's infrastructure, you must specify a new configuration for that network at that step in the wizard.

See also the description of the networks in [Specify Networking Information for the VI Workload Domain](#).

Procedure

1 [Start the Wizard to Create a VI Workload Domain](#)

You start the Configure VI wizard from the Dashboard page of the SDDC Manager Dashboard.

2 [Specify General Information about the VI Workload Domain](#)

In the General step of the creation wizard, you provide a name for the VI workload domain and optionally the name of the requesting organization.

3 [Select Availability Levels for the VI Workload Domain](#)

At the Workload step of the creation wizard, you specify the availability, you want provisioned for this VI workload domain.

4 [Specify Networking Information for the VI Workload Domain](#)

Specify the networking information for the VI workload domain.

5 Review the Details and Start the Creation Workflow

At the Review step of the wizard, you review the information about the to-be-created workload domain and start the creation workflow. You can also print the information or download a printable version to print later.

What to do next

For a description of actions you should perform after starting the creation workflow, see the [page 58](#) section of [Review the Details and Start the Creation Workflow](#).

Start the Wizard to Create a VI Workload Domain

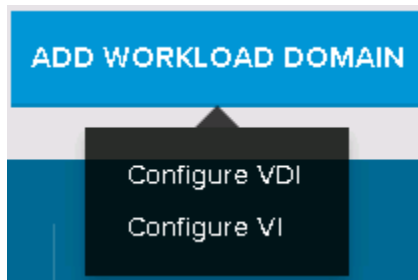
You start the Configure VI wizard from the Dashboard page of the SDDC Manager Dashboard.

Prerequisites

Verify that you have met the prerequisites described in [Create a Virtual Infrastructure Workload Domain](#).

Procedure

- 1 Start the wizard by selecting **ADD WORKLOAD DOMAIN > Configure VI**.



The wizard starts and the VI Configuration window appears. The top of the window shows the progress of the wizard as you complete each step.

- 2 Proceed to the next step by clicking **Next**.

Specify General Information about the VI Workload Domain

In the General step of the creation wizard, you provide a name for the VI workload domain and optionally the name of the requesting organization.

Spaces are not allowed in these names. The names can be three to twenty characters long and can contain any combination of the following:

- Lowercase alphabetic characters
- Uppercase alphabetic characters
- Numbers
- Hyphens
- Underscores

Procedure

- 1 Type a name for this VI workload domain, such as **Analytics**.
- 2 (Optional) Type a name for the organization that requested or will use the virtual infrastructure, such as **Finance**.
- 3 Proceed to the next step by clicking **Next**.

Select Availability Levels for the VI Workload Domain

At the Workload step of the creation wizard, you specify the availability, you want provisioned for this VI workload domain.

Based on your selections, SDDC Manager will determine:

- The number of hosts that it needs to fulfill those selections
- Which specific hosts in your environment are available and appropriate to fulfill those selections
- The virtual infrastructure features and their specific configurations that are needed to fulfill those selections

Note You can modify the vSAN configuration in vSphere without negatively affecting the Cloud Foundation configuration.

Procedure

- 1 Specify the level of availability you want configured for this virtual environment.

The availability level determines the level of redundancy that is set for the assigned resources.

Option	Description
None	<p>With this choice, the following vSAN parameters are used:</p> <ul style="list-style-type: none"> ■ Number of failures to tolerate: zero (0). <p>Because vSAN requires a minimum of three hosts by default, three hosts are assigned to the virtual infrastructure.</p>
Normal	<p>With this choice, the following vSAN parameters are used:</p> <ul style="list-style-type: none"> ■ Number of failures to tolerate: one (1). <p>Because vSAN requires a minimum of three hosts by default, three hosts are assigned to the virtual infrastructure.</p>
High	<p>With this choice, the following vSAN parameters are used:</p> <ul style="list-style-type: none"> ■ Number of failures to tolerate: two (2). <p>Because vSAN requires a minimum of five hosts by default for this setting, five hosts are assigned to the virtual infrastructure.</p>

- 2 Click **Use All Default Networks** to use pre-defined Cloud Foundation networks for vMotion, vSAN, and VXLAN.
- 3 Proceed to the next step by clicking **Next**.

Specify Networking Information for the VI Workload Domain

Specify the networking information for the VI workload domain.

For the workload domain's management network, the creation workflow uses the management network that was configured during your system's bring-up process. During deployment of the VI workload domain's infrastructure, the workflow also configures the networks used by the vMotion, vSAN, and VXLAN capabilities in the workload domain. You can choose to use the default configurations or specify new ones in the Network step of the wizard. For each subnet, you can also specify excluded IP addresses to prevent the workflow from assigning those IP addresses to the workload domain's resources.

Important If you specify IP addresses for exclusion for a subnet in these wizard screens, they override any IP exclusions that were entered originally during your system's bring-up process for that subnet. See [About Excluding IP Address from SDDC Manager Use](#).

Table 6-1. VI Workload Domain Network Configurations

Network Configuration	Description
Management	By default, the workload domain's management network configuration uses the management network that was configured during the bring-up process.
vMotion	<p>When you select to use the defaults, the workload domain's vMotion configuration uses the vMotion network that was configured during the bring-up process.</p> <p>If you choose to use this default, but the software detects inadequate IP address space in the existing vMotion network, you must specify a new configuration at that step in the wizard.</p>
vSAN	<p>When you select to use the defaults, the workload domain's vSAN configuration uses a portion of the vSAN network configuration that was configured during the bring-up process and allocates a VLAN ID (between 3000 - 4000) from its pool.</p> <p>If you choose to use this default, but the software detects inadequate IP address space in the existing vSAN network, you must specify a new configuration at that step in the wizard.</p>
VXLAN	<p>When you select to use the defaults, the workload domain's VXLAN configuration uses the VXLAN network that was configured during the bring-up process.</p> <p>If you choose to use this default, but the software detects inadequate IP address space in the existing VXLAN network, you must specify a new configuration at that step in the wizard.</p>
Data Center connection	<p>Used for access from outside this Cloud Foundation system to the workloads that you run in the workload domain. At this wizard step, you can:</p> <ul style="list-style-type: none"> ■ Select the network configuration that was configured during the bring-up process. ■ Select a network configuration that was configured in advance using the Data Center Connections settings screen. ■ Enter a new configuration. A VLAN ID is required. <p>Important Do not select a data center connection that is already associated with a VDI workload domain or unexpected results might occur.</p>

Prerequisites

Verify that you have met the networking prerequisites as described in [Create a Virtual Infrastructure Workload Domain](#).

Important If you enter custom network configurations for the vMotion, vSAN, and VXLAN networks instead of using the default configurations, do not duplicate any of the VLAN ID, subnet (network ID), or gateway addresses that you already entered during creation of other workload domains. For example, if you previously created a VI workload domain and used value 50.0.0.0 for its vMotion network subnet field, do not re-use that value.

Procedure

- 1 Choose whether to use already-configured vMotion, vSAN, and VXLAN networks for this VI workload domain.
 - Select the **USE ALL DEFAULT NETWORKS** check box. After selecting the **USE ALL DEFAULT NETWORKS** check box, click **Next** to proceed to the next wizard step for specifying the Data Center connection.

Note When you select the **USE ALL DEFAULT NETWORKS** check box, you need to configure the Data Center connection only.

Continue with [Step 8](#).

- Leave the **USE ALL DEFAULT NETWORKS** check box unselected and click **Next** to proceed.
- 2 (Optional) For the management network configuration, if you want to prevent the workflow from assigning some of the subnet's IP addresses to the workload domain's resources, type those addresses or ranges.

Other than the IP address exclusion fields, the other fields on this screen are read-only. The displayed management network settings are the ones that were specified during your system's bring-up process. Because the workload domains use the same management network, you cannot change these settings when configuring a workload domain.

Caution If you specify IP addresses for exclusion in this screen, they override any IP exclusions that were entered originally during the bring-up process. See [About Excluding IP Address from SDDC Manager Use](#).

- 3 Click **Next** to proceed to the vMotion network configuration.

4 For the vMotion network configuration, choose one of these options.

- To use the same vMotion network configuration that was specified during your system's bring-up process, make sure the **USE DEFAULTS** check box is checked and proceed to the vSAN network configuration.
- To specify a custom vMotion network for this workload domain, clear the **USE DEFAULTS** check box, type the network settings, and then proceed to the vSAN network configuration. A minimum subnet mask of /22 is recommended.

Note If you choose to use the defaults, but the software detects inadequate IP address space in the existing network, you must specify a new configuration.

5 Click **Next** to proceed to the vSAN network configuration.

6 For the vSAN network configuration, choose one of these options.

- To use the same vSAN network configuration that was specified during your system's bring-up process, check the **USE DEFAULTS** check box and proceed to the VXLAN network configuration.
- To specify a custom vSAN network for this workload domain, clear the **USE DEFAULTS** check box if it is selected, type the vSAN network settings, and then proceed to the VXLAN network configuration. A minimum subnet mask of /22 is recommended.

Note If you choose to use the defaults, but the software detects inadequate IP address space in the existing network, you must specify a new configuration.

Caution If you specify IP addresses for exclusion in this screen, they override any IP exclusions that were entered originally during your system's bring-up process. See [About Excluding IP Address from SDDC Manager Use](#).

7 For the VXLAN network configuration, choose one of these options.

- To use the same VXLAN network configuration that was specified during your system's bring-up process, check the **USE DEFAULTS** check box and proceed to the Data Center connection configuration.
- To specify a custom VXLAN network for this workload domain, type the VXLAN network settings and then proceed to the Data Center network configuration. A minimum subnet mask of /22 is recommended.

8 (Optional) For the Data Center connection, choose one of these options.

- Select one of the configurations that is already in place. During ongoing operations, Data Center configurations are established using the **Settings > Network Settings > Data Center** screen.
- Select **Public** to use the data center network provided during bring-up.
- Use the drop-down **Custom Configuration** choice to create a new configuration to be used for this workload domain. A VLAN ID is required.

Explicitly specifying a data center connection at this step is optional. If you do not specify a data center connection, the workflow uses the one associated with the management domain by default.

Important Do not select a data center connection that is already associated with a VDI workload domain or unexpected results might occur.

9 Proceed to the next step by clicking **Next**.

Review the Details and Start the Creation Workflow

At the Review step of the wizard, you review the information about the to-be-created workload domain and start the creation workflow. You can also print the information or download a printable version to print later.

The Review page displays information about the resources and their configurations that will be deployed when the workflow creates and deploys the virtual infrastructure for this workload domain.

The hosts that will be added to the workload domain are listed along with the names of the physical racks in which those hosts are located. Unless you chose **High** availability, the hosts can be located in different physical racks.

This page also displays the IP addresses of the vCenter Server instances that will be deployed to manage the resources assigned to the virtual environment.

Procedure

- 1 Scroll down the page to review the information.
- 2 (Optional) Print the information or download a printable version to print later.
- 3 Click **Finish** to begin the creation process.

The VI Workload Triggered window appears, letting you know that the workflow is starting the tasks that create and deploy the VI workload domain.

What to do next

To confirm the progress of the provisioning workflow's tasks, navigate to the System Status page and drill-down to the details about the workflow. When the VI workload domain is created, the Dashboard page refreshes to indicate the new domain exists. From the Dashboard page, you can click **View Details** to navigate to see the details of the new VI workload domain. From that details page, you can launch the vSphere Web Client to see the configured virtual environment and begin working within it. See [Navigate into the VI Workload Domain's Virtual Environment](#).

Navigate into the VI Workload Domain's Virtual Environment

Navigate to a VI workload domain's virtual environment using the launch link from the workload domain's details page. When you click the launch link, the vSphere Web Client opens to a view of the virtual environment associated with that workload domain and you can use the standard capabilities of the vSphere Web Client to work within the environment.

When a VI workload domain is created, SDDC Manager deploys and configures the required VMware SDDC infrastructure within your environment. Within that SDDC infrastructure, you can perform the typical workload-related tasks that you would typically do in a virtual environment built on a vSphere software stack.

Note All of the capabilities of a VMware SDDC are available to you in the VI workload domain's environment, such as creating, provisioning, and deploying virtual machines, configuring the software-defined networking features, and so on.

Procedure

- 1 From the SDDC Manager dashboard, navigate to the VI workload domain's details page.
- 2 In the domain details page, locate the **vCenter** launch link and click it to launch the vSphere Web Client.

The vSphere Web Client opens to the VI workload domain's environment.

What to do next

Begin provisioning the VI workload domain's SDDC environment for your organization's needs. In the vSphere Web Client, you can perform all of the tasks that you typically perform in a VMware SDDC environment.

- For detailed information about VM management and administration in a vCenter Server environment using the related capabilities of the vSphere Web Client, see the vSphere Virtual Machine Administration topics in the vSphere 6.0 Documentation Center at https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.vm_admin.doc/GUID-55238059-912E-411F-A0E9-A7A536972A91.html.
- For detailed information about configuring the NSX for vSphere software-defined networking features, see the NSX for vSphere documentation at <https://docs.vmware.com/en/VMware-NSX-for-vSphere/index.html>.

Create a VDI Workload Domain

You create a VDI workload domain using the SDDC Manager Dashboard. When you create a VDI workload domain, the SDDC Manager deploys the components from the VMware Horizon product that are necessary for the VDI infrastructure to deliver network-based virtual desktops, based on your specifications. You can also create and save VDI workload domain configurations.

When you create and deploy a VDI workload domain, SDDC Manager reserves the necessary hardware capacity and deploys the VMware software stack appropriate to provision the necessary components for a VDI environment. The creation workflow is a two-step process:

- 1 SDDC Manager first runs the VI workload domain creation workflow, to create a virtual infrastructure (VI) environment. For a description of VI workload domains and the VMware SDDC software that makes up a virtual infrastructure environment, see [Create a Virtual Infrastructure Workload Domain](#). The VI workload domain is sized based on the parameters you enter in the VDI workload domain creation wizard, such as the number of virtual desktops, the amount of vCPU and memory, and the persistence type for the desktops.
- 2 Then using that base VI environment, the creation workflow deploys and configures the additional VMware software needed for a VDI environment. The additional VMware software that supports the VDI environment on top of the base virtual infrastructure includes View Connection Server, View Agent, View Administrator, View Composer, and the various client applications used for accessing the virtual desktops. When you specify the App Volumes choice in the configuration wizard, the VMware App Volumes™ software is also configured in the VDI environment and the VMware App Volumes agent is installed in the deployed virtual desktops as part of the VDI environment creation process.

Prerequisites

Verify that you meet the following prerequisites before starting the process.

- You must provide the ISO image for a 64-bit Windows Server 2012 R2 Volume License (VL) Edition operating system. You will upload the ISO image in one of the wizard's steps. The creation workflow creates a virtual machine and installs this Windows Server operating system into it, and then installs View Connection Server software into the Windows Server operating system.

The Windows Server 2012 R2 VL edition that is supported for use in this release is:

- Standard
- Datacenter

Note The Essentials and Foundation editions are not supported for use in a VDI workload domain because the View software that underlies the VDI environment does not support those editions.

- You must provide a valid VL license key for that ISO image. You must test this license in advance and enter it carefully. The VDI workload domain deployment process does not check the validity of the key.

Caution If you enter a key that is not a VL key valid for use for the 64-bit Windows Server 2012 R2 Volume License (VL) Standard Edition or Datacenter Edition ISO, the VDI workload domain creation process will fail part way through and you will have to delete the partially created workload domain.

- When you are using the **Deploy Desktops** option in the wizard, instead of the **Reserve Resources** option, you must provide a Windows 7, Windows 8, or Windows 10 operating system in the form of an OVA file and the Windows installation in the OVA must be prepared with specific criteria to ensure that SDDC Manager can successfully deploy and manage the virtual desktops. Ensure your OVA file has been prepared according to the criteria and steps described in [Prepare the OVA for the Virtual Desktops](#).
- When you are selecting the **Persistence Type** option to have full clones instead of linked clones, the VDI environment creation process does not customize the virtual desktops. This behavior is by design from the View infrastructure software that underlies the VDI infrastructure. In the case of full clones, the desktops that the wizard creates are only copies of the OVA template that you upload in the wizard, and if you want customized full clones, you must implement the customization script in the Windows installation used for the OVA template and customize the virtual desktop the way you want it before generating the OVA file. See [Prepare the OVA for the Virtual Desktops](#).
- In the VDI workload domain creation wizard, you are prompted to enter networking information for a data center network or you can select pre-configured information from a drop-down list. During the VDI workload domain creation workflow, the SDDC Manager places the virtual desktops on this network and configures the network to carry traffic between this Cloud Foundation system and the environment external to the system. Prior to starting the VDI workload domain creation wizard, contact your organization's Data Center Network Administrator to determine the correct vlan ID, subnet, subnet, mask, default gateway, and DNS server information to use for this VDI environment's data center network.

Your Data Center Network administrator must ensure that the settings for the data center network provide for secure traffic and is routable outside the Cloud Foundation system. Your Data Center Network administrator must also ensure that this Cloud Foundation system's public management network is able to communicate with that secure data center network. Otherwise, the VDI workload domain creation workflow will fail. Your Cloud Foundation system's management network must be able to communicate with that secure data center network to provision and manage the VDI environment. This management network's information is specified during the Cloud Foundation bring-up process. By the time you are creating VDI workload domains, the management network is already configured.

As you proceed through the VDI workload domain creation wizard, instead of entering new data center networking information, you can select from one of the existing unused data center configurations previously entered using the SDDC Manager Dashboard. To see the existing data center network configurations and any workload domains they are already associated with, use the Settings page's Data Center screen. See [Data Center Screen](#).

To review the details of already configured networks, navigate to **Settings > Network Settings > IP Distribution** and use the **Download** button in the IP Allocations area to download a CSV file containing the details.

- Additionally, when you are selecting the **Connect from anywhere** option, the data center network must be securely routable to your company's demilitarized zone (DMZ), which will be used for creating a network in the Cloud Foundation. When you select the **Connect from anywhere** option, you are specifying that users can access their virtual desktops over the Internet using their View

clients. When the VDI environment is configured and ready for use, those View clients must be proxied through View Security servers that are placed within your company's demilitarized zone (DMZ) so that the View clients can reach the routable network in your Cloud Foundation system and the virtual desktops within.

- If you plan to use the **External** option for the Active Directory configuration, you must:
 - Have the information for your organization's Microsoft Active Directory domain and whether it requires use of secure LDAP (LDAPS). With the **External** option, your existing Active Directory infrastructure is used for the VDI infrastructure's Active Directory requirements.
 - Verify that your DHCP is installed and reachable by broadcast from the Data Center network configuration you select in the wizard. The virtual desktops must be able to reach that DHCP.
 - Have the following items set up in your Active Directory in advance:
 - An Organizational Unit (OU) in your Active Directory where the VDI infrastructure's servers will be created.
 - An Organizational Unit (OU) where the virtual desktops will be created. This OU can be the same as the OU for the VDI infrastructure's servers.
 - A user account with read-write access to those two OUs.
 - A user account that will be used to add View Composer servers in the VDI infrastructure. This View Service account is a user account that is used to authenticate when accessing View Composer servers from View Connection servers. This user account must have the permissions required by the VMware Horizon software components that provision the VDI infrastructure. The key permissions needed are Create Computer Objects, Delete Computer Objects, and Write All Properties permissions, including permissions that are assigned by default (List Contents, Read All Properties, Read Permissions, Reset Password). For more details about the account requirements on the user account for View Composer AD operations, see the related VMware Horizon version 7.2 documentation at <https://docs.vmware.com/en/VMware-Horizon-7/7.2/com.vmware.horizon-view.installation.doc/GUID-3446495C-FEC8-425C-AFF8-A6CAABA5E973.html>.
- If you plan to use the **Implement App Volumes** option and the Active Directory **External** option together, you must create a group in your Active Directory whose members will be the App Volumes administrator accounts. This group must be created in your Active Directory in advance of running the VDI workload domain creation process. You enter this group name in the wizard.
- If you plan to the **Implement App Volumes** option and the Active Directory **Internal** option together, the process creates a group named AppVolumesAdmins automatically in the auto-generated Active Directory. However no members are added. As a result, when the VDI workload domain creation process is completed, you must log in to the created Active Directory using the Active Directory administrator account and add members to the AppVolumesAdmins group. Until you add members to the AppVolumesAdmins group, no one will be able to log in to App Volumes.

Procedure

1 Prepare the OVA for the Virtual Desktops

Using the **Deploy Desktops** option in the VDI workload domain creation wizard means that the creation workflow will deploy the virtual machines that are the virtual desktops as part of creating the VDI environment. Therefore, when you plan to use the **Deploy Desktops** option, you must prepare a Windows 7, Windows 8, or Windows 10 operating system installation with specific criteria and then provide that installation in the form of an OVA file.

2 Start the Wizard to Create a VDI Workload Domain

You start the Configure VDI wizard from the Dashboard page of the SDDC Manager Dashboard.

3 Specify the General Configuration Information for the VDI Workload Domain

In the General Configuration: Topology step of the creation wizard, you provide a name for the VDI workload domain and other characteristics that determine the topology of the VDI environment.

4 Specify Active Directory and SQL for the VDI Environment

In the General Configuration: Active Directory and SQL step of the wizard, you specify details about the Microsoft Active Directory infrastructure that the VDI environment will use to authenticate the desktop users.

5 Specify Characteristics of the Virtual Desktops

In the Virtual Desktops: Management and Size steps of the creation wizard, you choose whether to configure the VDI environment to use VMware App Volumes to manage the desktops, specify the number of virtual desktops to be deployed in this environment, and specify the capacity to configure for each desktop. You can also choose to save the VDI workload domain configuration to facilitate the creation of workloads in the future.

6 Specify Networking Information for the VDI Workload Domain

In this step, you must specify the data center network that will be used for the actual desktop pools to which end users connect.

7 Specify the Windows Images for the VDI Environment

In the Images step of the creation wizard, you specify the Microsoft Windows Server ISO file and license key that are required for use by the VDI environment's server components. If you selected to have desktops deployed as part of the workload domain creation process, you also specify a Microsoft Windows template as an OVA to use for the parent virtual machine.

8 Review the Details and Start the Creation Workflow

At the Review step of the wizard, you review the information about the to-be-created workload domain and start the creation workflow. You can also print the information or download a printable version to print later.

9 Post-Deployment Tasks After Your VDI Workload Domain is Created

After the VDI workload domain creation workflow has completed, you typically launch the View Administrator Web interface to view and work with the VDI infrastructure that is configured for the workload domain. Depending on the options you selected in the creation wizard, you also must perform post-deployment tasks.

What to do next

After the workflow has completed, perform the tasks described in [Post-Deployment Tasks After Your VDI Workload Domain is Created](#), especially:

- If you selected the **Implement App Volumes** option and the Active Directory **External** option together, and your Active Directory domain controllers are configured with TLS certificates for secure LDAP connections, you should configure the deployed App Volumes Manager instance to use secure connection port 636.
- If you selected the **Implement App Volumes** option and the Active Directory **Internal** option together, you must log in to the created Active Directory using the Active Directory administrator account and add members to the AppVolumesAdmins group. The process creates a group named AppVolumesAdmins automatically in the auto-generated Active Directory, but does not add members to the group. Until you add members to the AppVolumesAdmins group, no one will be able to log in to App Volumes.
- If you selected to have full clones and the Active Directory **Internal** option together, you must manually join the created full clones to the created internal Active Directory domain.

Prepare the OVA for the Virtual Desktops

Using the **Deploy Desktops** option in the VDI workload domain creation wizard means that the creation workflow will deploy the virtual machines that are the virtual desktops as part of creating the VDI environment. Therefore, when you plan to use the **Deploy Desktops** option, you must prepare a Windows 7, Windows 8, or Windows 10 operating system installation with specific criteria and then provide that installation in the form of an OVA file.

Typically, your organization has its own approved end-user desktop image with software, configurations, and policy settings that your organization wants in its end-user desktops, such as anti-virus and VPN software, browser configurations, user settings, policies, and so on. The VDI environment creation process does not configure such organization-specific needs. However, Cloud Foundation needs the end-user desktop image to be prepared so that the VMware Horizon software and its View components that make up the VDI environment's infrastructure can use the desktop image as a template for the virtual desktops that are served by the VDI environment.

Therefore, to ensure the desktop image can meet the requirements of the VMware Horizon software, you must prepare the Windows operating system in advance and ensure it meets the specific criteria before you generate the OVA file from it. In this Cloud Foundation release, the Windows operating system can be Windows 7, Windows 8, or Windows 10. Cloud Foundation uses the uploaded Windows OVA as the desktop template to create all of the virtual desktops that will be deployed in the workload domain. Therefore, you must create this Windows installation in advance on another machine, either a physical or virtual machine, prepare the installation to meet the detailed requirements, and then convert into the OVA format that you can upload into the VDI workload domain creation wizard.

To avoid deployment issues and have the Windows OVA successfully used as a template virtual desktop in the deployed VDI environment, it must meet specific requirements. Many of the criteria are determined by the View software that underlies the VDI environment. Some requirements might differ according to the Windows operating system, whether it is Windows 7 or Windows 8 or Windows 10. In general, the

prepared Windows installation must meet the requirements of a Windows image optimized for VMware Horizon, as documented in the *VMware Windows Operating System Optimization Tool Guide: VMware Horizon 6, VMware Horizon 7, and VMware Horizon Cloud-Hosted* white paper. This white paper is available at <http://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/whitepaper/vmware-view-optimizationguidewindows7-en-white-paper.pdf> and includes settings to optimize Windows 7 and Windows 8.x for desktops.

Along with the white paper, you can use the VMware OS Optimization Tool (OSOT) to optimize your Windows desktop images. The OSOT takes the white paper's recommendations and automates them. The OSOT is a free VMware Flings that you can download. The *VMware Windows Operating System Optimization Tool Guide: VMware Horizon 6, VMware Horizon 7, and VMware Horizon Cloud-Hosted* white paper describes how to use the OSOT and the white paper's Appendix A lists all of the optimization settings used in the OSOT templates. The OSOT can help optimize the Windows 7, Windows 8, and Windows 10 operating systems that this release of Cloud Foundation supports using for virtual desktops. The OSOT is available at <https://labs.vmware.com/flings/vmware-os-optimization-tool>

To achieve successful results in the deployed VDI environment, at a minimum, the prepared virtual machine and its installed Windows operating system must meet the following configuration requirements:

- You must set the virtual hardware version of the template desktop virtual machine to hardware version 11. This release of Cloud Foundation has ESXi 6.5 hosts. For information about virtual machine hardware versions that can run on ESXi 6.5 hosts, see the *Virtual Machine Hardware Versions* topic in the vSphere 6.0 Documentation Center at <https://docs.vmware.com/en/VMware-vSphere/6.0/com.vmware.vsphere.hostclient.doc/GUID-68E5EDAE-66DE-43F8-9420-F424AFEADB1D.html>
- You must use Microsoft Key Management Service (KMS) system license activation to activate the prepared Windows installation, and activate it against the same KMS system that will be reachable by the virtual desktops that will be created during the VDI workload domain creation process. That KMS system must be the same one, so that the virtual desktops can subsequently activate against the same KMS system. That KMS system must be discoverable by broadcast in the Data Center network that you specify in the VDI workload domain creation wizard. If the prepared Windows installation was not already activated for the KMS system or that KMS system is not reachable from your Cloud Foundation system, the virtual desktops that are created based on the prepared Windows image will be unusable.

This requirement is determined by the View Composer software that is deployed in the VDI environment. As described in VMware KB article 1026556, by default the View Composer QuickPrep process uses KMS to activate Windows guest operating systems. To ensure linked-clone desktops are properly activated, you must use KMS license activation on the parent virtual machine. QuickPrep does not use other volume activation methods such as Multiple Activation Key (MAK) licensing.

- You must disable TLS 1.0. See <https://docs.vmware.com/en/VMware-vSphere/6.5/com.vmware.vsphere.security.doc/GUID-BAE07BBA-33D3-494C-90AD-C28DC72DC55C.html>
- You must enable the local Administrator user account in the Local Users and Groups in the Windows operating system and it must not be renamed.

- You must set the password for that Administrator user account and have it in advance of starting the VDI workload domain creation wizard so you can enter that password as you complete the wizard's steps. The VDI environment creation process uses the Administrator account to install additional agents into the Windows installation that are used by the VDI environment infrastructure, such as the App Volumes agent.
- You must install the latest VMware Tools in the template desktop virtual machine, or upgrade the already installed VMware Tools to the latest version. The latest VMware Tools must be installed prior to installing the View Agent. If the New Hardware wizard appears as you follow the Install/Upgrade VMware Tool on-screen instructions, go through the wizard and accept the defaults.

For detailed information, see the Installing and Configuring VMware Tools paper at <http://www.vmware.com/pdf/vmware-tools-installation-configuration.pdf> and the how-to video in the KB article at kb.vmware.com/kb/1018377

- You must install the View Agent, and install it only after the latest VMware Tools is installed.

Important The order of installation of VMware Tools and the View Agent is important. If you install them in the incorrect order, or if you do not know the order in which they were installed, uninstall both and reinstall in the correct order.

- Do not install the App Volumes agent. The App Volumes agent is installed by the VDI environment creation process as needed.
- You must configure the Windows installation to obtain an IP address using DHCP.
- If your desktop image is a Windows 7 installation and you intend to use App Volumes in the VDI environment, ensure that the Microsoft Security Update for Windows 7 KB3033929 is installed in that Windows 7 installation. The Microsoft KB article is located at <https://www.microsoft.com/en-us/download/details.aspx?id=46078>
- If you intend to have full clones instead of linked clones, you must implement the customization script in the Windows installation and customize the virtual desktop the way you want it before generating the OVA file. The VDI environment creation process does not customize the virtual desktops. This behavior is by design from the View infrastructure software that underlies the VDI infrastructure. In the case of full clones, the desktops that the wizard creates are only copies of the OVA template that you upload in the wizard. Therefore, if you want customized full clones, the customization script must already exist in the Windows installation and the virtual desktop customized the way you want it for your end users before the OVA file is generated.

In addition to the minimum preparation requirements, you should also perform a full anti-virus scan of the prepared Windows installation before the final step of creating an OVA file.

For best practices recommendations beyond the minimum preparation requirements, see the *Reviewers Guide for View in Horizon 6* white paper located at <http://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/whitepaper/view/vmware-view-evaluators-guide-white-paper.pdf>.

Procedure

- 1 Obtain the virtual machine that will be the template desktop image for the virtual desktops served by the VDI environment.

The way you obtain the parent virtual machine depends on whether your organization already has its own approved end-user desktop image that it wants for this VDI environment or if you need to create the virtual machine. If you need to create the virtual machine, see the VMware Horizon product documentation at <https://docs.vmware.com/en/VMware-Horizon-7/index.html>

- 2 Set the virtual hardware version of the desktop virtual machine to hardware version 11.
- 3 Configure the Windows operating system in the virtual machine to use KMS system license activation using the same KMS system that will be reachable by the Data Center network configuration you will use for the VDI environment.
- 4 Activate the virtual machine's Windows operating system against that KMS system.
- 5 Install the latest VMware Tools in the operating system, or upgrade the already installed VMware Tools to the latest version.

If the New Hardware wizard appears as you follow the Install/Upgrade VMware Tool on-screen instructions, go through the wizard and accept the defaults.

- 6 Enable the local Administrator user account in the Local Users and Groups in the Windows operating system.

Important Do not change the name of this account. It must remain named Administrator.

- 7 Set the password for that Administrator user account and make sure you know it for entering in the workload domain creation wizard.

You would typically use a password that meets your organization's policies for its end-user desktops.

- 8 Configure the Windows installation to obtain an IP address using DHCP.
- 9 (Optional) Depending on the software that your organization already requires installed in the operating system, increase the size of the virtual disk to ensure the View Agent can be installed.
- 10 Install the View agent in the operating system.
- 11 If you are planning to select the **Persistence Type** option in the VDI workload domain creation wizard to have full clones instead of linked clones, implement the customization script in the Windows installation.

When the option to have full clones is selected in the wizard, the VDI environment creation process does not customize the virtual desktops. This behavior is by design from the View infrastructure software that underlies the VDI infrastructure. In the case of full clones, the desktops that the wizard creates are only copies of the OVA template that you upload in the wizard, and if you want customized full clones, you must implement the customization script in the Windows installation and customize the virtual desktop the way you want it.

12 If your desktop image is a Windows 7 installation and you intend to specifying using App Volumes in the VDI environment, install the Microsoft Security Update for Windows 7 KB3033929 into the Windows 7b installation. The Microsoft KB article is located at <https://www.microsoft.com/en-us/download/details.aspx?id=46078>

13 (Optional) Make any additional configurations or install additional software, according to your organization's needs.

You might obtain additional configuration recommendations from:

- VMware Horizon product documentation <https://docs.vmware.com/en/VMware-Horizon-7/index.html>
- *Reviewers Guide for View in Horizon 6* white paper
- *VMware Windows Operating System Optimization Tool Guide: VMware Horizon 6, VMware Horizon 7, and VMware Horizon Cloud-Hosted* white paper
- Running the OSOT

14 Perform a full anti-virus scan of the prepared Windows installation.

Even though running an anti-virus scan is not required for the prepared desktop image to work in the VDI environment, it is strongly recommended.

15 Export the prepared virtual machine as an OVA.

You have an OVA that is prepared with the requirements for the template desktop virtual machine needed by the VDI environment creation process.

Start the Wizard to Create a VDI Workload Domain

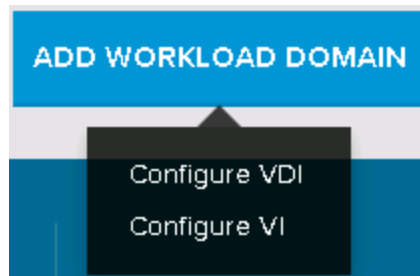
You start the Configure VDI wizard from the Dashboard page of the SDDC Manager Dashboard.

Prerequisites

Verify that you have met the prerequisites described in [Create a VDI Workload Domain](#).

Procedure

1 Start the wizard by selecting **ADD WORKLOAD DOMAIN > Configure VDI**.



The wizard starts and the VDI Checklist window appears.

2 Review the information and verify that the requirements are met before proceeding.

3 Click **BEGIN.**

The wizard starts and the VDI window appears. The top of the window shows the progress of the wizard as you complete each step.

4 Proceed to the next step by clicking **Next.****Specify the General Configuration Information for the VDI Workload Domain**

In the General Configuration: Topology step of the creation wizard, you provide a name for the VDI workload domain and other characteristics that determine the topology of the VDI environment.

Spaces are not allowed in the VDI name that you enter in this wizard step. The name can be three to twenty characters long and can contain any combination of the following:

- Lowercase alphabetic characters
- Uppercase alphabetic characters
- Numbers
- Hyphens
- Underscores

Procedure

- 1** Type a name for this VDI workload domain.
- 2** Select a deployment type.

Option	Description
Reserve resources	With this choice, the workflow provisions the necessary physical and logical resources that are required for the VDI environment, according to specifications you make in the wizard. However, the View desktop pools are not created. After the VDI environment is provisioned, you must log in to the View Administrator in the workload domain's deployed environment to create and provision the desktop pools.
Deploy Desktops	With this choice, the workflow provisions the necessary physical and logical resources that are required for the VDI environment and creates and provisions the desktop pools.

3 Select the desktop type for the domain.

Option	Description
Linked	A linked clone is a copy of a virtual machine that shares virtual disks with the parent virtual machine. This conserves disk space and allows multiple virtual machines to use the same software installation. The linked clone virtual machine must have access to the parent virtual machine's virtual disks. It stores changes to the virtual disks in a snapshot dedicated to the virtual machines.
Instant	An instant clone is a virtual machine created from the memory and disk of the running parent virtual machine. It uses copy-on-write for memory and disk management. After the instant clone is created, it shares the read disks of the replica virtual machine, exactly like a linked clone.
Full	A full clone is a complete copy of the original virtual machine, including all associated virtual disks.

4 Select the assignment type for the domain.

Option	Description
Floating Desktops	In a floating desktop assignment, users receive a virtual machine randomly selected from the desktop pool when they log in. When a user logs out, the virtual machine is destroyed and a new one is added to the pool. The advantage of this assignment type is that only a small number of virtual machines need to be powered on at any given time.
Dedicated Desktops	In a dedicated desktop assignment, users receive the same virtual machine each time they log in to the desktop pool. Other users cannot access that virtual machine. In this assignment type, all desktops need to be powered on at all times.

5 Select the type of desktop access that you want the VDI environment to support.

Option	Description
Corporate Network	This choice provides access to the virtual desktops from within the customer's network only.
Connect from Anywhere	This choice provides access to the virtual desktops from both within the customer's network and from the Internet.

6 Select **Use Legacy Security Servers** if you want to use Unified Access Gateways (UAG) to route traffic to the internet.

7 Proceed to the next step by clicking **Next**.

Specify Active Directory and SQL for the VDI Environment

In the General Configuration: Active Directory and SQL step of the wizard, you specify details about the Microsoft Active Directory infrastructure that the VDI environment will use to authenticate the desktop users.

A VDI environment requires the desktop users to authenticate using an Active Directory infrastructure. You can use your organization's existing Active Directory domain or have the creation workflow create an Active Directory infrastructure as part of the provisioned VDI workload domain. If you use your organization's existing Active Directory domain, you must provide the DNS server IP address used by your Active Directory server. If you select to have the workflow create an internal Active Directory server, specify the IP address of your corporate or enterprise DNS server to use so the internal Active Directory server can resolve your enterprise domain information. All of the VDI infrastructure's components will point to the internal Active Directory server for DNS resolution.

Prerequisites

Verify that you have met the prerequisites described in [Create a VDI Workload Domain](#) for the type of Active Directory infrastructure you want to use with this VDI environment.

If you are using your organization's existing Active Directory domain, verify whether your Active Directory domain requires use of secure LDAP (LDAPS). If it does, then you must select the checkbox to use LDAPS.

Procedure

- 1 Select whether to use your organization's existing Active Directory domain or to have the workflow create a new one.

Option	Description
Existing	<p>Select this option to have the VDI environment use your organization's existing Active Directory domain.</p> <p>Provide the following information:</p> <ul style="list-style-type: none"> ■ The System Administrator's password. This password is the one that will be set for the Administrator user in all of the VDI environment's Windows servers. ■ Domain name ■ IP address of the Active Directory domain controller ■ In Virtual Desktop Location, type the organizational unit (OU) to use for the virtual desktops. This OU must already exist in your Active Directory. ■ In Horizon Servers Location, type the Organizational Unit (OU) in your Active Directory which the VMware Horizon environment will use for its View servers, View Connection and View Composer servers. This OU must already exist in your Active Directory. ■ If your Active Directory domain requires use of LDAPS, select the Use secure connection (port 636) check box. When you select this check box, the thumbprint of the public certificate is retrieved from the IP address of the domain controller and displayed. ■ In Read-Write Account, type the account credentials, user name and password for a user account in your Active Directory that has read/write access for those OUs. This user account must already exist in your Active Directory. ■ In Horizon View Service Account, the account credentials, type the user name and password of a user account in your Active Directory that will be used to add the View Composer Service servers that are in the VMware Horizon environment. This user is used to authenticate when accessing View Composer servers from View Connection servers. This user account must already exist in your Active Directory and have the permissions required by the VMware Horizon environment. ■ In SQL Type, select Existing to have the VDI environment use your organization's existing SQL setup. Select New to have the workflow create a new dedicated SQL server. <p>When you use the Existing option for the VDI environment's Active Directory, your DHCP is expected to be reachable by the virtual desktops using the Data Center network configuration that you specify in the wizard. When you select this choice, the workflow does not install DHCP for the desktops and SDDC Manager expects that you have DHCP installed and reachable by broadcast from the Data Center network configuration.</p>
New	<p>Select this option to have the workflow create a new dedicated Active Directory server internally in the VDI environment and configure it with the necessary domain name, IP address, and OU information appropriate for the VDI workload domain.</p> <p>Type the IP address of your corporate or enterprise DNS server that this internal Active Directory domain can use to resolve your domain information.</p> <p>Type a password for the domain administrator account that will be created for the domain.</p>

Option	Description
	In SQL Type , select Existing to have the VDI environment use your organization's existing SQL setup. Select New to have the workflow create a new dedicated SQL sever.

- 2 Proceed to the next step by clicking **Next**.

Specify Characteristics of the Virtual Desktops

In the Virtual Desktops: Management and Size steps of the creation wizard, you choose whether to configure the VDI environment to use VMware App Volumes to manage the desktops, specify the number of virtual desktops to be deployed in this environment, and specify the capacity to configure for each desktop. You can also choose to save the VDI workload domain configuration to facilitate the creation of workloads in the future.

Prerequisites

If you plan to use App Volumes in this VDI environment, verify that you have met the related prerequisites described in [Create a VDI Workload Domain](#).

Procedure

- 1 On the Virtual Desktops - Management step, choose whether to configure the workload domain to use VMware App Volumes and then proceed to the next step.

If you select to use App Volumes and you previously selected the **New** option for Active Directory, you must also specify a group in your Active Directory whose members will have App Volumes administrator accounts. This group must already exist in your Active Directory in advance of starting the VDI workload domain creation process.
- 2 On the Virtual Desktops - Size step, type the number of virtual desktops that this workload domain will handle.

Note You can deploy a maximum of 2000 virtual desktops per workload domain.

- 3 Type the amounts of CPU, RAM, and storage to configure for each desktop.
- 4 (Optional) Save the current VDI workload domain configuration by clicking **SAVE AND CLOSE**.
This action takes you directly to the Dashboard.
 - a To view and work with the saved configuration, click **View Details** in the Workload Domains table.
The saved configuration is listed under the Saved Configurations header on the Workload Domains page.
 - b Click the name of the saved configuration to open the details page.

- c To create a new VDI domain workload based on the saved configuration, click **Resume Configuration**.

This action returns you to the VDI Configuration workflow with the saved configuration settings in place.

- d To delete the saved configuration, click **Delete Configuration**.

- 5 Proceed to the next step by clicking **Next**.

Specify Networking Information for the VDI Workload Domain

In this step, you must specify the data center network that will be used for the actual desktop pools to which end users connect.

If you selected the **Connect from anywhere** option in a previous wizard step, you must also provide a DMZ network configuration. The servers created for the VDI infrastructure will be installed in the environment's existing management network and the virtual desktops will be installed on the data center network.

Important Ensure that the configuration for the data center network, the DMZ network configuration, and the environment's management network meets the networking prerequisites described in [Create a VDI Workload Domain](#). If not all of the networking prerequisites are met prior to completing the wizard, the creation workflow might fail.

Prerequisites

Verify that you have met the networking prerequisites as described in [Create a VDI Workload Domain](#).

Procedure

- 1 On the Network Configuration: Data Center step, specify the data center network configuration to use for this VDI workload domain.
 - Select one of the existing configurations that are already in place in your installation. During ongoing operations, data center network configurations can be saved using the **Settings > Network Settings > Data Center** screen.
 - Click **Custom Configuration** and provide a network configuration to be used for this VDI environment.

If you selected to use the Active Directory domain **External** option in a previous wizard step, ensure that your external DHCP is installed and reachable by broadcast from your selected network configuration.
- 2 Proceed to the next step by clicking **Next**.
- 3 If you selected **Connect from anywhere** in a previous wizard step, you must provide a DMZ network configuration by selecting an existing configuration or by selecting **Custom Configuration** and providing a new configuration to be used for this environment.
- 4 Proceed to the next step by clicking **Next**.

Specify the Windows Images for the VDI Environment

In the Images step of the creation wizard, you specify the Microsoft Windows Server ISO file and license key that are required for use by the VDI environment's server components. If you selected to have desktops deployed as part of the workload domain creation process, you also specify a Microsoft Windows template as an OVA to use for the parent virtual machine.

The VDI infrastructure's components, such as the View Connection Server and View Composer components, must be installed on a Microsoft Windows Server operating system. You must provide a license key that is valid for that operating system.

If you have selected **Deploy Desktops** at the General - Topology step of the wizard, you provide a Windows OVA in this wizard step. This Windows OVA must be prepared in advance with specific criteria, as described in [Prepare the OVA for the Virtual Desktops](#).

If the Windows Server 2012 ISO file and Windows OVA files have already been uploaded into the software environment during a prior run of the VDI workload domain creation wizard, those existing files are displayed in the screen as selected by default.

Prerequisites

Verify that you have met the detailed prerequisites that are required on the Microsoft Windows Server operating system, on the license key, and on the Windows OVA, as described in [Create a VDI Workload Domain](#) and [Prepare the OVA for the Virtual Desktops](#).

Procedure

1 Specify the Windows Server 2012 image.

See the prerequisites list earlier in this topic for details on the Microsoft Windows Server operating system that is required. You must ensure that the license key you enter in the **Windows License Key** field is valid for the specified Windows Server 2012 image.

- If an ISO file is available in the software environment for this purpose, because it was previously uploaded during a prior run of this wizard, the file's name is displayed in the field by default. You can retain that file if you have the valid license key or you can remove it and upload a different one.
- Use the **BROWSE** button to locate and upload an appropriate ISO file.

Depending on the size of the ISO file, the upload process might take some time. The displayed progress bar indicates the upload status.

2 Type the valid license key to use for that Windows Server operating system.

Important Test the license key in advance and enter it carefully. The VDI environment creation process does not check the key's validity.

- 3 If you selected **Deploy Desktops** at the General - Topology step, specify the Windows OVA to use for the parent virtual machine and its Administrator account's password.

- a Specify the Windows OVA.

- If an OVA file is available for this purpose, because it was previously uploaded into the environment during a prior run of this wizard, the file's name is displayed in the field by default. You can retain that file or you can remove it and upload a different one.
- Use the **BROWSE** button to locate and upload the prepared OVA file.

Depending on the size of the OVA file, the upload process might take some time. The displayed progress bar indicates the upload status.

- b Type the Windows Administrator password for the enabled Administrator account in the Windows installation from which the Windows OVA was built.

The Administrator user in this Windows operating system must be enabled and must not have been renamed. VMware Tools and Horizon View agent must also be installed in this Windows system. See the prerequisites list earlier in this topic for the requirements on the Windows installation that must be met.

- 4 Proceed to the next step by clicking **Next**.

Review the Details and Start the Creation Workflow

At the Review step of the wizard, you review the information about the to-be-created workload domain and start the creation workflow. You can also print the information or download a printable version to print later.

The Review page displays information about the resources and their configurations that will be deployed when the workflow creates and deploys this VDI environment.

You can use the **View Configuration Details** and **View Component Details** drop-down arrows to review information related to the VDI infrastructure that will be created and deployed, such as the number of View Connection Server appliances.

Procedure

- 1 Scroll down the page to review the information.
- 2 (Optional) Print the information or download a printable version to print later.
- 3 Click **Finish** to begin the creation process.

The VDI Workload Triggered window appears, letting you know that the workflow is starting the tasks that create and deploy the VDI workload domain.

What to do next

To confirm the progress of the provisioning workflow's tasks, navigate to the System Status page and drill-down to the details about the workflow. When the VDI workload domain is created, the Dashboard page refreshes to indicate the new domain exists. From the Dashboard page, you can use the **View Details** button to navigate to see the details of the new VDI workload domain. From that details page, you can obtain the IP address for the View Administrator Web interface and use that IP address in a browser tab to launch the View Administrator Web interface's login screen. When you log in to the View Administrator Web interface, you can see the VDI infrastructure that is configured for this workload domain.

Important After the workflow has completed, complete any applicable items described in [Post-Deployment Tasks After Your VDI Workload Domain is Created](#).

Post-Deployment Tasks After Your VDI Workload Domain is Created

After the VDI workload domain creation workflow has completed, you typically launch the View Administrator Web interface to view and work with the VDI infrastructure that is configured for the workload domain. Depending on the options you selected in the creation wizard, you also must perform post-deployment tasks.

After the workflow has completed, perform one or more of the following post-deployment tasks. You must perform some of these tasks if you chose certain options in the creation wizard.

Table 6-2. Post-Deployment Tasks

Creation Wizard Settings	Post-Deployment Tasks
All	Launch the View Administrator Web interface using the connection information located in the workload domain's details page. Use the View Details button on the Dashboard page to navigate to the workload domain's details page.
All	As described in the vRealize Log Insight documentation, the workload domain's View Administrator installation is pre-configured to send the View Administrator logs to the vRealize Log Insight instance using the HKLM\Software\Policies\VMware, Inc.\VMware VDM\Log\SyslogSendSpec registry key. The View Administrator installation is not pre-configured with a syslog server on its Event Configuration screen. You can configure the vRealize Log Insight instance that SDDC Manager deploys for syslog forwarding. You use the Event Forwarding page of the vRealize Log Insight Web interface to configure forwarding incoming events to a syslog target. For information on logging in to the vRealize Log Insight instance, see Get Started Using the vRealize Log Insight Instance .

Table 6-2. Post-Deployment Tasks (Continued)

Creation Wizard Settings	Post-Deployment Tasks
<ul style="list-style-type: none"> ■ Active Directory Internal option ■ Implement App Volumes 	<p>You must log in to the created Active Directory using the Active Directory administrator account and add members to the AppVolumesAdmins group.</p> <p>The deployment process creates a group named AppVolumesAdmins automatically in the auto-generated Active Directory, but does not add members to the group. Until you add members to the AppVolumesAdmins group, no one will be able to log in to App Volumes.</p>
<ul style="list-style-type: none"> ■ Active Directory Internal option ■ Full clones 	<p>You must manually join the created full clones to the created internal Active Directory domain. The created virtual desktops are not automatically joined to the internal Active Directory domain that was also created.</p> <p>If instead you selected to use linked clones and the Active Directory Internal option, the View software customizes the linked-clone machines when they are created, including joining them to the internal Active Directory domain.</p>
<ul style="list-style-type: none"> ■ Implement App Volumes option ■ Active Directory External option ■ Your Active Directory domain is configured to provide secure LDAP connections (LDAPS) 	<p>When your Active Directory domain controllers are configured with TLS certificates for secure LDAP connections, you should configure the deployed App Volumes Manager instance to use secure connection port 636.</p> <ol style="list-style-type: none"> 1 From the Dashboard, navigate to the domain details for the created VDI workload domain and locate the IP address of the App Volumes Manager instance. 2 Use that IP address in a new browser tab to launch the App Volumes Manager user interface. 3 In the App Volumes user interface, navigate to Configuration > Active Directory. 4 Click Edit on the Active Directory screen. 5 In the Use LDAPS field, select the Use secure connection (port 636) check box. This option ensures that communication between App Volumes and your Active Directory domain is encrypted. 6 Click Save to save the updated configuration.

Utilize Capacity on Management Domain

Cloud Foundation configures the first four hosts on each physical rack as the management domain. You need at least three additional hosts in order to create a workload domain. If you do not have enough hosts to create a workload domain, you can utilize part of the capacity on the management domain by creating a workload VM and adding it to the management domain. In order to isolate the Cloud Foundation management VMs and the workload VMs, it is recommended that you create a resource pool for the workload VMs.

Procedure

- 1 Login to the vSphere Web Client.

- 2 Create a resource pool of the hosts in the management domain.

See *Create a Resource Pool* in *vSphere Resource Management*.

- 3 Create a workload VM.

See *Create a New Virtual Machine* in *vSphere Resource Management*.

Note Do not move any of the Cloud Foundation management VMs into the resource pool.

- 4 Move the workload VM to the resource pool.

See *Add a Virtual Machine to a Resource Pool* in *vSphere Resource Management*.

Note Do not move any of the Cloud Foundation management VMs to the newly created resource pool.

Expanding Management and Workload Domains

To increase the physical resources that are associated with a management domain or a workload domain, you can use the **Expand** action available on its details page.

Expand a Management Domain

To increase the physical resources that are associated with a management domain, you can expand that management domain.

Each physical rack in your Cloud Foundation installation has a management domain. When a management domain is expanded, the expansion process uses hosts that reside in the same physical rack in which that management domain resides.

You expand a management domain from its details page.

Procedure

- 1 From the SDDC Manager dashboard, navigate to details page for the management domain you want to expand.
- 2 In the Domain Details page, click **EXPAND DOMAIN**.
The Expand Domain wizard opens.
- 3 At the Resources step, specify the resources to add to the management domain.

Option	Description
Expand Method - By Capacity	Type the amount of CPU, memory, and storage capacity to add to the management domain.

- 4 Proceed to the next step by clicking **Next**.

- 5 At the Review step, review the displayed information and then click **Apply** to begin the expansion workflow.

The Review page lists the hosts that the expansion process will add to the management domain to accommodate the requested capacity and the physical rack details for those hosts.

Note When expanding a management domain, the expansion process considers hosts only from the same physical rack in which that management domain resides.

A message indicating the status of the workflow appears at the top of the Domain Details window. To confirm the progress of the expansion workflow's tasks, navigate to the System Status page and drill-down to the details about the workflow.

Expand a VI Workload Domain

To increase the physical resources that are associated with a Virtual Infrastructure workload domain, you can expand the workload domain.

You expand a workload domain from its details page.

Procedure

- 1 From the SDDC Manager dashboard, navigate to the workload domain's details page.
- 2 In the Domain Details page, click **EXPAND DOMAIN**.

The Expand Domain wizard opens.

- 3 At the Resources step, specify the resources to add to the workload domain.

Option	Description
Expand Method - By Capacity	Type the amount of CPU, memory, and storage capacity to add to the workload domain.

- 4 Proceed to the next step by clicking **Next**.
- 5 At the Review step, review the displayed information and then click **Apply** to begin the expansion workflow.

The Review page lists the hosts that the workflow will add to the workload domain to accommodate the requested capacity and the physical rack details for those hosts.

A message indicating the status of the workflow appears at the top of the Domain Details window. To confirm the progress of the expansion workflow's tasks, navigate to the System Status page and click **Tasks**.

Expand a VDI Workload Domain

To add more virtual desktops to a VDI workload domain, you expand the workload domain.

You expand a workload domain from its details page.

Procedure

1 From the SDDC Manager dashboard, navigate to the workload domain's details page.

2 In the Domain Details page, click **EXPAND DOMAIN**.

The expansion wizard opens.

3 On the General Configuration: Topology step, click **Next**.

This step displays the current settings for this workload domain. The settings are read-only because they cannot be changed using the expansion wizard.

4 On the General Configuration: Active Directory step, type the administrative account's password and then click **Next**.

5 At the Virtual Desktops: Management step, click **Next**.

This step displays the current settings for this workload domain. The settings are read-only because they cannot be changed using the expansion wizard.

6 At the Virtual Desktops: Size step, update the number of virtual desktops to the total number that you want for this workload domain.

The displayed number of virtual desktops is the number currently configured for the workload domain. Change the number to the total number of virtual desktops you want for this workload domain. For example, if the displayed number is 100 and you want to add another 100, type 200 in the **Number of Virtual Desktops** field.

The remaining fields on this step are read-only.

7 Click **Next**.

8 At the Review step, review the displayed information and then click **Apply** to begin the expansion workflow.

A message indicating the status of the workflow appears at the top of the Domain Details window. To confirm the progress of the expansion workflow's tasks, navigate to the System Status page and drill-down to the details about the workflow.

Delete a Workload Domain

To free up physical resources currently associated with a workload domain that you no longer have a need for, you must delete the workload domain. After the workload domain is deleted, the physical resources are returned to the pool of available capacity in your Cloud Foundation environment.

Caution Deleting a workload domain is a destructive and irreversible operation. All VMs within the workload domain are deleted and the underlying Virtual SAN environment is destroyed. If you accidentally delete a workload domain, all of its data will be lost.

Note During the deletion process, other Domain view windows may open more slowly.

Resources in the workload domain that are shared or in common with other workload domains are not deleted in this process. For example, for VDI workload domains, if a View Composer virtual machine is shared among multiple VDI workload domains, that View Composer virtual machine is not removed by this process.

Prerequisites

- Ensure that any user data that you want retained after the workload domain deletion is backed up. You are responsible for backing up such user data.
- Ensure that any virtual machines that you deployed into the workload domain and that you want retained after the workload domain deletion are migrated. You are responsible for migrating the virtual machines that you deployed in the workload domain.

Procedure

- 1 From the SDDC Manager dashboard, navigate to the workload domain's details page.
- 2 In the Domain Details page, click **DELETE DOMAIN**.
A confirmation window appears.
- 3 Click **Delete**.

Note The deleted workload remains visible in the Domain Details window until the deletion process is completed.

A message indicating the status of the workflow appears at the top of the Domain Details window. To confirm the progress of the delete workflow's tasks, navigate to the System Status page and drill-down to the details about the workflow.

Enabling vSAN Space Efficiency Features in All-Flash Installations

Your Cloud Foundation installation might be an all-flash storage environment. For all-flash storage, the software stack's vSAN space efficiency features enable you to reduce the amount of space for storing data in your workload domains.

As provided by the vSAN features installed in an all-flash environment, you can use these techniques to reduce the total storage capacity required to meet the needs in your workload domains:

- You can enable deduplication and compression on a workload domain's underlying vSAN environment to eliminate duplicate data and reduce the amount of space needed to store data.
- RAID 5 or RAID 6 erasure coding is a policy attribute in a workload domain's vSAN policy. Erasure coding can protect your data while using less storage space than the default RAID 1 mirroring. You set the **Failure tolerance method** in the vSAN policy to enable these features.

For detailed information about these vSAN space efficiency features, see the vSAN documentation at <http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-0D43429F-E2E7-4647-8ECA-8F606E9E910F.html>. Specific topics about these features include:

- Using Deduplication and Compression topic:
<http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-3D2D80CC-444E-454E-9B8B-25C3F620EFED.html>
- Deduplication and Compression Design Considerations topic:
<http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-2285B446-46BF-429C-A1E7-BEE276ED40F7.html>
- Using RAID 5 or RAID 6 Erasure Coding topic:
<http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-AD408FA8-5898-4541-9F82-FE72E6CD6227.html>. As described in that topic, RAID 5 or RAID 6 erasure coding enables vSAN to tolerate the failure of up to two capacity devices in the datastore. You can configure RAID 5 on all-flash Virtual SAN environments having four or more fault domains. You can configure RAID 5 or RAID 6 on all-flash Virtual SAN environments having six or more fault domains.
- RAID 5 or RAID 6 Design Considerations:
<http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-6D818555-8DE8-4F06-9498-66903FB9C775.html>
- The Edit Virtual SAN Settings topic includes the detailed steps for enabling deduplication and compression:
<http://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.virtualsan.doc/GUID-FF1AE93F-817A-4894-9A38-EB474AA754F1.html>

You enable these features on a workload domain's underlying environment by using the vSphere Web Client to edit the vSAN settings.

Prerequisites

Enable the deduplication and compression features on a workload domain after the workload domain creation process is successfully completed.

Procedure

- 1 Navigate to the workload domain's virtual environment in the vSphere Web Client using the **vCenter** launch link on the workload domain's details page.
- 2 Enable deduplication and compression by editing the Virtual SAN settings using the Manage tab and the general settings for Virtual SAN.

Set the **Add disks to storage** to **Manual** to access the deduplication and compression setting.

When you save your edits in the Virtual SAN settings to enable deduplication and compression, Virtual SAN will automatically upgrade the on-disk format, causing a rolling reformat of every disk group in the Virtual SAN environment. Wait until this process is completed before making additional changes to the workload domain.

3 (Optional) Enable RAID 5 or RAID 6 erasure coding.

- To use RAID 5, navigate to the Virtual SAN storage policy and edit it to set **Failure tolerance method to RAID-5/6 (Erasure Coding) - Capacity** and **Number of failures to tolerate** to 1.
- To use RAID 6, navigate to the Virtual SAN storage policy and edit it to set **Failure tolerance method to RAID-5/6 (Erasure Coding) - Capacity** and **Number of failures to tolerate** to 2.

As described in the vSphere Product Documentation's [Using RAID 5 or RAID 6 Erasure Coding](#) topic, RAID 5 and RAID 6 erasure codings do not support a **Number of failures to tolerate** value of 3.

Manually Update the Credentials for the vRealize Operations for Horizon Broker Agent When Account Credentials Change for the Connection Server Administrator Account

Whenever you update the account credentials for the Administrator account used for the VDI environment's View Connection Server hosts, you must manually update the pairing of credentials between the Connection Server instances with the Horizon broker agents used by the vRealize Operations Manager instance in your environment.

When you create a VDI workload domain, the workflow configures the VDI environment to use the features of vRealize Operations[®] for Horizon[®] to collect performance data from the VDI environment. If licensed for use in your environment, that data is provided in the vRealize Operations Manager instance in the environment. One of the configured elements is the vRealize Operations for Horizon broker agent. This broker agent is a Windows service that runs on the View Connection Server hosts, collecting inventory information about the VDI environment and sending that information to vRealize Operations Manager.

When the workflow installs the broker agent, credentials are paired between the broker agent and the account credentials set up for the Horizon Administrator account when the workflow creates the Windows Server VMs and installs the Connection Servers into those VMs. When you change the account's password, you must update those credentials in the broker agent settings.

For in-depth information about the connection between vRealize Operations Manager and VDI environments, see the vRealize Operations for Horizon product documentation at <http://pubs.vmware.com/v4h62/index.jsp>.

Prerequisites

Verify that you have the Administrator account credentials to log in to the VDI environment's Connection Server virtual machines. If this VDI environment was created using an internal Active Directory domain, the account uses the password that was specified in the **Domain Admin Password** fields. If this VDI environment was created using an external Active Directory domain, the account uses the password that was entered for the **System Administrator** field in the VDI workload domain creation wizard. See [Specify Active Directory and SQL for the VDI Environment](#).

Verify you have the IP addresses for all of the Connection Server machines used by this VDI workload domain.

Procedure

- 1 Using the IP address for the first Connection Server machine, remote desktop into its Windows environment and log in using the Administrator account credentials.
- 2 From the Windows **Start** menu, select **VMware > vRealize Operations Horizon Broker Agent Settings**.
- 3 In the Horizon with View section of the dialog box, type the new password for the account and click **Validate Credentials**.
- 4 Click **Apply** to save your changes.
- 5 Repeat the steps for each of the VDI environment's Connection Server machines.

Monitoring Capabilities in the Cloud Foundation Environment

7

The Cloud Foundation environment provides built-in capabilities to help you perform effective operations monitoring, troubleshooting, performance management, infrastructure capacity planning, and compliance monitoring and auditing.

You use the built-in monitoring capabilities for these typical scenarios.

Scenario	Monitoring Area	Examples
Are the systems online?	Operations and incident monitoring	Alerts raised to notify about issues that might require human intervention.
Why did a storage drive fail?	Troubleshooting	Hardware-centric views spanning inventory, configuration, usage, and event history to provide for diagnosis and resolution.
Is the infrastructure meeting tenant service level agreements (SLAs)?	Performance management	Analysis of system and device-level metrics to identify causes and resolutions.
At what future time will the systems get overloaded?	Infrastructure capacity planning	Trend analysis of detailed system and device-level metrics, with summarized periodic reporting
What person performed which action and when?	Compliance monitoring and auditing	Event history of secured user action, with periodic reporting. Workflow task history of actions performed in the system.

The monitoring capabilities involve these features:

Events

An event is a record of a system condition that is potentially significant or interesting to you, such as a degradation, failure, or user-initiated configuration change. Multiple events might be generated for the same condition.

Audit events

In Cloud Foundation, an audit event is an event raised for a user-initiated or system-generated actions. The following lists show some examples of actions that raise audit events. These lists are not meant to be a complete list of the actions that result in audit events.

Examples of user-initiated actions that raise audit events:

- Users logging in and out of the SDDC Manager client
- Users performing actions involving workflows, such as creating a workload domain

- User actions involving provisioning
- Users granting or revoking a role from other users
- Account password changes, including successful and failed actions
- Users performing actions on physical resources, such as powering off a host
- Users performing the actions for life cycle management of the Cloud Foundation software

Examples of system-generated actions that raise audit events:

- Validation activity, such as during the bring-up process
- All workflows and tasks, including successful and failed actions
- All actions of Cloud Foundation that are performed to fulfill user-initiated actions, such as host configuration activities to fulfill a user-initiated action to expand a workload domain
- Network interface configuration changes

Alerts

An alert is a record of a known detected problem. Cloud Foundation has a built-in capability for detecting problems using events raised at a device level, and generating alerts that warn you about problems that would impact workload Service Level Agreements (SLAs) or which require human intervention. Multiple alerts are not generated for the same problem. Each alert generates two events, an event when the alert is raised and an event when the alert is cleared.

Workflows and tasks

A task is a unit of work performed by SDDC Manager that changes the state of a resource. A workflow is a long-running group of tasks that perform an overall goal, such as creating a workload domain.

vRealize Log Insight instanced deployed by Cloud Foundation

Use of the vRealize Log Insight instance deployed by Cloud Foundation is licensed separately. When this deployed vRealize Log Insight instance is licensed for use in your environment, events and log content for the physical resources and the VMware SDDC virtual infrastructure are sent to the vRealize Log Insight instance. As a result, when you log in to the vRealize Log Insight Web interface, you can obtain a unified view of event and syslog information to assist with troubleshooting. Data from the events and audit events raised by Cloud Foundation is also sent to

vRealize Log Insight. You can use the searching, query, and reporting features of vRealize Log Insight to create trend reports and auditing reports from the event history. See [Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment](#).

Note The vRealize Log Insight environment that SDDC Manager deploys is sized for monitoring the hardware and software of your Cloud Foundation installation only. The default sizing accommodates the events and logs expected to be sent by the Cloud Foundation environment. This sizing might not accommodate the numbers of events and logs coming from additional applications or VMs that reside outside of your Cloud Foundation environment. Therefore, configuring the vRealize Log Insight environment that is deployed by SDDC Manager to collect events logs from additional applications or VMs that reside outside of your Cloud Foundation environment is not supported in this release.

vRealize Operations Manager instance deployed by Cloud Foundation

Use of the vRealize Operations Manager instance deployed by Cloud Foundation is licensed separately. When this deployed vRealize Operations Manager instance is licensed for use in your environment, the management and workload domains' vCenter Server instances send their event and metric data into the vRealize Operations Manager instance using the vCenter Adapter for vRealize Operations Manager. If you have licensed use of this vRealize Operations Manager instance, you can use the vRealize Operations Manager features to analyze this data based on history for the various virtual resources. See [Using vRealize Operations Manager Capabilities in Your Cloud Foundation Environment](#).

Note The vRealize Operations Manager environment that SDDC Manager deploys is sized for monitoring the contents of your Cloud Foundation installation only. The default sizing accommodates the metrics and events expected to be sent by the Cloud Foundation environment's vCenter Server instances and Horizon software components. This sizing might not accommodate the numbers of metrics and events for monitoring additional applications or VMs that reside outside of the Cloud Foundation environment. Therefore, configuring the vRealize Operations Manager environment that is deployed by SDDC Manager to monitor additional applications or VMs that reside outside of your Cloud Foundation environment is not supported in this release.

This chapter includes the following topics:

- [Managing Workflows and Tasks](#)
- [Managing Alerts, Events, and Audit Events](#)

- [Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment](#)
- [Using vRealize Operations Manager Capabilities in Your Cloud Foundation Environment](#)

Managing Workflows and Tasks

From the System Status page of the SDDC Manager client, you can work with the SDDC Manager workflows and tasks. A task is a unit of work that changes the state of a resource. A workflow is a long-running group of tasks that perform an overall goal, such as creating a workload domain.

On the System Status page, you can see the total count of workflows and tasks at a glance, as well as a listing of tasks by state: new, running, failed, resuming, and successful. As a result, you have immediate knowledge of their progress.



On the System Status page, you can filter the displayed workflow and task counts according to the time frame within which they were reported. You can use the **View Details** link to drill-down for details on the workflows and their tasks.

Workflow Details

When you click the **View Details** link, the Workflows page displays and lists all of the workflows that have been reported by the SDDC Manager software. In this page, you can:

- Search for a workflow in the list.
- Filter the displayed workflows list by the workflow state and time frame.
- Expand a workflow to see the number of tasks it has and how many in each state: new, running, successful, or failed.
- If a workflow is in a failed state because a task has failed, you can have the software attempt to restart the workflow. On the Workflows page, the **Restart Workflow** button is available for a workflow that is in a failed state. To access the **Restart Workflow** button on the Workflows page, expand the failed workflow to where you can see its description and how many subtasks are successful and then click **Restart Workflow** next to that workflow.

Task Details

When you expand a workflow in the list on the Workflows page, the **View Sub Tasks** link is available to see detailed information about each of the tasks involved in that workflow. When you click **View Sub Tasks** for a particular workflow, a page displays that lists the tasks involved in that workflow. In the page, you can:

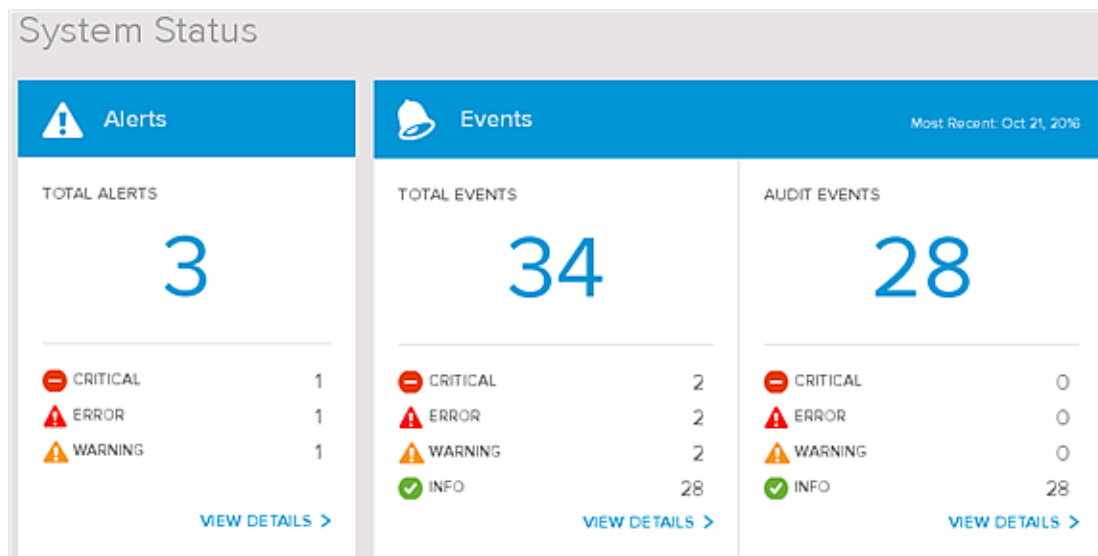
- Search for a task in the list.
- Filter the displayed workflows list by the workflow state and time frame.
- Expand a task to examine the available underlying details, if any, about that task.

Managing Alerts, Events, and Audit Events

From the System Status page of the SDDC Manager client, you can work with the alerts, events, and audit events that have been reported by your Cloud Foundation environment.

On the System Status page, you can see the total count of alerts, events, and audit events at a glance, and then use the **View Details** links to drill-down for details about each type.

The vRealize Log Insight instance that SDDC Manager deploys is the final destination for all events. SDDC Manager maintains 1000 events in its local database. Once those events have been forwarded to vRealize Log Insight, the locally stored events are deleted. The locally stored events are deleted when the event count reaches a system-default upper limit of 80% of 1000, or 800 events. The oldest events are deleted first. When the upper limit of 800 is reached, events are deleted in batches of 100 events, until the current event count is reduced to less than a system-default lower limit of 60% of 1000 events, or 600 events.



Examining, Filtering, and Clearing Alerts

Clicking **View Details** for the alerts displays a page in which you can examine and clear the alerts that have been raised. Alerts are raised based on dynamic discovery of problem conditions in the hardware or virtual resources. You can expand the alerts to see details such as the time an alert was reported and its description.

The screenshot shows the 'System Alerts' interface. At the top, there are counts for 1 CRITICAL, 1 ERROR, and 1 WARNING alert. Below these are filters for SEVERITY (set to 'All') and TYPE (set to 'Current'). A table lists three alerts:

Alert Name	Severity	First Occurrence	Last Occurrence
Alert - VMware Cloud ...	CRITICAL	Oct 21, 2016 6:47:30 PM	Oct 21, 2016 6:47:30 PM
Alert - Excessive read ...	WARNING	Oct 21, 2016 6:43:02 PM	Oct 21, 2016 6:43:02 PM
Alert - Server is power...	ERROR	Oct 21, 2016 5:36:17 PM	Oct 21, 2016 5:36:17 PM

You can expand an alert to see details such as the time it was reported and its description.

The screenshot shows the expanded details for the 'Alert - Excessive read errors' (WARNING). At the top, there is a 'CLEAR ALERT' button. The details are organized into two columns:

Alert Name	SSD_EXCESSIVE_READ_ERRORS_ALERT	Version	1.0
Resource Hierarchy		State	NEW
Categories	SERVER, HARDWARE	Type	NORMAL
Alert Id	6fe9084c-f7c8-48e8-aec2-2304b011fa49	Severity	WARNING
First Occurrence	Oct 21, 2016 6:43:02:453 PM +0000		
Last Occurrence	Oct 21, 2016 6:43:02:453 PM +0000		
Occurrences	1		
Remediation	Please contact support.		
Description	Alert - Excessive read errors reported for SSD in rack rack1 server N5 and SSD S1.		

By default, the list shows alerts of any severity (all) that have not yet been cleared (new). To see a subset, filter the list:

- Use the **Severity** menu to filter by severity of the alert (critical, error, warning). To see all of the alerts, select **All** in the **Severity** drop-down menu.
- Use the **Type** menu to filter by type (new, cleared). When **Cleared** is selected in the **Type** menu, only the alerts that have been cleared are displayed in the list.

After you have addressed the issue that is causing the alerts, you can clear the alerts:

- Clear an individual alert by expanding it in the list, clicking the **CLEAR ALERT** button within the expanded alert, and saving the change.
- Clear multiple alerts at once by first clicking **Edit** to put the page into editing mode and then selecting the check boxes next to the alerts that you want to clear, clicking **CLEAR SELECTED** at the top of the listing, and then saving the change.

1 CRITICAL 1 ERROR 1 WARNING		CLEAR SELECTED X CANCEL CATALOG	
SEVERITY	All ▼	TYPE	Current ▼
<input checked="" type="checkbox"/>	Alert - VMware Cloud ... ▼	CRITICAL	Oct 21, 2016 6:47:30 PM
<input checked="" type="checkbox"/>	Alert - Excessive read... ▼	WARNING	Oct 21, 2016 6:43:02 PM
<input type="checkbox"/>	Alert - Server is power... ▼	ERROR	Oct 21, 2016 5:36:17 PM

For a list of the alerts and their descriptions, see [SDDC Manager Alerts Raised During Ongoing Operations](#).

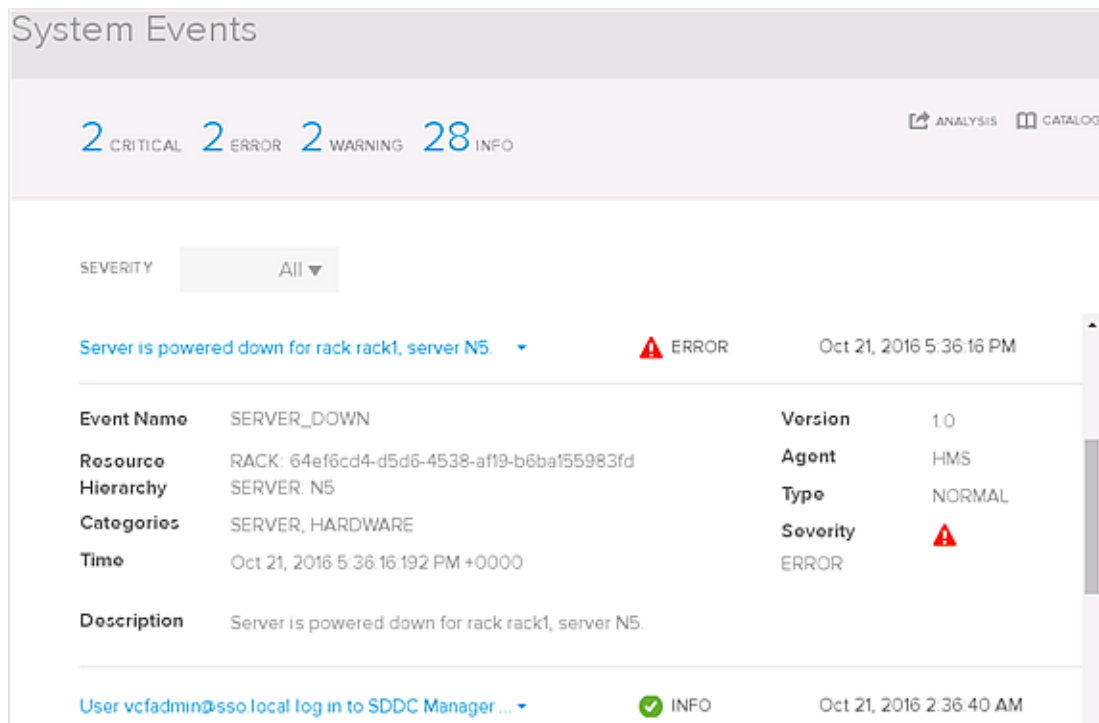
Examining Events

Clicking **View Details** for the total events list displays a screen in which you can examine the events that have occurred in the environment.

This screen includes events that have been raised by SDDC Manager within a system-default time period of fourteen days. Events that are older than fourteen days are not reported on this screen. To see the reports for events older than fourteen days, use the vRealize Log Insight instance, if your system is licensed for usage of vRealize Log Insight.

The count at the top of the screen reports the number of events raised within the system-default fourteen-day time period by SDDC Manager that have not yet been forwarded to the vRealize Log Insight instance. Because this count does not include events that have already been forwarded to the vRealize Log Insight instance, this count might be less than the number of events in the event listing below it, which includes both forwarded and not-yet-forwarded events.

The event listing in the lower part of the screen includes both forwarded events and not-yet-forwarded events, in order of occurrence. Because the not-yet-forwarded events are the most recent, those events appear at the top of the list. As you scroll down, more of the events that have been forwarded to vRealize Log Insight are displayed, until all events that have occurred within the past fourteen days are loaded into the list. You can expand each event to see details such as the time an event was reported and its description.



System Events

2 CRITICAL 2 ERROR 2 WARNING 28 INFO

ANALYSIS CATALOG

SEVERITY All ▼

Server is powered down for rack rack1, server N5. ERROR Oct 21, 2016 5:36:16 PM

Event Name	SERVER_DOWN	Version	1.0
Resource	RACK: 64ef6cd4-d5d6-4538-af19-b6ba155983fd	Agent	HMS
Hierarchty	SERVER: N5	Type	NORMAL
Categories	SERVER, HARDWARE	Severity	ERROR
Time	Oct 21, 2016 5:36:16 PM +0000		
Description	Server is powered down for rack rack1, server N5.		

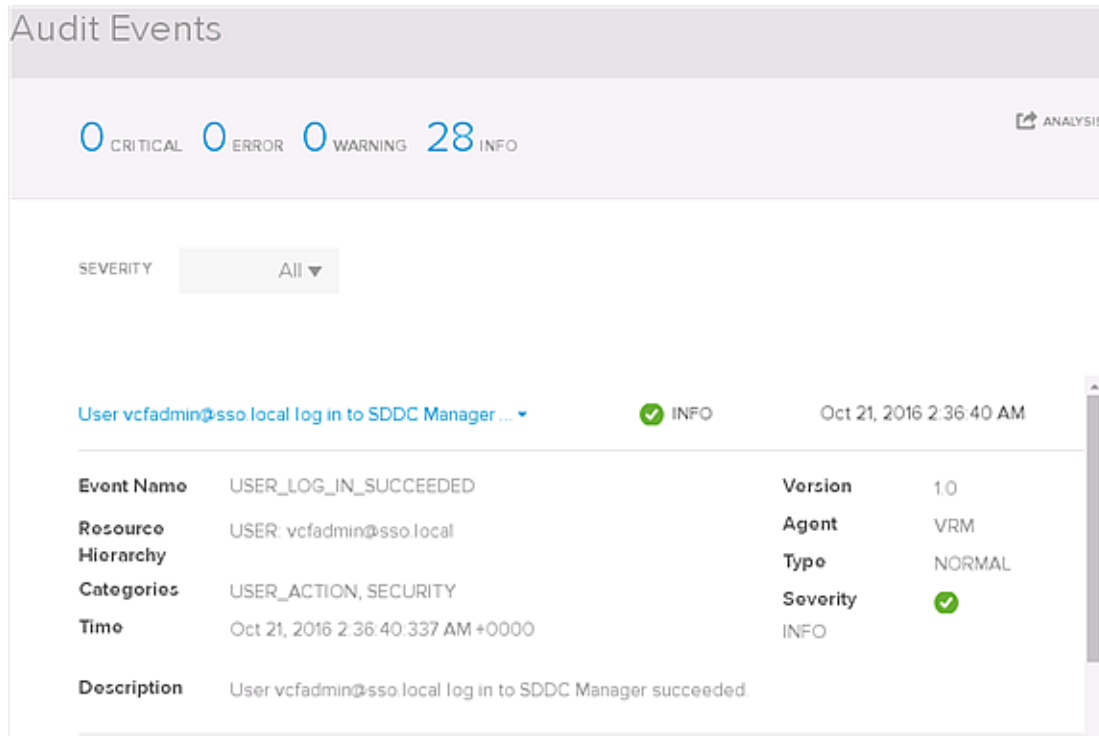
User vcfadmin@sso.local log in to SDDC Manager ... INFO Oct 21, 2016 2:36:40 AM

From the System Events page, you can:

- Click **Analysis** to launch the vRealize Log Insight Web interface and use the vRealize Log Insight capabilities examine the log data and troubleshoot, or create trend reports and auditing reports from the event history. See [Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment](#).
- Click **Catalog** to open the Event Catalog and view the definitions of all of the events that the software monitors and records as part of its event-driven problem detection capabilities. See [Event Catalog](#).

Examining Audit Events

Clicking **View Details** for the audit events list displays a page in which you can examine the events that have occurred from user-initiated actions. You can expand the audit events to see details such as the time an event was reported, which user initiated it, and its description.



From the Audit Events page, you can:

- Click **Analysis** to launch the vRealize Log Insight Web interface and use the vRealize Log Insight capabilities to examine the log data and troubleshoot, or create trend reports and auditing reports from the event history. See [Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment](#).

Searching and Filtering When Viewing Details

After you click **View Details** to see one of the lists, you can use the displayed filtering features to see that subset that matches your selected criteria. The Workflows screen also has a search feature to search using text in a workflow's name.

Event Catalog

You use the Event Catalog to view the definitions of all of the events that the SDDC Manager monitors and records as part of its event-driven problem detection capabilities.

From the Events page, you open the Event Catalog by clicking **Catalog**. You can open the Events page from the SDDC Manager dashboard by navigating to the System Status page and clicking on the **View Details** button in the Events area.

Expand an event to see its definition, containing details such as its severity, description, resource hierarchy, categories, and type.

HDD_EXCESSIVE_WRITE_ERRORS ▾	
Severity	WARNING
Resource Hierarchy	RACK, SERVER, STORAGE
Categories	SERVER, HARDWARE
Type	NORMAL
Description	Storage drive for rack (RACK_NAME) server (SERVER) and HDD (STORAGE) has excessive write errors.

You can filter the displayed list by the event severity.

Hardware Operational Events

The software raises these events that are related to hardware operations. The event is raised when the software has determined the event's condition exists. When the event is raised, the event report includes identifying information about the hardware device for which the event was raised and its containing physical device, such as the server name in which the device resides and the name of the physical rack in which the server resides. As appropriate for the particular event, other relevant values are reported in the event, such as current temperature values for temperature-related events.

Table 7-1. Hardware Operational Events Raised in a Cloud Foundation Environment

Event Name	Severity	Short Description
BMC_AUTHENTICATION_FAILURE	WARNING	The software is unable to authenticate to the server's out-of-band (OOB) management port.
BMC_MANAGEMENT_FAILURE	WARNING	The software failed to perform a management operation using the server's OOB management port.
BMC_NOT_REACHABLE	WARNING	The software is unable to communicate with the server's OOB management port.
CPU_CAT_ERROR	ERROR	A CPU has shut down due to the processor's catastrophic error (CATERR) signal.
CPU_INITIALIZATION_ERROR	ERROR	The software detected that a CPU startup initialization error has occurred.
CPU_MACHINE_CHECK_ERROR	ERROR	Server CPU has failed due to CPU Machine Check Error.
CPU_POST_FAILURE	ERROR	Server CPU has shut down due to POST failure.
CPU_TEMPERATURE_ABOVE_UPPER_THRESHOLD	WARNING	CPU temperature has reached its maximum safe operating temperature.
CPU_TEMPERATURE_BELOW_LOWER_THRESHOLD	WARNING	CPU temperature has reached its minimum safe operating temperature.
CPU_THERMAL_TRIP	ERROR	Server CPU has shut down due to thermal error.
DIMM_ECC_ERROR	ERROR	The software detected an uncorrectable Error Correction Code (ECC) error for a server's memory.

Table 7-1. Hardware Operational Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
DIMM_TEMPERATURE_ABOVE_UPPER_THRESHOLD	WARNING	Memory temperature has reached its maximum safe operating temperature.
DIMM_THERMAL_TRIP	ERROR	Memory has shut down due to thermal error.
HDD_DOWN	ERROR	Operational status is down for an HDD storage drive.
HDD_EXCESSIVE_READ_ERRORS	WARNING	Excessive read errors reported for an HDD storage drive.
HDD_EXCESSIVE_WRITE_ERRORS	WARNING	Excessive write errors reported for an HDD storage drive.
HDD_TEMPERATURE_ABOVE_THRESHOLD	WARNING	HDD storage drive temperature has reached its maximum safe operating temperature.
HDD_UP	INFO	Operational status is up for an HDD storage drive.
HDD_WEAROUT_ABOVE_THRESHOLD	WARNING	Wear-out state of an HDD storage drive is above its defined threshold.
HMS_AGENT_DOWN	CRITICAL	A physical rack's Hardware Management Services agent is down.
HMS_AGENT_UP	INFO	A physical rack's Hardware Management Services agent is operational.
MANAGEMENT_SWITCH_DOWN	CRITICAL	Operational status is down for a physical rack's management switch.
MANAGEMENT_SWITCH_PORT_DOWN	WARNING	Operational status is down for a switch port in a physical rack's management switch.
MANAGEMENT_SWITCH_PORT_UP	INFO	Operational status is up for a switch port in a physical rack's management switch.
MANAGEMENT_SWITCH_UP	INFO	Operational status is up for a physical rack's management switch.
NIC_LINK_DOWN	WARNING	Deprecated. NIC_PORT_DOWN event is used instead.
NIC_PACKET_DROP_ABOVE_THRESHOLD	WARNING	A NIC's packet drop is above its defined threshold.
NIC_PORT_DOWN	ERROR	Operational status is down for a NIC port.
NIC_PORT_UP	INFO	Operational status is up for a NIC port.
PCH_TEMPERATURE_ABOVE_THRESHOLD	WARNING	Platform controller hub [PCH] temperature has reached its maximum safe operating temperature.
SERVER_DOWN	ERROR	Server is in the powered-down state.
SERVER_PCIE_ERROR	ERROR	A server's system has PCIe errors.
SERVER_POST_ERROR	ERROR	A server's system has POST failures.
SERVER_UP	INFO	Server is in the powered-up state.
SPINE_SWITCH_DOWN	ERROR	Operational status is down for a physical rack's spine switch.

Table 7-1. Hardware Operational Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
SPINE_SWITCH_PORT_DOWN	WARNING	Operational status is down for a switch port: in a physical rack's spine switch.
SPINE_SWITCH_PORT_UP	INFO	Operational status is up for a switch port: in a physical rack's spine switch.
SPINE_SWITCH_UP	INFO	Operational status is up for a physical rack's spine switch.
SSD_DOWN	ERROR	Operational status is down for an SSD storage device.
SSD_EXCESSIVE_READ_ERRORS	WARNING	Excessive read errors reported for an SSD storage drive.
SSD_EXCESSIVE_WRITE_ERRORS	WARNING	Excessive write errors reported for an SSD storage drive.
SSD_TEMPERATURE_ABOVE_THRESHOLD	WARNING	SSD storage drive temperature has reached its maximum safe operating temperature.
SSD_UP	INFO	Operational status is up for an SSD storage device.
SSD_WEAROUT_ABOVE_THRESHOLD	WARNING	Wear-out state of an SSD storage drive is above its defined threshold.
STORAGE_CONTROLLER_DOWN	ERROR	Operational status is down for a storage adapter.
STORAGE_CONTROLLER_UP	INFO	Operational status is up for a storage adapter.
TOR_SWITCH_DOWN	ERROR	Operational status is down for a physical rack's ToR switch.
TOR_SWITCH_PORT_DOWN	WARNING	Operational status is down for a switch port in a physical rack's ToR switch.
TOR_SWITCH_PORT_UP	INFO	Operational status is up for a switch port in a physical rack's ToR switch.
TOR_SWITCH_UP	INFO	Operational status is up for a physical rack's ToR switch.

Audit Events

In a Cloud Foundation environment, an audit event is an event raised for a user-initiated or system-generated action. The audit event is raised when the software has determined the event's related auditable condition exists. As appropriate for the particular event, when the event is raised, the event report includes information such as the user who initiated the event, the type of operation that was performed, whether the operation succeeded or failed, and so on.

Table 7-2. Audit Events Raised in a Cloud Foundation Environment

Event Name	Severity	Short Description
DOMAIN_ADD_FAILED	WARNING	Creation and deployment of a workload domain failed.
DOMAIN_ADD_SUCCEEDED	INFO	Creation and deployment of a workload domain succeed.

Table 7-2. Audit Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
DOMAIN_RETRY_ADD	INFO	User has initiated the restart workflow action on a workload-domain-related workflow.
DOMAIN_STATUS_UPDATE	INFO	A workload-domain-related workflow has changed status.
DOMAIN_TASK_ADDED	INFO	The software has added a new subtask to a workload-domain-related workflow. The software creates workflows for certain user actions and this event is raised when the software adds a new subtask to such workflows.
DOMAIN_TASK_FAILED	WARNING	A subtask within a workload-domain-related workflow has failed.
DOMAIN_TASK_STATUS_UPDATE	INFO	A subtask within a workload-domain-related workflow has changed status.
DOMAIN_TASK_SUCCEEDED	INFO	A subtask within a workload-domain-related workflow has completed successfully.
DOMAIN_VDI_ADD	INFO	User has initiated the operation to create a VDI workload domain in the environment.
DOMAIN_VIRTUAL_INFRASTRUCTURE_ADD	INFO	User has initiated the operation to create a Virtual Infrastructure workload domain in the environment.
PERMISSION_GRANT_FAILED	WARNING	User has initiated the action to assign a role granting permissions to a user failed.
PERMISSION_GRANT_SUCCEEDED	INFO	The user-initiated action to assign a role granting permissions to a user has succeeded.
PERMISSION_REVOKE_FAILED	WARNING	The user-initiated action to remove a role from a user and revoke the user's permissions granted by that role has failed.
PERMISSION_REVOKE_SUCCEEDED	INFO	The user-initiated action to remove a role from a user and revoke the user's permissions granted by that role has succeeded.
PERMISSION_UPDATE_FAILED	WARNING	The user-initiated action the action to change a user's existing role to another role has failed.
PERMISSION_UPDATE_SUCCEEDED	INFO	The user-initiated action to change a user's existing role to another role has completed successfully.
ROLE_ADD_FAILED	WARNING	The user-initiated action to create a new role in the environment has failed.
ROLE_ADD_SUCCEEDED	INFO	The user-initiated action to create a new role in the environment has completed successfully.
ROLE_DELETE_FAILED	WARNING	The user-initiated action to delete a role has failed.
ROLE_DELETE_SUCCEEDED	WARNING	The user-initiated action to delete a role has completed successfully.
ROLE_NAME_CHANGE_FAILED	WARNING	The user-initiated action to change a role name has failed.
ROLE_NAME_CHANGE_SUCCEEDED	INFO	The user-initiated action to change a role's name has completed successfully.

Table 7-2. Audit Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
ROLE_PRIVILEGE_UPDATE_FAILED	WARNING	The user-initiated action to change the privileges associated with a role has failed.
ROLE_PRIVILEGE_UPDATE_SUCCEEDED	INFO	The user-initiated action to change the privileges associated with a role has completed successfully.
SERVER_POWER_CYCLE_FAILED	WARNING	The user-initiated action to power cycle a server has failed.
SERVER_POWER_CYCLE_SUCCEEDED	WARNING	The user-initiated action to power cycle a server has completed successfully.
SERVER_POWER_OFF_FAILED	WARNING	The user-initiated action to power off a server has failed.
SERVER_POWER_OFF_SUCCEEDED	WARNING	The user-initiated action to power off a server has completed successfully.
SERVER_POWER_ON_FAILED	WARNING	The user-initiated action to power on a server has failed.
SERVER_POWER_ON_SUCCEEDED	INFO	The user-initiated action to power on a server has completed successfully.
USER_LOG_IN_FAILED	WARNING	Log in to SDDC Manager failed for the user.
USER_LOG_IN_SUCCEEDED	INFO	Log in to SDDC Manager succeeded for the user.
USER_LOG_OUT_FAILED	WARNING	Log out from SDDC Manager failed for the user.
USER_LOG_OUT_SUCCEEDED	INFO	Log out from SDDC Manager succeeded for the user.

Life Cycle Management Events

The software raises these events that are related to the life cycle management operations that are available in your Cloud Foundation environment. As appropriate for the particular event, when the event is raised, the event report includes information such as the type of operation that was performed, whether the operation succeeded or failed, and the condition for which the event was raised. For details about using the life cycle management features available in your environment, see [Chapter 14 Patching and Upgrading Cloud Foundation](#).

Table 7-3. Life Cycle Management Events Raised in a Cloud Foundation Environment

Event Name	Severity	Short Description
BUNDLE_DOWNLOAD_FAILURE	ERROR	The software failed to download a bundle from the remote source location. The exact cause of the failure could not be detected by the software.
BUNDLE_DOWNLOAD_FILESIZE_MISMATCH	ERROR	The downloaded bundle's file size is greater than the file size specified in the bundle manifest.
BUNDLE_DOWNLOAD_INVALID_TAR_MANIFEST	ERROR	An error occurred while parsing the manifest file inside the downloaded bundle retrieved from the remote download source.
BUNDLE_DOWNLOAD_SCHEDULED	INFO	A bundle download is scheduled. The scheduled time is provided in the event description.
BUNDLE_DOWNLOAD_STARTED	INFO	Downloading the bundle from the bundles' remote source location has started.

Table 7-3. Life Cycle Management Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
BUNDLE_DOWNLOAD_SUCCEEDED	INFO	The software successfully downloaded the bundle from the bundle's remote source location.
BUNDLE_DOWNLOAD_TIMEOUT	ERROR	The bundle download process timed out while downloading the bundle from the remote source location.
BUNDLE_MANIFEST_DOWNLOAD_SUCCEEDED	INFO	The software successfully downloaded the bundle's manifest from the remote source location.
BUNDLE_MANIFEST_DOWNLOAD_FAILURE	ERROR	The software failed to retrieve the bundle manifest file from the remote source location. The exact cause of the failure could not be detected by the software.
BUNDLE_MANIFEST_INVALID	ERROR	The software has determined that the bundle manifest which was retrieved from the remote source location and written to the local repository is invalid.
BUNDLE_MANIFEST_SIGNATURE_INVALID	ERROR	The signature for the bundle manifest is invalid.
BUNDLE_MANIFEST_SIGNATURE_NOT_FOUND	ERROR	The software cannot locate the bundle manifest's signature file in the expected location. The signature file is used for validating the bundle manifest file.
BUNDLE_REPO_FILE_NOT_FOUND	WARNING	The software cannot locate the specified bundle at the expected location within the bundle repository.
BUNDLE_REPO_WRITE_FAILURE	ERROR	Problems with the bundle repository are preventing bundle downloads from completing successfully.
PARTIAL_BUNDLE_DOWNLOAD	ERROR	A bundle was not fully downloaded from its remote source location. The number of bytes downloaded does not match the number of bytes stated in the bundle manifest.
UPGRADE_ABORTED	WARNING	The software has automatically cancelled a scheduled upgrade because a workflow is taking place, such as a workload domain creation or deletion workflow.
UPGRADE_CANCELLED	INFO	User has cancelled the upgrade.
UPGRADE_COMPLETION	WARNING	The life cycle management upgrade completed. The upgraded component and the completion status is provided in the event description.
UPGRADE_FAILED	WARNING	Upgrade operation has failed.
UPGRADE_NOT_NEEDED	INFO	The software has determined all of the environment's components have up-to-date versions and upgrading them is not needed.
UPGRADE_SCHEDULED	INFO	A bundle upgrade is scheduled. The scheduled time is provided in the event description.
UPGRADE_STARTED	INFO	Upgrade operation has started.
UPGRADE_SUCCEEDED	INFO	Upgrade operation has succeeded.
UPGRADE_TIMEOUT	WARNING	Upgrade operation has timed out.

Table 7-3. Life Cycle Management Events Raised in a Cloud Foundation Environment (Continued)

Event Name	Severity	Short Description
VMWARE_DEPOT_CONNECT_FAILURE	WARNING	The software failed to connect to the remote source location from which the upgrade bundles are downloaded.
VMWARE_DEPOT_INDEX_FILE_NOT_FOUND	ERROR	The software cannot locate an index file at the remote source location.
VMWARE_DEPOT_INSUFFICIENT_PERMISSION	ERROR	The software failed to download a bundle or bundle manifest from the remote source location because the user account used to connect to the remote location does not have read permission for the remote directory or file.
VMWARE_DEPOT_INDEX_INVALID	ERROR	The retrieved bundle index is invalid.
VMWARE_DEPOT_MANIFEST_FILE_NOT_FOUND	ERROR	The software cannot locate a manifest file at the remote source location.
VMWARE_DEPOT_MISSING_BUNDLE	ERROR	The software cannot locate a bundle available for downloading from the remote source location.
VMWARE_DEPOT_UNKNOWN_HOST	ERROR	The software cannot resolve the VMware Depot host of the configured remote source location for downloading upgrade bundles.

Alert Catalog

You use the Alert Catalog page to view the SDDC Manager alert definitions.

In this page, you can expand an alert to see its definition, containing details such as its severity, description, resource hierarchy, categories, and type.

You can use the keyword search to locate an alert in the catalog and you can filter the displayed list by severity.

For more information about how system alerts are raised during ongoing system operations and an alphabetical listing of the system alerts, see [SDDC Manager Alerts Raised During Ongoing Operations](#).

SDDC Manager Alerts Raised During Ongoing Operations

An alert is a stateful record for a problem. SDDC Manager raises an alert based on the detection of problem conditions in the hardware or virtual resources. Problem detection can occur during the Power On System Validation (POSV) portion of the Cloud Foundation bring-up process and during ongoing operations.

During ongoing operations, SDDC Manager raises alerts for problems detected as a result of its periodic polling of hardware status or from alert-raising events. Alerts are not generated for fleeting conditions or for problems that the environment can resolve itself. Alerts are raised for issues that:

- Persist
- Require human intervention to resolve

The software periodically polls the status of the hardware resources and raises alerts when analysis of the results indicates a problem condition exists.

- Every 30 minutes, the servers and switches are polled to verify that those resources are discoverable and to obtain the power status of the servers and switches. This 30-minute polling ensures that any status change of a server or switch is captured, if it has not already been captured by generated events.
- Every 24 hours, the hardware resources are polled to determine the current hardware resources and refresh its hardware inventory information with the obtained information. This 24-hour polling ensures that any hardware change that has occurred in the installation in the last 24 hours is captured. Inventory validation alerts are raised when mismatches are found between the obtained actual inventory and the expected inventory. The expected inventory is defined by the installation's manifest.

After each polling interval, the built-in problem-detection service is called to analyze the updated status and inventory information and determine whether a persistent condition exists. If a problem that requires human intervention exists, an alert is raised. Even though multiple events can be generated for a particular outstanding problem, only one alert is created about the persistent problem. You then verify and resolve the reported problem and clear the alert using the SDDC Manager client.

In addition to alerts raised as a result of conditions found by the periodic polling, certain events initiate the raising of alerts at the time when those events are generated. Unless noted otherwise in the following table, the event-initiating alert's name is the event's name plus the suffix `_ALERT` added to the end of the event name. As an example, the `BMC_AUTHENTICATION_FAILURE` event raises the alert named `BMC_AUTHENTICATION_FAILURE_ALERT`. See [Event Catalog](#) for a list of the event definitions that you can view in the Event Catalog user interface.

Some of the alerts are more likely to be raised during the Power On System Validation (POSV) portion of the bring-up process. As an example, the alert named `VMWARE_CLOUD_FOUNDATION_BUNDLE_INCOMPLETE_ALERT` is raised during POSV if the system detects elements are missing from the software ISO file. For the list of alerts that are raised during POSV, see the *VMware Cloud Foundation Overview and Bring-Up Guide*.

You can use the Alerts Catalog page in the SDDC Manager client to view the SDDC Manager alert definitions. You open the Alert Catalog from the System Alerts page by clicking **Catalog**. For more information about using the Alerts Catalog page, see [Alert Catalog](#).

Table 7-4. SDDC Manager Alerts

Alert Name	Short Description	Severity	Detected By
<code>BMC_AUTHENTICATION_FAILURE_ALERT</code>	The system is unable to authenticate to the server's OOB management port. This alert is initiated by the <code>BMC_AUTHENTICATION_FAILURE</code> event.	WARNING	Event
<code>BMC_MANAGEMENT_FAILURE_ALERT</code>	The system failed to perform a management operation using the server's OOB management port. This alert is initiated by the <code>BMC_MANAGEMENT_FAILURE</code> event.	WARNING	Event
<code>BMC_NOT_REACHABLE_ALERT</code>	The system is unable to communicate with the server's OOB management port. This alert is initiated by the <code>BMC_NOT_REACHABLE</code> event.	WARNING	Event

Table 7-4. SDDC Manager Alerts (Continued)

Alert Name	Short Description	Severity	Detected By
COORDINATION_SERVICE_DOWN_ALERT	The system cannot establish a connection to the virtual machines that provide the required coordination service. This service is provided by the ISVM virtual machines that run in the N0 ESXi host in the environment's primary rack. The bring-up process requires connection to the coordination service.	CRITICAL	Event 30-minute poll 24-hour poll
CPU_CAT_FAILURE_ALERT	A CPU has shut down due to the processor's catastrophic error (CATERR) signal. This alert is initiated by the CPU_CAT_ERROR event.	ERROR	Event
CPU_EXTRA_ALERT	The polling found an additional CPU that does not match what is expected according to the manifest.	WARNING	24-hour poll
CPU_INITIALIZATION_ERROR_ALERT	The system detected that a CPU startup initialization error has occurred. This alert is initiated by the CPU_INITIALIZATION_ERROR event.	ERROR	Event
CPU_INVALID_ALERT	The polling detected a type of CPU in the server that does not match what is expected according to the manifest.	ERROR	24-hour poll
CPU_MACHINE_CHECK_ERROR_ALERT	A server CPU has failed due to CPU Machine Check Error. This alert is initiated by the CPU_MACHINE_CHECK_ERROR event.	ERROR	Event
CPU_POST_FAILURE_ALERT	A server CPU has shut down due to POST failure. This alert is initiated by the CPU_POST_FAILURE event.	ERROR	Event
CPU_TEMPERATURE_ABOVE_UPPER_THRESHOLD_ALERT	A CPU temperature has reached its maximum safe operating temperature. This alert is initiated by the CPU_TEMPERATURE_ABOVE_UPPER_THRESHOLD event.	WARNING	Event
CPU_TEMPERATURE_BELOW_LOWER_THRESHOLD_ALERT	A CPU temperature has reached its minimum safe operating temperature. This alert is initiated by the CPU_TEMPERATURE_BELOW_LOWER_THRESHOLD event.	WARNING	Event
CPU_THERMAL_TRIP_ERROR_ALERT	A server CPU has shut down due to thermal error. This alert is initiated by the CPU_THERMAL_TRIP_ERROR event.	ERROR	Event
CPU_UNDETECTED_ALERT	The polling did not detect a CPU that matches what is expected according to the manifest.	ERROR	24-hour poll
DIMM_ECC_MEMORY_ERROR_ALERT	The system detected an uncorrectable Error Correction Code (ECC) error for a server's memory. This alert is initiated by the DIMM_ECC_MEMORY_ERROR event.	ERROR	Event
DIMM_TEMPERATURE_ABOVE_THRESHOLD_ALERT	Memory temperature has reached its maximum safe operating temperature. This alert is initiated by the DIMM_TEMPERATURE_ABOVE_THRESHOLD event.	WARNING	Event
DIMM_THERMAL_TRIP_ALERT	Memory has shut down due to thermal error. This alert is initiated by the DIMM_THERMAL_TRIP event.	ERROR	Event

Table 7-4. SDDC Manager Alerts (Continued)

Alert Name	Short Description	Severity	Detected By
HDD_DOWN_ALERT	Operational status is down for an HDD. This alert is initiated by the HDD_DOWN event.	ERROR	Event
HDD_EXCESSIVE_READ_ERRORS_ALERT	Excessive read errors reported for an HDD. This alert is initiated by the HDD_EXCESSIVE_READ_ERRORS event.	WARNING	Event
HDD_EXCESSIVE_WRITE_ERRORS_ALERT	Excessive write errors reported for an HDD. This alert is initiated by the HDD_EXCESSIVE_WRITE_ERRORS event.	WARNING	Event
HDD_EXTRA_ALERT	The polling found an additional HDD that does not match what is expected according to the manifest.	WARNING	24-hour poll
HDD_INVALID_ALERT	The polling detected a type of HDD that does not match what is expected according to the manifest.	ERROR	24-hour poll
HDD_TEMPERATURE_ABOVE_THRESHOLD_ALERT	HDD temperature has reached its maximum safe operating temperature. This alert is initiated by the HDD_TEMPERATURE_ABOVE_THRESHOLD event.	WARNING	Event
HDD_UNDETECTED_ALERT	The polling did not detect an HDD that matches what is expected according to the manifest.	ERROR	24-hour poll
HDD_WEAROUT_ABOVE_THRESHOLD_ALERT	Wear-out state of an HDD is above its defined threshold. This alert is initiated by the HDD_WEAROUT_ABOVE_THRESHOLD event.	WARNING	Event
HMS_AGENT_DOWN_ALERT	The Hardware Management Services (HMS) aggregator cannot communicate with the HMS agent on the rack's management switch through the private management network, either because the agent is down or the network is not available. This alert is initiated by the HMS_AGENT_DOWN event or by polling.	CRITICAL	30-minute poll 24-hour poll Event
HMS_DOWN_ALERT	The SDDC Manager cannot communicate with the HMS aggregator.	CRITICAL	30-minute poll 24-hour poll Event
HOST_AGENT_NOT_ALIVE_ALERT	This alert is raised when the polling detects that an ESXi host does not have its hostd process running or when the system is unable to determine if the hostd process is running. The hostd (host daemon) is an infrastructure service agent in the ESXi operating system.	CRITICAL	30-minute poll 24-hour poll
LICENSE_PRESENT_CHECK_FAILED_ALERT	The check for the license for a particular bundle failed.	WARNING	Event
MANAGEMENT_SWITCH_DOWN_ALERT	Operational status is down for a physical rack's management switch. This alert is initiated by the periodic polling and by the MANAGEMENT_SWITCH_DOWN event.	WARNING	Event 30-minute poll 24-hour poll
MANAGEMENT_SWITCH_EXTRA_ALERT	The polling found an additional management switch that does not match what is expected according to the manifest.	WARNING	24-hour poll

Table 7-4. SDDC Manager Alerts (Continued)

Alert Name	Short Description	Severity	Detected By
MANAGEMENT_SWITCH_INVALID_ALERT	The polling detected a type of management switch that does not match what is expected according to the manifest.	CRITICAL	24-hour poll
MANAGEMENT_SWITCH_PORT_DOWN_ALERT	Operational status is down for a switch port in a physical rack's management switch. This alert is initiated by the MANAGEMENT_SWITCH_PORT_DOWN event.	WARNING	Event
MEMORY_EXTRA_ALERT	The polling found additional memory that does not match what is expected according to the manifest.	WARNING	24-hour poll
MEMORY_INVALID_ALERT	The polling detected a type of memory that does not match what is expected according to the manifest.	ERROR	24-hour poll
MEMORY_UNDETECTED_ALERT	The polling did not detect memory that matches what is expected according to the manifest.	ERROR	24-hour poll
NIC_EXTRA_ALERT	The polling found an additional NIC that does not match what is expected according to the manifest.	WARNING	24-hour poll
NIC_INVALID_ALERT	The polling detected a type of NIC that does not match what is expected according to the manifest.	ERROR	24-hour poll
NIC_PORT_DOWN_ALERT	Operational status is down for a NIC port in a rack's server. This alert is initiated by the NIC_PORT_DOWN event.	WARNING	Event
NIC_UNDETECTED_ALERT	The polling did not detect a NIC that matches what is expected according to the manifest.	ERROR	24-hour poll
PCH_TEMPERATURE_ABOVE_THRESHOLD_ALERT	Platform controller hub [PCH] temperature has reached its maximum safe operating temperature. This alert is initiated by the PCH_TEMPERATURE_ABOVE_THRESHOLD event.	WARNING	Event
POSTGRES_DOWN_ALERT	The system cannot connect to an internal database.	CRITICAL	Event
SERVER_DOWN_ALERT	Server is in the powered-down state. This alert is initiated by the SERVER_DOWN event.	ERROR	Event 30-minute poll 24-hour poll
SERVER_EXTRA_ALERT	The polling detected an additional server that does not match what is expected according to the manifest.	WARNING	24-hour poll
SERVER_INVALID_ALERT	The polling detected a type of server that does not match what is expected according to the manifest.	ERROR	24-hour poll
SERVER_PCIE_ERROR_ALERT	A server's system has PCIe errors. This alert is initiated by the SERVER_PCIE_ERROR event.	ERROR	Event
SERVER_POST_ERROR_ALERT	A server has POST failures.	ERROR	Event
SERVER_UNDETECTED_ALERT	The polling did not detect a server that matches what is expected according to the manifest.	ERROR	30-minute poll 24-hour poll

Table 7-4. SDDC Manager Alerts (Continued)

Alert Name	Short Description	Severity	Detected By
SPINE_SWITCH_DOWN_ALERT	Operational status is down for a physical rack's spine switch. This alert is initiated by the periodic polling and by the SPINE_SWITCH_DOWN event.	ERRORS	Event 30-minute poll 24-hour poll
SPINE_SWITCH_EXTRA_ALERT	The polling detected an additional spine switch that does not match what is expected according to the manifest.	WARNING	24-hour poll
SPINE_SWITCH_INVALID_ALERT	The polling detected a type of spine switch that does not match what is expected according to the manifest.	ERROR	24-hour poll
SPINE_SWITCH_PORT_DOWN_ALERT	Operational status is down for a switch port: in a physical rack's spine switch. This alert is initiated by the SPINE_SWITCH_PORT_DOWN event.	WARNING	Event
SSD_DOWN_ALERT	Operational status is down for an SSD. This alert is initiated by the SSD_DOWN event.	ERROR	Event
SSD_EXCESSIVE_READ_ERRORS_ALERT	Excessive read errors reported for an SSD. This alert is initiated by the SSD_EXCESSIVE_READ_ERRORS event.	WARNING	Event
SSD_EXCESSIVE_WRITE_ERRORS_ALERT	Excessive write errors reported for an SSD. This alert is initiated by the SSD_EXCESSIVE_WRITE_ERRORS event.	WARNING	Event
SSD_EXTRA_ALERT	The polling found an additional SSD that does not match what is expected according to the manifest.	WARNING	24-hour poll
SSD_INVALID_ALERT	The polling detected a type of SSD that does not match what is expected according to the manifest.	ERROR	24-hour poll
SSD_TEMPERATURE_ABOVE_THRESHOLD_ALERT	SSD temperature has reached its maximum safe operating temperature. This alert is initiated by the SSD_TEMPERATURE_ABOVE_THRESHOLD event.	WARNING	Event
SSD_UNDETECTED_ALERT	The polling did not detect an SSD that matches what is expected according to the manifest.	ERROR	24-hour poll
SSD_WEAROUT_ABOVE_THRESHOLD_ALERT	Wear-out state of an SSD is above its defined threshold. This alert is initiated by the SSD_WEAROUT_ABOVE_THRESHOLD event.	WARNING	Event
STORAGE_CONTROLLER_DOWN_ALERT	Operational status is down for a storage adapter. This alert is initiated by the STORAGE_CONTROLLER_DOWN event.	ERROR	Event
STORAGE_CONTROLLER_EXTRA_ALERT	The polling detected an additional storage adapter that does not match what is expected according to the manifest.	WARNING	24-hour poll
STORAGE_CONTROLLER_INVALID_ALERT	The polling detected a type of storage adapter that does not match what is expected according to the manifest.	ERROR	24-hour poll
STORAGE_CONTROLLER_UNDETECTED_ALERT	The polling did not detect a storage adapter that matches what is expected according to the manifest.	ERROR	24-hour poll

Table 7-4. SDDC Manager Alerts (Continued)

Alert Name	Short Description	Severity	Detected By
TOR_SWITCH_DOWN_ALERT	Operational status is down for a physical rack's ToR switch. This alert is initiated by the periodic polling and by the TOR_SWITCH_DOWN event.	ERROR	Event 30-minute poll 24-hour poll
TOR_SWITCH_EXTRA_ALERT	The polling found an additional ToR switch that does not match what is expected according to the manifest.	WARNING	24-hour poll
TOR_SWITCH_INVALID_ALERT	The polling detected a type of ToR switch that does not match what is expected according to the manifest.	ERROR	24-hour poll
TOR_SWITCH_PORT_DOWN_ALERT	Operational status is down for a switch port in a physical rack's ToR switch. This alert is initiated by the TOR_SWITCH_PORT_DOWN event.	WARNING	Event
VMWARE_CLOUD_FOUNDATION_BUNDLE_INCOMPLETE_ALERT	The ISO file is missing items, according to its manifest.	CRITICAL	Event
VMWARE_CLOUD_FOUNDATION_BUNDLE_INVALID_ALERT	Checksum validation for the ISO file failed.	CRITICAL	Event
VMWARE_CLOUD_FOUNDATION_BUNDLE_MISSING_ALERT	A required ISO file or its expected checksum file or manifest file is missing.	CRITICAL	Event

Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment

The vRealize Log Insight instance that is deployed by SDDC Manager is licensed separately. When the vRealize Log Insight instance is licensed for use in your Cloud Foundation environment, you can use the capabilities of vRealize Log Insight to work with the event and log data that is collected from the various hardware devices and SDDC virtual infrastructure.

vRealize Log Insight is a log aggregator that provides simplified log viewing and analysis. Events and log content for the environment's physical resources and the virtual infrastructure are collected by the vRealize Log Insight instance, which indexes them and then provides unified querying and analysis of the content for problem diagnosis and repair. As a result, logging in to the vRealize Log Insight Web interface provides a unified view of event and log information to assist with troubleshooting. Data from the events and audit events raised by SDDC Manager is also sent to the vRealize Log Insight instance, and you can use its searching, query, and reporting features to create trend reports and auditing reports from the event history.

You can configure the vRealize Log Insight instance for remote syslog forwarding to an instance of vRealize Log Insight that is external to the Cloud Foundation installation or to another syslog server. You configure vRealize Log Insight to forward incoming events to a syslog target using the Event Forwarding page of the vRealize Log Insight Web interface. For the steps on configuring event forwarding in the vRealize Log Insight Web interface, see [Add vRealize Log Insight Event Forwarding Destination](#) in the vRealize Log Insight 3.3 documentation center at <http://pubs.vmware.com/log-insight-33/index.jsp>.

For the steps to log in to the vRealize Log Insight Web interface from the SDDC Manager client, see [Get Started Using the vRealize Log Insight Instance](#).

Note The vRealize Log Insight environment that SDDC Manager deploys is sized for monitoring the hardware and software of your Cloud Foundation installation only. The default sizing accommodates the events and logs expected to be sent by the Cloud Foundation environment. This sizing might not accommodate the numbers of events and logs coming from additional applications or VMs that reside outside of your Cloud Foundation environment. Therefore, configuring the vRealize Log Insight environment that is deployed by SDDC Manager to collect events logs from additional applications or VMs that reside outside of your Cloud Foundation environment is not supported in this release.

Content Packs

The vRealize Log Insight instance includes a set of content packs. Content packs are read-only plug-ins to vRealize Log Insight that provide pre-defined knowledge about specific types of events such as log messages. The purpose of a content pack is to provide knowledge about a specific set of events in a format that is easily understandable by administrators, monitoring teams, and executives. A content pack consists of information that can be saved from either the Dashboards or Interactive Analytics pages in the vRealize Log Insight Web interface. Such information typically includes:

- Queries
- Fields
- Aggregations
- Alerts
- Dashboards

The vRealize Log Insight instance includes a number of VMware content packs, including the Cloud Foundation content pack. For a detailed description of the Cloud Foundation content pack, see [SDDC Manager Content Pack](#). For descriptions of the other installed content packs, use the Content Packs choice from the upper right drop-down menu in the vRealize Log Insight Web interface and select the content pack's name in the list.

Content Pack	Overview
Cloud Foundation	This content pack includes an overview dashboard that gives overall summary views of the data sent by the Cloud Foundation, and also provides detailed views for the various levels of interest, such as rack-level, server-level, switch-level, device-level, and so on.
General	This content pack includes four dashboards, providing generic information about any events being sent to the vRealize Log Insight instance, configured vRealize Log Insight agents, and information discovered by the machine learning capabilities
vSphere	This content pack provides various dashboards and filters to give you insight into the data that is sent by the management and workload domains' vCenter Server instances.

Content Pack	Overview
NSX for vSphere	This content pack provides various dashboards and filters to give you insight into the data that is sent by the NSX for vSphere virtual infrastructure in the management and workload domains' vCenter Server instances.
Horizon View	This content pack provides various dashboards and filters to give you insight into the data that is sent by the VDI workload domain's virtual infrastructure. Log information from the VDI workload domain's servers is collected and consolidated.
Virtual SAN	This content pack provides various dashboards and filters to give you insight into the logs that are sent by the management and workload domains' Virtual SAN features.

To see the dashboards for one of the content packs in the vRealize Log Insight Web interface, select **Dashboards** and then select the specific content pack in the left hand drop-down menu.

SDDC Manager Content Pack

The SDDC Manager content pack provides graphical summary views for various SDDC Manager events that are sent to vRealize Log Insight. The content pack organizes the views into multiple tabs that display collected information about various aspects of the installation. The top **Overview** tab includes high-level overview of all events such as count of events by severity, count of events by rack, critical events by server and by switch, server and network events by rack, timeline view of events, audit event summary and so on. The content pack's other tabs provide detailed information about events at the various hardware levels of the installation, such as the rack-level, server-level, switch-level, component-level, and so on. As a result, this set of tabs gives you the ability to get an overall cross-system view using the **Overview** tab, and then drill-down into the hardware level you are interested in by using the other tabs.

The **Audits - Summary** tab provides views of the collected audit event data by severity, by system audit event and user audit event, and a timeline view of audit events.

Get Started Using the vRealize Log Insight Instance

Use of the vRealize Log Insight instance that is deployed by SDDC Manager is licensed separately. vRealize Log Insight delivers real-time log management for VMware environments, providing visibility of logs and easier troubleshooting across the physical and virtual infrastructure in your Cloud Foundation installation.

During the bring-up process of your installation, SDDC Manager deploys and configures the vRealize Log Insight virtual appliance. When you have the license to use that deployed vRealize Log Insight instance, you use the vRealize Log Insight Web interface to perform the tasks related to the collected log and events data, such as troubleshooting and trend analysis and reporting tasks.

Note The vRealize Log Insight environment that SDDC Manager deploys is sized for monitoring the hardware and software of your Cloud Foundation installation only. The default sizing accommodates the events and logs expected to be sent by the Cloud Foundation environment. This sizing might not accommodate the numbers of events and logs coming from additional applications or VMs that reside outside of your Cloud Foundation environment. Therefore, configuring the vRealize Log Insight environment that is deployed by SDDC Manager to collect events logs from additional applications or VMs that reside outside of your Cloud Foundation environment is not supported in this release.

Also as part of the bring-up process, content packs are installed and configured in the vRealize Log Insight instance. In vRealize Log Insight, a content pack provides dashboards, extracted fields, predefined queries, and alerts that are related to the content pack's specific product or set of logs. When you launch the vRealize Log Insight Web interface, the installed content packs are ready for use. For an overview of these content packs, see [Using vRealize Log Insight Capabilities in Your Cloud Foundation Environment](#). For detailed information on how to use the dashboards, predefined queries, and collected log data in vRealize Log Insight, see the vRealize Log Insight product documentation at <https://www.vmware.com/support/pubs/log-insight-pubs.html>.

From the SDDC Manager client, you can open the vRealize Log Insight Web interface using the following methods. During a logged-in session of the SDDC Manager client, you must authenticate to vRealize Log Insight the first time you open the vRealize Log Insight Web interface. Subsequent launches do not require re-authentication until the cache for the logged-in session expires or you log out of the vRealize Log Insight Web interface. The launch of the Web interface is context-aware. For example, if you launch using the **Analysis** button from the Audit Events page, the vRealize Log Insight display is filtered to show the audit events only. You can navigate within the Web interface to view other information collected from your environment.

If this is the first time after the initial bring-up process that the vRealize Log Insight Web interface is launched, type the system-assigned credentials into the login screen and then click **Login**. Then use the vRealize Log Insight Web interface to assign permissions to your superuser account and other user accounts. You can look up the system-assigned credentials for the vRealize Log Insight Web interface by logging in to the SDDC Manager VM and running the `vrn-cli.sh lookup-password` in the VM's `/home/vrack/bin` directory. See [Credentials for Logging In To the SDDC Manager \(vrn\) Virtual Machine](#) and [Look Up Account Credentials Using the Lookup-Password Command](#).

Note Do not change the password of the admin account from within the vRealize Log Insight Web interface, or unpredictable results can occur. To change the admin account's password without rotating all account passwords, log in to the SDDC Manager VM and use the `vrn-cli.sh rotate-password-li-api` command.

Procedure

- 1 Open the vRealize Log Insight Web interface.

Option	Description
From the Audit Events page, click the Analysis button.	The vRealize Log Insight display is filtered to show the collected audit events only.
From the Events page, click the Analysis button.	The vRealize Log Insight displays all collected events.
From a management domain's details, click the launch link listed in the Management Info area.	The vRealize Log Insight displays all collected events.

- 2 If the vRealize Log Insight login screen appears, log in with the appropriate credentials.
 - If this is the first time logging in to vRealize Log Insight after the initial bring-up process, use the username **admin** and the randomized password that was set when the passwords were rotated at the end of the bring-up process.
 - If you are using an account that was set up for you in vRealize Log Insight, use those credentials to log in.

When you are logging in to the vRealize Log Insight Web interface with the **admin** account after doing a password rotation, you must use the randomized password that is set for that account by the rotation procedure. For details about password rotation, see [Chapter 3 On-Demand Password Rotation in Your Cloud Foundation Installation](#).

The vRealize Log Insight Web interface appears with the display filtered to show the events that meet the criteria for the launch context from SDDC Manager.

What to do next

Examine the descriptions of the content packs that are available by selecting **Content Packs** in the upper right corner menu.

Examine the data available in the content packs. To display the dashboards for an installed content pack, click **Dashboards** and use the drop-down menu at the upper left to select the content pack.

Enable login accounts for additional users. See the Managing User Accounts in vRealize Log Insight topic and its subtopics in the vRealize Log Insight product documentation available at the following locations:

- From the **Help** menu choice in the vRealize Log Insight Web interface.
- In the vRealize Log Insight product documentation online at <http://pubs.vmware.com/log-insight-33/index.jsp>.

For detailed information about how to use the content packs and other capabilities of the vRealize Log Insight Web interface, see the vRealize Log Insight product documentation also available at those two locations.

Configure Syslog from the Switches to vRealize Log Insight

A vRealize Log Insight instance is a syslog collector. When vRealize Log Insight is licensed for use in your Cloud Foundation environment, you can manually configure the switches to export their log files to the vRealize Log Insight instance.

Prerequisites

Verify that you have the root account credentials to log in remotely to the SDDC Manager virtual machines on each rack. The root account credentials are managed by your organization. See [Credentials for Logging In To the SDDC Manager \(vrn\) Virtual Machine](#).

Procedure

- 1 On the primary rack, using the root account, connect and log in, for example by SSH, to the SDDC Manager VM.
- 2 Change to the `/home/vrack/bin` directory.
- 3 Configure ability to export the switches' log files to the vRealize Log Insight instance by typing the command:

```
./vrn-cli.sh configure-syslog
```

The command output displays information that the command is running and when it is finished.

What to do next

- Repeat the steps for each rack in your installation.
- Log in to the vRealize Log Insight Web interface to verify that it is receiving the logs. For steps for logging in, see [Get Started Using the vRealize Log Insight Instance](#).

Using vRealize Operations Manager Capabilities in Your Cloud Foundation Environment

The vRealize Operations Manager instance that is deployed by SDDC Manager is licensed separately. When the vRealize Operations Manager instance is licensed for use in your Cloud Foundation environment, you can use its capabilities to work with the Cloud Foundation data that is sent to it and obtain a picture of the health of the virtual infrastructure for the management and workload domains.

The capabilities of vRealize Operations Manager help you to proactively identify and solve emerging issues with predictive analysis and smart alerts, ensuring optimal performance monitoring and availability of the virtual infrastructure it monitors. Data from the management and workload domains can propagate to the vRealize Operations Manager instance and you get a unified view of the event data and metrics for the virtual infrastructure. The vCenter Adapter for vRealize Operations Manager is installed and configured in vRealize Operations Manager. Additionally, when you create a VDI workload domain, the

Horizon View Adapter for vRealize Operations Manager is installed and configured also. Over time, you can use the vRealize Operations Manager Web interface to analyze event data for the management and workload domains' virtual infrastructure over time, providing the ability for performance management and infrastructure capacity planning.

Note The vRealize Operations Manager environment that SDDC Manager deploys is sized for monitoring the contents of your Cloud Foundation installation only. The default sizing accommodates the metrics and events expected to be sent by the Cloud Foundation environment's vCenter Server instances and Horizon software components. This sizing might not accommodate the numbers of metrics and events for monitoring additional applications or VMs that reside outside of the Cloud Foundation environment. Therefore, configuring the vRealize Operations Manager environment that is deployed by SDDC Manager to monitor additional applications or VMs that reside outside of your Cloud Foundation environment is not supported in this release.

vRealize Operations Manager Multiple-Node Cluster

In a single-rack Cloud Foundation environment, the vRealize Operations Manager cluster is deployed as a cluster with a single node, the master node. When an additional rack is added to the environment, the vRealize Operations Manager cluster is scaled out by adding a data node on that rack, making the vRealize Operations Manager environment a multiple-node cluster. In a multiple-node cluster, the nodes act together as a single vRealize Operations Manager cluster.

Accessing the vRealize Operations Manager administrative Web interface on any node allows access to the data from all of the nodes. Adapters for the objects residing in the physical rack are created on the vRealize Operations Manager node that is on that rack, to provide for balanced operation.

Examine the Health of the Virtual Infrastructure Using vRealize Operations Manager

Use of the vRealize Operations Manager instance is licensed separately. When the vRealize Operations Manager instance is licensed for use in your Cloud Foundation environment, you can obtain a picture of how the virtual infrastructure for the management and workload domains is running and the health of that virtual infrastructure by using the vRealize Operations Manager Web interface to examine the event data that is sent from the management and workload domains.

In the SDDC Manager client, you can launch the vRealize Operations Manager Web interface using the following methods. When logged in to the SDDC Manager client, you must authenticate to vRealize Operations Manager the first time you open the vRealize Operations Manager Web interface. Subsequent launches do not require re-authentication until the cache for the logged-in session expires or you log out of the vRealize Operations Manager Web interface.

Procedure

- 1 Open the vRealize Operations Manager Web interface by clicking the **vROPS** launch link located in the domain details for the management domains.

The vRealize Operations Manager login screen appears.

2 For the authentication source, select the **All vCenter Servers** choice.

3 Log in using your SDDC Manager administrator account credentials.

Those account credentials are the ones for the superuser name and password entered during the bring-up process in the Create Superuser screen.

The vRealize Operations Manager web interface displays its Solutions view. The Solution Details area indicates that vRealize Operations Manager is collecting data from your environment's management and workload domains.

4 Click **Home**.

The vRealize Operations Manager Web interface appears and you can examine the collected data and examine the alerts and health indicators.

What to do next

For detailed information and procedures for using the features of vRealize Operations Manager, see the vRealize Operations Manager Documentation Center located at <http://pubs.vmware.com/vrealizeoperationsmanager-6/index.jsp>.

Settings Configuration Using the SDDC Manager Client

8

Use the Settings area of the SDDC Manager client to review and configure settings for parameters that are used in various features of the environment.

This chapter includes the following topics:

- [Customize Default Values Used When Creating VDI Workload Domains](#)
- [Additional Rack Settings Screen](#)
- [Managing Network Settings](#)

Customize Default Values Used When Creating VDI Workload Domains

You can set default values for some of the parameters that SDDC Manager uses when creating VDI workload domains so that each time you create a VDI workload domain, the default values are used. Some of the parameters for which you can set defaults are the prefixes for the View Connection Server names, the maximum number of virtual desktops per View Connection Server, among others.

When you create a VDI workload domain, the workflow creates those VDI-specific resources for a View infrastructure that are appropriate for the selections you make in the Configure VDI wizard. Default values are used for the View infrastructure's required parameters. You can customize those default values using the VDI Settings page.

Procedure

- 1 In the SDDC Manager client, navigate to **Settings > PHYSICAL RACK SETTINGS > VDI Settings**.
- 2 Set the page to edit mode by using the edit icon.

To change a parameter's value, type over the value currently displayed in the entry field for that parameter.

For descriptions of the parameters, see [VDI Infrastructure Settings](#).

- 3 Save your changes using the save icon.

The customized default values are subsequently used when a new VDI infrastructure is provisioned using the Create VDI wizard.

To revert to the original default values, click **RESTORE DEFAULTS** and then click **CONFIRM**.

VDI Infrastructure Settings

VDI infrastructure settings are the parameters that SDDC Manager uses when creating VDI workload domains.

VDI Parameters

If you do not customize these values, when you configure a new VDI workload domain, the default values are used for the VDI parameters. To see the steps for customizing these default values, see [Customize Default Values Used When Creating VDI Workload Domains](#).

Type	Default Value	Description
Internal AD Name	horizon.local	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this name is used for the Active Directory DNS name.
AD VM Name prefix	ad-	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this prefix is used in the name of the VM on which the Active Directory Domain Controller is installed. The actual name of the VM is generated by adding the VDI domain's ID plus an incremental number to the end of this prefix, starting with the number one (1).
Domain Net BIOS Name	HORIZON	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this parameter sets the NetBIOS name of the Active Directory that is deployed in the VDI workload domain.
Domain Controller Name	DC1	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this prefix is used as the server name prefix of the Active Directory Domain Controller. The actual name of the Domain Controller is generated by adding the VDI domain's ID plus an incremental number to the end of this prefix, starting with the number one (1).
Virtual Desktops OU	CN=Computers,DC=horizon,DC=local	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this parameter is the LDAP location within the internal Active Directory where the virtual desktops are deployed.

Type	Default Value	Description
View Servers OU	OU=View,DC=horizon,DC=local	When the choice to deploy an internal Active Directory is selected in the configuration wizard, this parameter is the LDAP location within the internal Active Directory where the virtual servers are deployed.
Number of Server Processors	4 of 8	The number of processors a single VDI server must have in the deployed VDI workload domain.
Memory per Server	10 GB of 32 GB	The amount of memory a single VDI server must have in the deployed VDI workload domain.
Servers System Drive	80 GB of 400 GB	The size of the system drive that a single VDI server must have in the deployed VDI workload domain.
Connection Server Naming Convention	con-	The prefix used in the Horizon View Connection server names that are deployed in the infrastructure of the VDI workload domain. The server names are generated by adding the VDI workload domain ID plus an incremental number to the end of the prefix, starting with the number one (1).
Composer Server Naming Convention	com-	The prefix used in the Horizon View Composer server names that are deployed in the infrastructure of the VDI workload domain. The server names are generated by adding the VDI workload domain ID plus an incremental number to the end of the prefix, starting with the number one (1).
Security Server Naming Convention	sec-	The prefix used in the Horizon View Security server names that are deployed in the infrastructure of the VDI workload domain. The server names are generated by adding the VDI workload domain ID plus an incremental number to the end of the prefix, starting with the number one (1).
Virtual Desktops Naming Convention	vm-	The prefix used in the names of the virtual desktops that are deployed in the VDI workload domain. The virtual desktop names are generated by adding the VDI workload domain ID plus an incremental number to the end of the prefix, starting with the number one (1).

Type	Default Value	Description
Max Desktops per Connection Server	2000	Specifies the maximum number of virtual desktops that one Horizon View Connection server in the deployed VDI workload domain should handle. If the total number of virtual desktops exceeds this number, a Replica Connection server is deployed in the VDI environment.
Max Desktops per Security Server	500	Specifies the maximum number of virtual desktops that one Horizon View Security server in the deployed VDI workload domain should handle. If the total number of virtual desktops exceeds this number, a Replica Security server is deployed in the VDI environment.
Max Desktops per vCenter Server	2000	Specifies the maximum number of virtual desktops that a single VDI workload domain can handle. By default, each VDI workload domain is managed by a single vCenter Server instance. If the total number of virtual desktops exceeds this number, an additional vCenter Server instance is deployed.
Max Virtual CPUs per Core	4	Specifies the maximum number of virtual processors (vCPUs) that a physical core on the ESXi hosts should handle.
Desktop System Drive Size [GB]	60	Specifies the size (in GB) of the data drive that is configured as a D: drive for each virtual desktop.
Desktop System Snapshot Size	5	Specifies the size (in GB) of the data drive that is configured as a snapshot for each virtual desktop.
Desktops accessed via the Internet [%]	10	Specifies the percentage of the virtual desktops that are going to connect to this VDI workload domain from outside your corporate network compared to the total number of virtual desktops handled by this VDI workload domain.
Desktop Pool Name Prefix	pl-	The prefix used in the desktop pool names that are deployed in the infrastructure of the VDI workload domain. The pool names are generated by adding the VDI workload domain ID plus an incremental number to the end of the prefix, starting with the number one (1).

Additional Rack Settings Screen

Use the Additional Rack Settings screen to add physical racks to your Cloud Foundation installation.

As described in the *VMware Cloud Foundation Overview and Bring-Up Guide*, when you follow the steps to power on a new rack and use the spine switches to connect it to the installation's existing racks, the thumbprint of the added rack is displayed in this screen. Then you start the Add Rack wizard to verify the identity of the new rack using its thumbprint and bootstrap password.

See the Bringing-Up on Additional Racks procedure in the *VMware Cloud Foundation Overview and Bring-Up Guide* for the detailed steps.

Managing Network Settings

Use the Network Settings screen to examine and make changes to network-related settings in your Cloud Foundation installation.

Manage Uplink Connectivity Settings Using the SDDC Manager Client

After the Cloud Foundation bring-up process, you can use the Uplink screen in the SDDC Manager client to review and update the uplink connectivity settings. The uplinks are used by the top-of-rack (ToR) switches to carry traffic to your corporate network.

Note Not every feature that the ToR switches support can be configured using the SDDC Manager user interface. You must manually set advanced switch features during installation of the physical rack. Examples of these advanced switch features are spanning tree parameters, redundancy features using Hot Standby Router Protocol (HSRP), and so on.

The ToR uplink settings are entered during the bring-up process. The ToR uplink connectivity can be either L2 or L3 to the upstream network. After the bring-up process, you use this screen to change the settings that were previously entered.

Note You cannot use this screen to change the uplink type, from L2 to L3 or L3 to L2.

Prerequisites

If you plan to change the uplink settings, connect to port 48 on the management switch and log in to the SDDC Manager client using that connection.

Important Changing the settings triggers uplink reconfiguration on the switches. Because the reconfiguration process might take a few minutes to complete, connectivity to the corporate network might be lost during the process. To avoid losing connectivity with the SDDC Manager, it is strongly recommended that you are connected to port 48 on the management switch when updating the settings using this screen.

Procedure

- 1 In the SDDC Manager client, navigate to **Settings > NETWORK SETTINGS > UPLINK**.

2 Review the current uplink settings.

Option	Description
Uplink Type	This field indicates whether the current ToR uplink uses L2 or L3 settings. Read-only.
Uplink LAG Enabled	Specify whether to enable link aggregation (LAG), YES or NO .
Uplink Ports	Specify the ToR switch ports that are cabled as the uplink to your corporate network. Ports must be in the ranges: <ul style="list-style-type: none"> ■ 43 to 46, for uplink speeds less than 40Gbps ■ 51 to 54, for a 40Gps uplink speed ■ When LAG is not enabled, the ToR switch uplink uses one port number in the valid range. ■ When LAG is enabled, the ToR switch uplink can use up to four ports. Typically the number of switch ports in the uplink is related to the required bandwidth.
Uplink IP	For an L3 uplink, this field displays the starting IP used for the L3 uplink.
Mask IP	For an L3 uplink, this field displays the netmask used for the L3 uplink.
Next-hop IP	For an L3 uplink, this field displays the IP address used for the next hop IP.
Uplink Speed	This field displays the uplink speed in Gbps.

3 Click **Edit** to update the settings.

When you edit the settings, you click **Save Edits** to save your changes.

About Excluding IP Address from SDDC Manager Use

You can exclude IP addresses in the subnets used in your installation to prevent SDDC Manager from assigning those addresses to resources.

SDDC Manager allocates IP addresses to resources from the subnets you enter during the Cloud Foundation bring-up process or during the workload domain creation process. When those subnets include IP address that are already used in your corporate network for other purposes, or which you want to reserve for another use, you exclude those IP addresses to prevent IP conflicts.

SDDC Manager has two types of exclusions:

Global exclusions	Global exclusions are persistent and are configured using the IP Exclusions area on the IP Distribution screen. See IP Distribution Screen .
Local exclusions	Local exclusions are valid until another local exclusion is subsequently created for that subnet's addresses. For each subnet, the most recent local exclusion overwrites the earlier one. Local exclusions are created by the bring-up process and the VI workload domain creation workflow.

For example, during the bring-up process on the first rack in a Cloud Foundation installation, specifying excluded IP addresses in the management subnet screen of the bring-up wizard prevents the software from using those excluded IP addresses as it assigns management IPs to the physical and logical resources involved in this process, such as the ESXi hosts in the rack, the management domain and the virtual appliances, and so on. The list of excluded IP addresses is saved.

Then, during creation of a VI workload domain, the software uses the same management network subnet that was used during bring-up process. When you specify excluded IP addresses for the management network subnet in the VI workload domain creation wizard, that list of excluded IP addresses replaces the excluded IP addresses that were entered during the bring-up process.

IP Distribution Screen

You use the IP Distribution screen to work with the set of excluded IP addresses and to download information about the IP addresses allocated by the SDDC Manager software's IP address management (IPAM).

IP Exclusions

This area displays the set of IP addresses and range of addresses that are currently registered in the software as excluded addresses. SDDC Manager is prevented from assigning the IP addresses in this set to resources. You usually want to exclude an IP address when it is already assigned to a service in your corporate network or which you want reserved for other uses.

SDDC Manager allocates IP addresses to internal resources from the subnets you enter during the Cloud Foundation bring-up process or during the Virtual Infrastructure workload domain creation process. When those subnets include IP address that are already used in your corporate network for other purposes, or which you want to reserve for another use, you exclude those IP addresses to prevent IP conflicts. Using this screen, you can add those IP addresses or ranges of addresses that you want to prevent from automatic assignment to resources in your Cloud Foundation installation. Excluding such IP addresses helps to prevent IP conflicts.

When you make a change in this screen, you must use the **Update** button to confirm the change.

Add to the excluded set by entering the address or range that you want to exclude, clicking **+**, and clicking **Update**. Remove an item from the set by clicking its **-** and clicking **Update**.

IP Allocations

Click **Download** to download a CSV file that contains information about the IP address allocations made by IPAM, such as:

- Information about each subnet established in your installation, such as the subnet address, broadcast address, and so on

- Number of IPs currently available in each subnet
- The distributed port group associated with each subnet

Data Center Screen

You use the Data Center screen to manage the relationships between workload domains and the data center network connections that are in place for your Cloud Foundation installation. You can review the information for the existing connections, add new data center connections, associate and disassociate data center connections with workload domains, and remove data center connections that are no longer associated with a workload domain.

Data Center Connections

By default, this screen opens with the **New Connection** choice selected and the fields for defining a new data center connection displayed. Click **Cancel** if you want to review the list without creating a new data center connection.

The screen displays the list of data center connections that are already established. For a Cloud Foundation installation, a data center connection specifies the network that carries traffic between the installation and the networking environment external to the installation, such as your corporate network. During the Cloud Foundation bring-up process, a data center connection was specified. During ongoing operations, a data center connection can be specified when creating a workload domain and using this screen.

Note Associations between data center connection and VDI workload domains must be one to one. A VDI workload domain cannot share data center connections with any other management or workload domain.

In the Data Center screen you can:

- Examine the settings of a data center connection and the workload domains that are associated with it by selecting its name. By default, the management domains that are associated with the data center connection are also displayed. The management and workload domains that are associated with the selected data center connection are highlighted.
- Add a new data center connection by clicking **Actions > ADD NEW DATACENTER NETWORK**, typing the network details, and clicking **Save**.
- Associate a data center connection with a workload domain by selecting the data center connection, clicking **Actions > ASSOCIATE DOMAINS**, and clicking the workload domain's icon.
- Disassociate the data center connection from an associated workload domain by selecting the data center connection and clicking the workload domain's icon.
- Remove a data center connection that is no longer associated with any management or workload domains by selecting it and clicking **Actions > REMOVE**. You cannot remove a data center connection if it has an associated management or workload domain.

Back Up Component Configurations Using the SoS Tool

9

Use the SoS tool to create backup files of various components' configurations in your Cloud Foundation environment. This Python tool resides in each SDDC Manager virtual machine in your environment.

The SoS tool makes backup files of these components' configurations:

- ESXi hosts
- Switches (management, ToR, spine)
- The three infrastructure (ISVM) virtual machines' Zookeeper server instances and Cassandra distributed database
- SDDC Manager instances (the virtual machines in each rack with names starting with vrm)
- The SDDC Manager instances' HMS software components

The backup files are written by default to the `/var/tmp` directory in the filesystems of your environment's SDDC Manager instances:

- When you run the `./sos --backup` command in the SDDC Manager instance that is currently assigned the SDDC Manager VIP, the SoS tool makes an API call to all of the SDDC Manager instances on your environment's other racks to initiate the backup process for the component configurations on those racks. Each rack's backup configuration files are written to the `/var/tmp` directory in the filesystem of each rack's SDDC Manager instance. You then log in to each SDDC Manager instance and change directories to the `/var/tmp` directory to find the output files for that rack.
- When you run the `./sos --backup` command in an SDDC Manager instance that is not currently assigned the VIP, the tool creates the backup files only for that rack's components. The output files are written to the `/var/tmp` directory in that SDDC Manager instance's filesystem.

After the output file are created, you can copy the files to another location to have them available for future replacement and restoration situations.

For a description of the SDDC Manager VIP and how to determine which instance it is currently assigned to, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

Prerequisites

When running the backup command to create the backup files for all racks in the installation in a single command run, you must have the root account credentials for the SDDC Manager instance that currently has the SDDC Manager VIP. When you want to get these backup files created for all racks in a single command run, you can run the tool in that SDDC Manager instance, logging in using the root account credentials for that VM. In the management domain on each rack, the SDDC Manager instance is the one whose virtual machine name starts with vrm. See [Credentials for Logging In To the SDDC Manager \(vrm\) Virtual Machine](#).

Procedure

- 1 Using the root account, connect and log in, for example by SSH, to the SDDC Manager instance in which you want to run the backup command.
- 2 Change to the `/opt/vmware/evosddc-support` directory.
- 3 Type the command to collect the configurations and save the backup files to the `/var/tmp` directory.

```
./sos --backup
```

The tool displays Welcome to SoS(Supportability and Serviceability) utility!, and messages about the tool's progress, for example:

```
rack-1-vrm-1:/opt/vmware/evosddc-support # ./sos --backup
Welcome to SoS(Supportability and Serviceability) utility!
Backup: /var/tmp/backup-2016-11-08-15-01-48-3650
Log file: /var/tmp/backup-2016-11-08-15-01-48-3650/sos.log
Progress : 0%
```

The tool collects the configurations from the components and writes the output to the `/var/tmp` directory in the SDDC Manager instance in which the SoS tool was invoked. Inside that directory, the tool writes the output into a directory whose name reflects the timestamp when the SoS tool initiated the process. If the tool was invoked in the SDDC Manager instance that has the SDDC Manager VIP, the tool also writes backup configurations into the other SDDC Manager instances' `/var/tmp` directories.

Note Each rack's backup files are written into the subdirectory named `rack-1` in the `/var/tmp/backup-timestamp` directory that is created in that rack's SDDC Manager instance.

```
/var/tmp
  backup-timestamp
    sos.log
    rack-1
      esx
        configBundle-hostname.domain.tgz #One per host
      switch
        ToR-or-spine-switch-ip-address-manufacturername-running-config.gz #File named according to the
switch's IP address and manufacturer
        cumulus-192.168.100.1.tgz #Management switch configuration file
      zk #This directory appears for the rack where the ISVM VMs are deployed
```

```
isvm-ip-address #Three directories in the zk directory, each named using the IP address of an
ISVM VM, such as 192.168.100.43
    cassandra-db-backup.tgz
    zk-db-backup.tgz
    vrm.properties
    hms_ib_inventory.json
    vrm.properties
    vrm.properties.vRack
    vrm-security.keystore
    hms.tar.gz
    vrm-timestamp.tgz
```

What to do next

Copy the backup files to a location where you can conveniently retrieve them for future configuration restoration situations.

Adding and Replacing Hosts

You can add capacity to your Cloud Foundation stack by adding a new host or a previously decommissioned host. The inserted host behaves just as the existing hosts in the rack.

The procedure to replace a faulty host or a host with faulty components depends on whether the host is operational (reachable by vCenter Web Client) and the component that needs to be replaced.

- [Add a Host to a Physical Rack](#)

When you add a host to a physical rack, it is added to the capacity pool. You can then add it to the appropriate management or workload domain.

- [Replace Hosts and Hosts Components](#)

The replacement procedure depends on the component being replaced and the condition of the component.

- [Install ESXi VIBs on New Host](#)

Follow this procedure to install ESXi VIBs on a host.

Add a Host to a Physical Rack

When you add a host to a physical rack, it is added to the capacity pool. You can then add it to the appropriate management or workload domain.

- [Add a New Host to a Physical Rack](#)

You can add capacity to your Cloud Foundation installation depending on the power availability in the rack. You can then expand a workload domain to include the additional capacity. When you have a set of 3 hosts, you can create a new dedicated workload domain.

- [Add a Previously Decommissioned Host to a Physical Rack](#)

When you decommission a server, it is cleaned up as part of the workflow. However, a dead host or host with a failed SATADOM is not cleaned up during decommissioning.

Add a New Host to a Physical Rack

You can add capacity to your Cloud Foundation installation depending on the power availability in the rack. You can then expand a workload domain to include the additional capacity. When you have a set of 3 hosts, you can create a new dedicated workload domain.

Prerequisites

The new host should be identical to the other hosts in the rack - from the same vendor, of the same model number, and have the same firmware version. It should be physically at your site before you begin this procedure.

Ensure that the following has been completed on the decommissioned host before adding it to a physical rack.

- 1 Password on the host is EvoSddc!2016, the default password for all ESXi hosts.
- 2 Secure Shell (SSH) is enabled.
- 3 Firewall on SSH host is enabled and connections are restricted to the 192.168.100.0/22 subnet.
- 4 DNS IP is set to 192.168.1.254.
- 5 Has an IP address from the range 192.168.100.50 - 192.168.100.73.
- 6 Appropriate VIB is installed based on the controller.

Procedure

- 1 Do one of the following.
 - Image the new host. See *Image Individual Server in VIA User's Guide*.
 - Install ESXi VIBs on the new host, See [Install ESXi VIBs on New Host](#).
- 2 Mount the new host in an empty slot on the rack and connect it to the management and ToR switches according to the wiremap. See [Chapter 16 Rack Wiring](#).
- 3 Power on the new host.

The management switch learns the host MAC via the DHCP request it receives from the new host. HMS learns that a new host is connected and updates its internal inventory.

- 4 In a command line window, SSH to the SDDC Manager VM on the rack where you are adding the host.
- 5 Open the `/home/vrack/VMware/vRack/server-commission.properties` file and specify values for:

- `hms.host.bmc.username`

For example, `hms.host.bmc.username=root`

- `hms.host.bmc.password`

For example, `hms.host.bmc.password=calvin`

Do not use quotes when specifying the above values.

Note Verify that you have typed the user name and password correctly.

- 6 Type the following CLI command to run the Server Commission Tool:

```
sudo /home/vrack/bin/server-commission.sh
```

You need administrator credentials to run this command, and can commission one server at a time. During host commissioning, the system recognizes the new host and adds it to the inventory and the capacity pool.

The command window displays the task progress.

```
In loadConfig, loading configuration from '/home/vrack/VMware/vRack/server-commission.properties'.
In loadConfig, loading configuration from '/home/vrack/VMware/vRack/vrm.properties'.
In getNewHosts, discovering new hosts.
In commissionServer, discovered new host. BMC - [ IP: 192.168.0.51, MAC: 64:00:6a:c4:02:16 ].
In getNewHostInbandIpAddress, '192.168.100.51' is new host Inband IP address.
In addHostKeyToKnownHosts, SSH key for the host '192.168.100.51' added to known hosts file
'/home/vrack/.ssh/known_hosts'.
In enableCdp, Cisco Discovery Protocol is set in 'both' mode for vSwitch: 'vSwitch0'
In applyLicense, license is applied.
In addHostToHmsInventory, new host's hostId is 'N6'.
In addHostToHmsInventory, saved HMS inventory after adding new host to inventory.
In refreshHmsInventory, HMS inventory refreshed successfully.
In addHostToPRMInventory, adding host 'N6' to PRM inventory.
In addHostToPrmInventory, PRM inventory updated successfully.
In addHostToPRMInventory, added host 'N6' to PRM inventory.
In commissionHost, commissioning host 'N6' initiated successfully.
In getHostCommissioningStatus, host commissioning succeeded.
In commissionServer, server commissioned successfully.
In updatePRMInventoryForServer, successfully updated PRM Inventory.
In commissionServer, PRM Inventory updated after server commissioned.
In commissionServer, VRM Health service restarted.
Server Commissioning SUCCEEDED.
```

Note the `hostId` displayed in the output. In the above example, the `hostId` is N6.

Sever commissioning is complete when the command window displays the following:

```
Server Commissioning SUCCEEDED
```

- 7 Configure NTP on the newly commissioned server to synchronize the time on this server with the rest of the physical rack. See this [Knowledge Base article](#).
- 8 Retrieve the IP address of the commissioned host using the `hostId` noted earlier.
 - a On the SDDC Manager Dashboard, click **View Details** for **Physical Resources**.
 - b Click the rack on which the host was commissioned.
 - c Click the host corresponding to the `hostId` you noted down in step 6.
 - d Note down the inband IP address (**NETWORK TWO** address on the screen).

9 Change the password on the host to the common password for ESXi hosts.

The common password is the password that was set on all ESXi hosts when you rotated passwords on the rack after bring-up.

a Log in to the SDDC Manager VM on the rack on which you added the new host.

b Navigate to the `/home/vrack/bin` directory.

c Stop the `vrn-watchdogserver` and `vrn-tcserver` services.

```
service vrn-watchdogserver stop
```

```
service vrn-tcserver stop
```

d Type the following command:

```
./vrn-cli.sh setup-password-esx hostIPAddress EvoSddc\!2016
```

where *hostIPAddress* is the IP address you noted down in step 7d.

e Restart the `vrn-watchdogserver` service, which also restarts the `vrn-tcserver` service.

```
Service vrn-watchdogserver start
```

10 For All-flash servers, mark each flash device on the server to be used for the capacity layer as a capacity disk using the following command.

```
esxcli vsan storage tag add -d diskID -t capacityFlash
```

Note Make sure that you reserve two flash devices for caching and performance.

The new host is now available for addition to workload domains.

Add a Previously Decommissioned Host to a Physical Rack

When you decommission a server, it is cleaned up as part of the workflow. However, a dead host or host with a failed SATADOM is not cleaned up during decommissioning.

Prerequisites

Ensure that the following has been completed on the decommissioned host before adding it to a physical rack.

- 1 The decommissioned host has been re-imaged or ESXi VIBs have been installed on it. Depending on what you want to do, see [Image Individual Server in VIA User's Guide](#) or [Install ESXi VIBs on New Host](#). If you are installing ESXi VIBs manually on a host that was not cleaned up during decommissioning, you must clean the host before installing ESXi.
- 2 Password on the host is `EvoSddc!2016`, the default password for all ESXi hosts.
- 3 Has an IP address from the range `192.168.100.50 - 192.168.100.73`.
- 4 Secure Shell (SSH) is enabled.
- 5 Firewall on SSH host is enabled and connections are restricted to the `192.168.100.0/22` subnet.

- 6 DNS IP is set to 192.168.1.254.

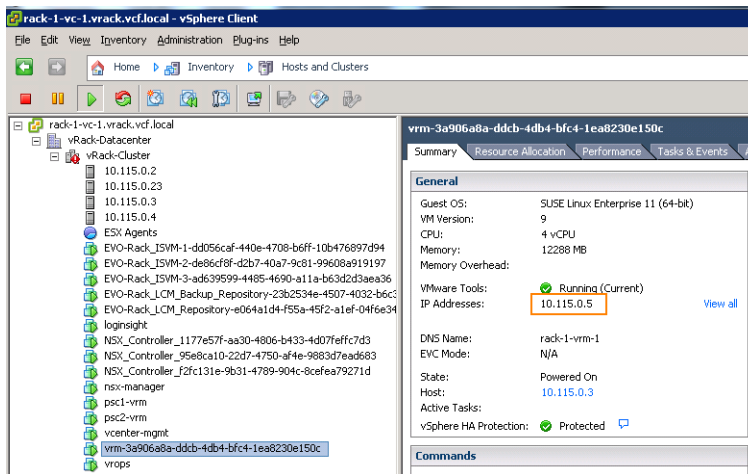
Procedure

- 1 Mount the host in an empty slot on the rack and connect it to the management and ToR switches according to the wiremap. See [Chapter 16 Rack Wiring](#).

- 2 Power on the host.

The management switch learns the host MAC via the DHCP request it receives from the new host. HMS learns that a new host is connected and updates its internal inventory.

- 3 Retrieve the IP address of the SDDC Manager VM.
 - a Log in to the vCenter Web Client.
 - b Click the SDDC Manager VM (displayed as **vrms-UUID**).
 - c The IP address is displayed on the right panel.



- 4 In a command line window, SSH to the SDDC Manager VM on the rack where you are adding the host.
- 5 Open the `/home/vrack/VMware/vRack/server-commission.properties` file and specify values for:

- `hms.host.bmc.username`

For example, `hms.host.bmc.username=root`

- `hms.host.bmc.password`

For example, `hms.host.bmc.password=calvin`

Do not use quotes when specifying the above values.

Note Verify that you have typed the user name and password correctly.

- 6 Type the following CLI command to run the Server Commission Tool:

```
sudo /home/vrack/bin/server-commission.sh
```

You need administrator credentials to run this command, and can commission one server at a time. During host commissioning, the system recognizes the new host and adds it to the inventory and the capacity pool.

The command window displays the task progress.

```
In loadConfig, loading configuration from '/home/vrack/VMware/vRack/server-commission.properties'.
In loadConfig, loading configuration from '/home/vrack/VMware/vRack/vrm.properties'.
In getNewHosts, discovering new hosts.
In commissionServer, discovered new host. BMC - [ IP: 192.168.0.51, MAC: 64:00:6a:c4:02:16 ].
In getNewHostInbandIpAddress, '192.168.100.51' is new host Inband IP address.
In addHostKeyToKnownHosts, SSH key for the host '192.168.100.51' added to known hosts file
'/home/vrack/.ssh/known_hosts'.
In enableCdp, Cisco Discovery Protocol is set in 'both' mode for vSwitch: 'vSwitch0'
In applyLicense, license is applied.
In addHostToHmsInventory, new host's hostId is 'N6'.
In addHostToHmsInventory, saved HMS inventory after adding new host to inventory.
In refreshHmsInventory, HMS inventory refreshed successfully.
In addHostToPRMInventory, adding host 'N6' to PRM inventory.
In addHostToPrmInventory, PRM inventory updated successfully.
In addHostToPRMInventory, added host 'N6' to PRM inventory.
In commissionHost, commissioning host 'N6' initiated successfully.
In getHostCommissioningStatus, host commissioning succeeded.
In commissionServer, server commissioned successfully.
In updatePRMInventoryForServer, successfully updated PRM Inventory.
In commissionServer, PRM Inventory updated after server commissioned.
In commissionServer, VRM Health service restarted.
Server Commissioning SUCCEEDED.
```

Note the `hostId` displayed in the output. In the above example, the `hostId` is N6.

Sever commissioning is complete when the command window displays the following:

```
Server Commissioning SUCCEEDED
```

- 7 Configure NTP on the newly commissioned server to synchronize the time on this server with the rest of the physical rack. See this [Knowledge Base article](#).
- 8 Retrieve the IP address of the commissioned host using the `hostId` noted earlier.
 - a On the SDDC Manager Dashboard, click **Physical Resources**.
 - b Click the rack on which the host was commissioned.
 - c Click the host corresponding to the `hostId` you noted down in step 6.
 - d Note down the inband IP address (**NETWORK TWO** address on the screen).

9 Change the password on the host to the common password for ESXi hosts.

The common password is the password that was set on all ESXi hosts when you rotated passwords on the rack after bring-up.

a Log in to the SDDC Manager VM on the rack on which you added the new host.

b Navigate to the `/home/vrack/bin` directory.

c Stop the `vrn-watchdogserver` and `vrn-tcserver` services.

```
service vrn-watchdogserver stop
```

```
service vrn-tcserver stop
```

d Type the following command:

```
./vrn-cli.sh setup-password-esx hostIPAddress EvoSddc\!2016
```

where *hostIPAddress* is the IP address you noted down in step 7d.

e Restart the `vrn-watchdogserver` service, which also restarts the `vrn-tcserver` service.

```
Service vrn-watchdogserver start
```

The new host is now available for addition to workload domains.

Replace Hosts and Hosts Components

The replacement procedure depends on the component being replaced and the condition of the component.

■ [Replace Components of a Host Running in Degraded Mode](#)

■ [Replace Dead Host or Host SAS Controller or Expander](#)

When the faulty host is not operational or when you need to replace the SAS controller or expander on a host, you must decommission the host before you remove it from the physical rack. The procedure you follow depends on whether the dead host belongs to a workload domain or is part of the capacity pool.

■ [Replace SATADOM Disk on a Host](#)

This section describes the replacement procedure for a failed SATADOM disk on a host.

■ [Move Disks from a Dead Host to a New Host](#)

If a host is dead, but the disks are still working (SATADOM, capacity, and cache drives), you can move the disks to a new host.

■ [Replace Capacity Drive \(SSD or HDD\) or Cache Drive \(SSD\) in a Host](#)

You can replace the capacity drive in a host when you see an `Operation status is down for storage device` alert. The alert description says `SSD_DOWN_ALERT` or `HDD_DOWN_ALERT`.

Replace Components of a Host Running in Degraded Mode

Follow this procedure to replace the components of a server running in degraded mode. This procedure applies to the following components:

- CPU
- memory
- NIC
- power supply
- iDRAC

Prerequisites

- Host is operational and is reachable by vCenter Web Client.
- Management, vSAN, and vMotion networks must be available on the host
- The HDD and SSD disks on the host are in a good state.

Procedure

- 1 Log in to vSphere Web Client.
- 2 Right-click the affected host and click **Enter Maintenance Mode**.
- 3 If the host belongs to a domain, click **Full Data Migration**.
- 4 On the Dashboard page, click **VIEW DETAILS** for **Workload Domain** and click the affected domain.
- 5 Click the physical rack that contains the affected server.
- 6 Scroll down to the **Hosts** section.

- 7 In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

The screenshot shows the VMware SDDC Manager interface. The breadcrumb trail is: DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS. The page title is "Rack Details" for "D14-Rack2".

Switches

SWITCH	SUMMARY	STATUS
S0 - MANAGEMENT	s3000_c2338 - 2.5.8	Warning
S1 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning
S2 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning
S3 - SPINE	N9K-C9332PG - 70(3)13(1)	Warning
S4 - SPINE	N9K-C9332PG - 70(3)13(1)	Warning

Hosts

HOST	CPU	MEMORY	HDD STORAGE	STATUS
N0	55.176 GHz	384 GB	8.747 TB	OK
N1	55.176 GHz	384 GB	8.747 TB	Critical

The Host Details page displays the details for this host.

The screenshot shows the VMware SDDC Manager interface for "Host Details" of host "N1". The breadcrumb trail is: DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS > HOST DETAILS. At the top, there are buttons: DECOMMISSION, TURN OFF HOST, and POWER CYCLE.

General Info

CPU: 55.176 GHz
 MEMORY: 384 GB
 STORAGE: 11.658 TB
 HDD STORAGE: 8.747 TB
 SSD STORAGE: 2.911 TB
 POWERED: ON

Management Info

MANAGEMENT IP ADDRESS: 192.168.0.52
 DISK UTILIZATION: 0
 WORKLOAD DOMAIN: MANAGEMENT-D14-RACK2
 RACK: D14-RACK2
 VCENTER SERVER: VCENTER
 ESX CLUSTER: VRACK-CLUSTER

Network

NETWORK ONE: 10.115.0.25
 NETWORK TWO: 192.168.100.111

- 8 Pull the host out of the physical rack. Note the ports on the management and ToR switches it was connected to.
- 9 Service the appropriate part.
- 10 Put the host back in the physical rack and connect it to the management and ToR switches.
- 11 Power on the host.
- 12 In vSphere Web Client, right-click the host and click **Exit Maintenance Mode**.

Replace Dead Host or Host SAS Controller or Expander

When the faulty host is not operational or when you need to replace the SAS controller or expander on a host, you must decommission the host before you remove it from the physical rack. The procedure you follow depends on whether the dead host belongs to a workload domain or is part of the capacity pool.

- [Replace Dead Host or SAS Controller or Expander when Host Belongs to a Workload Domain](#)
If you need to replace a SAS controller or a SAS expander, or a dead host, you must remove the host from the physical rack. You can then add a new host or replace the failed component on the host and add it back.
- [Replace Dead Host or SAS Controller or Expander when the Host does not Belong to a Workload Domain](#)

Replace Dead Host or SAS Controller or Expander when Host Belongs to a Workload Domain

If you need to replace a SAS controller or a SAS expander, or a dead host, you must remove the host from the physical rack. You can then add a new host or replace the failed component on the host and add it back.

Prerequisites

Ensure that there are at least 4 hosts in the management or workload domain to which the faulty host belongs. If there are less than 4 hosts, add a host to the domain from the capacity pool if possible.

Procedure

- 1 Decommission the host.
 - a If you are decommissioning a qualified vSAN Ready Node (i.e. if you did not purchase a fully integrated system from a partner), note the BMC password for the host by navigating to the `/home/vrack/bin/directory` in the SDDC Manager Controller VM VM and running the `lookup-password` command.
 - b On the Dashboard page, click **VIEW DETAILS** for **Workload Domain** and click the affected domain.
 - c In the **PHYSICAL RACKS** column, click the physical rack that contains the affected server.
 - d Scroll down to the **Hosts** section.

- e In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

vmware SDDC Manager

DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS

Rack Details

D14-Rack2

Switches

SWITCH	SUMMARY	STATUS
S0 - MANAGEMENT	s3000_c2338 - 2.5.8	⚠
S1 - TOR	N9K-C9372PX-E - 70(3)12(2)	⚠
S2 - TOR	N9K-C9372PX-E - 70(3)12(2)	⚠
S3 - SPINE	N9K-C9332PQ - 70(3)13(1)	⚠
S4 - SPINE	N9K-C9332PQ - 70(3)13(1)	⚠

Hosts

HOST	CPU	MEMORY	HDD STORAGE	STATUS
N0	55.176 GHz	384 GB	8.747 TB	✅
N1	55.176 GHz	384 GB	8.747 TB	⚠

- f In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

The Host Details page displays the details for this host.

DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS > HOST DETAILS

Host Details

DECOMMISSION TURN OFF HOST POWER CYCLE

N1

General Info

CPU: 55.176 GHz

MEMORY: 384 GB

STORAGE: 11.658 TB

HDD STORAGE: 8.747 TB

SSD STORAGE: 2.911 TB

POWERED: ON

Management Info

MANAGEMENT IP ADDRESS: 192.168.0.52

DISK UTILIZATION: 0

WORKLOAD DOMAIN: MANAGEMENT-D14-RACK2

RACK: D14-RACK2

VCENTER SERVER: VCENTER

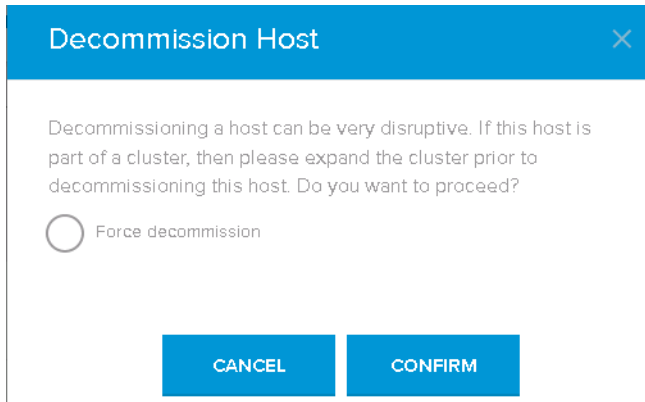
ESX CLUSTER: VRACK-CLUSTER

NETWORK ONE: 10.115.0.25

NETWORK TWO: 192.168.100.111

- g In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).
- h Note the IP addresses displayed in the **NETWORK TWO** and **MANAGEMENT IP ADDRESS** fields.

- i Click **Decommission**.



If this host belongs to a workload domain, the domain must include at least 4 hosts. If the domain has fewer than 4 hosts, you must expand the domain before decommissioning the host. If the domain contains only 4 hosts and one of them is dead, click **Force decommission** to decommission the host.

- j Click **CONFIRM**.

During the host decommissioning task, the host is removed from the workload domain to which it was allocated and the environment's available capacity is updated to reflect the reduced capacity. The ports that were being used by the server are marked unused and the network configuration is updated.

- k Monitor the progress of the decommissioning task.

- 1 On the SDDC Manager Dashboard, click **STATUS** in the left navigation pane.
- 2 In the Workflow Tasks section, click **View Details**.
- 3 Look for the **VI Resource Pool - Decommission of hosts** task.
- 4 After about 10 minutes, refresh this page and wait till the task status changes to **Successful**.

- l For qualified vSAN Ready Nodes, change the password on the host to the common password for ESXi hosts. Log in to the BMC console using the password noted in step a and change the OOB password to D3c0mm1ss10n3d!.

This step is automated for hosts in an integrated system.

- 2 Turn on the chassis-identification LED on the host.

- a In a web browser, navigate to the OOB IP address that you noted down in step 6.
- b Login with your BMC user name and password.
- c Following the documentation from your vendor, turn on the chassis-identification LED.

The chassis-identification LED on the host starts to beacon (flashing on and off).

- 3 Power off the host and remove it from the physical rack. Note the ports on the management and ToR switches it was connected to.

What to do next

Replace the failed component on the host as appropriate and add it back to the rack. See [Add a Previously Decommissioned Host to a Physical Rack](#). For adding a new host, see [Add a New Host to a Physical Rack](#).

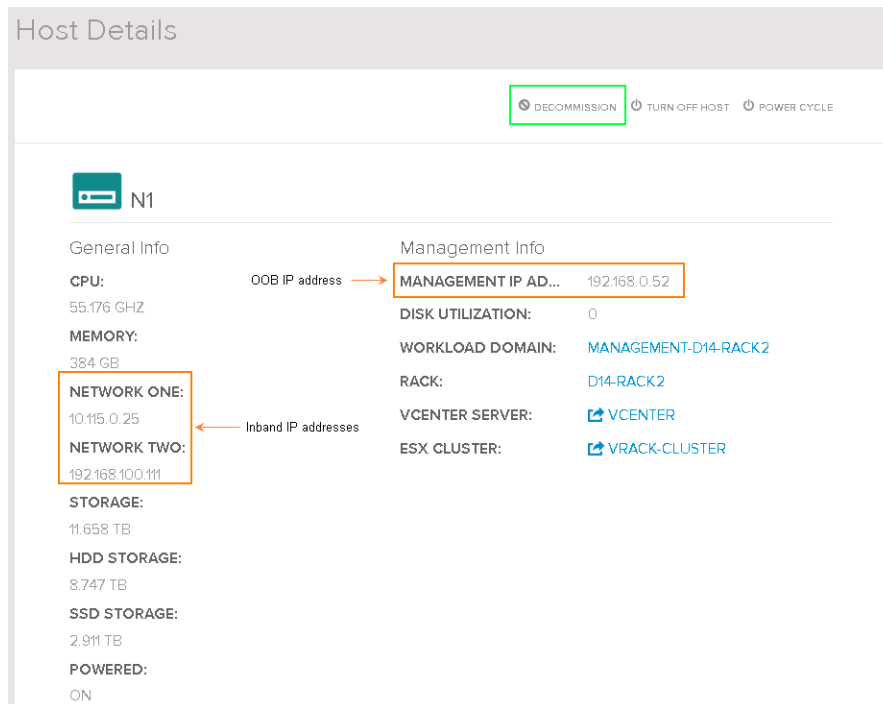
Replace Dead Host or SAS Controller or Expander when the Host does not Belong to a Workload Domain

Procedure

- 1 If the host with the faulty component does not belong to a workload domain, retrieve the password of the host.
 - a In a command line window, SSH to the SDDC Manager VM on the rack.
 - b Navigate to `/home/vrack/bin`.
 - c Type the following command:

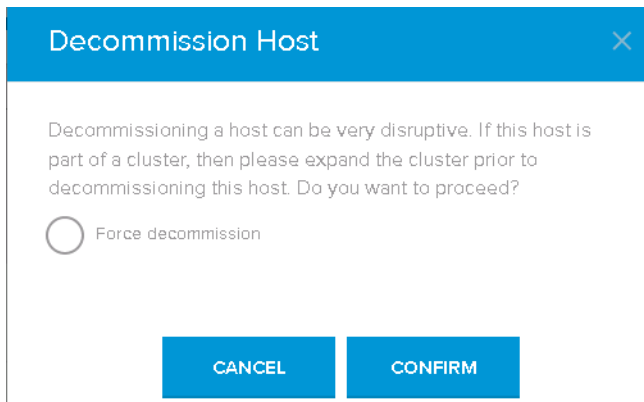
```
./vrm-cli.sh lookup-password
```
 - d Note the ESXi and IPMI passwords of the host that is to be decommissioned.
- 2 On the Dashboard page, click **VIEW DETAILS** for **Physical Resources** and click the affected rack.
- 3 Scroll down to the Hosts section.
- 4 In the **HOST** column, click the host name that shows a critical status (for example, N0).

The Host Details page displays the details for this host.



- 5 Note the OOB IP address (management IP address).

6 Click **Decommission**.



The dialog box titled "Decommission Host" has a blue header with a close button (X). The main content area contains a warning message: "Decommissioning a host can be very disruptive. If this host is part of a cluster, then please expand the cluster prior to decommissioning this host. Do you want to proceed?". Below the message is a radio button labeled "Force decommission". At the bottom are two buttons: "CANCEL" and "CONFIRM".

7 Click **Force decommission**

The sever decommission task is scheduled. During this task, the host is removed from the hosts list and the environment's available capacity is updated to reflect the reduced capacity.

8 To watch the progress of the decommission task, click **STATUS** in the left navigation pane.

The host is not put into maintenance mode. It is in a clean state, similar to the state it was in after imaging as it has not been used for any workload.

9 After the host is decommissioned, the user names and passwords are set as specified in the table below.

ESXi Credentials	
User name	root
Password	Password is the same as you noted down in step 1.
IPMI/BMC Credentials	
User name	Depends on host type and vendor. This is usually root or admin.
Password	D3c0mm1ss10n3d!

10 Turn on the chassis-identification LED on the host.

- In a web browser, navigate to the OOB IP address that you noted down in step 6.
- Login with your BMC user name and password.
- Following the documentation from your vendor, turn on the chassis-identification LED.

The chassis-identification LED on the host starts to beacon (flashing on and off).

11 Power off the decommissioned host and remove it from the physical rack. Note the ports on the management and ToR switches it was connected to.

What to do next

Replace the failed component on the host as appropriate and add it back to the rack. See [Add a Previously Decommissioned Host to a Physical Rack](#). For adding a new host, see [Add a New Host to a Physical Rack](#).

Replace SATADOM Disk on a Host

This section describes the replacement procedure for a failed SATADOM disk on a host.

Prerequisites

Ensure that there are at least 4 hosts in the management or workload domain to which the faulty host belongs. If there are less than 4 hosts, add a host to the domain from the capacity pool, if possible.

Procedure

- 1 On the Dashboard page, click **VIEW DETAILS** for **Workload Domain** and click the affected domain.
- 2 Click the physical rack that contains the affected server.
- 3 Scroll down to the **Hosts** section.

- 4 In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

The screenshot shows the VMware SDDC Manager interface. The breadcrumb trail is: DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS. The page title is "Rack Details" for "D14-Rack2".

Switches Table:

SWITCH	SUMMARY	STATUS
S0 - MANAGEMENT	s3000_c2338 - 2.5.8	Warning (Yellow Triangle)
S1 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning (Yellow Triangle)
S2 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning (Yellow Triangle)
S3 - SPINE	N9K-C9332PQ - 70(3)13(1)	Warning (Yellow Triangle)
S4 - SPINE	N9K-C9332PQ - 70(3)13(1)	Warning (Yellow Triangle)

Hosts Table:

HOST	CPU	MEMORY	HDD STORAGE	STATUS
N0	55.176 GHz	384 GB	8.747 TB	OK (Green Checkmark)
N1	55.176 GHz	384 GB	8.747 TB	Critical (Red Triangle)

The Host Details page displays the details for this host.

The screenshot shows the "Host Details" page for host "N1". At the top, there are action buttons: DECOMMISSION, TURN OFF HOST, and POWER CYCLE. The host is represented by a server icon.

General Info:

- CPU: 55.176 GHz
- MEMORY: 384 GB
- STORAGE: 11.658 TB
- HDD STORAGE: 8.747 TB
- SSD STORAGE: 2.911 TB
- POWERED: ON

Management Info:

- MANAGEMENT IP ADDRESS: 192.168.0.52 (highlighted with an orange box)
- DISK UTILIZATION: 0
- WORKLOAD DOMAIN: MANAGEMENT-D14-RACK2
- RACK: D14-RACK2
- VCENTER SERVER: VCENTER
- ESX CLUSTER: VRACK-CLUSTER

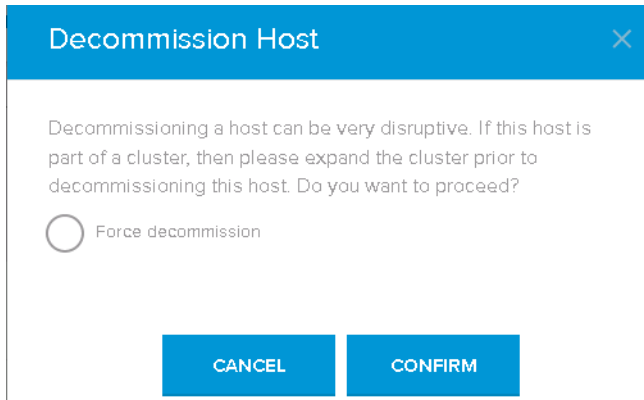
Network Info:

- NETWORK ONE: 10.115.0.25
- NETWORK TWO: 192.168.100.111 (highlighted with an orange box)

Annotations: An arrow points from "OOB IP address" to the "MANAGEMENT IP ADDRESS" field. Another arrow points from "Inband IP addresses" to the "NETWORK TWO" field.

- 5 Note the IP addresses displayed in the **NETWORK TWO** and **MANAGEMENT IP ADDRESS** fields.

6 Click **Decommission**.



If this host belongs to a workload domain, the domain must include at least 4 hosts. If the domain has fewer than 4 hosts, you must expand the domain before decommissioning the host. If the domain contains only 4 hosts and one of them is dead, click **Force decommission** to decommission the host.

During the host decommissioning task, the host with the faulty SATADOM is removed from the workload domain to which it was allocated and the environment's available capacity is updated to reflect the reduced capacity. The ports that were being used by the server are marked unused and the network configuration is updated.

7 Monitor the progress of the decommissioning task.

- a On the SDDC Manager Dashboard, click **STATUS** in the left navigation pane.
- b In the Workflow Tasks section, click **View Details**.
- c Look for the **VI Resource Pool - Decommission of hosts** task.
- d After about 10 minutes, refresh this page and wait till the task status changes to **Successful**.

8 Power off the server.

9 Turn on the chassis-identification LED on the host.

- a In a web browser, navigate to the Management IP address that you noted down in step 5.
- b Login with your BMC user name and password.
- c Following the documentation from your vendor, turn on the chassis-identification LED.

The chassis-identification LED on the host starts to beacon (flashing on and off).

10 Replace the faulty SATADOM on the server and power on the server.

11 Install ESXi on the host. See [Install ESXi VIBs on New Host](#).

- Select the SATADOM for installation.
- Set the root password on the host to EvoSddc!2016.

12 Reboot the host.

13 Log in to the server with the following credentials.

User name: root

Password: EvoSddc!2016

14 Perform the following steps on the host.

- a Assign a static IPv4 address between the range 192.168.100.50 - 192.168.100.73, subnet 255.255.252.0, and gateway 192.168.100.1.
- b Set the DNS IP to 192.168.1.254.
- c Enable SSH.
- d Enable firewall on SSH host and restrict connections to the 192.168.100.0/22 subnet by running the following commands:

```
esxcli network firewall ruleset set --ruleset-id=sshServer --allowed-all false
```

```
esxcli network firewall ruleset allowedip add --ip-address=192.168.100.0/22 --ruleset-id=sshServer
```

15 SSH to the host and clean the vSAN partitions by running the following commands.

```
#esxcli vsan storage automode set --enabled=false
```

```
#esxcli vsan storage list|grep "Is SSD: true" -C5| grep "Display Name" |awk '{print $3}'
```

Note the SSD naa.

```
#esxcli vsan storage remove -s SSD naa
```

Run this command for each diskgroup.

```
#esxcli vsan cluster leave
```

16 If you were unable to remove the vSAN naa, power cycle the host and re-try step 15.**What to do next**

Add the host back to the rack. See [Add a Previously Decommissioned Host to a Physical Rack](#).

Move Disks from a Dead Host to a New Host

If a host is dead, but the disks are still working (SATADOM, capacity, and cache drives), you can move the disks to a new host.

Prerequisites

The new host should have the necessary firmware and BIOS settings.

Procedure

- 1 Note down name and IP details of the dead host.
 - a On the Dashboard page, click **VIEW DETAILS** for Physical Resources and click the affected rack.
 - b Scroll down to the Hosts section.
 - c In the **HOST** column, click the host name that shows a critical status.
The Host Details page displays the details for this host.
 - d Note down the host name, and Management IP, Network One, and Network Two IP addresses.
- 2 Decommission the dead host.
 - a If you are decommissioning a qualified vSAN Ready Node (i.e. if you did not purchase a fully integrated system from a partner), note the BMC password for the host by navigating to the /home/vrack/bin/directory in the SDDC Manager Controller VM VM and running the `lookup-password` command.
 - b On the Dashboard page, click **VIEW DETAILS** for **Workload Domain** and click the affected domain.
 - c In the **PHYSICAL RACKS** column, click the physical rack that contains the affected server.
 - d Scroll down to the **Hosts** section.
 - e In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

The screenshot shows the VMware SDDC Manager interface. The breadcrumb trail is: DASHBOARD > WORKLOAD DOMAINS > DOMAIN DETAILS > RACK DETAILS. The page title is "Rack Details" for "D14-Rack2".

Switches Table:

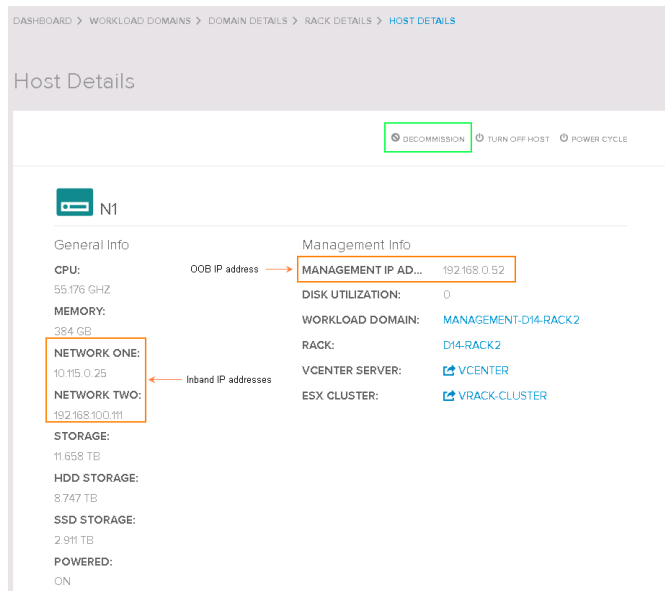
SWITCH	SUMMARY	STATUS
S0 - MANAGEMENT	s3000_c2338 - 2.5.8	Warning (Yellow Triangle)
S1 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning (Yellow Triangle)
S2 - TOR	N9K-C9372PX-E - 70(3)12(2)	Warning (Yellow Triangle)
S3 - SPINE	N9K-C9332PQ - 70(3)13(1)	Warning (Yellow Triangle)
S4 - SPINE	N9K-C9332PQ - 70(3)13(1)	Warning (Yellow Triangle)

Hosts Table:

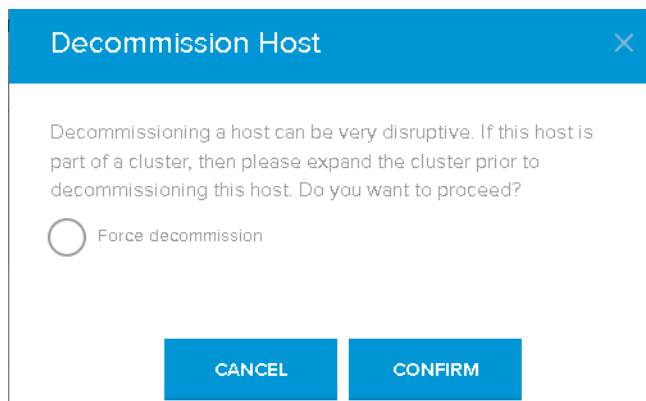
HOST	CPU	MEMORY	HDD STORAGE	STATUS
N0	55.176 GHz	384 GB	8.747 TB	OK (Green Checkmark)
N1	55.176 GHz	384 GB	8.747 TB	Critical (Red Triangle)

- f In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).

The Host Details page displays the details for this host.



- g In the **HOST** column, click the host name that shows a critical status (for example, N1 in the example below).
- h Note the IP addresses displayed in the **NETWORK TWO** and **MANAGEMENT IP ADDRESS** fields.
- i Click **Decommission**.



If this host belongs to a workload domain, the domain must include at least 4 hosts. If the domain has fewer than 4 hosts, you must expand the domain before decommissioning the host. If the domain contains only 4 hosts and one of them is dead, click **Force decommission** to decommission the host.

- j Click **CONFIRM**.

During the host decommissioning task, the host is removed from the workload domain to which it was allocated and the environment's available capacity is updated to reflect the reduced capacity. The ports that were being used by the server are marked unused and the network configuration is updated.

- k Monitor the progress of the decommissioning task.

- 1 On the SDDC Manager Dashboard, click **STATUS** in the left navigation pane.
- 2 In the Workflow Tasks section, click **View Details**.
- 3 Look for the **VI Resource Pool - Decommission of hosts** task.
- 4 After about 10 minutes, refresh this page and wait till the task status changes to **Successful**.

- l For qualified vSAN Ready Nodes, change the password on the host to the common password for ESXi hosts. Log in to the BMC console using the password noted in step a and change the OOB password to D3c0mm1ss10n3d!.

This step is automated for hosts in an integrated system.

- 3 SSH to the management switch (IP address 192.168.100.1) and take backup of dhcpd.leases file with the following command.

```
cp /var/lib/dhcp/dhcpd.leases /var/lib/dhcp/dhcpd.leases.bk
```

- 4 SSH to the SDDC Manager Controller VM and take a backup of hms_ib_inventory.json and prm-manifest.json files with the following commands:

```
cp /home/vrack/VMware/vRack/hms_ib_inventory.json /home/vrack/VMware/vRack/hms_ib_inventory.json.bk
```

```
cp /home/vrack/VMware/vRack/prm-manifest.json /home/vrack/VMware/vRack/prm-manifest.json.bkp
```

- 5 Power off the dead host and note the ports on the management and ToR switches it is connected to. Remove all physical connections from it and remove it from the rack.

Note In vSphere Web Client, the dead host will not be responsive. Do not remove the dead host from the inventory. After the disks are moved to the new host, the new host will automatically reconnect.

- 6 Remove the SATADOM, SSDs, and HDDs from the dead host and install them in the new host in the appropriate order and slots.
- 7 Mount the new host in the rack and connect it to the same ports of the management and ToR switches as the dead host. Refer to your notes from step 4.
- 8 Power on the new host.
- 9 Retrieve the password of the root account. See [Look Up Account Credentials Using the Lookup-Password Command](#).

- 10 Login to the vCenter Web Client with the root account and confirm that the new host is connected to the vCenter Server. If it is not connected, right-click on the disconnected host, click **Connection**, and then click **Connect**.
- 11 If the dead host belonged to a workload domain, ensure that re-synching is in progress.
 - a In vCenter Web Client, click the cluster name.
 - b Click **Monitor > vSAN > Resyncing Components**.
 - c Check for any reported issues.
- 12 On the SDDC Manager Dashboard, confirm that the replacement host has the same host name, Management, and Network IP addresses as the dead host that you removed from the rack. Refer to your notes in step 1.
- 13 If the Management IP address of the new server is different from the one assigned to the dead host, update the IP address by following the steps below.
 - a Note the OOB Mac address of the new host. For details, refer to the vendor documentation.
 - b SSH to the management switch (IP address 192.168.100.1) and type the following command.


```
cp /var/lib/dhcp/dhcpd.leases
```

Look for the OOB MAC (Management IP) address for the new host from step 13a. Note the IP address 192.168.0.x next to lease.
 - c SSH to the SDDC Manager Controller VM and type


```
vi /home/vrack/VMware/vRack/hms_ib_inventory.json.
```
 - d Search for the 192.168.100.x (Network Two) IP address noted in step 13b.
 - e Press the Insert key and update the managementIP record with this new IP address.
 - f On the SDDC Manager Dashboard, confirm that the Management IP address of the new host has been updated.
- 14 SSH to the management switch and reboot it by typing the command `sudo reboot`.
- 15 SSH to the SDDC Manager Controller VM and reboot it by typing the command `sudo reboot`.
- 16 Check vSAN status, and health and disk groups to ensure that they are healthy and operational.
 - a In vCenter Web Client, click the vRack-Cluster, and select **Manage > Settings > Disk Management**.
 - b Click the host that you added in and check the State and vSAN columns.
- 17 Perform vSAN proactive tests to confirm that the vSAN disks are healthy. In the vcenter server click on the cluster name, go to Monitor, vSAN, Proactive Tests. Click on each of the tests and press the green play button. Once the tests complete, logout of the system.
 - a In vCenter Web Client, click the cluster and select **Monitor > vSAN > Proactive Tests**.
 - b Click each test and press the green Play button.
 - c After the tests are complete, log out of vCenter Web Client.

Replace Capacity Drive (SSD or HDD) or Cache Drive (SSD) in a Host

You can replace the capacity drive in a host when you see an `Operation status is down` for storage device alert. The alert description says `SSD_DOWN_ALERT` or `HDD_DOWN_ALERT`.

Procedure

- 1 Expand the alert and note the rack number, host name, and disk type displayed in the Description field.
- 2 On the SDDC Manager Dashboard, click **View Details** in the **Physical Resources** section.
- 3 Click the affected rack and then click the host name.

The Host Details page displays host details.

- 4 If the host does not belong to a workload domain (the **Workload Domain** field is blank), pull the disk out of the host and replace it with a new disk. For details, refer to the vendor documentation.
- 5 If the host is part of a workload domain (the **Workload Domain** field displays the domain name), follow the steps below.
 - a Note the **ESX Cluster** name.
 - b In **vCenter Server**, click the **vCenter** link.
 - c Navigate to the **ESX Cluster** name you had noted earlier.
 - d In the **Manage** tab, select **vSAN > General**.
 - e In the **vSAN is Turned On** field, click **Edit**.
 - f In **Add disks to Storage**, select **Manual** and click **OK**.
 - g Select the host with the failed disk, click the **Manage** tab and select **Disk Management** in the vSAN section.
 - h Select the disk group with the failed capacity drive.
 - i Select the failed capacity drive and click **Remove selected disk(s) from disk group**.
 - j Wait for the disk to be deleted and then remove the disk from the host.

Note For a cache drive, the corresponding disk group is also deleted.

- k Add the new disk to the host and wait for vCenter Server to detect it.
 If vCenter Server is unable to detect the drive, confirm that the disk is seated properly in the slot and perform a device re-scan.
- l Select the host with the newly replaced disk, click the **Manage** tab and select **Disk management** in the vSAN section.

- m For a cache drive, re-create the disk group.
 - 1 In vCenter, select the host with the replaced cache drive.
 - 2 In the **Manage** tab, select **vSAN > Disk Management** and select the host that had the drive replaced.
 - 3 Click **Create a new disk group**.
 - 4 Select a flash device under cache tier and select 4 HDD/SSD devices under Capacity tier.
 - 5 Click **OK**.
 - 6 Wait for the task to complete and then verify that the new disk group was created for the host.
 - n In the **vSAN is Turned On** field, click **Edit**.
 - o In **Add disks to Storage**, select **Automatic** and click **OK**.
 - p Log out of all open systems.
- 6 If the host you just replaced contains all flash storage, mark the disk as capacity.
- a SSH to the ESXi host and run the `esxcli storage core device list` command. Locate the diskID of the newly added SSD.
 - b Run the `esxcli vsan storage tag add -d diskID -t capacityFlash` command.
 - c SSH to the SDDC Manager Controller VM and copy the `/opt/vmware/scripts/capacityflash.py` script to the host on which you replaced the SSD.
 - d Run the `capacityflash.py` script on the host.

The drive on the host is successfully replaced.

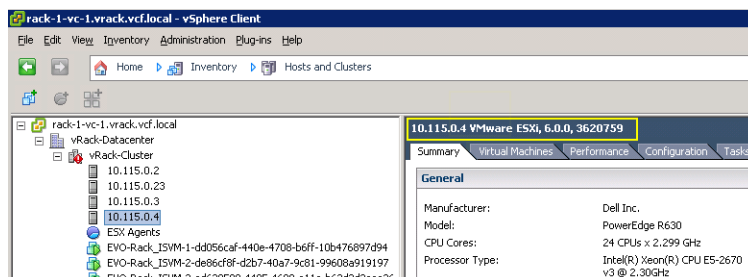
Install ESXi VIBs on New Host

Follow this procedure to install ESXi VIBs on a host.

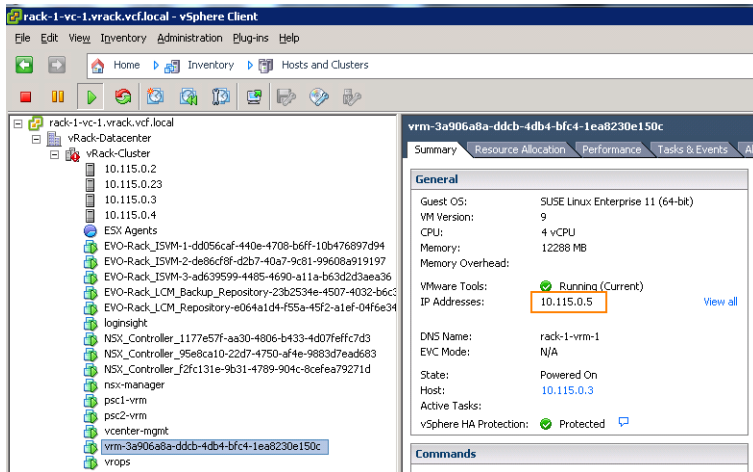
Procedure

- 1 Identify the ESXi version and build in your Cloud Foundation installation.
 - a Log in to the vSphere Web Client.
 - b On the left navigation panel, click an operational ESXi host.

The ESXi version and build are displayed on the top in the right panel.



- 2 Retrieve the IP address of the SDDC Manager VM.
 - a Log in to the vCenter Web Client.
 - b Click the SDDC Manager VM (displayed as **vrmm-UUID**).
 - c The IP address is displayed on the right panel.



- 3 In a command line window, SSH to the SDDC Manager VM on the rack where you are adding the host.
- 4 Navigate to **/mnt/cdrom/vcf-bundle-2.1.0-4726423/vmware/esxi_image** and copy the ESXi image on a USB drive.
- 5 Install the ESXi image on the new host.

See <https://pubs.vmware.com/vsphere-60/topic/com.vmware.vsphere.install.doc/GUID-4E57A4D7-259D-4FA9-AA26-E0C71487A376.html>.
- 6 Set the password on the host to **EvoSddc!2016**.

This is the default password of all ESXi hosts.
- 7 Assign an IP address to the host from the following range:

192.168.100.50 - 192.168.100.73

where the subnet is 255.255.252.0 and gateway is 192.168.100.1.
- 8 Enable the Secure Shell (SSH) for the new host:
 - a Open the vSphere Web Client.
 - b Right-click **Host** in the VMware Host Client.
 - c Click **SSH Enable**.

- 9 Enable firewall on SSH host and restrict connections to the 192.168.100.0/22 subnet by running the following commands:

```
esxcli network firewall ruleset set --ruleset-id=sshServer --allowed-all false
esxcli network firewall ruleset allowedip add --ip-address=192.168.100.0/22 --
ruleset-id=sshServer
```

- 10 Set the DNS IP on the host to 192.168.1.254.
- 11 Depending on the controller on your new host, copy the appropriate VIB to the new host. The VIBs are located in the SDDC Manager VM.

Controller	VIB Location and Path
PERC H730	/mnt/cdrom/VCF_bundle/servers/dell/vibs/lsi-mr3-6.903.85.00-10EM.600.0.0.2768847.x86_64.vib
LSI 3008	/mnt/cdrom/VCF_bundle/servers/quantia/vibs/d51b/lsi-msgpt3-10.00.00.00-10EM.600.0.0.2159203
LSI 2308	/mnt/cdrom/VCF_bundle/servers/quantia/vibs/d51b/scsi-mpt2sas-18.00.00.00.1vmw-10EM.550.0.0.1331820.x86_64.vib
HP Smart Array P840	/mnt/cdrom/VCF_bundle/servers/hp/vibs/scsi-hpsa_6.0.0.116-10EM.600.0.0.2494585.vib

- 12 Run the following command to install the VIB on the host.

```
esxcli software vib install --force -v pathToVIB
```

Replacing and Restoring Switches

11

If necessary, you can replace your Cloud Foundation installation's network switches. Each rack in the installation has one management switch and two top-of-rack (ToR) switches. The whole installation also has two spine switches.

You can also restore a switch to a configuration backup previously created.

Note The replacement switches must be from the supported list in the [VMware Cloud Foundation Compatibility Guide](#). Your ToR and spine switches must be from the same vendor, such as all Cisco switches or all Arista switches. Mixing and matching of switches is not supported.

This chapter includes the following topics:

- [Replace a Management Switch](#)
- [Replace a Cisco Top-of-Rack or Spine Switch](#)
- [Replace an Arista Top-of-Rack or Spine Switch](#)

Replace a Management Switch

The HMS component does a periodic ping on your Cloud Foundation system to check the health of the management switch and reports failures. When a management switch failure occurs, the system raises a `MANAGEMENT_SWITCH_DOWN` critical alert.

For information on viewing alerts, see [Managing Alerts, Events, and Audit Events](#). When you replace the management switch in a rack, you must replace it with a switch that has the same identical specifications as the one you are replacing. The replacement management switch must be from the same manufacturer and be the same model as the one it is replacing.

Replacing the management switch is a mult-step process. You must perform the tasks in the order in which they are documented.

Prerequisites

- Verify your Cloud Foundation environment is operational. You can do this by verifying that the workload domains you have in the environment are running.
- Verify you have a replacement switch from the same manufacturer and of the same model as the management switch you are replacing.

- Verify the replacement switch has the 2.5.x version of Cumulus Linux OS that is supported for this Cloud Foundation release. For the Cumulus Linux OS version that is supported in this release, see the *Release Notes*.

Procedure

1 Set Default Boot Mode on New Management Switch

The default boot mode for the new management switch must be set to ONIE.

2 Image New Management Switch

Imaging the new management switch with VIA installs the necessary software on the switch.

3 Restore Backup Configuration on New Management Switch

The SoS tool takes periodic backups of the Cloud Foundation racks in your environment. After you insert the imaged management switch in the physical rack, you can restore the backup configuration on the switch.

Set Default Boot Mode on New Management Switch

The default boot mode for the new management switch must be set to ONIE.

Procedure

1 Power on the management switch.

Check to see if the default boot mode is ONIE. If autoboot starts, press the Esc key to display the Boot screen and select ONIE.

2 If the switch comes up in BMP mode, install ONIE on the switch. Refer to the vendor documentation.

Image New Management Switch

Imaging the new management switch with VIA installs the necessary software on the switch.

Prerequisites

- Management switch must be connected to the laptop or management host where VIA is installed.
 - If VIA is installed on a laptop, the NIC port on the laptop must be connected to port 48 of the management switch.
 - If VIA is installed on a management host, the management host must be connected to a private managed switch that is connected to port 48 of the management switch.
- Identify the Cloud Foundation version in your environment and ensure that the appropriate bundle and md5sum file is uploaded on VIA.

Note Do not connect the management switch to any host before or during imaging.

Procedure

1 In the VIA user interface, click **Imaging**.

Ensure that you are in the **Details** tab.

- 2 (Optional) Type a name and description for the imaging run.
- 3 In **Deployment Type**, select **Cloud Foundation Individual Deployment**.
- 4 In **Device Type**, select **MGMT_SWITCH**.
- 5 Select the vendor and model number of the switch. The IP address is displayed.
- 6 Click **Start Imaging**.
Imaging fails at collect BMC-IP information task. This is expected behavior.
- 7 Disconnect the switch from the laptop or management host.

Restore Backup Configuration on New Management Switch

The SoS tool takes periodic backups of the Cloud Foundation racks in your environment. After you insert the imaged management switch in the physical rack, you can restore the backup configuration on the switch.

Prerequisites

Retrieve the following files.

- Backup file of the failed management switch's configuration. This file is named `cumulus-192.168.100.1.tgz`.
- The `hms.tar.gz` backup file of the rack on which the management switch is to be replaced.

For the location of these file within the SoS tool's output, see [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).

Procedure

- 1 Disconnect the management switch you are replacing and remove it from the rack.
- 2 Install the replacement management switch into the rack and wire it according to the same wiring connections the previous one had.
See [Chapter 16 Rack Wiring](#).
- 3 Use PuTTY to log into the management switch IP address 192.168.100.1 with username `cumulus` and password `CumulusLinux!`.
- 4 Add the following line to the end of the `/etc/dhcp/dhcpd.conf` file:
`ping-check false;`
If this line already exists in the file, leave it as is.
- 5 Use WinSCP to copy the `hms.tar.gz` and `cumulus-192.168.100.1.tgz` files to the `/home/cumulus` directory of the new management switch.
- 6 Use PuTTY to log into the management switch IP 192.168.100.1 with username `cumulus` and password `CumulusLinux!`.

- 7 Type the following command.

```
sudo su
```

- 8 Restore the backup configuration to the new switch.

- a Change to the root directory.

```
cd /
```

- b Unpack the contents of the `hms.tar.gz` file.

```
tar zxvf /home/cumulus/hms.tar.gz
```

- c Unpack the contents of the `cumulus-192.168.100.1.tgz` file.

```
tar zxvf /home/cumulus/cumulus-192.168.100.1.tgz
```

- 9 Change the password of the new management switch to the current password for your Cloud Foundation environment's management switches, as obtained from the `./vrm-cli.sh lookup-password` command.

- 10 Reboot the new management switch.

- 11 The **Physical Resources > Rack Details** page on the Dashboard displays a message **Error loading rack details**. Follow these steps to resolve this error.

- a Collect the following information.

Table 11-1.

Information Required	Procedure
SDDC Manager (VRM) VM IP address	Log in to vSphere Web Client and note down the 192.168.x.x address for the SDDC Manager (VRM) VM
PSC IP address	Log in to vSphere Web Client and note down the PSC1 VM IP address
Single Sign On and management switch passwords	See Look Up Account Credentials Using the Lookup-Password Command .

- b Using the root account, SSH to the SDDC Manager (VRM) VM IP address 192.168.x.x.

- c Run the following script with Python 2.7.

```
#!/opt/vmware/bin/python2.7 /opt/vmware/evosddc-support/fru-mgmtsw.py
```

Wait for the script to complete.

- 12 Reboot the management switch and the SDDC Manager (VRM) VM.

Replace a Cisco Top-of-Rack or Spine Switch

When you replace a Cisco top-of-rack (ToR) or spine switch in a rack, you must replace it with a Cisco switch that has the same identical specifications as the one you are replacing. The replacement ToR or spine switch must be the same model and have the same version of the Cisco switch operating system as the one it is replacing.

For a list of the Cisco switch models that are supported for use as a ToR or spine switch in this release, see [VMware Cloud Foundation Compatibility Guide](#).

The goal of this procedure is to restore the previously taken backup configuration of the working state of the system on to the replacement ToR or spine switch.

Prerequisites

- Verify your Cloud Foundation environment is operational. You can do this by verifying that the workload domains you have in the environment are running.
- Verify that backups have been taken of the component configurations. If the backups have not been taken, take the backups as described in [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).
- Verify you have the following items:
 - The backup file of the to-be-replaced Cisco ToR or switch's configuration. In the set of backups taken by the SoS tool for the rack, this file is named *ToR-or-spine-switch-IP-address-cisco-running-config.gz* where *ToR-or-spine-switch-IP-address* is the switch's IP address, such as *192.168.0.20-cisco-running-config.gz* for a ToR switch with IP address of 192.168.0.20. For the location of this file within the SoS tool's output, see [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).
 - The credentials for the management switch of the rack which has the ToR or spine switch you are replacing. Steps in the replacement procedure require copying files to and from the management switch. For steps on how to look up this password, see [Look Up Account Credentials Using the Lookup-Password Command](#).
 - A replacement Cisco switch of the same model as the Cisco switch you are replacing.
 - A diagram or photo of the to-be-replaced switch's wiring, so that you can refer to it after you have disconnected the switch. See the *Cloud Foundation VIA User's Guide* for the switch wiremaps.
- Verify the replacement switch has the same version of the Cisco OS installed on it that is supported for use in this Cloud Foundation release. For the Cisco OS version that is supported in this release, see the *Release Notes*.

Procedure

- 1 Copy the to-be-replaced switch's backup configuration file to its rack's management switch's `/var/tmp` directory.

```
scp ToR-or-spine-switch-IP-address-cisco-running-config.gz
cumulus@192.168.100.1:/var/tmp
```

As an example, when replacing the Cisco ToR switch with IP address 192.168.0.20, you copy the backup configuration file named *192.168.0.20-cisco-running-config.gz* to the management switch in that ToR switch's rack.

- 2 Disconnect the switch you are replacing and remove it from the rack.

- 3 Install the replacement switch into the rack and wire it according to the same wiring connections the previous one had.

Refer to the diagram or photo you took of the previous switch before removing it or to the wiring diagrams in the *Cloud Foundation VIA User's Guide*.

- 4 Boot the newly installed switch.
- 5 Exit out of the POAP (PowerOn Auto Provisioning) mode by following the instructions in the switch console screen.
- 6 Following the prompts in the switch console screen, set a password for the "admin" user.

Important Make a note of the password you set. This step is required for all Cisco Nexus switches. Even though the admin password will be updated when the backup configuration is applied to this switch in a later step, you want to ensure you have a working password as you perform the steps prior to applying the backup configuration.

- 7 Using the original switch's IP address, configure that same IP address with subnet mask /24 on the new switch on the interface named mgmt 0 and configure VRF (virtual routing and forwarding) to the mgmt 0 port.

As an example, when replacing a ToR switch that has IP address 192.168.0.20, the example configuration is:

```
switch# configure Terminal
switch(config)# interface mgmt 0
switch(config-if)# ip address 192.168.0.20/24
switch(config-if)# vrf member management
switch(config-if)# no shut
switch(config-if)# end
```

When replacing a spine switch that has IP address 192.168.0.31, the example configuration is:

```
switch# configure Terminal
switch(config)# interface mgmt 0
switch(config-if)# ip address 192.168.0.31/24
switch(config-if)# vrf member management
switch(config-if)# no shut
switch(config-if)# end
```

- 8 Verify the newly installed switch can reach the management switch (at IP 192.168.100.1) by using the ping command.

```
switch(config)# ping 192.168.100.1 vrf management
PING 192.168.100.1 (192.168.100.1): 56 data bytes
64 bytes from 192.168.100.1: icmp seq=0 ttl=63 time=1.574 ms
...
```

- 9 Copy the previous switch's backup configuration file to the newly installed switch from the location on the rack's management switch where you copied it in step [Step 1](#).

As an example, when replacing the Cisco ToR switch that has the backup configuration file named `192.168.0.20-cisco-running-config.gz` that was copied to the `/var/tmp` location on the rack's management switch at IP address `192.168.100.1`:

```
switch(config)# copy scp: bootflash: vrf management
Enter source filename: /var/tmp/192.168.0.20-cisco-running-config.gz
Enter hostname for the scp server: 192.168.100.1
Enter username: cumulus
cumulus@192.168.100.1's password:
192.168.0.20-cisco-running-config.gz 100% 1891 1.9KB/s 00:00
Copy complete, now saving to disk (please wait)...
```

- 10 Use the `dir bootflash:` command to verify the backup configuration file was copied to the flash.

```
switch(config)# dir bootflash:
```

- 11 Decompress the copied backup configuration file.

Using the example from the previous step:

```
switch(config)# gunzip bootflash:///192.168.0.20-cisco-running-config.gz
```

As a result of this step, the backup file is saved in `bootflash:` without the `.gz` extension.

- 12 Install the backup configuration into the new switch's startup configuration:

Using the example from the previous step:

```
switch(config)# copy 192.168.0.20-cisco-running-config startup-configuration
```

- 13 Copy the switch's startup configuration to its running configuration.

Using the example from the previous step:

```
switch(config)# copy startup-config running-config
```

The replacement switch is in place and has the backup configuration from the switch it replaced.

Note Restoring the configuration to the new switch also restores the admin password.

What to do next

Verify the new switch is operating correctly by seeing if all hosts and virtual machines are reachable from both ToR switches or both spine switches, depending on which type you replaced.

Replace an Arista Top-of-Rack or Spine Switch

When you replace an Arista top-of-rack (ToR) or spine switch in a rack, you must replace it with a Arista switch that has the same identical specifications as the one you are replacing. The replacement ToR or spine switch must be the same model and have the same version of the Arista switch operating system as the one it is replacing.

For a list of the Arista switch models that are supported for use as a ToR or spine switch in this release, see [VMware Cloud Foundation Compatibility Guide](#).

The goal of this procedure is to restore the previously taken backup configuration of the working state of the system on to the replacement ToR or spine switch.

Prerequisites

- Verify your Cloud Foundation environment is operational. You can do this by verifying that the workload domains you have in the environment are running.
- Verify that backups have been taken of the component configurations. If the backups have not been taken, take the backups as described in [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).
- Verify you have the following items:
 - The backup file of the to-be-replaced Arista ToR or switch's configuration. In the set of backups taken by the SoS tool for the rack, this file is named *ToR-or-spine-switch-IP-address-arista-running-config.gz* where *ToR-or-spine-switch-IP-address* is the switch's IP address, such as *192.168.0.20-arista-running-config.gz* for a ToR switch with IP address of 192.168.0.20. For the location of this file within the SoS tool's output, see [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).
 - The credentials for the management switch of the rack which has the ToR or spine switch you are replacing. Steps in the replacement procedure require copying files to and from the management switch. For steps on how to look up this password, see [Look Up Account Credentials Using the Lookup-Password Command](#).
 - A replacement Arista switch of the same model as the Arista switch you are replacing.
 - A diagram or photo of the to-be-replaced switch's wiring, so that you can refer to it after you have disconnected the switch. See the *Cloud Foundation VIA User's Guide* for the switch wiremaps.
- Verify the replacement switch has the same version of the Arista OS installed on it that is supported for use in this Cloud Foundation release. For the Arista OS version that is supported in this release, see the *Release Notes*.

Procedure

- 1 Copy the to-be-replaced switch's backup configuration file to its rack's management switch's /var/tmp directory.

```
scp ToR-or-spine-switch-IP-address-arista-running-config.gz
cumulus@192.168.100.1:/var/tmp
```

As an example, when replacing the Arista ToR switch with IP address 192.168.0.20, you copy the backup configuration file named 192.168.0.20-arista-running-config.gz to the management switch in that ToR switch's rack.

- 2 Disconnect the switch you are replacing and remove it from the rack.
- 3 Install the replacement switch into the rack and wire it according to the same wiring connections the previous one had.

Refer to the diagram or photo you took of the previous switch before removing it or to the wiring diagrams in the *Cloud Foundation VIA User's Guide*.

- 4 Boot the newly installed switch and cancel the Zero Touch Provisioning (ZTP) mode.

```
AristaSwitch# zerotouch cancel
```

- 5 Log in to the replacement switch, using the default credentials that came with your replacement switch.
- 6 Using the original switch's IP address, configure that same IP address with subnet mask /24 on the new switch on the interface named management1.

As an example, when replacing a ToR switch that has IP address 192.168.0.20, you configure the management1 interface as:

```
interface management1
 ip address 192.168.0.20/24
```

When replacing a spine switch that has IP address 192.168.0.31, you configure the management1 interface as:

```
interface management1
 ip address 192.168.0.31/24
```

- 7 Verify the newly installed switch can reach the management switch (at IP 192.168.100.1) by using the ping command.

```
AristaSwitch# ping 192.168.100.1
PING 192.168.100.1 (192.168.100.1): 56 data bytes
64 bytes from 192.168.100.1: icmp seq=0 ttl=63 time=1.574 ms
...
```


- 8 Copy the previous switch's backup configuration file to the newly installed switch from the location on the rack's management switch where you copied it in [Step 1](#).

As an example, when replacing the Arista ToR switch that has the backup configuration file named `192.168.0.20-arista-running-config.gz` that was copied to the `/var/tmp` location on the rack's management switch at IP address `192.168.100.1`:

```
AristaSwitch#copy scp:cumulus@192.168.100.1/var/tmp/192.168.0.20-arista-running-config.gz flash:/
192.168.0.20-arista-running-config.gz
cumulus@192.168.100.1's password: *****
192.168.0.20-arista-running-config.gz      100% 1761 1.7KB/s 00:00
Copy completed successfully.
AristaSwitch#
```

- 9 Use the `dir flash` command to verify the backup configuration file was copied to the flash.

```
AristaSwitch#dir flash:
```

- 10 Go into bash and decompress the copied backup configuration file .

Using the example from the previous step:

```
AristaSwitch# bash
Arista Networks EOS shell
[admin@ AristaSwitch ~]$ cd /mnt/flash
[admin@ AristaSwitch flash]$ gunzip 192.168.0.20-arista-running-config.gz
```

As a result of this step, the extension `.gz` is removed from the file.

- 11 Exit out of bash.

```
[admin@ AristaSwitch flash]$ exit
AristaSwitch#
```

- 12 Copy the backup configuration file that resulted from the decompression to the switch's startup configuration.

Using the example from the previous step:

```
AristaSwitch# copy flash: 192.168.0.20-arista-running-config startup-config
```

- 13 Copy the switch's startup configuration to its running configuration.

```
AristaSwitch# copy startup-config running-config
```

The replacement switch is in place and has the backup configuration from the switch it replaced.

What to do next

Verify the new switch is operating correctly by seeing if all hosts and virtual machines are reachable from both ToR switches or both spine switches, depending on which type you replaced.

License Management

The SDDC Manager client's Licensing screen provides a way to manage your Cloud Foundation licenses. The Licensing screen is available from the Settings page in the SDDC Manager client.

This chapter includes the following topics:

- [Cloud Foundation Licensing Model](#)
- [Manage License Keys for the Software in Your Cloud Foundation Environment](#)

Cloud Foundation Licensing Model

The SDDC Manager software is licensed under the Cloud Foundation license. As part of the Cloud Foundation product, SDDC Manager deploys specific VMware software products, some of which are licensed under the Cloud Foundation license and some are licensed separately.

The following VMware software deployed by SDDC Manager is licensed under the Cloud Foundation license:

- VMware vSphere
- VMware Virtual SAN
- VMware NSX for vSphere

The following VMware software deployed by SDDC Manager is licensed separately:

- VMware vCenter Server
- VMware vRealize Log Insight
- VMware vRealize Operations
- Content packs for Log Insight
- Management packs for vRealize Operations
- VMware Horizon 6
- VMware App Volumes

Note For information about which specific editions of each VMware product are licensed for use with the Cloud Foundation license, use the information resources at the Cloud Foundation product information page at <http://www.vmware.com/products/cloud-foundation.html>.

All physical processors in your installation are licensed using the base Cloud Foundation license.

Product	Product Licensing Model Within the Base License
VMware vSphere®	Per CPU
VMware Virtual SAN™	Per CPU
VMware NSX® for vSphere®	Per CPU

Manage License Keys for the Software in Your Cloud Foundation Environment

Use the Licensing screen of the SDDC Manager client to work with the Cloud Foundation license keys.

In the Licensing screen, you can:

- Review the license keys that are currently assigned in your installatio.
- Enter license keys.
- Edit the descriptions of the assigned license keys. The descriptions are displayed in the Licensing screen.
- Remove license keys.

Procedure

- ◆ Manage the license keys using the action menus in the screen.

Option	Description
Enter a license key by clicking Actions > Add License Key.	The Add License window opens for entering the details. Type in the license key and an optional description and click Verify . When the verification is successful, click Add .
Edit the description of an already entered license key by clicking the Edit choice in the action menu next to that license key.	In the Add License window, edit the description and save your changes.
Remove a license key from use by clicking the Delete choice in the action menu next to that license key.	Confirm the action to remove the license key from use by this environment.

Power Off a Dual-Rack Cloud Foundation Environment and Power It Back On

13

You might have situations in which you want to power off the environment and power it back on. In such situations, you must use a specific sequence to power off the virtual machines, ESXi hosts, and switches and subsequently power them on.

You power off the VMs in the secondary racks management domain first, in a prescribed sequence, and then power off the rack's ESXi hosts. You then power off the VMs in the primary rack's management domain, in a prescribed sequence, and ESXi hosts in the primary rack. Then the ToR switches, followed by the spine switches. You power down the management switches last.

When powering the environment back on, you power on the switches in the primary rack first, followed by the primary rack's ESXi hosts and VMs, and then power on the switches in the secondary rack, followed by its ESXi hosts and VMs.

Prerequisites

Ensure you have the root account credentials to log in to the ESXi hosts and to the switches' operating systems for those hardware components in your environment. For the steps to look up the credentials, see [Look Up Account Credentials Using the Lookup-Password Command](#).

Ensure you have the FQDNs for the ESXi hosts in each rack. Each ESXi host has an FQDN that starts with the rack identifier, followed by the subdomain and root DNS domain used by the environment, such as rack-1-n0.subdomain.root-domain, rack-1-n1.subdomain.root-domain, rack-2-n0.subdomain.root-domain, and so on:

- rack-1-n0.subdomain.root-domain is the ESXi host N0 in the primary rack
- rack-1-n1.subdomain.root-domain is the ESXi host N1 in the primary rack
- rack-2-n0.subdomain.root-domain is the ESXi host N0 in the secondary rack
- rack-2-n1.subdomain.root-domain is the ESXi host N1 in the secondary rack

Note The above host names will be determined by your local DNS.

Ensure you know which ESXi hosts are the ones used by each rack's management domain. You can see the hosts that are used by a management domain by navigating to its domain details page in the SDDC Manager client. Write down the FQDNs of the hosts used by the primary rack's management domain and the FQDNs used by the second rack's management domain. You will use this information to locate the management domain's VMs in the powering-on procedures.

Procedure

1 Power Off the Second Rack's VMs and Hosts

You power off the second rack first. You first power off the rack's management domain's virtual machines in a specific sequence, and then the rack's ESXi hosts.

2 Power Off the Primary Rack's VMs and Hosts

After powering off the secondary rack, you power down the primary rack's management domain's virtual machines in a specific sequence, and then the rack's ESXi hosts.

3 Power Down Switches

After powering down the primary rack, you power down all of the switches in a prescribed sequence.

4 Power On the Primary Rack's Hosts and VMs

You power on all of the switches in the dual-rack installation first. Then you power on the primary rack starting with its ESXi hosts, followed by its management domain's virtual machines in a specific sequence.

5 Power On the Secondary Rack's Hosts and VMs

After powering on the primary rack's management domain, you power on the second rack starting with its ESXi hosts, followed by its management domain's virtual machines in a specific sequence.

What to do next

After both rack's management domain's VMs are up and running, you can power on the VMs for the VI and VDI workload domains in the environment.

Power Off the Second Rack's VMs and Hosts


You power off the second rack first. You first power off the rack's management domain's virtual machines in a specific sequence, and then the rack's ESXi hosts.

Prerequisites

Verify you have met the prerequisites described in [Chapter 13 Power Off a Dual-Rack Cloud Foundation Environment and Power It Back On](#).

Procedure

- 1 Launch the vSphere Web Client to the vCenter Server instance for the second rack's management domain.

- a In the SDDC Manager client, open the domain details for the second rack's management domain.
- b Click the launch link () for the vCenter Server instance that is displayed in the domain details window for that management domain.

A new browser tab opens and displays the vSphere Web Client.

2 Place the hosts for each workload domain in maintenance mode.

You must use the CLI command that supports setting thevSAN mode when entering maintenance mode.

- a On each host, connect and log in to the ESXi console.
- b Place the host into maintenance mode using the following command, with the noAction option included.

```
# esxcli system maintenanceMode set -e true -m noAction
```

- c Shut down all the ESXi hosts in the workload domain.

3 Shut down the VMs in the management domain in the following sequence.

- a SDDC Manager Utility VM
- b The three NSX Controllers
- c vRealize Log Insight
- d NSX Manager
- e SDDC Manager Controller VM
- f vCenter Server for management domain
- g vCenter Server for the workload domains
- h Both Platform Services Controllers

4 Place the management domain hosts in maintenance mode.

You must use the CLI command that supports setting thevSAN mode when entering maintenance mode.

- a On each host, connect and log in to the ESXi console.
- b Put the host into maintenance mode using the following command, with the noAction option included.

```
# esxcli system maintenanceMode set -e true -m noAction
```

- c Shut down all the ESXi hosts in the workload domain.

5 Shut down the unmanaged hosts in the system, if any.**6** Shut down the switches in the specified order. For a Cumulus switch, log in first and then shut it down.

- a ToR switches in each rack
- b Inter-rack switches in rack 2.
- c Management switches in each rack.


Power Off the Primary Rack's VMs and Hosts

After powering off the secondary rack, you power down the primary rack's management domain's virtual machines in a specific sequence, and then the rack's ESXi hosts.

Prerequisites

Verify you have met the prerequisites described in [Chapter 13 Power Off a Dual-Rack Cloud Foundation Environment and Power It Back On](#).

Procedure

- 1 Launch the vSphere Web Client to the vCenter Server instance for the primary rack's management domain.
 - a In the SDDC Manager client, open the domain details for the primary rack's management domain.
 - b Click the launch link () for the vCenter Server instance that is displayed in the domain details window for that management domain.

A new browser tab opens and displays the vSphere Web Client.

- 2 Place the hosts for each workload domain in maintenance mode.

You must use the CLI command that supports setting thevSAN mode when entering maintenance mode.

- a On each host, connect and log in to the ESXi console.
- b Place the host into maintenance mode using the following command, with the noAction option included.

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- c Shut down all the ESXi hosts in the workload domain.
- 3 Shut down the VMs in the management domain in the following sequence.
 - a SDDC Manager Utility VM
 - b The three NSX Controllers
 - c vRealize Log Insight
 - d NSX Manager
 - e SDDC Manager Controller VM
 - f vCenter Server for management domain
 - g vCenter Server for the workload domains
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4 Place the management domain hosts in maintenance mode.

You must use the CLI command that supports setting thevSAN mode when entering maintenance mode.

- a On each host, connect and log in to the ESXi console.
- b Put the host into maintenance mode using the following command, with the noAction option included.

```
# esxcli system maintenanceMode set -e true -m noAction
```

- c Shut down all the ESXi hosts in the workload domain.

5 Shut down the unmanaged hosts in the system, if any.

6 Shut down the switches in the specified order. For a Cumulus switch, log in first and then shut it down.

- a ToR switches in each rack
- b Inter-rack switches in rack 2.
- c Management switches in each rack.

Power Down Switches

After powering down the primary rack, you power down all of the switches in a prescribed sequence.

Procedure

- 1 Power down the ToR switches in each rack.
- 2 Power down the spine switches in the second rack.
Only the second rack in a Cloud Foundation installation has the two spine switches.
- 3 Power down the management switches in each rack.

Power On the Primary Rack's Hosts and VMs

You power on all of the switches in the dual-rack installation first. Then you power on the primary rack starting with its ESXi hosts, followed by its management domain's virtual machines in a specific sequence.

Prerequisites

Verify you have met the prerequisites described in [Chapter 13 Power Off a Dual-Rack Cloud Foundation Environment and Power It Back On](#).

Procedure

- 1 Power on all of the switches in both racks using the following sequence.
 - a Power on the spine switches.
 - b Power on the ToR switches in both racks.
 - c Power on the management switches in both racks.
- 2 Power on all of the primary rack's ESXi hosts in the order of N0, N1, N2, and so on.
- 3 Log in to each of the management domain's four ESXi hosts using the VMware Host Client and the account credentials for the hosts.

You log in to an ESXi host using the VMware Host Client by pointing a browser to the URL of the form `https://host-FQDN/ui/` or `https://host-IP-address/ui/`, where *host-FQDN* is the FQDN for the host and *host-IP-address* is the host's IP address.

- 4 For each VM in the following sequence, use the **Power on** action in the VMware Host Client to power on the VM.

Note For most of these VMs, you can verify that it is the one in the primary rack's management domain by looking at its Summary tab in the vSphere Web Client and verifying that its DNS name begins with rack-1-.

- The two Platform Services Controller instances whose DNS names start with rack-1-psc-1 and rack-1-psc-2.
- The vCenter Server instance whose DNS name starts with rack-1-vc-1.
- The SDDC Manager instance whose DNS name starts with rack-1-vm-1.
- The VM whose name contains ISVM-1
- The VM whose name contains ISVM-2
- The VM whose name contains ISVM-3
- The VM whose name contains LCM_Repository
- The NSX Manager instance whose DNS name starts with rack-1-nsxmanager-1.
- The vRealize Log Insight instance whose DNS name starts with rack-1-li-1.
- The vRealize Operations Manager instance whose DNS name starts with rack-1-vrops-1.
- The NSX Controller instance whose DNS name starts with rack-1-nsxctlr-1
- The NSX Controller instance whose DNS name starts with rack-1-nsxctlr-2
- The NSX Controller instance whose DNS name starts with rack-1-nsxctlr-3
- The VM whose name contains LCM_Backup_Repository

Note After the VMs for the primary rack's management domain are up, but before the second rack is powered on, the web interfaces to the vCenter Server instance, vRealize Log Insight instance, vRealize Operations Manager instance are partially accessible. They will be fully accessible after you power on the second rack.

Power On the Secondary Rack's Hosts and VMs

After powering on the primary rack's management domain, you power on the second rack starting with its ESXi hosts, followed by its management domain's virtual machines in a specific sequence.

Prerequisites

Verify you have met the prerequisites described in [Chapter 13 Power Off a Dual-Rack Cloud Foundation Environment and Power It Back On](#).

Procedure

- 1 Power on all of the second rack's ESXi hosts in the order of N0, N1, N2, and so on.
- 2 Log in to each of the management domain's four ESXi hosts using the VMware Host Client and the account credentials for the hosts.

You log in to an ESXi host using the VMware Host Client by pointing a browser to the URL of the form `https://host-FQDN/ui/` or `https://host-IP-address/ui/`, where *host-FQDN* is the FQDN for the host and *host-IP-address* is the host's IP address.

- 3 For each VM in the following sequence, use the **Power on** action in the VMware Host Client to power on the VM.

Note For each VM, you can verify that it is the one in the second rack's management domain by looking at its Summary tab in the vSphere Web Client and verifying that its DNS name begins with rack-2-.

- The SDDC Manager instance whose DNS name starts with rack-2-vm-1.
- The vCenter Server instance whose DNS name starts with rack-2-vc-1.
- The vRealize Operations Manager instance whose DNS name starts with rack-2-vrops-1.
- The NSX Manager instance whose DNS name starts with rack-2-nsxmanager-1.
- The NSX Controller instance whose DNS name starts with rack-2-nsxctrl-1
- The NSX Controller instance whose DNS name starts with rack-2-nsxctrl-2
- The NSX Controller instance whose DNS name starts with rack-2-nsxctrl-3

What to do next

After both racks are powered on, power on the virtual machines used for the VI and VDI workload domains. You can see all of those virtual machines by using the vSphere Web Client to log in to the primary rack's management domain's vCenter Server instance.

Patching and Upgrading Cloud Foundation

14

Lifecycle Management (LCM) enables you to perform automated updates on Cloud Foundation components (SDDC Manager, HMS, and LCM) as well as VMware components (vCenter Server, ESXi, and NSX).

SDDC Manager is pre-configured to communicate with the VMware software repository. The high level update workflow is described below.

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

Update is applied to the selected targets at the scheduled time.

Even though SDDC Manager may be available while the update is installed, it is recommended that you schedule the update at a time when it is not being heavily used.

This section describes generic patching and upgrading. For information on upgrading to a specific Cloud Foundation, see [GUID-F64221FD-F13B-49EB-9691-971369C2D332#GUID-F64221FD-F13B-49EB-9691-971369C2D332](#).

This chapter includes the following topics:

- [Login to your VMware Account](#)
- [Use a Proxy Server to Download Upgrade Bundles](#)
- [Download Update Bundle](#)
- [Select Targets and Schedule Update](#)
- [View Inventory Component Versions](#)
- [Display Backup Locations](#)

Login to your VMware Account

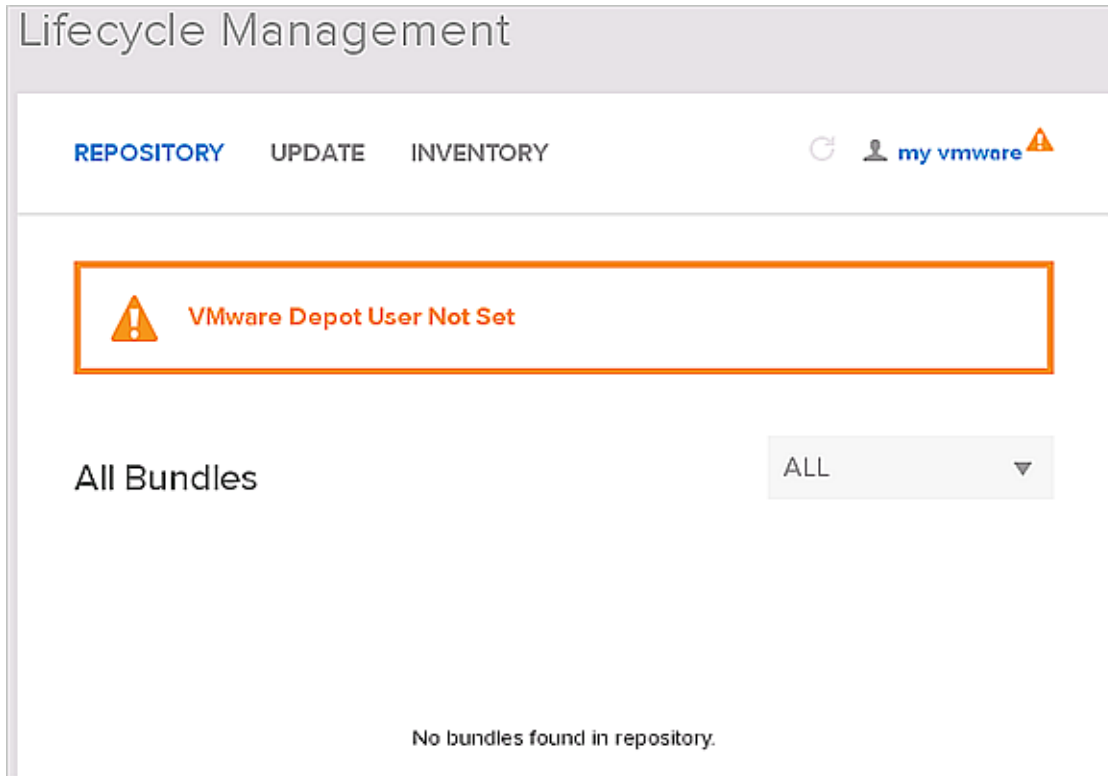
You must sign in to your VMware account so that LCM can access update bundles from the VMware depot.

If you do not have external connectivity on the rack, see [Use a Proxy Server to Download Upgrade Bundles](#).

Procedure

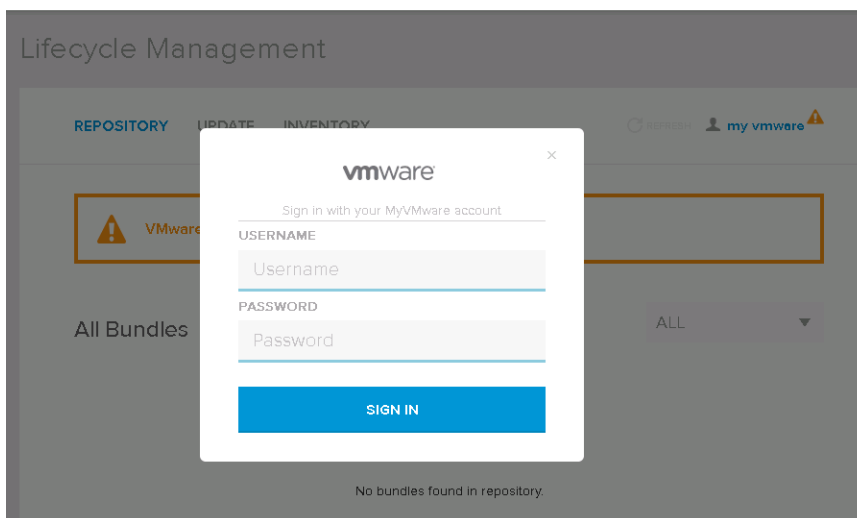
- 1 In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The Lifecycle Management page appears with a message saying that the VMware depot user has not been set.



- 2 Click **my vmware** on the top right corner.

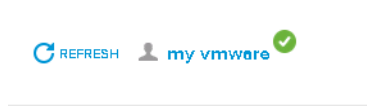
The sign in page appears.



- 3 Type your VMware account user name and password.

4 Click **SIGN IN**.

The top right corner of the window displays a green check mark.



5 Follow the workaround described in <https://kb.vmware.com/kb/2148653>.

What to do next

To change account credentials, click **my vmware** on the top right corner and type in the appropriate credentials.

Use a Proxy Server to Download Upgrade Bundles

If you do not have external connectivity on a rack, you can use a proxy server to download the LCM update bundles.

Procedure

- 1 Using the root account, SSH to the rack's SDDC Manager VM.
- 2 Open the `/home/vrack/lcm/lcm-app/conf/application-prod.properties` file.
- 3 Add 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
```

- 4 Restart the LCM server by typing the following command:

```
service lcm-init restart
```

- 5 Wait for 5 minutes and then proceed to the next step.

Download Update Bundle

When an update bundle is available, a notification is displayed on the SDDC Manager dashboard. You can view the available updates and determine the update bundle that you want to download. The downloaded bundle is then available in the bundle repository.

Prerequisites

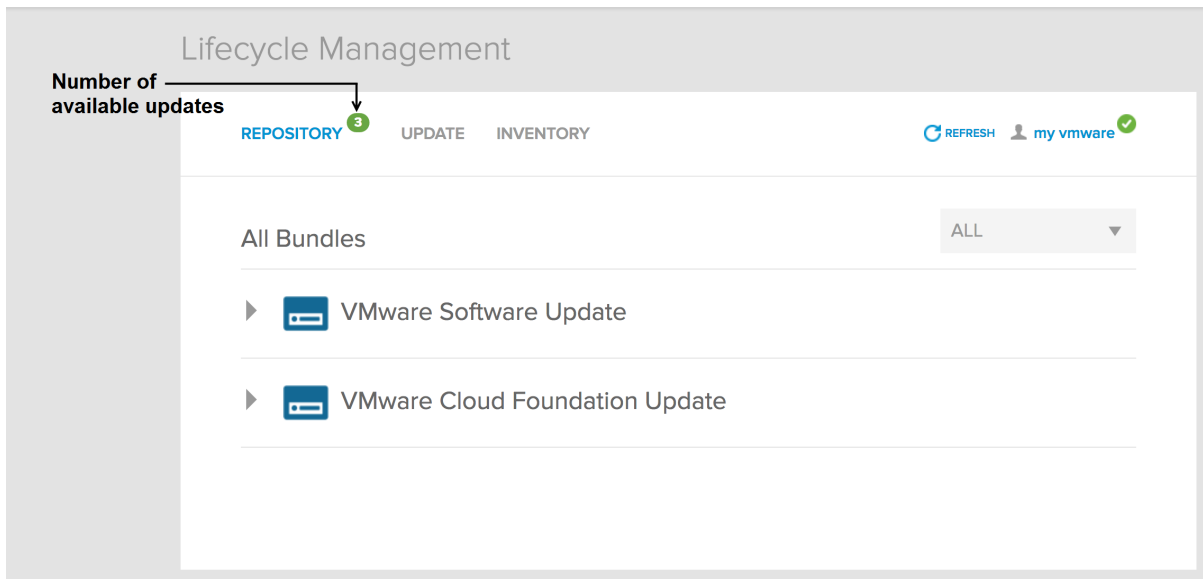
Sync the laptop where you are running the SDDC Manager client with the SDDC Manager NTP server.

Procedure

1 Do one of the following:

- Click the bundle notification on the SDDC Manager dashboard.
- In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The number of available updates is displayed next to the title of the **REPOSITORY** tab. The window is refreshed every 3 minutes to display the latest bundles on the SFTP server.



- ### 2
- Click the Cloud Foundation drop-down to see the available updates for Cloud Foundation components and the **VMware Software Update** drop-down to see vCenter Server and ESXi updates.


Since this tab mirrors the depot, all bundles may be displayed here independent of the version in your environment. However, the Download link will be enabled only for the bundles appropriate to your environment.

To view the metadata details for an update bundle, click **MORE** next to the release date of the bundle. The bundle severity levels are described in the table below.

Severity Value	Description
Critical	A problem which may severely impact your production systems (including the loss of production data). Such impacts could be system down or HA not functioning. A workaround is not in place.
Important	A problem may affect functionality, or cause a system to function in a severely reduced capacity. The situation causes significant impact to portions of the business operations and productivity. The system is exposed to potential loss or interruption of services. A change to support hardware enablement (for example, a driver update), or a new feature for an important product capability.
Moderate	A problem may affect partial non-critical functionality loss. This may be a minor issue with limited loss, no loss of functionality, or impact to the client's operations and issues in which there is an easy circumvention or avoidance by the end user. This includes documentation errors.
Low	A problem is considered low or no impact to a product's functionality or a client's operations. There is no impact on quality, performance, or functionality of the product.

You can filter bundles by status.

3 Do one of the following:

- Click **DOWNLOAD** to download the bundle right away.
- Click  next to **DOWNLOAD** to schedule the download. Select the date and time and then click **SCHEDULE**.

4 On the Review Download page, review the download schedule for the bundle. If the scheduled download has a dependency on other bundles, those downloads are automatically scheduled for download before the bundle you selected to download. For example, if there are update bundles available that have a release date prior to the one you are downloading, those bundles are force downloaded along with the bundle you selected.

Review Download

DOWNLOAD SCHEDULE

Tuesday, December 6, 2016 8:25 PM

BUNDLE TYPE	BUNDLE VERSION	RELEASED DATE	BUNDLE SIZE
VMware Cloud Foundation	1.2.0-4724414 MORE	Dec 6, 2016	360 MB

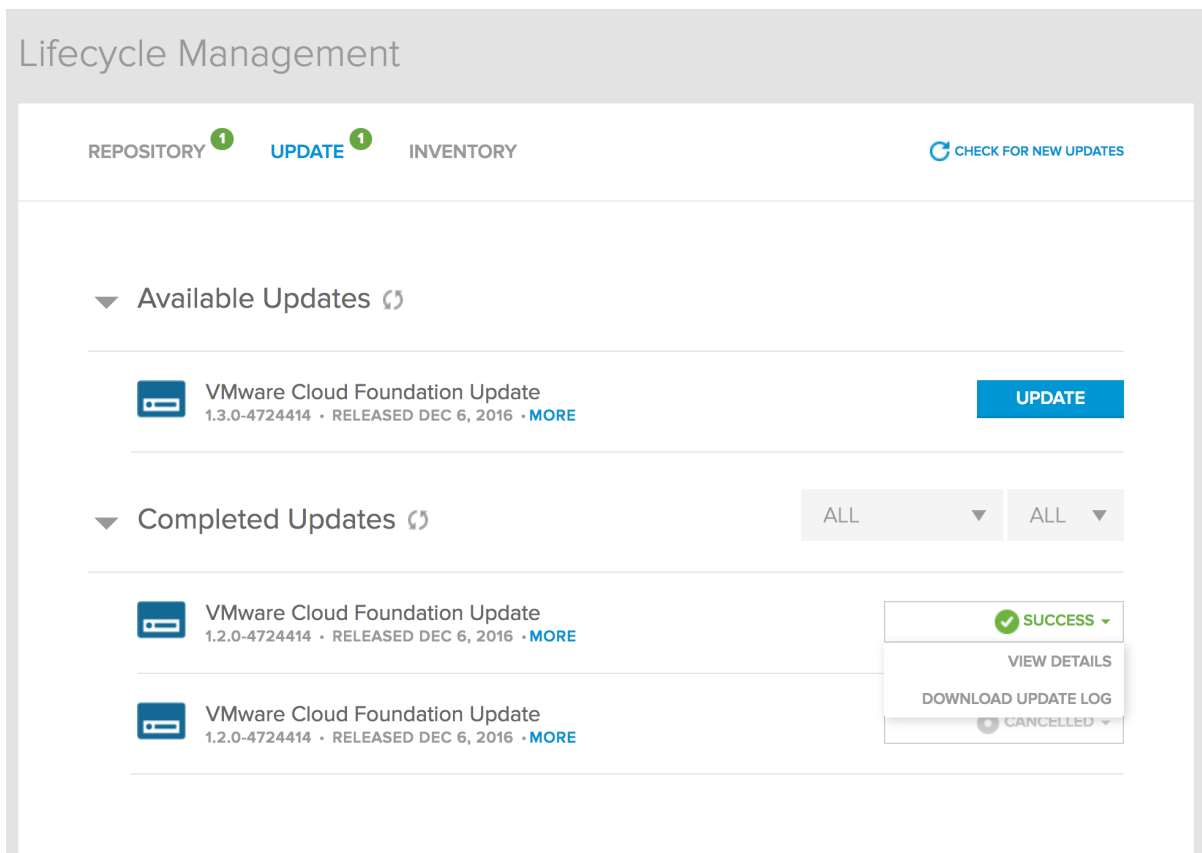
[CANCEL](#)[DOWNLOAD](#)

The Review Download page also displays the total bundle size (bundle you selected to download as well as dependent bundles that need to be force downloaded).

5 Click **DOWNLOAD**.

The status bar next to the bundle name shows the progress update. For bundles scheduled to be downloaded at a later time, the time remaining for the download to begin is displayed.

When the bundle is downloaded, the term **DOWNLOADED** is displayed next to the bundle.



If the download fails, possible errors may be recoverable or unrecoverable.

For a recoverable error, you can resolve the problem and then click **RETRY DOWNLOAD**. For example, the OOB agent for HMS may be down while you are downloading an SDDC Manager software update. After you restart the OOB agent, you can click **RETRY DOWNLOAD**.

For an unrecoverable error, you can view failure details by clicking **VIEW DETAILS**.

Select Targets and Schedule Update

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Even though SDDC Manager may be available while the update is applied, it is recommended that you schedule the update at a time when SDDC Manager is not being heavily used.

Note You cannot schedule an update while a workload is running. If an update is scheduled to start while a workload is in progress, the upgrade is cancelled.

Prerequisites

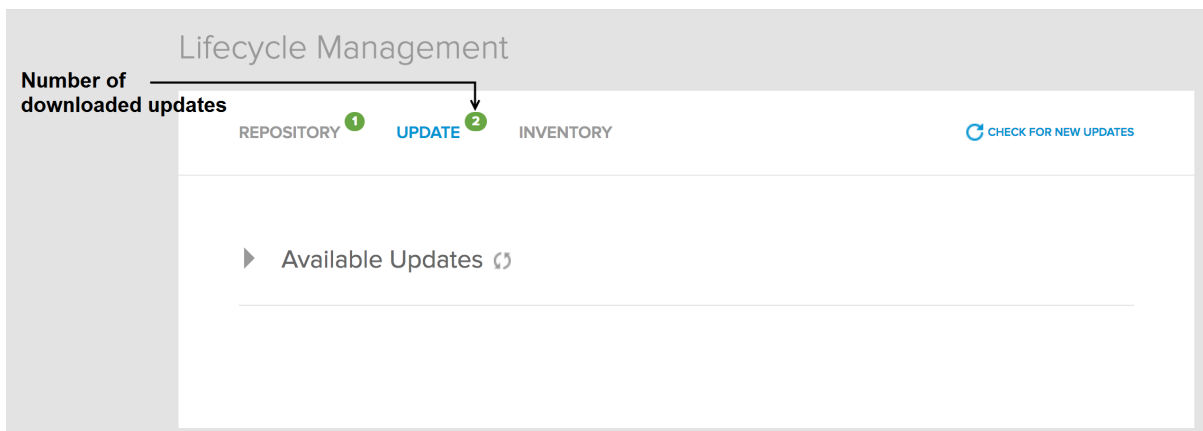
- 1 You must have downloaded the appropriate bundle so that it is available in the local repository.

- 2 Ensure that the SDDC Manager and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.
- 3 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

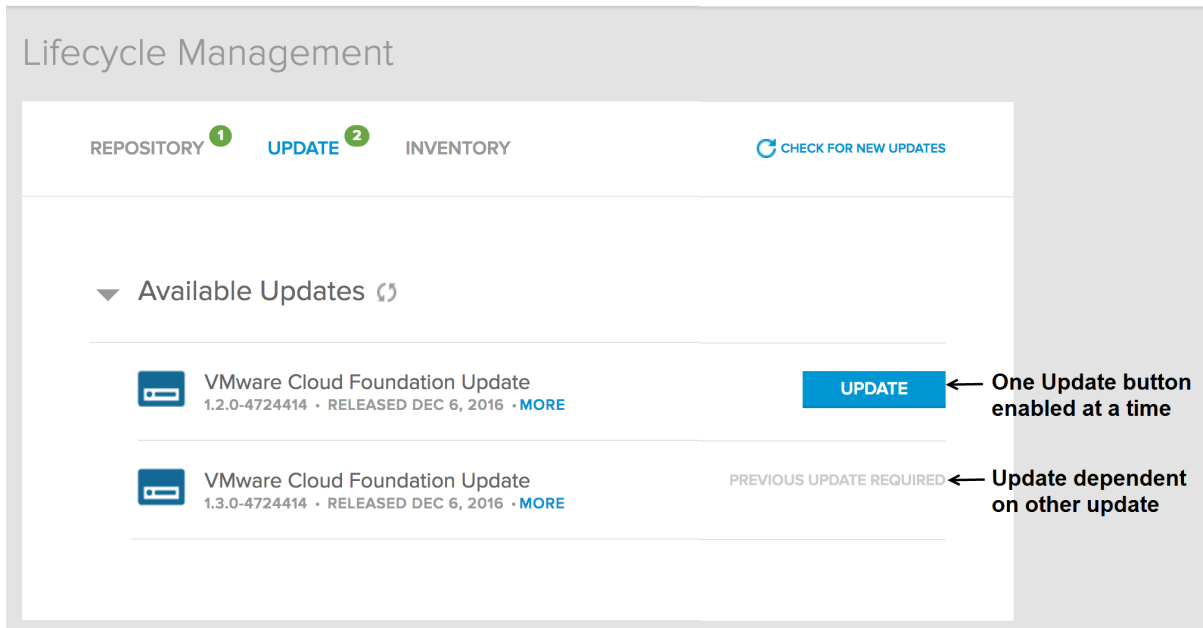
- 1 On the Lifecycle Management page, click the **UPDATES** tab.

The number of available updates is displayed next to the title of the **UPDATE** tab.



- 2 Click the drop-down next to Available Updates.

If an update is dependent on another update, it displays **PREVIOUS UPDATE REQUIRED**. Once the dependency update is installed, the **UPDATE** button becomes available. As an example, a VMware software update may be dependent on a Cloud Foundation update.



3 Click **UPDATE**.

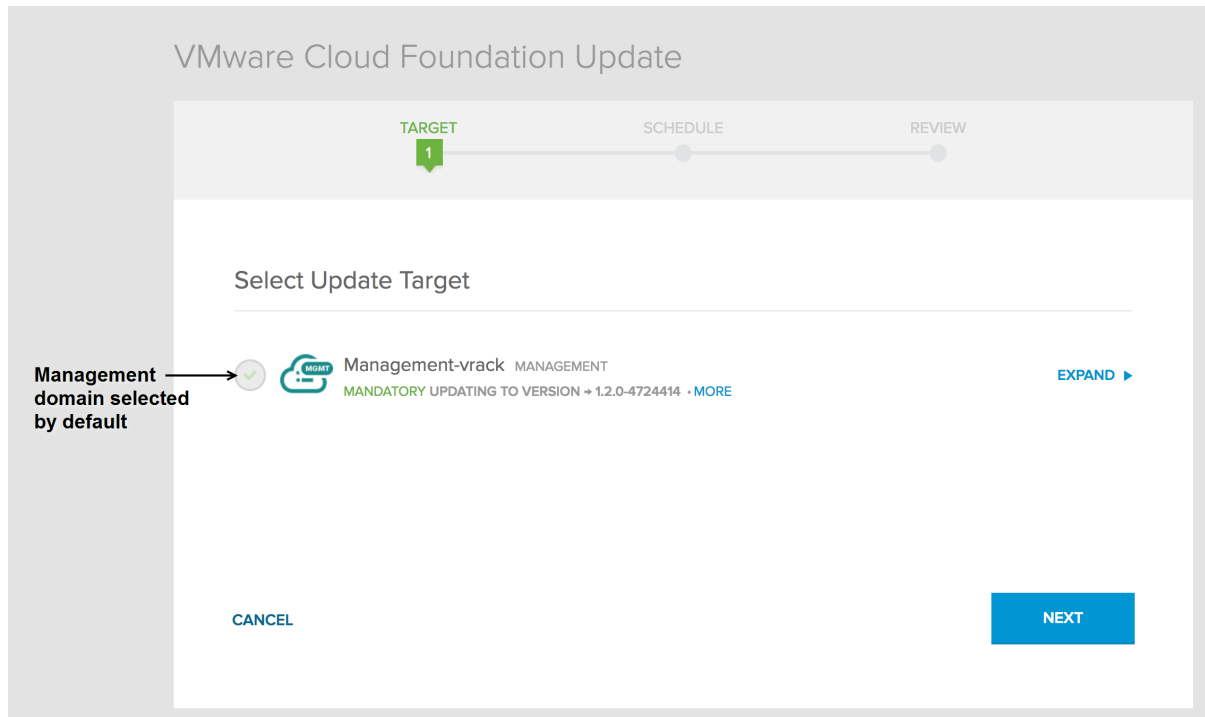
The **UPDATE** button is enabled only for one update at a time. Once you schedule a Cloud Foundation update, the UI allows you to schedule a VMware software update. However, VMware recommends that you schedule only one update at a time. Wait for the scheduled update to be installed successfully before scheduling another update.

The system validates that update pre-requisites are met before displaying the target selection.

4 On the **TARGET** page, select the domains where the update is to be applied.

When a new version of the software is available, it must be installed on the management domain. So the management domain is automatically selected for update and the checkbox next to it grayed out.

Click **EXPAND** next to the domain to see the areas of your datacenter that will be updated.



The targets on the primary rack (the rack that contains the PSCs) are updated before the targets on additional racks.

Note If you select only a subset of the domains in your datacenter to be updated, the update will be displayed in both the Available Updates section (since some domains are yet to be updated) as well the Scheduled Updates section. You cannot schedule an update on a failed domain. If the system does not let you select a domain, click the **INVENTORY** tab to check the status of the domain. Resolve the issue and then re-schedule the update.

- 5 Click **NEXT**.
- 6 On the **SCHEDULE** page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
2
SCHEDULE
REVIEW

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT


Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.

VMware Cloud Foundation Update

TARGET SCHEDULE REVIEW 3

Review Update

 **Warning :** Avoid any changes to the domains being upgraded until after the upgrade is complete

BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

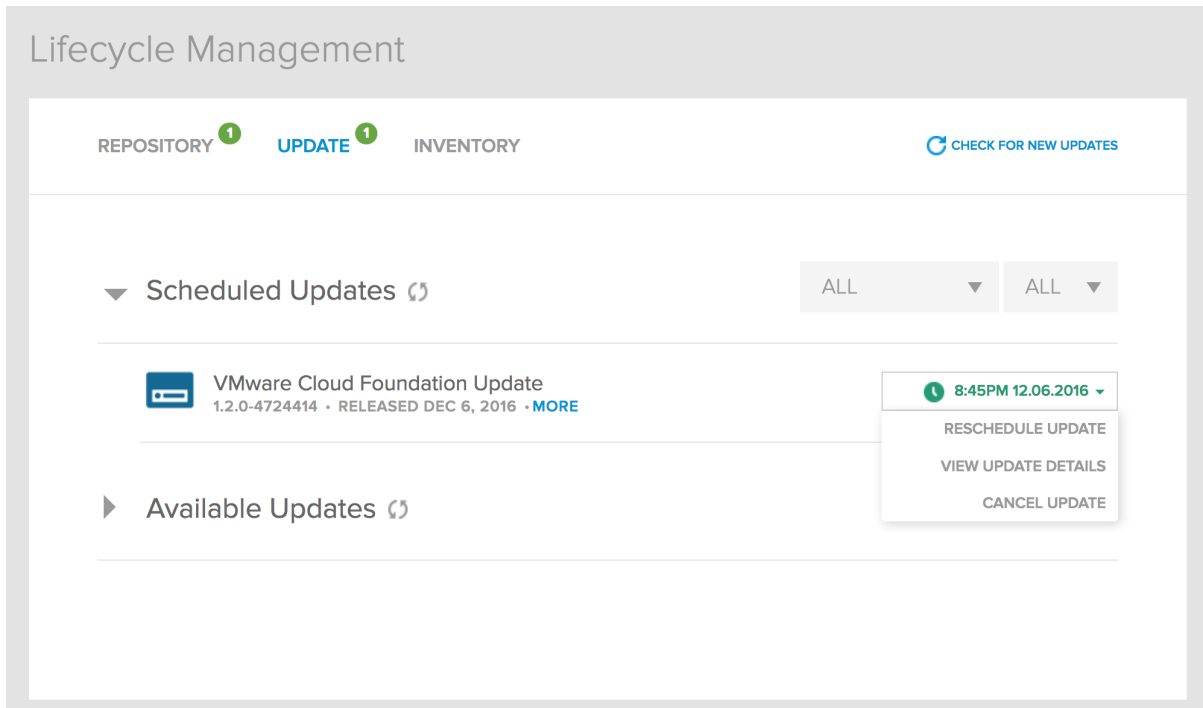
BACK

CANCEL

SCHEDULE UPDATE

If you had selected multiple domains on the Target page, the Review Update page displays a notification that the management domain is updated first, followed by the other domains.

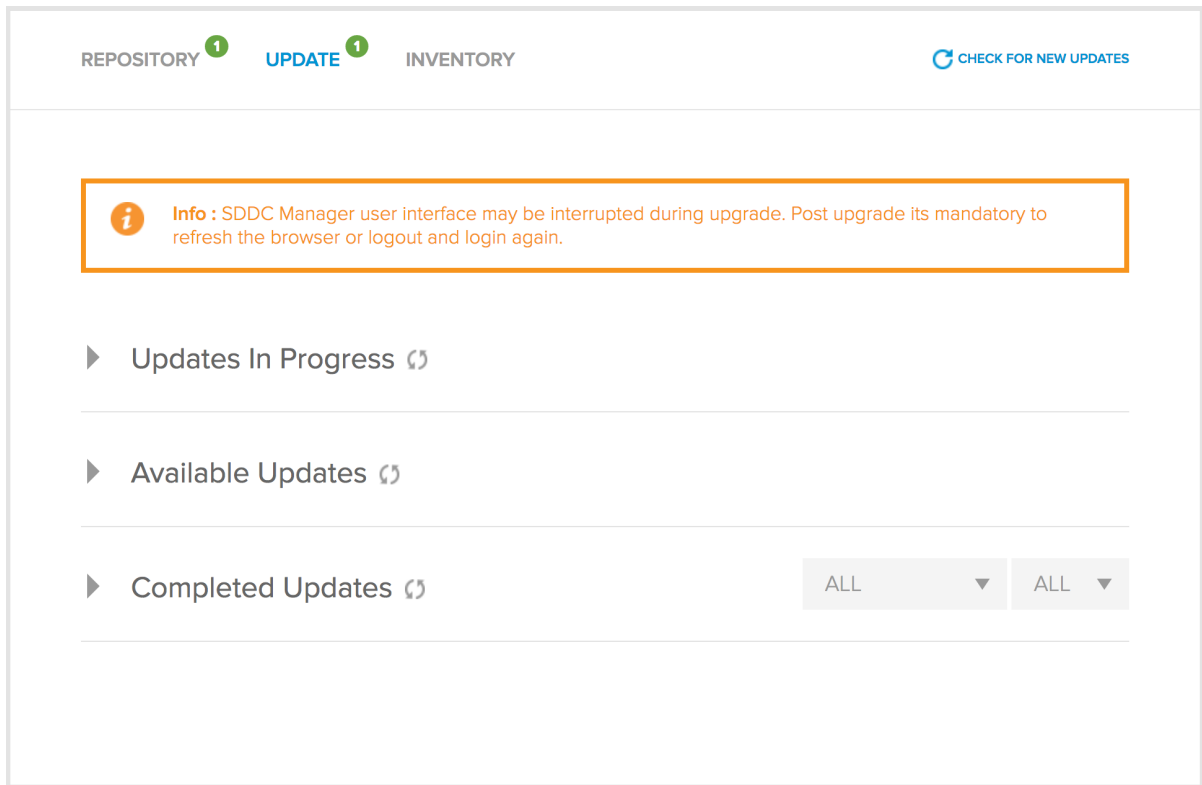
- 9 Click **SCHEDULE UPDATE**.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon.

If an update is scheduled to start while a workload is running, the update is cancelled so that the system is kept in a consistent state. You must re-schedule the update.

When an update is in progress, the Lifecycle Management page displays a warning message that the interface may be unresponsive and require user log out and back in after the update.



10 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status.

Lifecycle Management

REPOSITORY **UPDATE** ¹ INVENTORY CHECK FOR NEW UPDATES

▶ Available Updates (3)

▶ Completed Updates (3) ALL ALL

Update Name	Version	Released	Status
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	SUCCESS
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	SUCCESS
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	CANCELLED

- 11 To download the log file, click next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

Here is an example of why an update might fail. For a VMware software update, an ESXi update is installed on the ESXi hosts in the appropriate domain sequentially. During an update, the system puts each host into maintenance mode to perform the update on that host, and then tells the host to exit maintenance mode after its update is completed. If an issue on the host prevents it from entering maintenance mode, the update fails. This might happen when a VM is not protected by HA and cannot be migrated to another host. In this case, you can manually resolve this problem by enabling HA on that VM. Then navigate back to the **UPDATE** tab and click **Available Updates**. Re-schedule the update and follow the update progress on the **Update Status** page.

View Inventory Component Versions

The Inventory Status displays the current versions of all workload domains and the domain components in your inventory.

Procedure


- 1 On the Lifecycle Management page, click the **INVENTORY** tab.

The current version and resource status for all domains in your datacenter is displayed.

Lifecycle Management


REPOSITORY UPDATE INVENTORY REFRESH STATUS

Inventory Status


 **Management-vrack** MANAGEMENT COLLAPSE ▼


VMware Cloud Foundation Software


VRM 2.1.0-RELEASE-4724414	HMS 2.1.0-RELEASE-4712935	LCM 2.1.0-RELEASE-4712935
-------------------------------------	-------------------------------------	-------------------------------------


 **vcenter-mgmt** 4 ESXI NODES
6.0.0-3634791


rack-1-n0 6.0.0-4192238	rack-1-n1 6.0.0-4192238	rack-1-n3 6.0.0-4192238	rack-1-n2 6.0.0-4192238
-----------------------------------	-----------------------------------	-----------------------------------	-----------------------------------

 **PSC rack-1-psc-2.vrack.vmware.com**
6.0.0-3634791

 **PSC rack-1-psc-1.vrack.vmware.com**
6.0.0-3634791

 **10.0.0.10** NSX MANAGER
6.2.4-4292526

 **NSX Controller Cluster** CONTROLLER CLUSTER
6.2.47844

 Host Prep Clusters

vRack-Cluster 6.2.4.4292526

- 2 Click a component to view the upgrade history for that component.

The Upgrade History tab for that component is displayed.

Display Backup Locations

For LCM and ESXi updates, you can display the location where the configuration files for the updates are backed up.

Prerequisites

The LCM and/or ESXi update for which you want to see the backup location must have been completed.

Procedure

- 1 On the Lifecycle Management page, click the **INVENTORY** tab.
- 2 Click an LCM or ESXi resource.
The Resource Details page is displayed.
- 3 Click ▼ to the right of the component name and then click **GET BACKUP LOCATION**.
The backup file name and location is displayed.

Upgrade Cloud Foundation to a 2.1.x Release

15

During the upgrade process, Lifecycle Management takes the following backups:

- PSC VM snapshot
- vCenter VM snapshot
- ESXi configuration backup.

Backup directory on SDDC Manager Utility VM is `/backup/lcm/ESX`. Backup for each ESXi host is stored in its guid (stored in database). Each backup is in a date sub folder. An example ESXi backup file name is `/backup/lcm/ESX/f32b407e-8fdb-4999-ab80-2082003586fb/02022017014114/backup/firmwareConfig865759412960483871.tgz`.

- NSX configuration backup.

Backup directory on SDDC Manager Utility VM is `/backup`. File names have the prefix `evo-nsx-domain_id_date`. An example NSX backup file name is `/backup/evo-nsx-888bcb7f-30d0-3aee-9291-b7777052a1ac-01_00_00_Tue07Feb2017`.

To access the backup directory, login to the SDDC Manager Utility VM as root. See [Look Up Account Credentials Using the Lookup-Password Command](#).

For best practice information, refer to the documentation for individual VMware products.

This chapter includes the following topics:

- [General Prerequisites Before Upgrading](#)
- [Prerequisites for Upgrading VMware Software](#)
- [Upgrade Cloud Foundation to 2.1](#)
- [Upgrade Cloud Foundation to 2.1.1](#)
- [Upgrade Cloud Foundation to 2.1.2](#)
- [Upgrade Cloud Foundation to 2.1.3](#)

General Prerequisites Before Upgrading

You must ensure that these prerequisites are met before upgrading.

- Take a back up of your Cloud Foundation system.
 - a Using the root account, SSH in to the SDDC Manager Controller VM.
 - b Navigate to the `/opt/vmware/sddc-support` directory.
 - c Type the following command:

```
./sos --backup
```

The backup is stored in the `/var/tmp` directory.

The SoS tool makes backup files of these components' configurations:

- ESXi hosts
- Switches (management, ToR, inter-rack)
- SDDC Manager Controller VM
- SDDC Manager Utility VM
- The SDDC Manager instance's HMS software components
- Take a snapshot of all VMs.
- In a multi-rack scenario, the Cloud Foundation version must be the same on all racks. Therefore, if you are planning to add a new rack to your setup, you must first upgrade rack 1 to the latest version before adding the new rack to your environment.

Prerequisites for Upgrading VMware Software

Ensure that the prerequisites in each section are met before you begin a VMware software upgrade.

Domain Operations

Verify that no domain operations are running. See [Managing Workflows and Tasks](#).

ESXi Prerequisites

- 1 Verify that all ESXi hosts are within a domain cluster in vCenter.
- 2 Verify that all ESXi hosts within the cluster are in a healthy state. If a host is not healthy, and therefore in maintenance mode, the upgrade will fail.

NSX Prerequisites

- 1 Back up the NSX configuration.
 - a Using the root account, SSH in to the SDDC Manager Controller VM.

- b Type the following command.
`/home/vrack/bin/lookup-password`
- c Note down the values for the following.
 - IP address for SDDC Manager Utility VM that resides in the management domain vCenter
 - username
 - password
- d Follow the procedure *Back Up NSX Manager Data* in *Upgrading NSX*. For the NSX backup files to be accessible by Cloud Foundation, you must specify the settings specified in the table below.

Setting	Value
IP/Hostname	IP address that you noted in step 3.
Transfer Protocol	SFTP
Port	22
Username	Username that you noted in step 3.
Password	Password that you noted in step 3.
Backup Directory	/backup
Filename Prefix	<i>nsx_type_domain-number</i> For example, type <i>nsx_mgmt_dmn01</i> when taking a backup of the NSX management domain. Type <i>nsx_vdi_dmn01</i> when taking a VDI domain backup.
Passphrase	nsxmgr_backup

- 2 If you are upgrading a workload domain that contains 3 hosts, disable the anti-affinity rule that separates NSX controllers across hosts.
 - a Login to the vCenter Server of the domain.
 - b In the left navigation pane, right-click the cluster and click **Edit Setting**.
 - c In the left navigation pane, click **Rules**.
 - d Un-select the NSX-Controller Anti-Affinity rule.
 - e Click **OK**.
 - f After the upgrade is complete, enable the rule again.

Upgrade Cloud Foundation to 2.1

During the upgrade process, Lifecycle Management takes the following backups:

- PSC VM snapshot
- vCenter VM snapshot
- ESXi configuration backup.

Backup directory on SDDC Manager Utility VM is `/backup/lcm/ESX`. Backup for each ESXi host is stored in its guid (stored in database). Each backup is in a date sub folder. An example ESXi backup file name is `/backup/lcm/ESX/f32b407e-8fdb-4999-ab80-2082003586fb/02022017014114/backup/firmwareConfig865759412960483871.tgz`.

- NSX configuration backup.

Backup directory on SDDC Manager Utility VM is `/backup`. File names have the prefix `evo-nsx-domain_id_date`. An example NSX backup file name is `/backup/evo-nsx-888bcb7f-30d0-3aee-9291-b7777052a1ac-01_00_00_Tue07Feb2017`.

To access the backup directory, login to the SDDC Manager Utility VM as root. See [Look Up Account Credentials Using the Lookup-Password Command](#).

For best practice information, refer to the documentation for individual VMware products.

Upgrading Cloud Foundation is a multi step process. You must follow each step in the order in which it is documented.

- 1 [Upgrade Cloud Foundation Software on Management Domain](#)

You begin by upgrading the VMware Cloud Foundation software on the management domain.

- 2 [Upgrade ISVMs for 2.1](#)

Upgrade the ISVMs on rack 1.

- 3 [Upgrade Third Party Software](#)

The third party upgrade script is part of the Cloud Foundation bundle and is located in the SDDC Manager VM.

- 4 [Upgrade VMware Software on Management Domain](#)

Applying the VMware software bundle upgrades the VMware software that is part of Cloud Foundation software.

- 5 [Upgrade VMware Software on VDI and VI Domains](#)

Upgrade VMware software on the other domains in your environment. It is recommended that you upgrade one domain at a time.

Upgrade Cloud Foundation Software on Management Domain

You begin by upgrading the VMware Cloud Foundation software on the management domain.

Prerequisites

- 1 Ensure that the SDDC Manager and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.

- 2 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

- 1 Save VMware account credentials. See [Login to your VMware Account](#).
- 2 Follow steps in <https://kb.vmware.com/kb/2148568>.
- 3 Download all available update bundles. See [Download Update Bundle](#).
- 4 On the Lifecycle Management page, click the **UPDATES** tab.
The number of available updates is displayed next to the title of the **UPDATE** tab.
- 5 Click the drop-down next to **Available Updates**.
- 6 Click the **UPDATE** button next to the VMware Cloud Foundation update.
On the TARGET page, the management domain is selected by default.
- 7 Click **NEXT**.
- 8 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW

1
2
3

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT


Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 9 Click **NEXT**.
- 10 On the Review Update page, review the update bundle, targets, and schedule.

VMware Cloud Foundation Update

TARGET SCHEDULE REVIEW 3

Review Update

 **Warning :** Avoid any changes to the domains being upgraded until after the upgrade is complete

BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

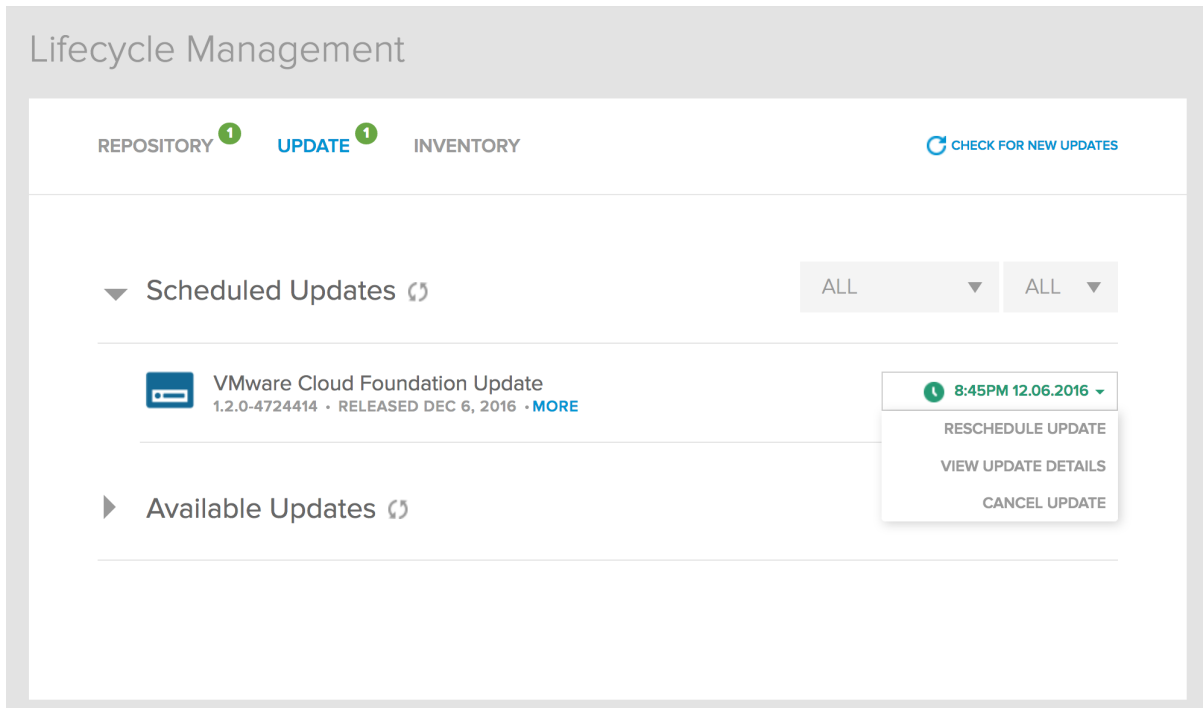
UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

BACK

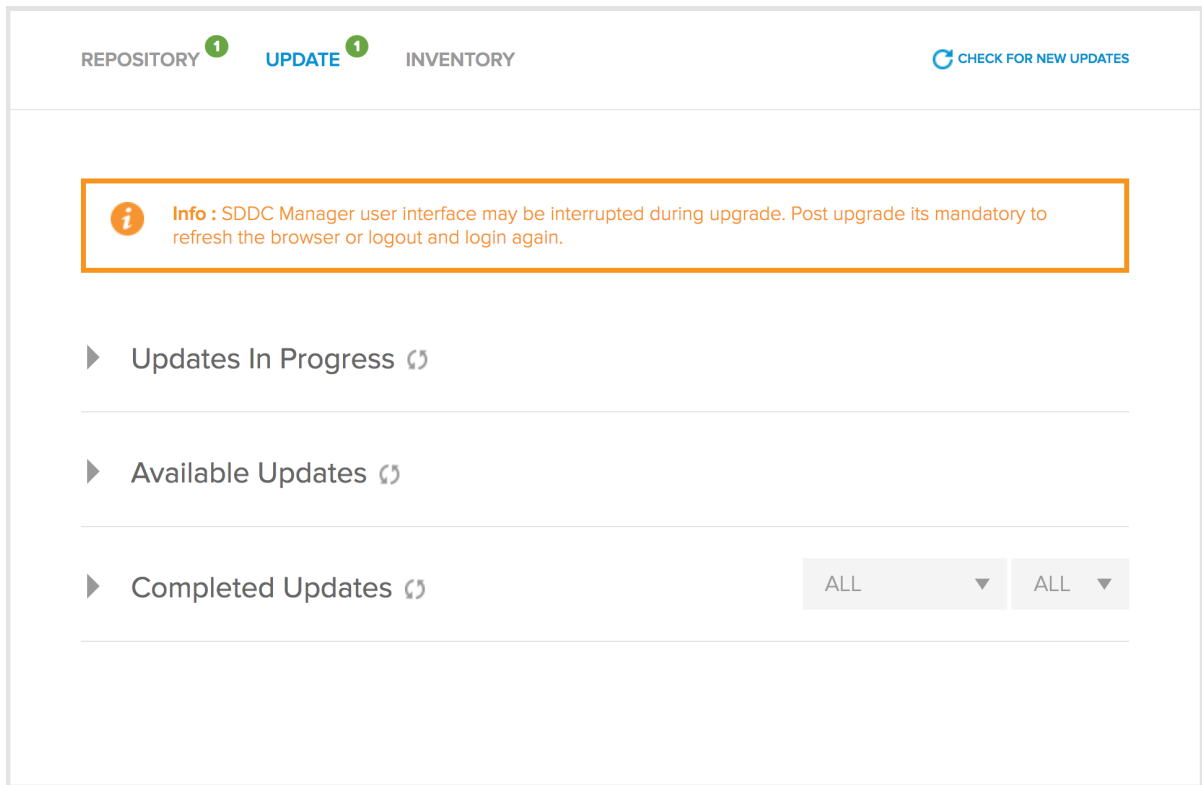
CANCEL

SCHEDULE UPDATE

11 Click **SCHEDULE UPDATE**.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon. When an update is in progress, the Lifecycle Management page displays a warning message that the interface may be unresponsive and require user log out and back in after the update.



12 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status.

The screenshot shows the 'Lifecycle Management' interface with the 'UPDATE' tab selected. It displays a list of updates under the 'Completed Updates' section. The third update, 'VMware Cloud Foundation Update 1.2.0-7944279', is marked as 'SUCCESS'. A dropdown menu is open next to it, showing options: 'VIEW DETAILS' and 'DOWNLOAD UPDATE LOG'.

Update Name	Version	Released	Status	Actions
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	SUCCESS	VIEW DETAILS, DOWNLOAD UPDATE LOG
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	CANCELLED	

- 13 To download the log file, click next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

- 14 Update the cacerts file that contains the VMware Depot certificate. See <https://kb.vmware.com/kb/2148926>.

Upgrade ISVMs for 2.1

Upgrade the ISVMs on rack 1.

Procedure

- 1 If you have multiple racks in your datacenter, stop SDDC Manager and LCM services on each additional rack. In a single rack scenario, the ISVM upgrade scripts stops the services so you can proceed to step 2.

- a Using the root account, SSH to the rack's SDDC Manager VM.

- b Type the following commands.

```
service vrm-watchdogserver stop
```

```
service vrm-tcserver stop
```

```
service lcm-watchdogserver stop
```

```
service lcm-init stop
```

Leave this console window open.

- 2 In a command line window, SSH to the 192.168.* IP address for the SDDC Manager VM on rack 1.

- 3 Type the following.

```
ls /home/vrack/lcm/upgrade
```

Note the upgrade ID displayed.

- 4 Navigate to the following directory. *upgrade_id* is the upgrade ID you noted in step 3.

```
/home/vrack/lcm/upgrade/vrm/upgrade_id/vrm-upgrade-rtp3-vcfr0/isvm/scripts/
```

- 5 Run the following command to update the *isvm-upgrade.conf* file.

```
python isvm_upgrade_autoconf.py > isvm-upgrade.conf
```

- 6 Run the following command to upgrade the ISVMs.

```
./isvm-upgrade.sh vm-upgrade isvm-upgrade.conf ../ova/EVO-RACK-ISVM-Appliance-  
Version.ova 2>&1 | tee update.log
```

After the ISVM upgrade is complete, the following message is displayed in the console window.

```
*** Done upgrading ISVMs *** If the ISVM cluster is functioning  
correctly, you can delete backup ISVMs. Their names end with  
-isvm-upgrade-backup.
```

If you see an error, rollback the ISVM.

Contact VMware Support and fix the error before proceeding with the upgrade. Your current environment will be functional even though the upgrade has not been completed.

- 7 Click Control + C to exit the command window.
- 8 For a multi-rack scenario, go back to the console window you had left open in step 1 and restart the SDDC Manager and LCM services.

```
service vrm-watchdogserver start
```

```
service vrm-tcserver start
service lcm-watchdogserver start
service lcm-init start
```

Upgrade Third Party Software

The third party upgrade script is part of the Cloud Foundation bundle and is located in the SDDC Manager VM.

Procedure

- 1 Using the root account, SSH to the 192.168.* IP address of the SDDC Manager VM on rack 1.
- 2 Navigate to the following directory:
`/home/vrack/lcm/upgrade/vrm/upgrade_id/vrm-upgrade-rtp3-vcfr0/ova_packages/`
- 3 Run the 3rd party upgrade script:
`./ova_packages_upgrade.sh ALL`
- 4 In a multi-rack scenario, follow steps 1 and 2 on each additional rack and then run the following command:
`./ova_packages_upgrade.sh VRM`

Upgrade VMware Software on Management Domain

Applying the VMware software bundle upgrades the VMware software that is part of Cloud Foundation software.

Prerequisites

The VMware software bundle must be available in the local repository.

Procedure

- 1 Apply the workaround described in [VMware Cloud Foundation 2.1.1 update bundle fails to download](#).
- 2 On the Lifecycle Management page on the SDDC Manager Dashboard, click the **UPDATES** tab.
- 3 Click the drop-down next to Available Updates.
- 4 Click the **UPDATE** button next to the VMware Software update.
 On the TARGET page, the management domain is selected by default.
- 5 Click **NEXT**.
- 6 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.
- 9 Click **SCHEDULE UPDATE**.

Upgrade VMware Software on VDI and VI Domains

Upgrade VMware software on the other domains in your environment. It is recommended that you upgrade one domain at a time.

Prerequisites

The VMware software bundle must be available in the local repository.

Procedure

- 1 Disable the anti-affinity rule that separates NSX controllers across hosts.
 - a Login to the vCenter Server of the domain.
 - b In the left navigation pane, right-click the cluster and click **Edit Setting**.
 - c In the left navigation pane, click **Rules**.
 - d Un-select the NSX-Controller Anti-Affinity rule.
 - e Click **OK**.
- 2 On the Lifecycle Management page, click the **UPDATES** tab.
- 3 Click the drop-down next to Available Updates.
- 4 Click the **UPDATE** button next to the VMware Software update.

On the TARGET page, the management domain is selected by default.
- 5 On the TARGET page, select the appropriate VDI and VI domains.
- 6 Click **NEXT**.
- 7 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.
- 8 Click **NEXT**.
- 9 On the Review Update page, review the update bundle, targets, and schedule.
- 10 Click **SCHEDULE UPDATE**.
- 11 Enable the anti-affinity rule that separates NSX controllers across hosts.

Upgrade Cloud Foundation to 2.1.1

You can upgrade to Cloud Foundation 2.1.1 only if you are at Cloud Foundation 2.1. If your environment includes a Cloud Foundation version prior to 2.1, you must first upgrade to 2.1 and then upgrade to 2.1.1.

Ensure that the [General Prerequisites Before Upgrading](#) are met before you begin the upgrade.

Upgrading Cloud Foundation is a multi step process. You must follow each step in the order in which it is documented.

Procedure

1 [Login to your VMware Account](#)

You must sign in to your VMware account so that LCM can access update bundles from the VMware depot.

2 [Download Update Bundle](#)

When an update bundle is available, a notification is displayed on the SDDC Manager dashboard. You can view the available updates and determine the update bundle that you want to download. The downloaded bundle is then available in the bundle repository.

3 [Select Targets and Schedule Update](#)

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

4 [Select Targets and Schedule Update](#)

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Login to your VMware Account

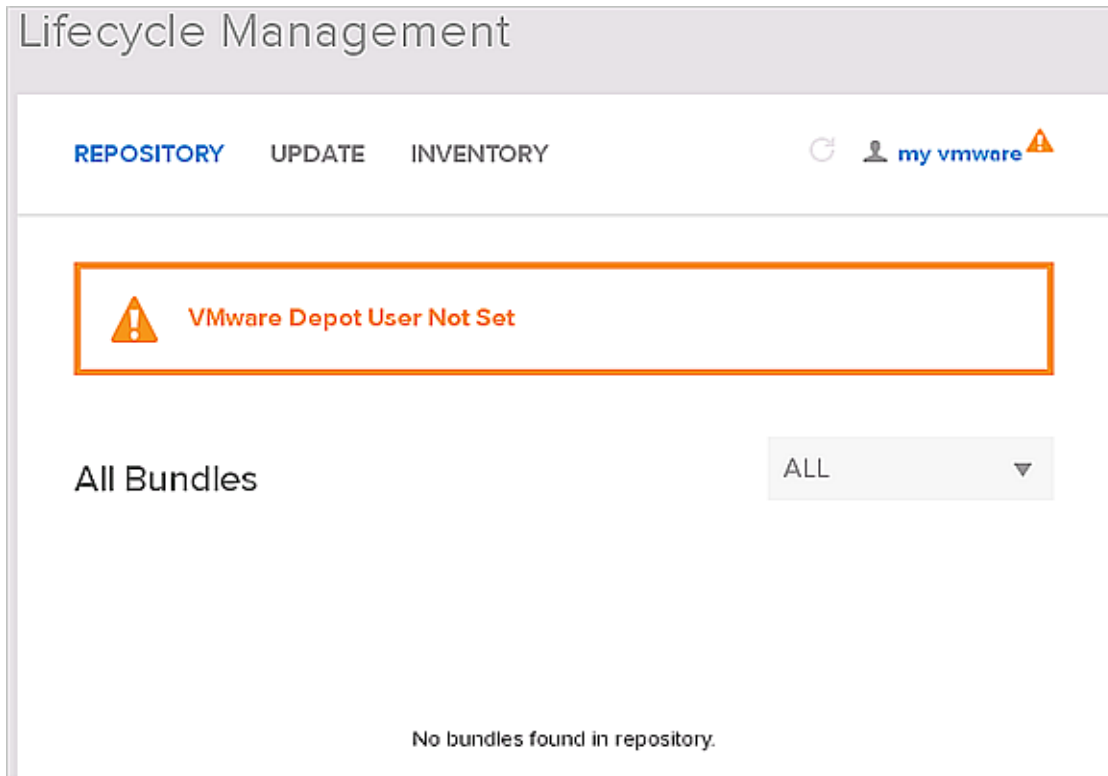
You must sign in to your VMware account so that LCM can access update bundles from the VMware depot.

If you do not have external connectivity on the rack, see [Use a Proxy Server to Download Upgrade Bundles](#).

Procedure

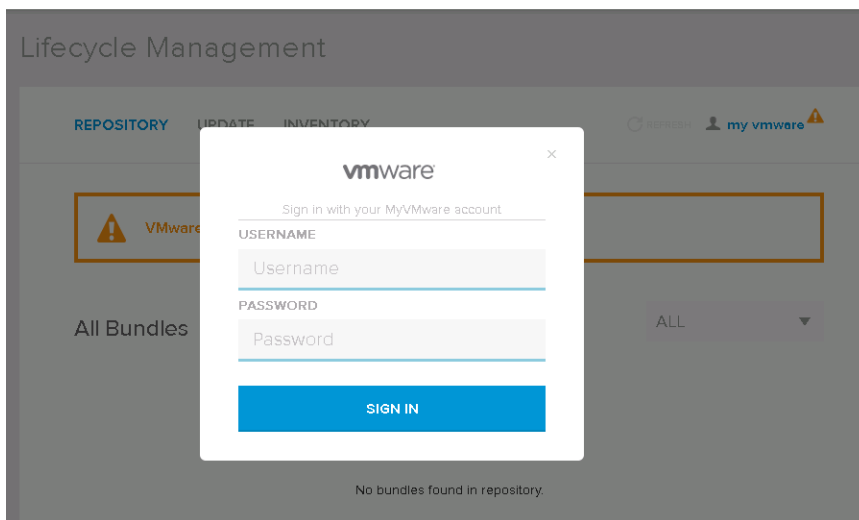
1 In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The Lifecycle Management page appears with a message saying that the VMware depot user has not been set.



- 2 Click **my vmware** on the top right corner.

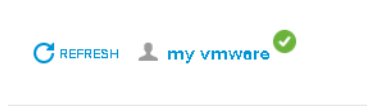
The sign in page appears.



- 3 Type your VMware account user name and password.

4 Click **SIGN IN**.

The top right corner of the window displays a green check mark.



5 Follow the workaround described in <https://kb.vmware.com/kb/2148653>.

What to do next

To change account credentials, click **my vmware** on the top right corner and type in the appropriate credentials.

Download Update Bundle

When an update bundle is available, a notification is displayed on the SDDC Manager dashboard. You can view the available updates and determine the update bundle that you want to download. The downloaded bundle is then available in the bundle repository.

Prerequisites

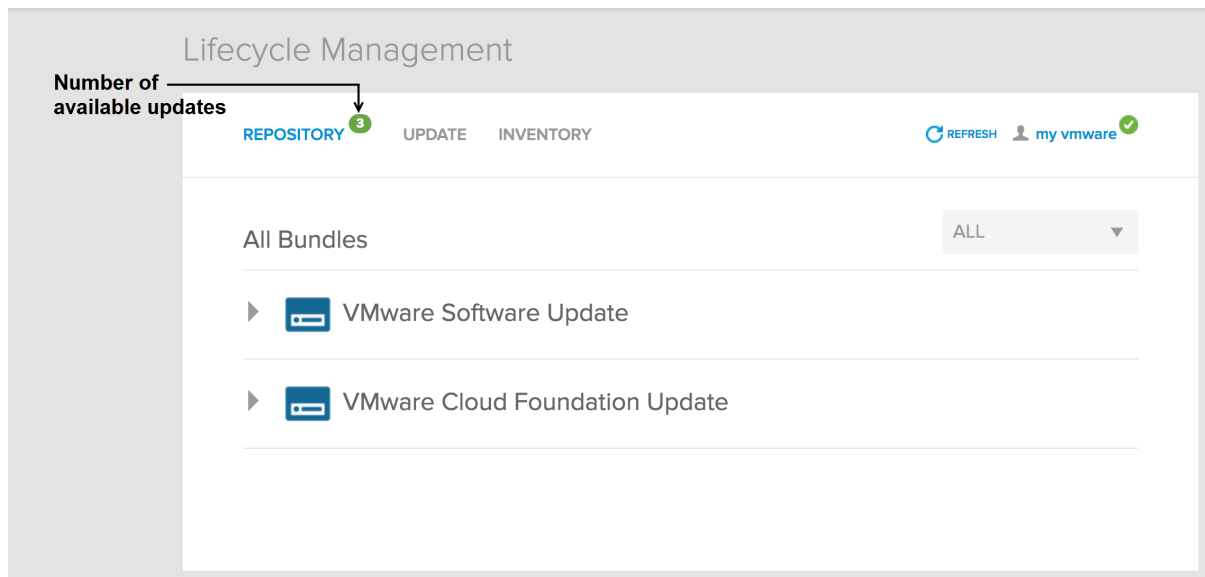
Sync the laptop where you are running the SDDC Manager client with the SDDC Manager NTP server.

Procedure

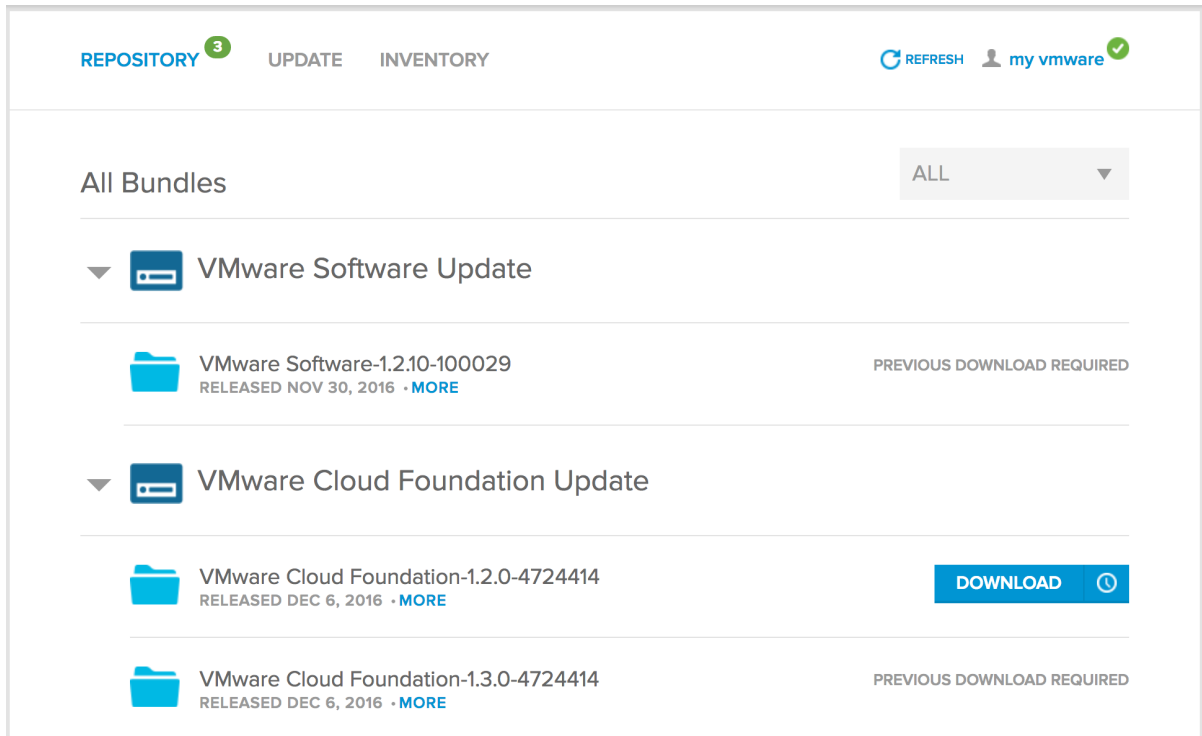
1 Do one of the following:

- Click the bundle notification on the SDDC Manager dashboard.
- In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The number of available updates is displayed next to the title of the **REPOSITORY** tab. The window is refreshed every 3 minutes to display the latest bundles on the SFTP server.



- Click the Cloud Foundation drop-down to see the available updates for Cloud Foundation components and the **VMware Software Update** drop-down to see vCenter Server and ESXi updates.




Since this tab mirrors the depot, all bundles may be displayed here independent of the version in your environment. However, the Download link will be enabled only for the bundles appropriate to your environment.

To view the metadata details for an update bundle, click **MORE** next to the release date of the bundle. The bundle severity levels are described in the table below.

Severity Value	Description
Critical	A problem which may severely impact your production systems (including the loss of production data). Such impacts could be system down or HA not functioning. A workaround is not in place.
Important	A problem may affect functionality, or cause a system to function in a severely reduced capacity. The situation causes significant impact to portions of the business operations and productivity. The system is exposed to potential loss or interruption of services. A change to support hardware enablement (for example, a driver update), or a new feature for an important product capability.
Moderate	A problem may affect partial non-critical functionality loss. This may be a minor issue with limited loss, no loss of functionality, or impact to the client's operations and issues in which there is an easy circumvention or avoidance by the end user. This includes documentation errors.
Low	A problem is considered low or no impact to a product's functionality or a client's operations. There is no impact on quality, performance, or functionality of the product.

You can filter bundles by status.

3 Do one of the following:

- Click **DOWNLOAD** to download the bundle right away.
- Click  next to **DOWNLOAD** to schedule the download. Select the date and time and then click **SCHEDULE**.

4 On the Review Download page, review the download schedule for the bundle. If the scheduled download has a dependency on other bundles, those downloads are automatically scheduled for download before the bundle you selected to download. For example, if there are update bundles available that have a release date prior to the one you are downloading, those bundles are force downloaded along with the bundle you selected.

Review Download

DOWNLOAD SCHEDULE

Tuesday, December 6, 2016 8:25 PM

BUNDLE TYPE	BUNDLE VERSION	RELEASED DATE	BUNDLE SIZE
VMware Cloud Foundation	1.2.0-4724414 MORE	Dec 6, 2016	360 MB

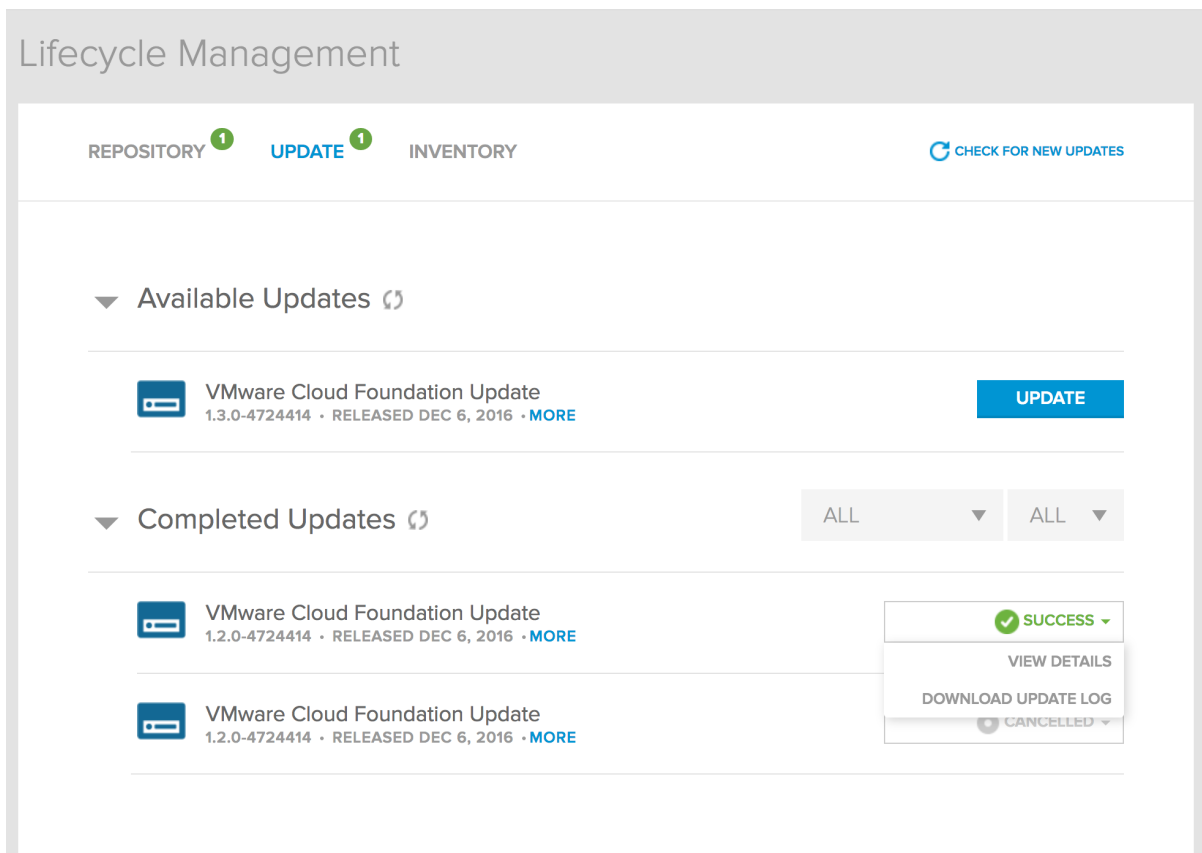
[CANCEL](#)[DOWNLOAD](#)

The Review Download page also displays the total bundle size (bundle you selected to download as well as dependent bundles that need to be force downloaded).

5 Click **DOWNLOAD**.

The status bar next to the bundle name shows the progress update. For bundles scheduled to be downloaded at a later time, the time remaining for the download to begin is displayed.

When the bundle is downloaded, the term **DOWNLOADED** is displayed next to the bundle.



If the download fails, possible errors may be recoverable or unrecoverable.

For a recoverable error, you can resolve the problem and then click **RETRY DOWNLOAD**. For example, the OOB agent for HMS may be down while you are downloading an SDDC Manager software update. After you restart the OOB agent, you can click **RETRY DOWNLOAD**.

For an unrecoverable error, you can view failure details by clicking **VIEW DETAILS**.

Select Targets and Schedule Update

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Even though SDDC Manager may be available while the update is applied, it is recommended that you schedule the update at a time when SDDC Manager is not being heavily used.

Note You cannot schedule an update while a workload is running. If an update is scheduled to start while a workload is in progress, the upgrade is cancelled.

Prerequisites

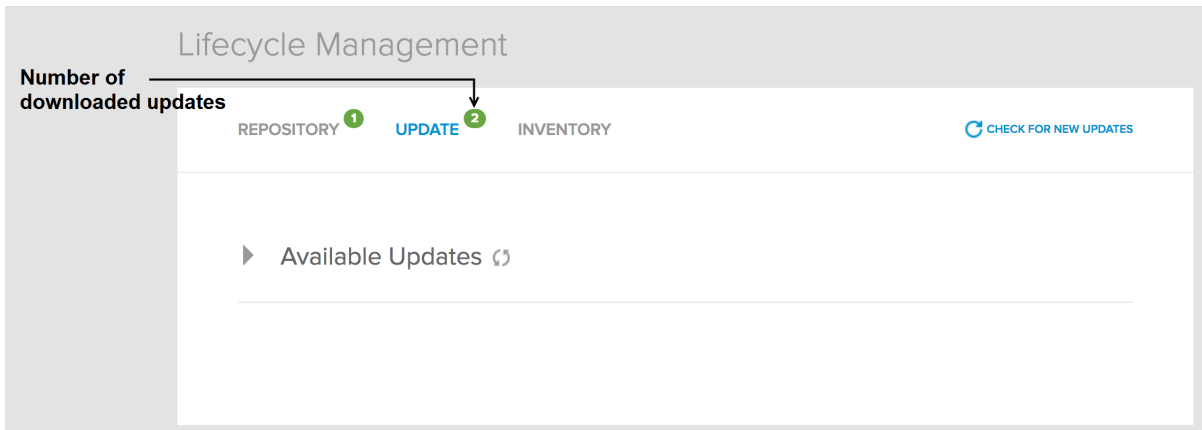
- 1 You must have downloaded the appropriate bundle so that it is available in the local repository.

- 2 Ensure that the SDDC Manager and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.
- 3 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

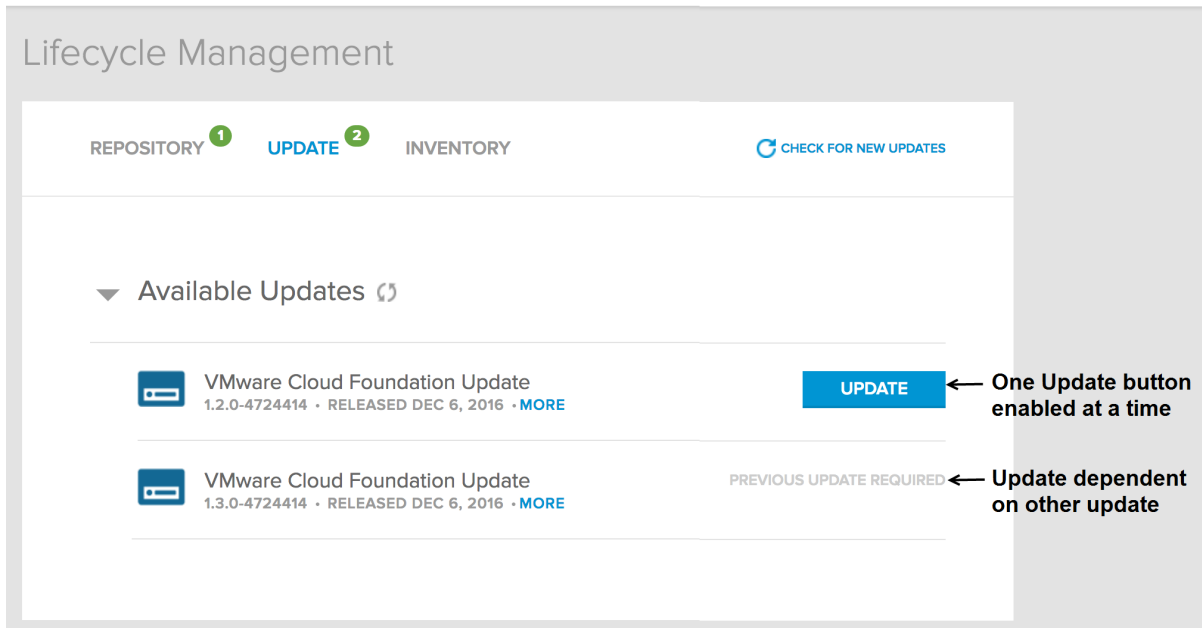
- 1 On the Lifecycle Management page, click the **UPDATES** tab.

The number of available updates is displayed next to the title of the **UPDATE** tab.



- 2 Click the drop-down next to Available Updates.

If an update is dependent on another update, it displays **PREVIOUS UPDATE REQUIRED**. Once the dependency update is installed, the **UPDATE** button becomes available. As an example, a VMware software update may be dependent on a Cloud Foundation update.



3 Click **UPDATE**.

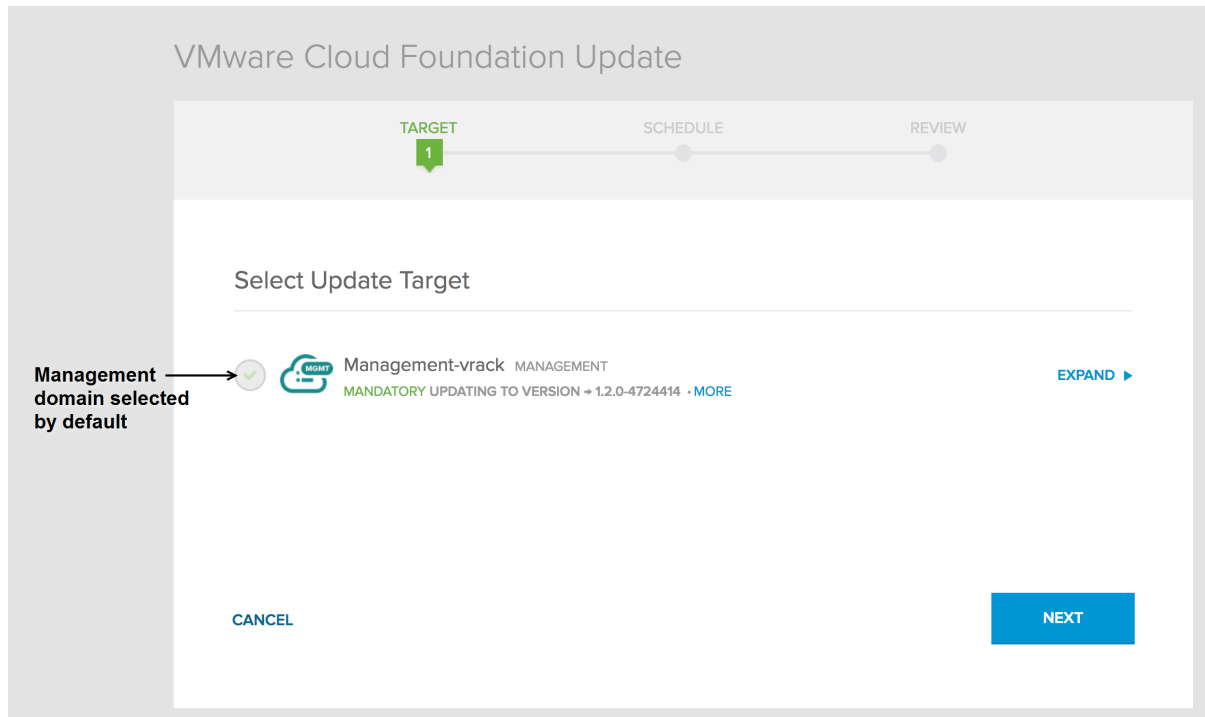
The **UPDATE** button is enabled only for one update at a time. Once you schedule a Cloud Foundation update, the UI allows you to schedule a VMware software update. However, VMware recommends that you schedule only one update at a time. Wait for the scheduled update to be installed successfully before scheduling another update.

The system validates that update pre-requisites are met before displaying the target selection.

4 On the **TARGET** page, select the domains where the update is to be applied.

When a new version of the software is available, it must be installed on the management domain. So the management domain is automatically selected for update and the checkbox next to it grayed out.

Click **EXPAND** next to the domain to see the areas of your datacenter that will be updated.



The targets on the primary rack (the rack that contains the PSCs) are updated before the targets on additional racks.

Note If you select only a subset of the domains in your datacenter to be updated, the update will be displayed in both the Available Updates section (since some domains are yet to be updated) as well the Scheduled Updates section. You cannot schedule an update on a failed domain. If the system does not let you select a domain, click the **INVENTORY** tab to check the status of the domain. Resolve the issue and then re-schedule the update.

- 5 Click **NEXT**.
- 6 On the **SCHEDULE** page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW

1
2
3

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT


Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW **3**

Review Update


Warning : Avoid any changes to the domains being upgraded until after the upgrade is complete

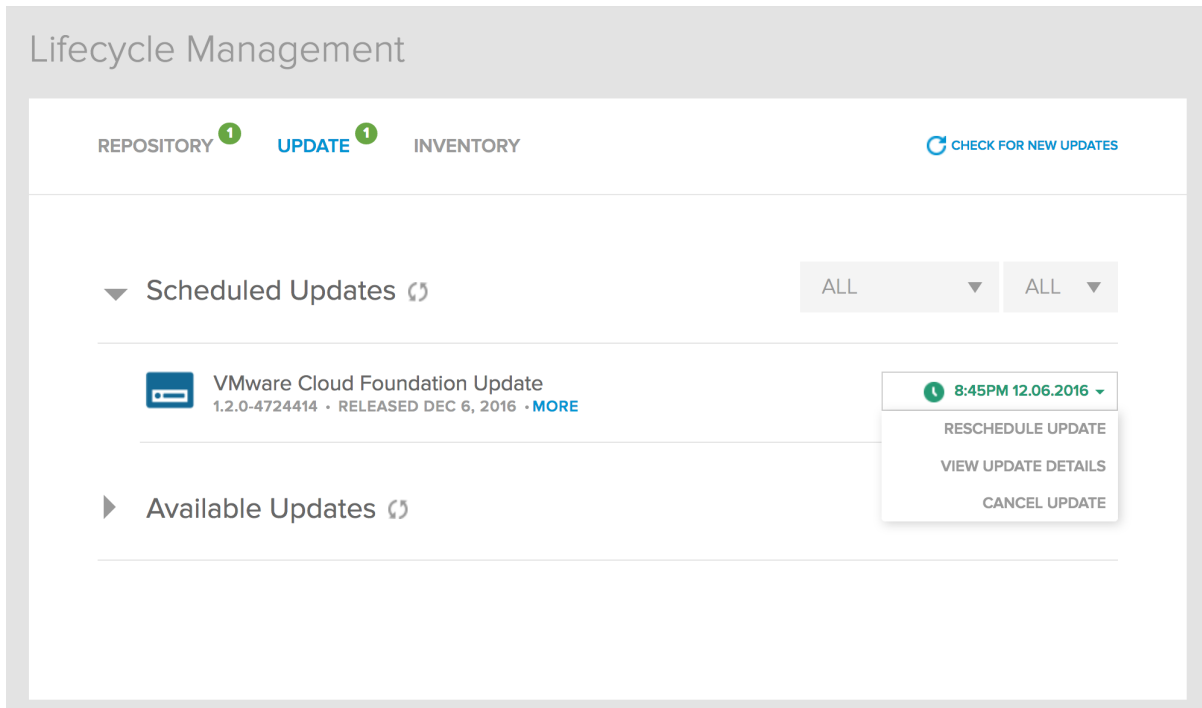
BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

BACK
CANCEL
SCHEDULE UPDATE

If you had selected multiple domains on the Target page, the Review Update page displays a notification that the management domain is updated first, followed by the other domains.

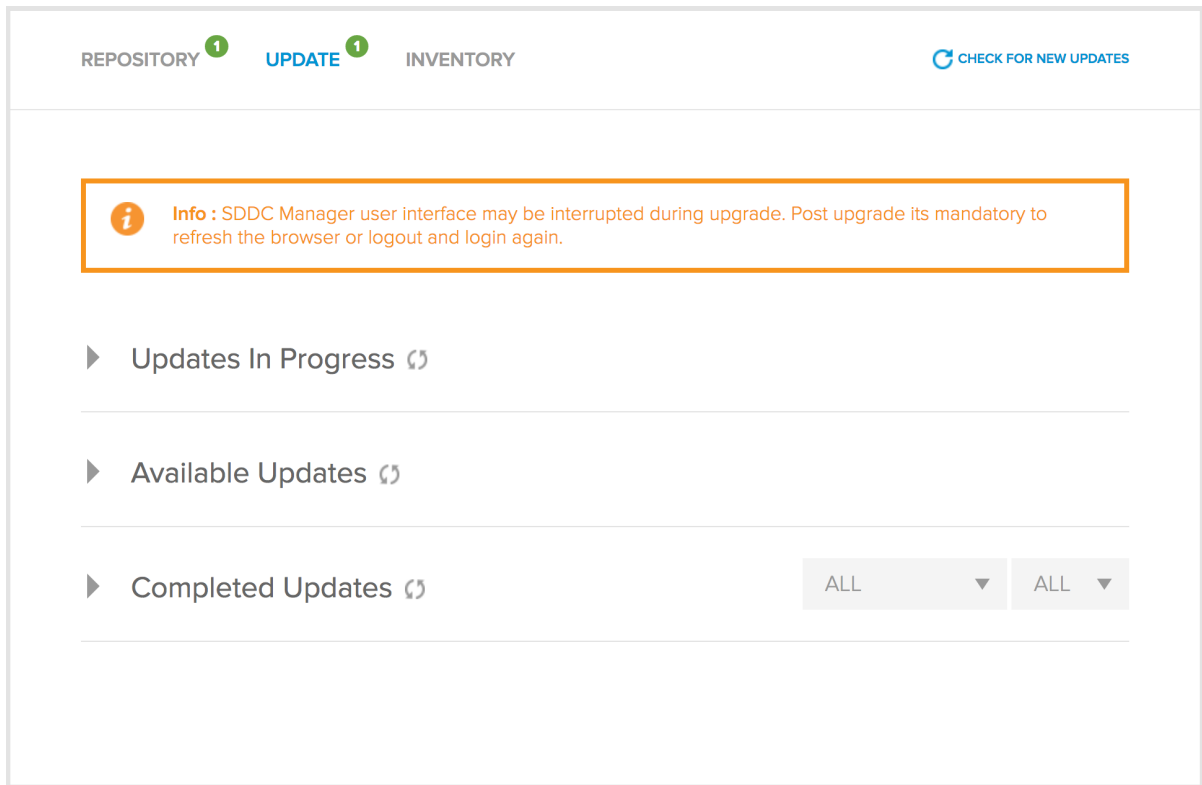
9 Click **SCHEDULE UPDATE**.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon.

If an update is scheduled to start while a workload is running, the update is cancelled so that the system is kept in a consistent state. You must re-schedule the update.

When an update is in progress, the Lifecycle Management page displays a warning message that the interface may be unresponsive and require user log out and back in after the update.



10 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status.

The screenshot displays the Lifecycle Management interface. At the top, there are tabs for 'REPOSITORY', 'UPDATE' (which is selected and has a notification badge), and 'INVENTORY'. A 'CHECK FOR NEW UPDATES' button is located in the top right corner. Below the tabs, there are two expandable sections: 'Available Updates' and 'Completed Updates'. The 'Completed Updates' section includes two dropdown menus, both currently set to 'ALL'. A list of updates is shown below, each with a VMware logo icon, the update name, version, release date, and a 'MORE' link. The updates include 'VMWARE_SOFTWARE Update' and 'VMware Cloud Foundation Update'. The 'VMware Cloud Foundation Update' (version 1.2.0-7944279) is marked as 'SUCCESS' and has a dropdown menu with options for 'VIEW DETAILS' and 'DOWNLOAD UPDATE LOG'. Other updates are marked as 'CANCELLED'.

- 11 To download the log file, click ▼ next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

Here is an example of why an update might fail. For a VMware software update, an ESXi update is installed on the ESXi hosts in the appropriate domain sequentially. During an update, the system puts each host into maintenance mode to perform the update on that host, and then tells the host to exit maintenance mode after its update is completed. If an issue on the host prevents it from entering maintenance mode, the update fails. This might happen when a VM is not protected by HA and cannot be migrated to another host. In this case, you can manually resolve this problem by enabling HA on that VM. Then navigate back to the **UPDATE** tab and click **Available Updates**. Re-schedule the update and follow the update progress on the **Update Status** page.

Select Targets and Schedule Update

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Even though SDDC Manager may be available while the update is applied, it is recommended that you schedule the update at a time when SDDC Manager is not being heavily used.

Note You cannot schedule an update while a workload is running. If an update is scheduled to start while a workload is in progress, the upgrade is cancelled.

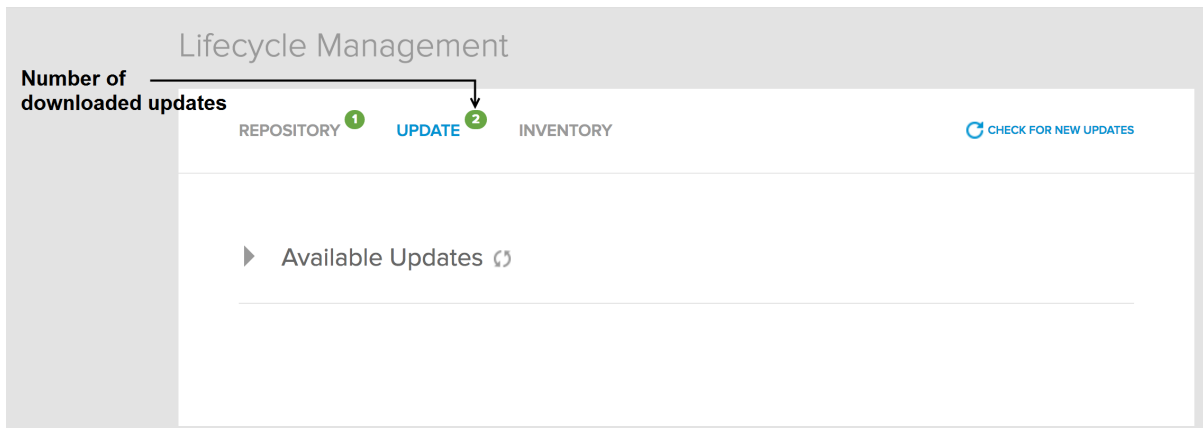
Prerequisites

- 1 You must have downloaded the appropriate bundle so that it is available in the local repository.
- 2 Ensure that the SDDC Manager and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.
- 3 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

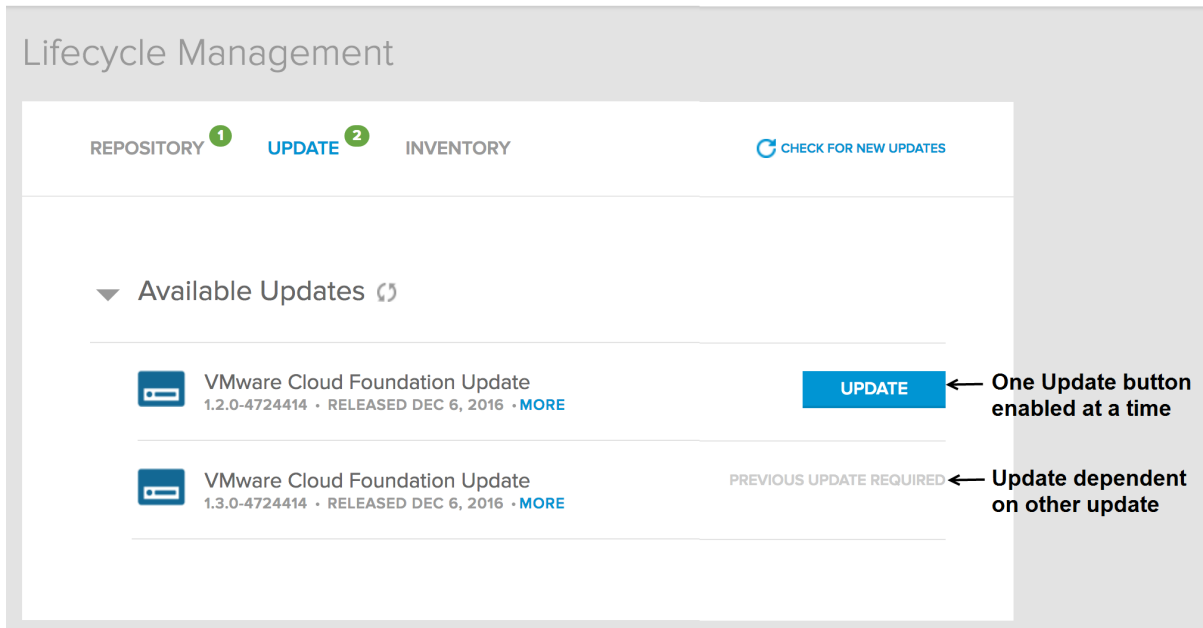
- 1 On the Lifecycle Management page, click the **UPDATES** tab.

The number of available updates is displayed next to the title of the **UPDATE** tab.



- 2 Click the drop-down next to Available Updates.

If an update is dependent on another update, it displays **PREVIOUS UPDATE REQUIRED**. Once the dependency update is installed, the **UPDATE** button becomes available. As an example, a VMware software update may be dependent on a Cloud Foundation update.



3 Click **UPDATE**.

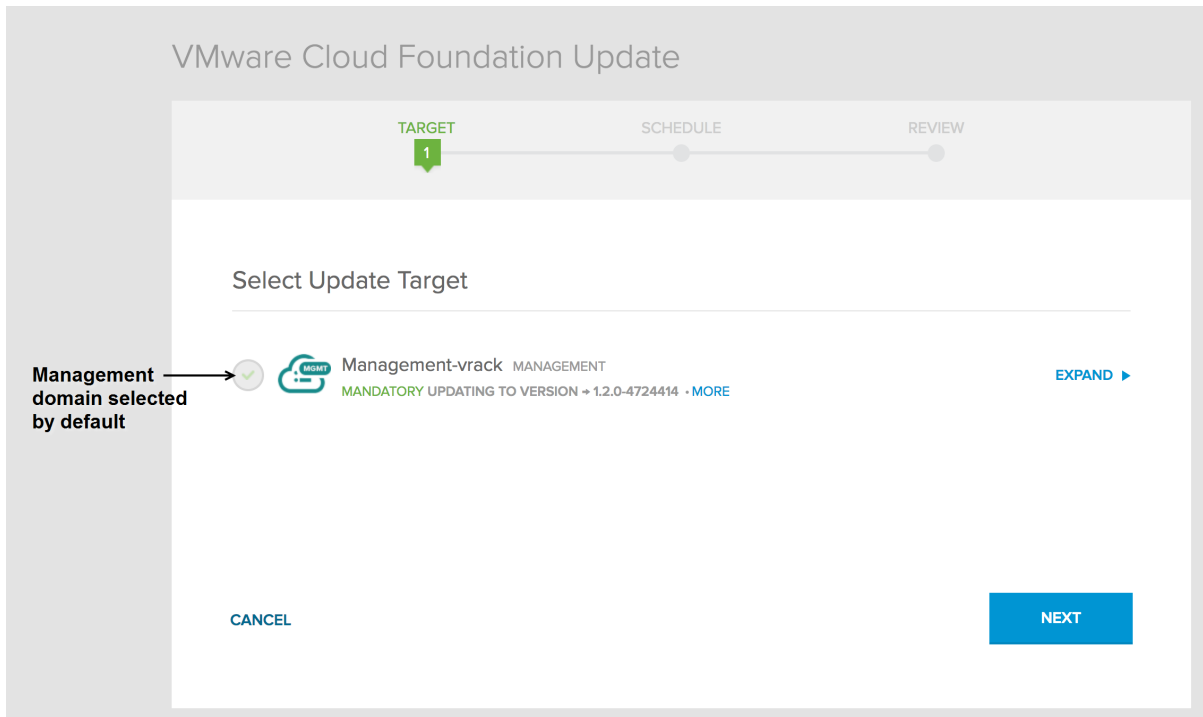
The **UPDATE** button is enabled only for one update at a time. Once you schedule a Cloud Foundation update, the UI allows you to schedule a VMware software update. However, VMware recommends that you schedule only one update at a time. Wait for the scheduled update to be installed successfully before scheduling another update.

The system validates that update pre-requisites are met before displaying the target selection.

4 On the **TARGET** page, select the domains where the update is to be applied.

When a new version of the software is available, it must be installed on the management domain. So the management domain is automatically selected for update and the checkbox next to it grayed out.

Click **EXPAND** next to the domain to see the areas of your datacenter that will be updated.



The targets on the primary rack (the rack that contains the PSCs) are updated before the targets on additional racks.

Note If you select only a subset of the domains in your datacenter to be updated, the update will be displayed in both the Available Updates section (since some domains are yet to be updated) as well the Scheduled Updates section. You cannot schedule an update on a failed domain. If the system does not let you select a domain, click the **INVENTORY** tab to check the status of the domain. Resolve the issue and then re-schedule the update.

- 5 Click **NEXT**.
- 6 On the **SCHEDULE** page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW

1
2
3

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT


Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.

VMware Cloud Foundation Update

TARGET SCHEDULE REVIEW 3

Review Update

 **Warning :** Avoid any changes to the domains being upgraded until after the upgrade is complete

BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

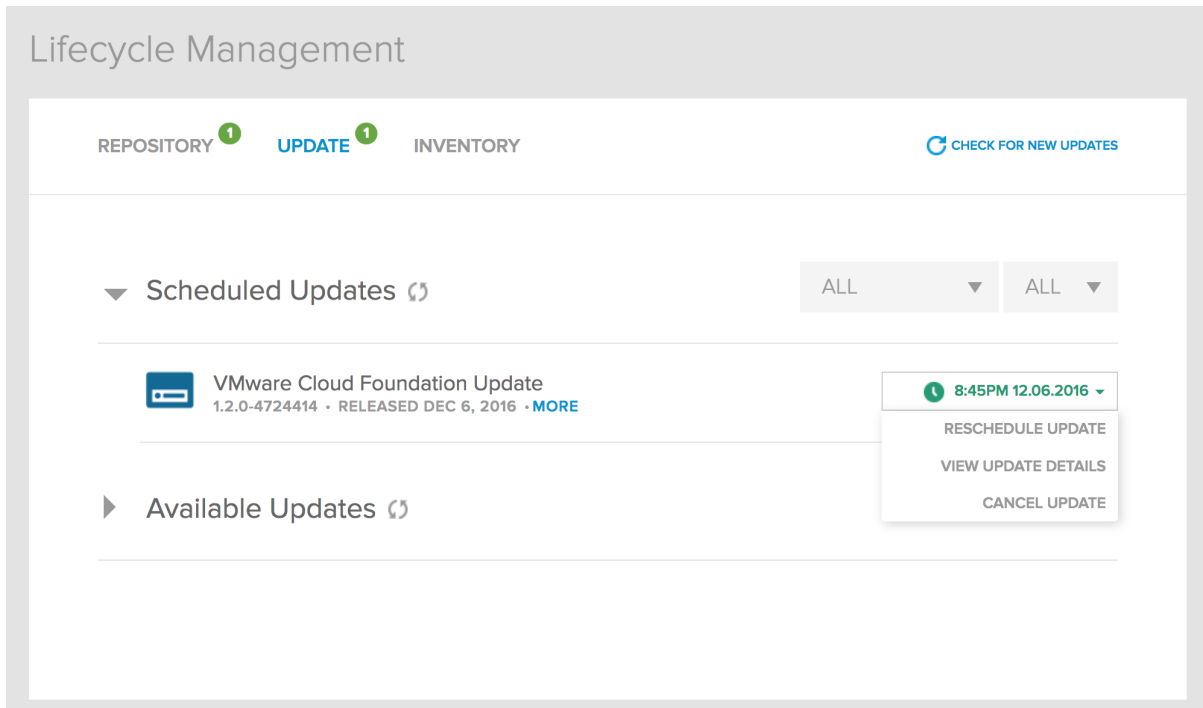
BACK

CANCEL

SCHEDULE UPDATE

If you had selected multiple domains on the Target page, the Review Update page displays a notification that the management domain is updated first, followed by the other domains.

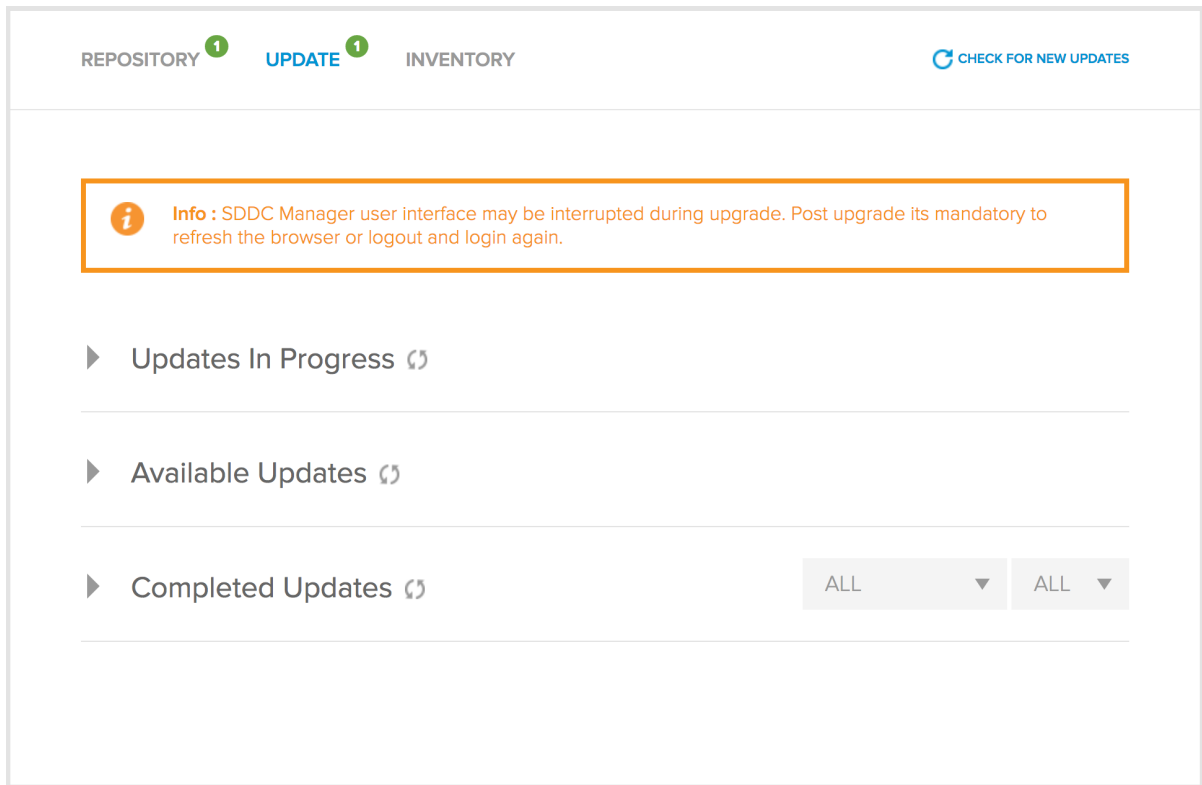
- 9 Click **SCHEDULE UPDATE**.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon.

If an update is scheduled to start while a workload is running, the update is cancelled so that the system is kept in a consistent state. You must re-schedule the update.

When an update is in progress, the Lifecycle Management page displays a warning message that the interface may be unresponsive and require user log out and back in after the update.



10 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status.

The screenshot shows the 'Lifecycle Management' interface with the 'UPDATE' tab selected. The 'UPDATE' tab has a notification badge with the number '1'. Below the tabs, there is a 'CHECK FOR NEW UPDATES' button. The main content area is divided into two sections: 'Available Updates' and 'Completed Updates'. The 'Completed Updates' section has two dropdown menus, both set to 'ALL'. Below these, there is a list of updates. Each update entry includes a VMware logo, the update name, version, release date, and a 'MORE' link. To the right of each entry is a status button. The third update, 'VMware Cloud Foundation Update 1.2.0-7944279', is marked as 'SUCCESS' and has a dropdown menu with options 'VIEW DETAILS' and 'DOWNLOAD UPDATE LOG'. The other updates are marked as 'CANCELLED'.

Update Name	Version	Release Date	Status	Actions
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	SUCCESS	VIEW DETAILS, DOWNLOAD UPDATE LOG
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	CANCELLED	

- 11 To download the log file, click next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

Here is an example of why an update might fail. For a VMware software update, an ESXi update is installed on the ESXi hosts in the appropriate domain sequentially. During an update, the system puts each host into maintenance mode to perform the update on that host, and then tells the host to exit maintenance mode after its update is completed. If an issue on the host prevents it from entering maintenance mode, the update fails. This might happen when a VM is not protected by HA and cannot be migrated to another host. In this case, you can manually resolve this problem by enabling HA on that VM. Then navigate back to the **UPDATE** tab and click **Available Updates**. Re-schedule the update and follow the update progress on the **Update Status** page.

Upgrade Cloud Foundation to 2.1.2

You can upgrade to Cloud Foundation 2.1.2 only if you are at Cloud Foundation 2.1.1. If your environment includes a Cloud Foundation version prior to 2.1.1, you must first upgrade to 2.1.1 and then upgrade to 2.1.1.

Upgrading Cloud Foundation is a multi step process. You must follow each step in the order in which it is documented.

Prerequisites

Complete the [Prerequisites for Upgrading VMware Software](#)

Procedure

1 [Login to your VMware Account](#)

You must sign in to your VMware account so that LCM can access update bundles from the VMware depot.

2 [Download Update Bundle](#)

When an update bundle is available, a notification is displayed on the SDDC Manager dashboard. You can view the available updates and determine the update bundle that you want to download. The downloaded bundle is then available in the bundle repository.

3 [Select Targets and Schedule Update](#)

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Login to your VMware Account

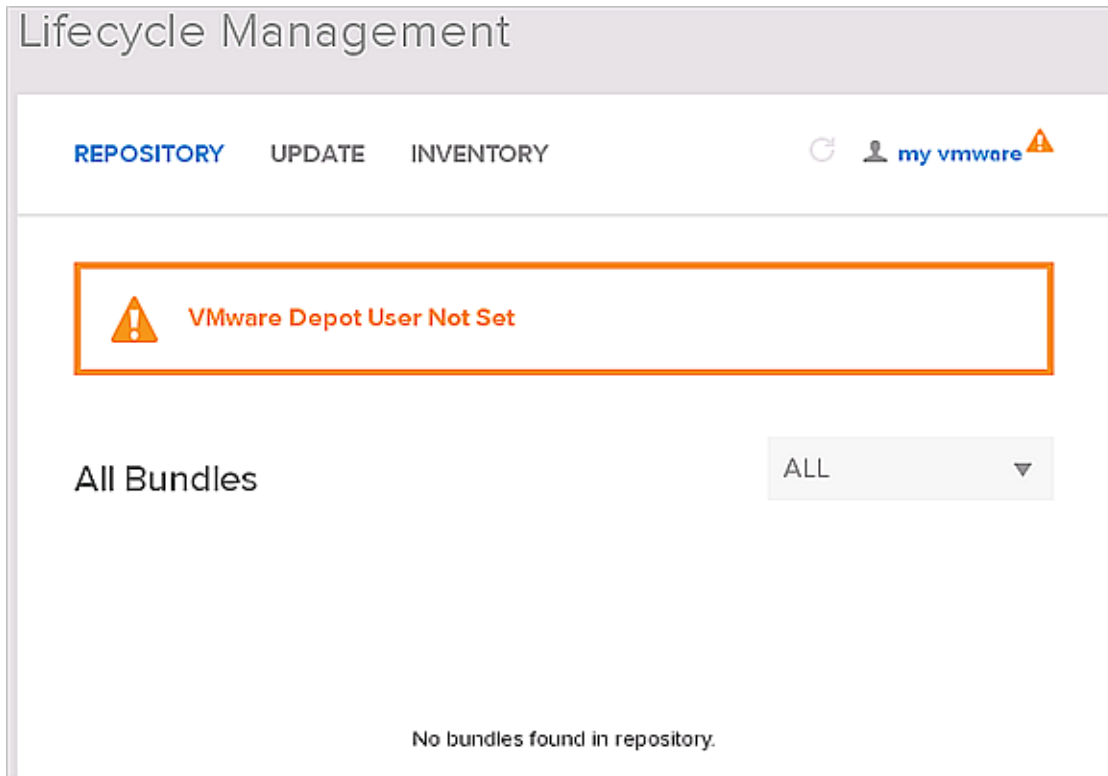
You must sign in to your VMware account so that LCM can access update bundles from the VMware depot.

If you do not have external connectivity on the rack, see [Use a Proxy Server to Download Upgrade Bundles](#).

Procedure

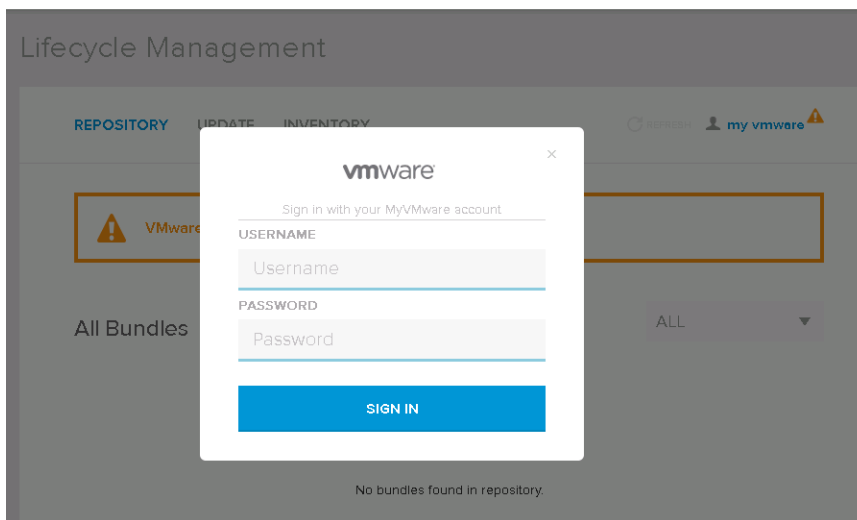
1 In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The Lifecycle Management page appears with a message saying that the VMware depot user has not been set.



- 2 Click **my vmware** on the top right corner.

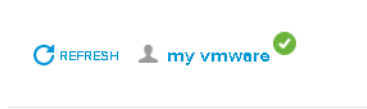
The sign in page appears.



- 3 Type your VMware account user name and password.

4 Click **SIGN IN**.

The top right corner of the window displays a green check mark.



5 Follow the workaround described in <https://kb.vmware.com/kb/2148653>.

What to do next

To change account credentials, click **my vmware** on the top right corner and type in the appropriate credentials.

Download Update Bundle

When an update bundle is available, a notification is displayed on the SDDC Manager dashboard. You can view the available updates and determine the update bundle that you want to download. The downloaded bundle is then available in the bundle repository.

Prerequisites

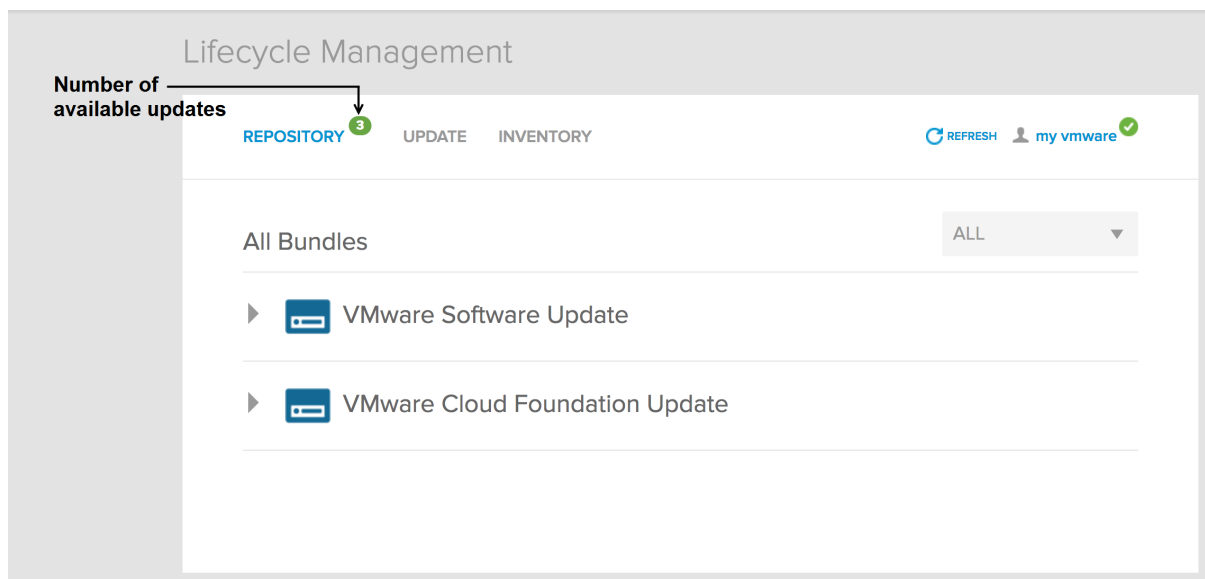
Sync the laptop where you are running the SDDC Manager client with the SDDC Manager NTP server.

Procedure

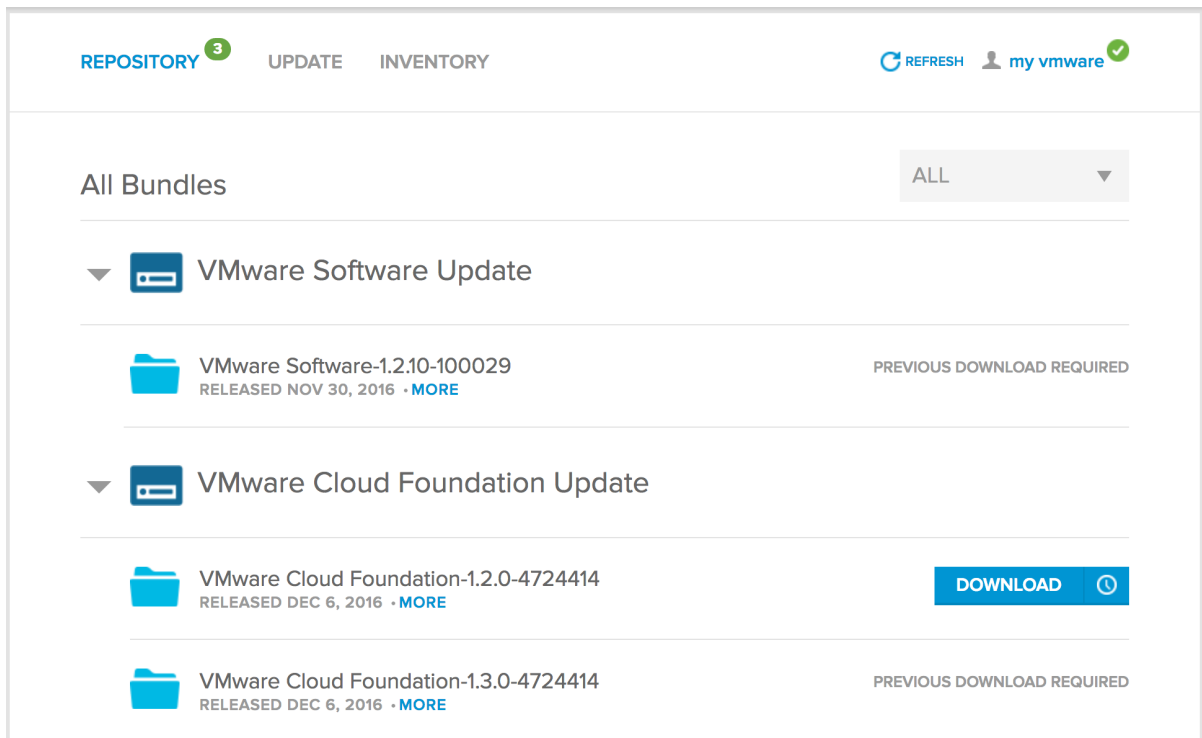
1 Do one of the following:

- Click the bundle notification on the SDDC Manager dashboard.
- In the SDDC Manager web interface, click **LIFECYCLE** on the left navigation pane.

The number of available updates is displayed next to the title of the **REPOSITORY** tab. The window is refreshed every 3 minutes to display the latest bundles on the SFTP server.



- Click the Cloud Foundation drop-down to see the available updates for Cloud Foundation components and the **VMware Software Update** drop-down to see vCenter Server and ESXi updates.




Since this tab mirrors the depot, all bundles may be displayed here independent of the version in your environment. However, the Download link will be enabled only for the bundles appropriate to your environment.

To view the metadata details for an update bundle, click **MORE** next to the release date of the bundle. The bundle severity levels are described in the table below.

Severity Value	Description
Critical	A problem which may severely impact your production systems (including the loss of production data). Such impacts could be system down or HA not functioning. A workaround is not in place.
Important	A problem may affect functionality, or cause a system to function in a severely reduced capacity. The situation causes significant impact to portions of the business operations and productivity. The system is exposed to potential loss or interruption of services. A change to support hardware enablement (for example, a driver update), or a new feature for an important product capability.
Moderate	A problem may affect partial non-critical functionality loss. This may be a minor issue with limited loss, no loss of functionality, or impact to the client's operations and issues in which there is an easy circumvention or avoidance by the end user. This includes documentation errors.
Low	A problem is considered low or no impact to a product's functionality or a client's operations. There is no impact on quality, performance, or functionality of the product.

You can filter bundles by status.

3 Do one of the following:

- Click **DOWNLOAD** to download the bundle right away.
- Click  next to **DOWNLOAD** to schedule the download. Select the date and time and then click **SCHEDULE**.

4 On the Review Download page, review the download schedule for the bundle. If the scheduled download has a dependency on other bundles, those downloads are automatically scheduled for download before the bundle you selected to download. For example, if there are update bundles available that have a release date prior to the one you are downloading, those bundles are force downloaded along with the bundle you selected.

Review Download

DOWNLOAD SCHEDULE

Tuesday, December 6, 2016 8:25 PM

BUNDLE TYPE	BUNDLE VERSION	RELEASED DATE	BUNDLE SIZE
VMware Cloud Foundation	1.2.0-4724414 MORE	Dec 6, 2016	360 MB

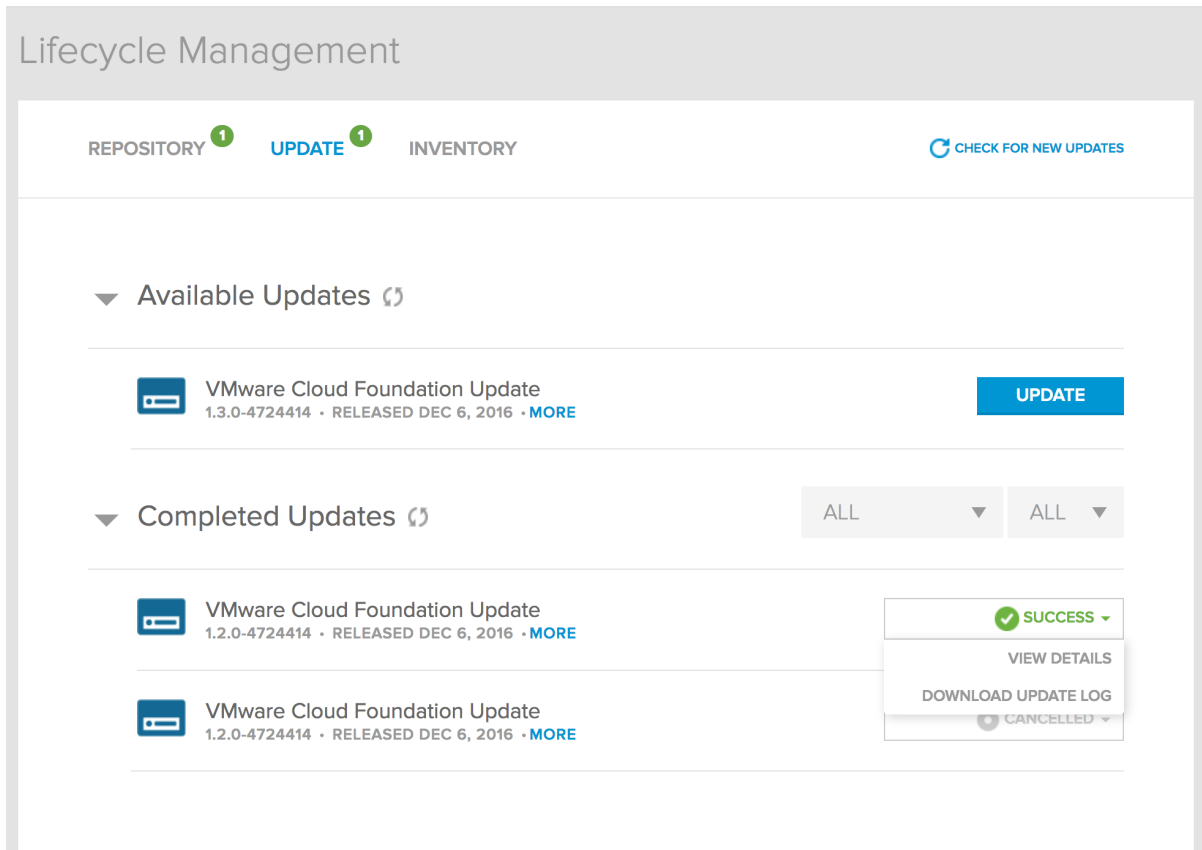
[CANCEL](#)[DOWNLOAD](#)

The Review Download page also displays the total bundle size (bundle you selected to download as well as dependent bundles that need to be force downloaded).

5 Click **DOWNLOAD**.

The status bar next to the bundle name shows the progress update. For bundles scheduled to be downloaded at a later time, the time remaining for the download to begin is displayed.

When the bundle is downloaded, the term **DOWNLOADED** is displayed next to the bundle.



If the download fails, possible errors may be recoverable or unrecoverable.

For a recoverable error, you can resolve the problem and then click **RETRY DOWNLOAD**. For example, the OOB agent for HMS may be down while you are downloading an SDDC Manager software update. After you restart the OOB agent, you can click **RETRY DOWNLOAD**.

For an unrecoverable error, you can view failure details by clicking **VIEW DETAILS**.

Select Targets and Schedule Update

You can schedule an update after it has been downloaded. You can also view updates in progress, scheduled updates, and installed updates.

Even though SDDC Manager may be available while the update is applied, it is recommended that you schedule the update at a time when SDDC Manager is not being heavily used.

Note You cannot schedule an update while a workload is running. If an update is scheduled to start while a workload is in progress, the upgrade is cancelled.

Prerequisites

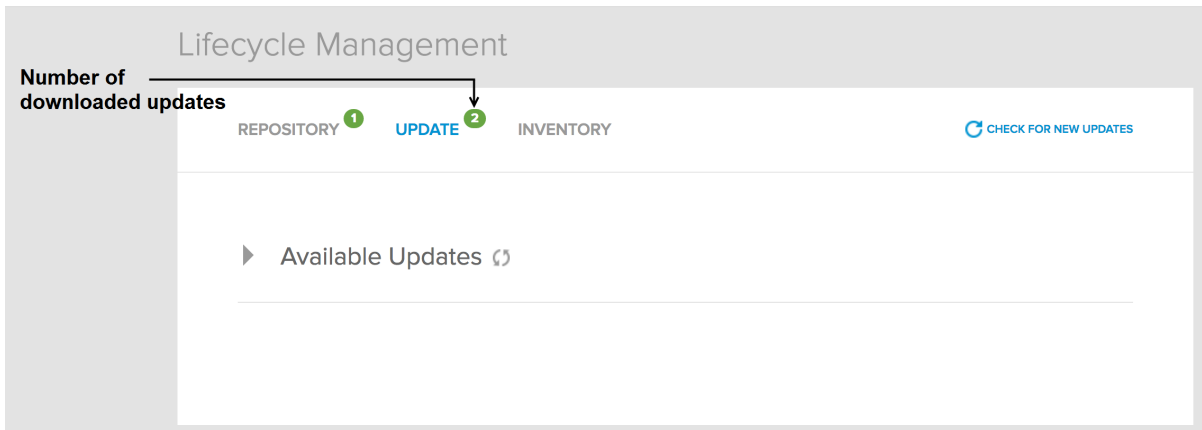
- 1 You must have downloaded the appropriate bundle so that it is available in the local repository.

- 2 Ensure that the SDDC Manager and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.
- 3 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

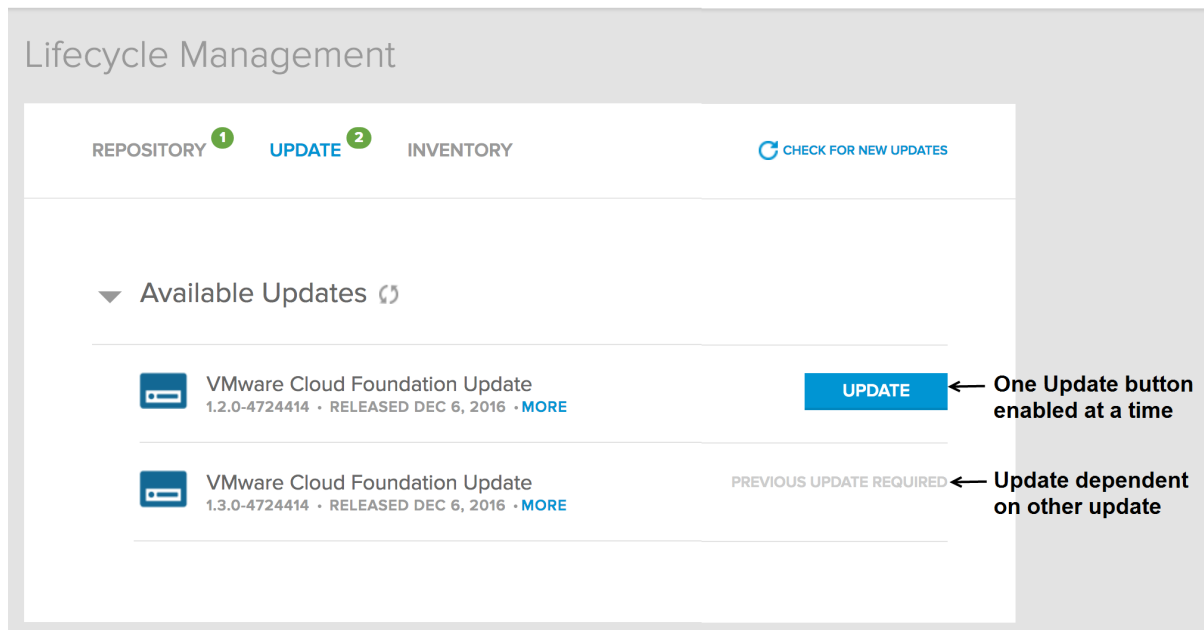
- 1 On the Lifecycle Management page, click the **UPDATES** tab.

The number of available updates is displayed next to the title of the **UPDATE** tab.



- 2 Click the drop-down next to Available Updates.

If an update is dependent on another update, it displays **PREVIOUS UPDATE REQUIRED**. Once the dependency update is installed, the **UPDATE** button becomes available. As an example, a VMware software update may be dependent on a Cloud Foundation update.



3 Click **UPDATE**.

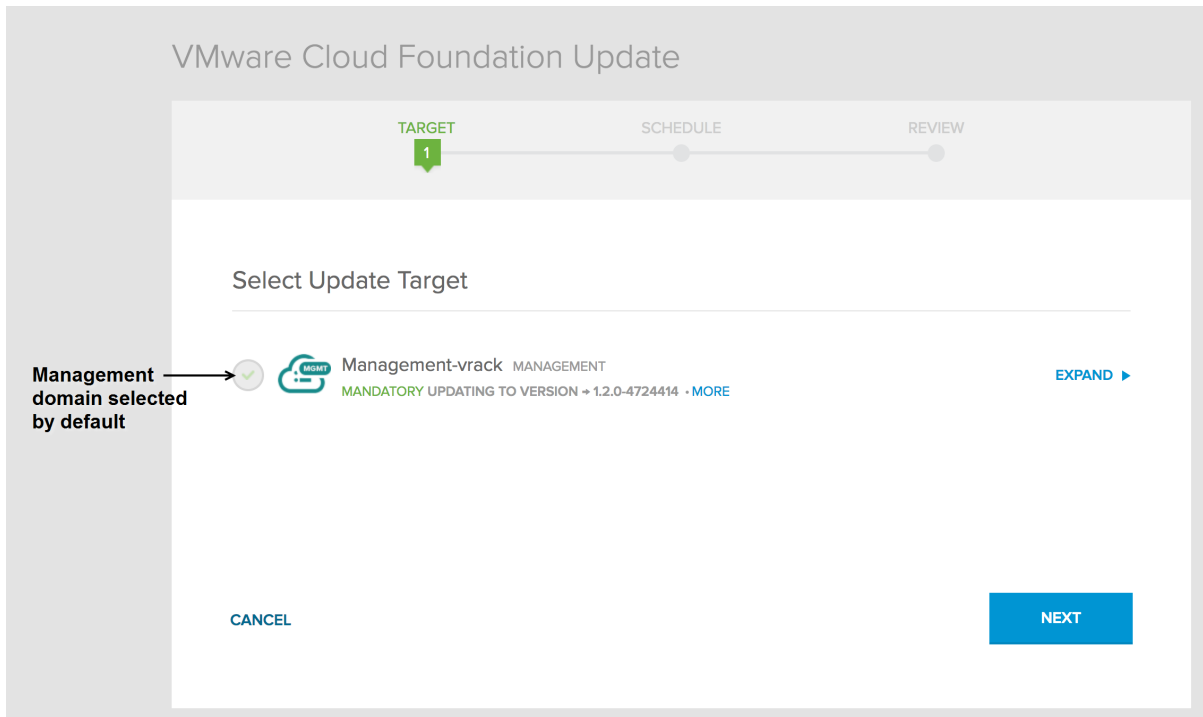
The **UPDATE** button is enabled only for one update at a time. Once you schedule a Cloud Foundation update, the UI allows you to schedule a VMware software update. However, VMware recommends that you schedule only one update at a time. Wait for the scheduled update to be installed successfully before scheduling another update.

The system validates that update pre-requisites are met before displaying the target selection.

4 On the **TARGET** page, select the domains where the update is to be applied.

When a new version of the software is available, it must be installed on the management domain. So the management domain is automatically selected for update and the checkbox next to it grayed out.

Click **EXPAND** next to the domain to see the areas of your datacenter that will be updated.



The targets on the primary rack (the rack that contains the PSCs) are updated before the targets on additional racks.

Note If you select only a subset of the domains in your datacenter to be updated, the update will be displayed in both the Available Updates section (since some domains are yet to be updated) as well the Scheduled Updates section. You cannot schedule an update on a failed domain. If the system does not let you select a domain, click the **INVENTORY** tab to check the status of the domain. Resolve the issue and then re-schedule the update.

- 5 Click **NEXT**.
- 6 On the **SCHEDULE** page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW

1
2
3

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT


Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.

VMware Cloud Foundation Update

TARGET SCHEDULE REVIEW 3

Review Update

 **Warning :** Avoid any changes to the domains being upgraded until after the upgrade is complete

BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

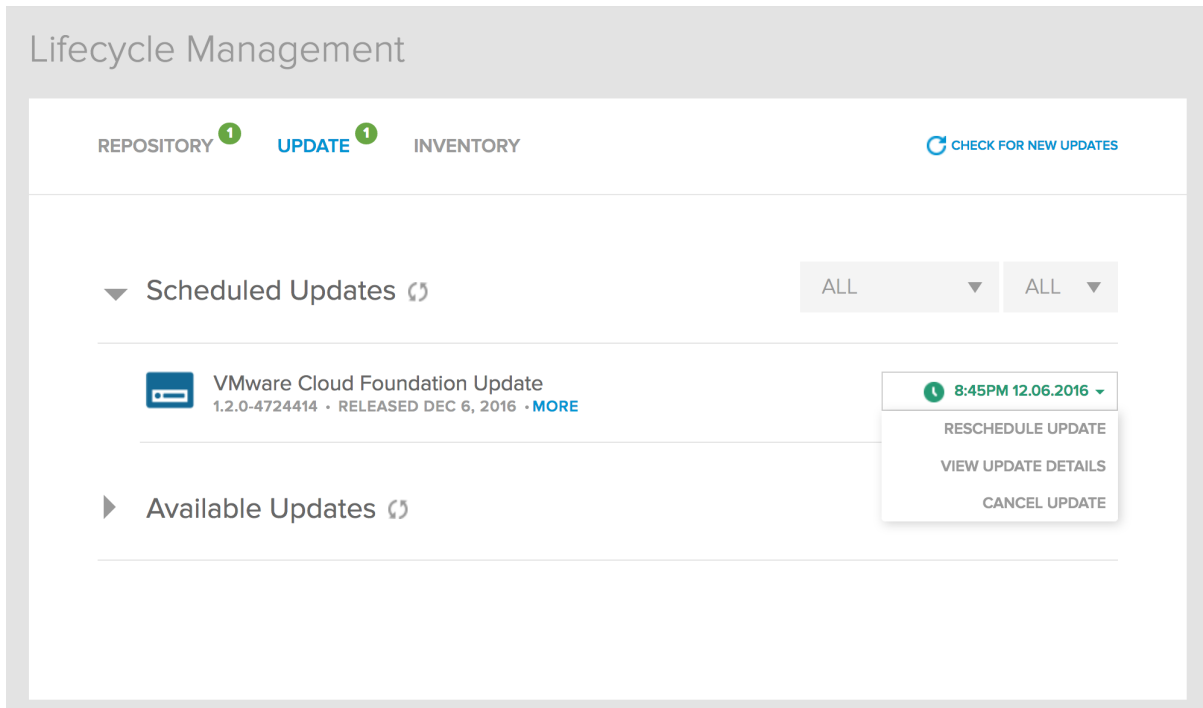
BACK

CANCEL

SCHEDULE UPDATE

If you had selected multiple domains on the Target page, the Review Update page displays a notification that the management domain is updated first, followed by the other domains.

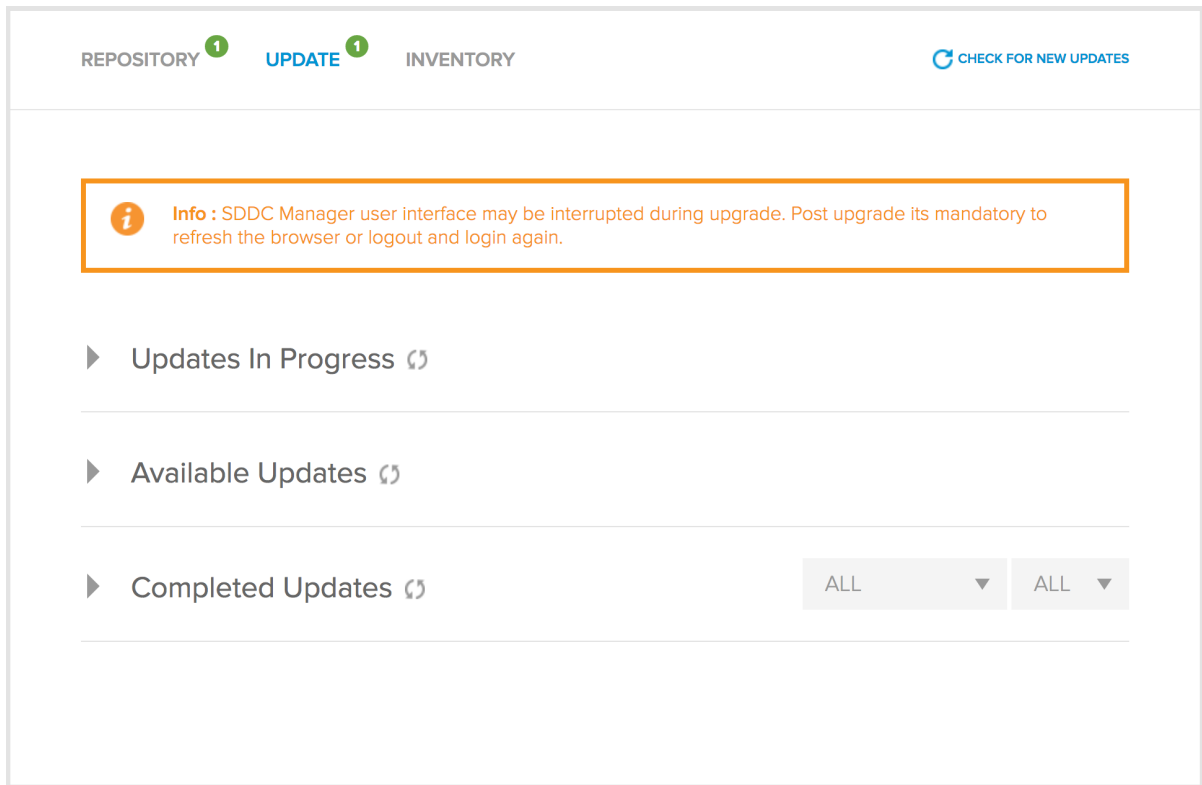
- 9 Click **SCHEDULE UPDATE**.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon.

If an update is scheduled to start while a workload is running, the update is cancelled so that the system is kept in a consistent state. You must re-schedule the update.

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10 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status.

The screenshot shows the 'Lifecycle Management' interface with the 'UPDATE' tab selected. The 'UPDATE' tab has a notification badge with the number '1'. Below the tabs are sections for 'Available Updates' and 'Completed Updates'. The 'Completed Updates' section has two dropdown menus, both set to 'ALL'. A list of updates is displayed below, each with a VMware logo icon, update name, version, release date, and a 'MORE' link. The status of each update is shown in a box on the right: 'CANCELLED' for failed updates and 'SUCCESS' for completed ones. For the successful 'VMware Cloud Foundation Update', a dropdown menu is open showing 'VIEW DETAILS' and 'DOWNLOAD UPDATE LOG' options.

Update Name	Version	Released	Status
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	SUCCESS
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	SUCCESS
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	CANCELLED

- 11 To download the log file, click next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

Here is an example of why an update might fail. For a VMware software update, an ESXi update is installed on the ESXi hosts in the appropriate domain sequentially. During an update, the system puts each host into maintenance mode to perform the update on that host, and then tells the host to exit maintenance mode after its update is completed. If an issue on the host prevents it from entering maintenance mode, the update fails. This might happen when a VM is not protected by HA and cannot be migrated to another host. In this case, you can manually resolve this problem by enabling HA on that VM. Then navigate back to the **UPDATE** tab and click **Available Updates**. Re-schedule the update and follow the update progress on the **Update Status** page.

Upgrade Cloud Foundation to 2.1.3

You can upgrade to Cloud Foundation 2.1.3 only if you are at Cloud Foundation 2.1.2. If your environment includes a Cloud Foundation version prior to 2.1.2, you must first upgrade to 2.1.2 and then upgrade to 2.1.3.

Upgrading Cloud Foundation is a multi step process. You must follow each step in the order in which it is documented.

Prerequisites

Ensure that the following prerequisites are met before you begin the upgrade:

- [General Prerequisites Before Upgrading](#)
- [Prerequisites for Upgrading VMware Software](#)

Procedure

1 [Upgrade VMware Cloud Foundation Software on Management Domain for 2.1.3](#)

You begin by upgrading the VMware Cloud Foundation software on the management domain.

2 [Upgrade ISVMs on Rack 1 for 2.1.3](#)

3 [Upgrade Third Party Software for 2.1.3](#)

The third party upgrade script is part of the Cloud Foundation bundle and is located in the SDDC Manager VM.

4 [Upgrade VMware Software on Management Domain for 2.1.3](#)

Applying the VMware software bundle upgrades the VMware software that is part of Cloud Foundation software.

5 [Upgrade VMware Software on VDI and VI Domains for 2.1.3](#)

Upgrade VMware software on the other domains in your environment. It is recommended that you upgrade one domain at a time.

Upgrade VMware Cloud Foundation Software on Management Domain for 2.1.3

You begin by upgrading the VMware Cloud Foundation software on the management domain.

Prerequisites

- 1 Ensure that the SDDC Manager (VRM, LCM) and HMS are at the same version. In a dual rack scenario, the SDDC Manager and HMS versions must be the same on both racks. To confirm this, click the **LIFECYCLE** tab and then click **INVENTORY**.

- 2 Ensure that the existing version of Horizon View is compatible with the software versions in the LCM update you are applying. Refer to the VMware Product Interoperability Matrixes at http://www.vmware.com/resources/compatibility/sim/interop_matrix.php#db. If there is a mismatch, manually upgrade the Horizon View components before applying the LCM patch. Refer to the Horizon View documentation on www.vmware.com/support/pubs.

Procedure

- 1 Save VMware account credentials. See [Login to your VMware Account](#).
- 2 Download all available update bundles. See [Download Update Bundle](#).
- 3 On the Lifecycle Management page, click the **UPDATES** tab.
The number of available updates is displayed next to the title of the **UPDATE** tab.
- 4 Click the drop-down next to **Available Updates**.
- 5 Click the **UPDATE** button next to the VMware Cloud Foundation update.
On the TARGET page, the management domain is selected by default.
- 6 Click **NEXT**.
- 7 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

VMware Cloud Foundation Update

TARGET
SCHEDULE
REVIEW

1
2
3

Select Update Schedule

◀ December 2016 ▶

SUN	MON	TUE	WED	THU	FRI	SAT
27	28	29	30	01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
01	02	03	04	05	06	07

DATE

2016-12-06

TIME

08:40:PM
⌚

BACK
CANCEL
NEXT

Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 8 Click **NEXT**.
- 9 On the Review Update page, review the update bundle, targets, and schedule. An example screenshot is provided below.


VMware Cloud Foundation Update

TARGET

SCHEDULE

REVIEW 3

Review Update

 **Warning :** Avoid any changes to the domains being upgraded until after the upgrade is complete

BUNDLE TYPE	UPDATE SCHEDULE
VMware Cloud Foundation Update	12/06/2016 8:45PM

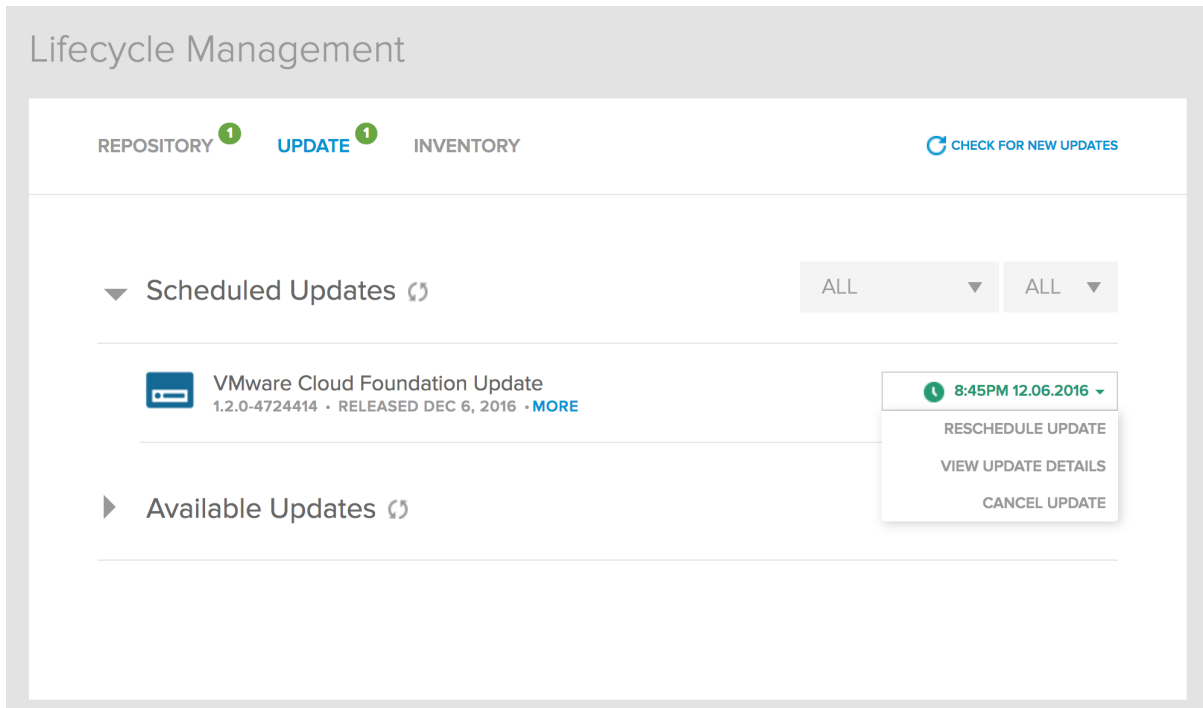
UPDATE TARGETS	UPDATE VERSION
Management-vrack <small>MANAGEMENT</small>	1.2.0-4724414

BACK

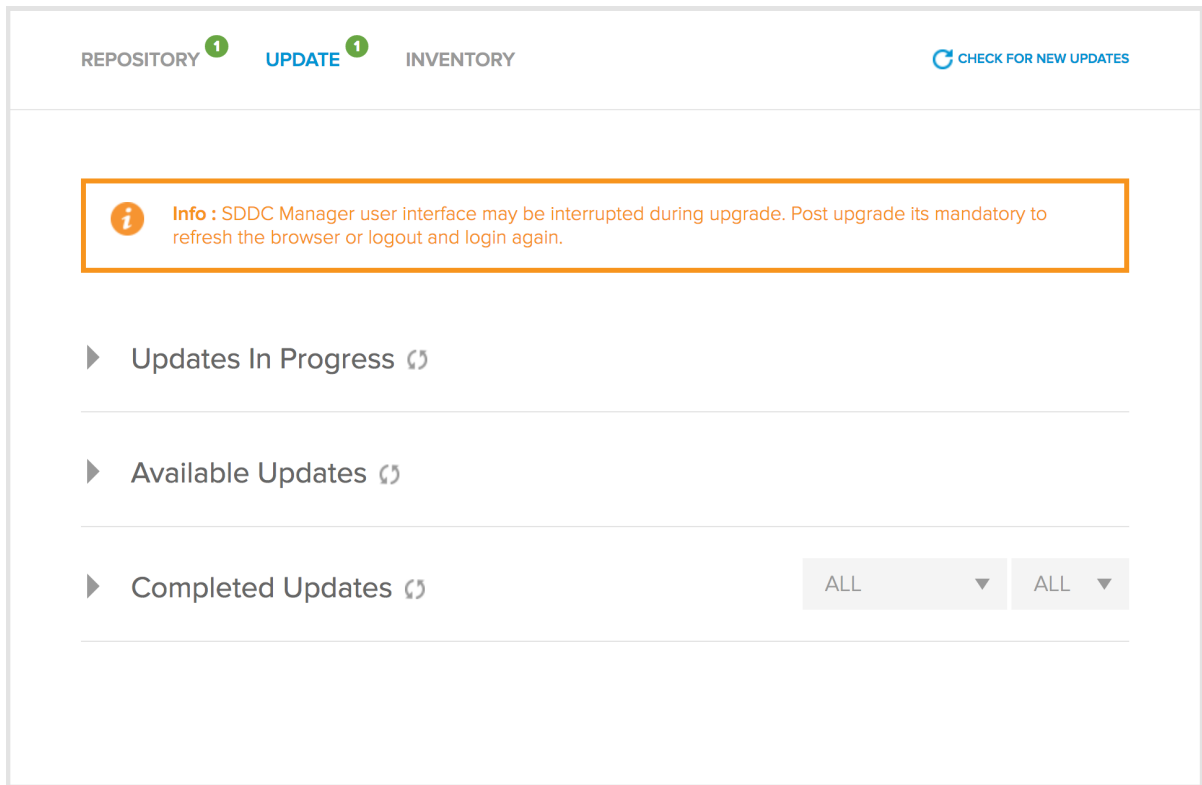
CANCEL

SCHEDULE UPDATE

10 Click **SCHEDULE UPDATE**. An example screenshot is provided below.



The scheduled update appears in the SCHEDULED UPDATES section on the UPDATES tab and displays the time it is scheduled to be installed. Click **MORE** to see the update bundle details. When it is time for a scheduled update to be installed, the UPDATE tab is refreshed within 3 minutes of the start time. The **In Progress** section displays the update details. Click **VIEW UPDATE DETAILS** to display the Update Status. The Update Status page displays the resources within the domain being updated as well as the update progress (tasks completed and the total number of tasks). The resource being updated displays the icon. Resources that have been updated display the icon. When an update is in progress, the Lifecycle Management page displays a warning message that the interface may be unresponsive and require user log out and back in after the update.



- 11 Click on a resource to view the update details on that resource.

Caution Do not cancel an in-progress update.

When all resources within the domain have been updated, the overall status of the domain update is displayed as COMPLETED. Click **LIFECYCLE MANAGEMENT** to go back to the UPDATE page where the completed update is displayed under COMPLETED UPDATES with the SUCCESS status. An example screenshot is provided below.

The screenshot shows the 'Lifecycle Management' interface with the 'UPDATE' tab selected. The 'UPDATE' tab has a notification badge with the number '1'. A 'CHECK FOR NEW UPDATES' button is in the top right. Below the tabs, there are sections for 'Available Updates' and 'Completed Updates'. The 'Completed Updates' section has two 'ALL' dropdown menus. A list of updates is shown below, each with a status icon and a 'CANCELLED' or 'SUCCESS' button. The third update, 'VMware Cloud Foundation Update', is marked as 'SUCCESS' and has a dropdown menu open showing 'VIEW DETAILS' and 'DOWNLOAD UPDATE LOG' options.

Update Name	Version	Released	Status	Actions
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	SUCCESS	VIEW DETAILS, DOWNLOAD UPDATE LOG
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 14, 2016	CANCELLED	
VMWARE_SOFTWARE Update	1.1.1-3626923	RELEASED Apr 13, 2016	CANCELLED	
VMware Cloud Foundation Update	1.2.0-7944279	RELEASED SEP 13, 2016	CANCELLED	

12 To download the log file, click next to SUCCESS and then click **DOWNLOAD UPDATE LOG**.

If an update on a resource fails, a failure message is displayed on the Update Status page. You must resolve the issue with the resource that failed to be updated. The failed update is displayed on the UPDATE tab under Available Updates. You can re-schedule this update once the issue is resolved.

Upgrade ISVMs on Rack 1 for 2.1.3

Procedure

- 1 If you have multiple racks in your datacenter, stop SDDC Manager and LCM services on each additional rack. In a single rack scenario, the ISVM upgrade scripts stops the services so you can proceed to step 2.

- a Using the root account, SSH to the rack's SDDC Manager VM.

- b Type the following commands.

```
service vrm-watchdogserver stop
```

```
service vrm-tcserver stop
```

```
service lcm-watchdogserver stop
```

```
service lcm-init stop
```

Leave this console window open.

- 2 In a command line window, SSH to the 192.168.100.x IP address for the SDDC Manager VM on rack 1.

- 3 Type the following.

```
ls -lt /home/vrack/lcm/upgrade/vrm
```

Note the upgrade ID displayed on the top row.

- 4 Navigate to the following directory. *upgrade_id* is the upgrade ID you noted in step 3.

```
cd /home/vrack/lcm/upgrade/vrm/upgrade_id/vrm-upgrade-vcf212-vcf213/isvm/scripts/
```

- 5 Run the following command to update the `isvm-upgrade.conf` file.

```
python isvm_upgrade_autoconf.py > isvm-upgrade.conf
```

- 6 Run the following command to upgrade the ISVMs.

```
./isvm-upgrade.sh vm-patch isvm-upgrade.conf ../packages/isvm-vcf212-to-vcf213-  
upgrade.tar.gz | tee isvm-patch_upgrade.log
```

- 7 After the ISVM upgrade is complete, press control-C to exit the console.

- 8 Start services on each additional rack. SSH to each SDDC Manager VM and run the following commands.

```
service vrm-watchdogserver start  
service lcm-watchdogserver start
```

9 If the ISVM upgrade fails, follow the steps below.

- a SSH to each ISVM and run the following commands.

```
/etc/init.d/zkserver start
/etc/init.d/ismd start
/etc/init.d/ism-watchdog start
/etc/init.d/cassandraserver start
```

- b SSH to each SDDC Manager VM and run the following commands.

```
service vrm-watchdogserver start
service lcm-watchdogserver start
```

- c Contact VMware Support and fix the error before proceeding with the upgrade. Your current environment will be functional even though the upgrade has not been completed.

Upgrade Third Party Software for 2.1.3

The third party upgrade script is part of the Cloud Foundation bundle and is located in the SDDC Manager VM.

In a multi-rack environment, you must upgrade third party software on rack 1 and then on the other racks in your datacenter.

Procedure

- 1 Using the root account, SSH to the 192.168.100.x IP address of the SDDC Manager VM on rack 1.
- 2 Navigate to the following directory:

```
cd /home/vrack/lcm/upgrade/vrm/upgrade_id/vrm-upgrade-vcf212-vcf213/ova_packages/
```

- 3 Run the 3rd party upgrade script:

```
./ova_packages_upgrade.sh ALL
```

- 4 In a multi-rack scenario, SSH to the SDDC Manager VM on each additional rack and run the following command.

```
cd /home/vrack/lcm/upgrade/vrm/<upgrade_id>/vrm-upgrade-vcf212-vcf213/ova_packages/
./ova_packages_upgrade.sh VRM
```

- 5 Reboot VMs in the following order.

- a ISVM1
- b ISVM2
- c ISVM3
- d LCM-Repo
- e LCM-Backup-Repo

- f VRM1 on rack 1
- g VRM VM on each additional rack

Upgrade VMware Software on Management Domain for 2.1.3

Applying the VMware software bundle upgrades the VMware software that is part of Cloud Foundation software.

Prerequisites

- The VMware software bundle must be available in the local repository.
- Ensure that [Prerequisites for Upgrading VMware Software](#) are met.
- To validate that your system is ready for the upgrade, run the Cloud Foundation Pre-Upgrade Check utility. See [Knowledge Base article 2150030](#).

Procedure

- 1 On the Lifecycle Management page on the SDDC Manager Dashboard, click the **UPDATES** tab.
- 2 Click the drop-down next to Available Updates.
- 3 Click the **UPDATE** button next to the VMware Software update.
On the TARGET page, the management domain is selected by default.
- 4 Click **NEXT**.
- 5 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.

Note Do not reboot the physical racks, any devices on the rack, or the SDDC Manager VM while the upgrade is in progress.

- 6 Click **NEXT**.
- 7 On the Review Update page, review the update bundle, targets, and schedule.
- 8 Click **SCHEDULE UPDATE**.

Upgrade VMware Software on VDI and VI Domains for 2.1.3

Upgrade VMware software on the other domains in your environment. It is recommended that you upgrade one domain at a time.

Prerequisites

- The VMware software bundle must be available in the local repository.
- Ensure that [Prerequisites for Upgrading VMware Software](#) are met.

- To validate that your system is ready for the upgrade, run the Cloud Foundation Pre-Upgrade Check utility. See [Knowledge Base article 2150030](#).

Procedure

- 1 On the Lifecycle Management page, click the **UPDATES** tab.
- 2 Click the drop-down next to Available Updates.
- 3 Click the **UPDATE** button next to the VMware Software update.
On the TARGET page, the management domain is selected by default.
- 4 On the TARGET page, select the appropriate VDI and VI domains.
- 5 Click **NEXT**.
- 6 On the SCHEDULE page, select the date and time for the update to be applied to the target domains and click **NEXT**. You can select a date within a year from the present date.
- 7 Click **NEXT**.
- 8 On the Review Update page, review the update bundle, targets, and schedule.
- 9 Click **SCHEDULE UPDATE**.
- 10 Enable the anti-affinity rule that separates NSX controllers across hosts.

Rack Wiring

Download VCF Wiremap from the Product Downloads page and connect the wires in your physical rack according to the wiremap. This section contains the logical views of the wiremaps.

Wiring for Rack with Dell Management Switch

Figure 16-1. Wiremap for rack 1 with Cisco ToR Switches and Dell Management Switch

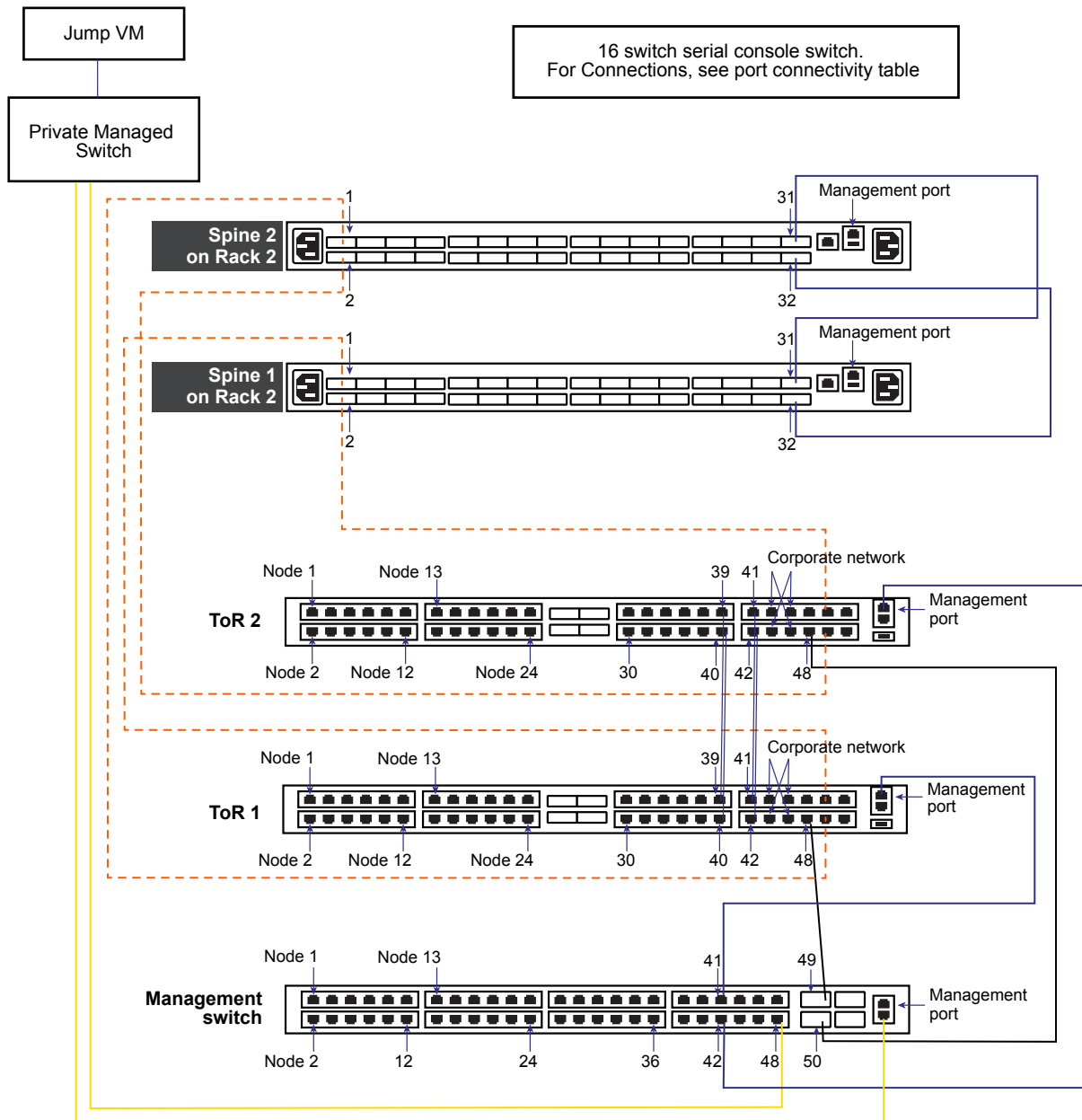
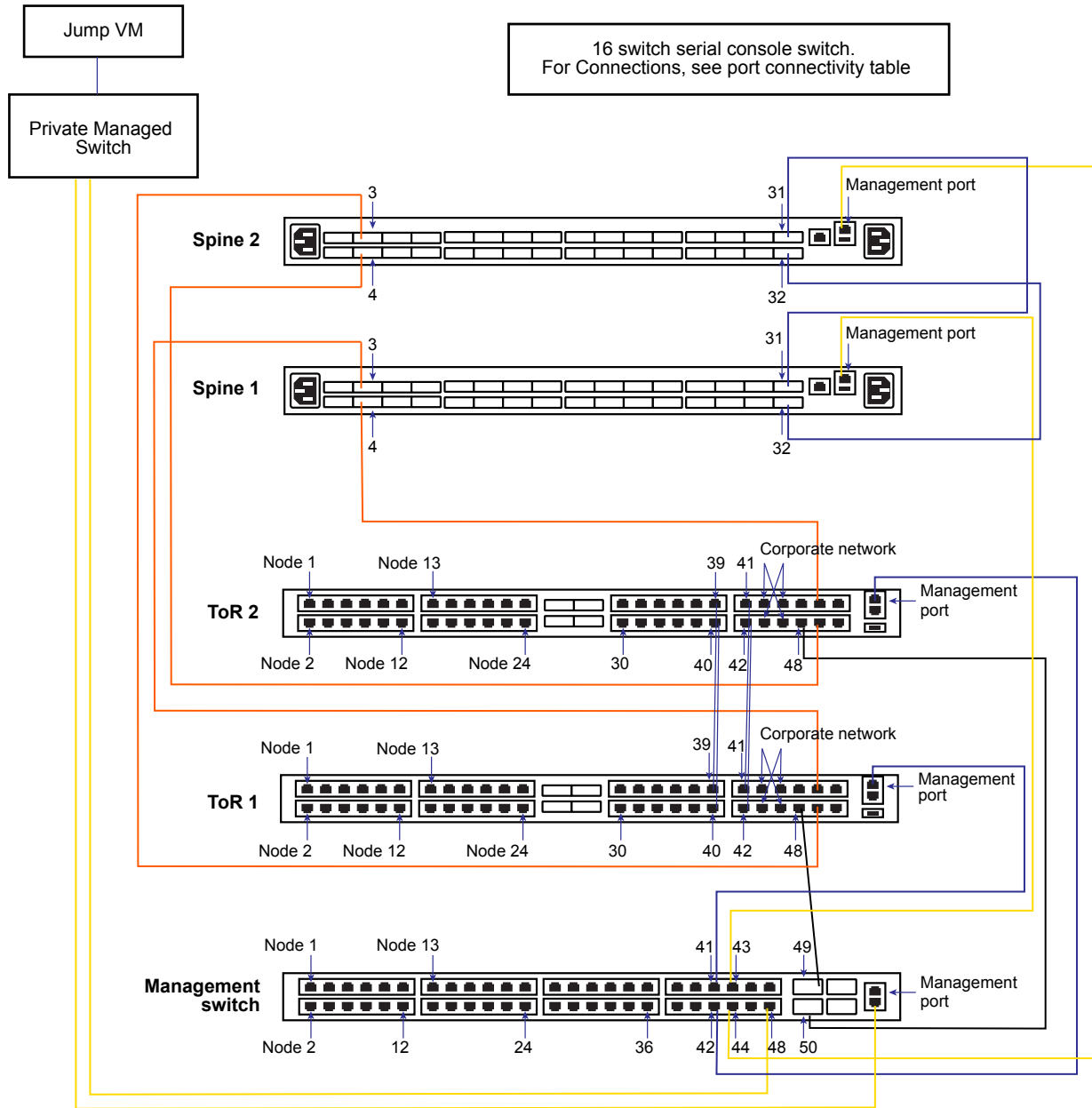


Figure 16-2. Wiremap for rack 2 with Cisco ToR Switches and Dell Management Switch



Wiring for Rack with Quanta Management Switch

Figure 16-3. Wiremap for rack 1 with Cisco ToR Switches and Quanta Management Switch

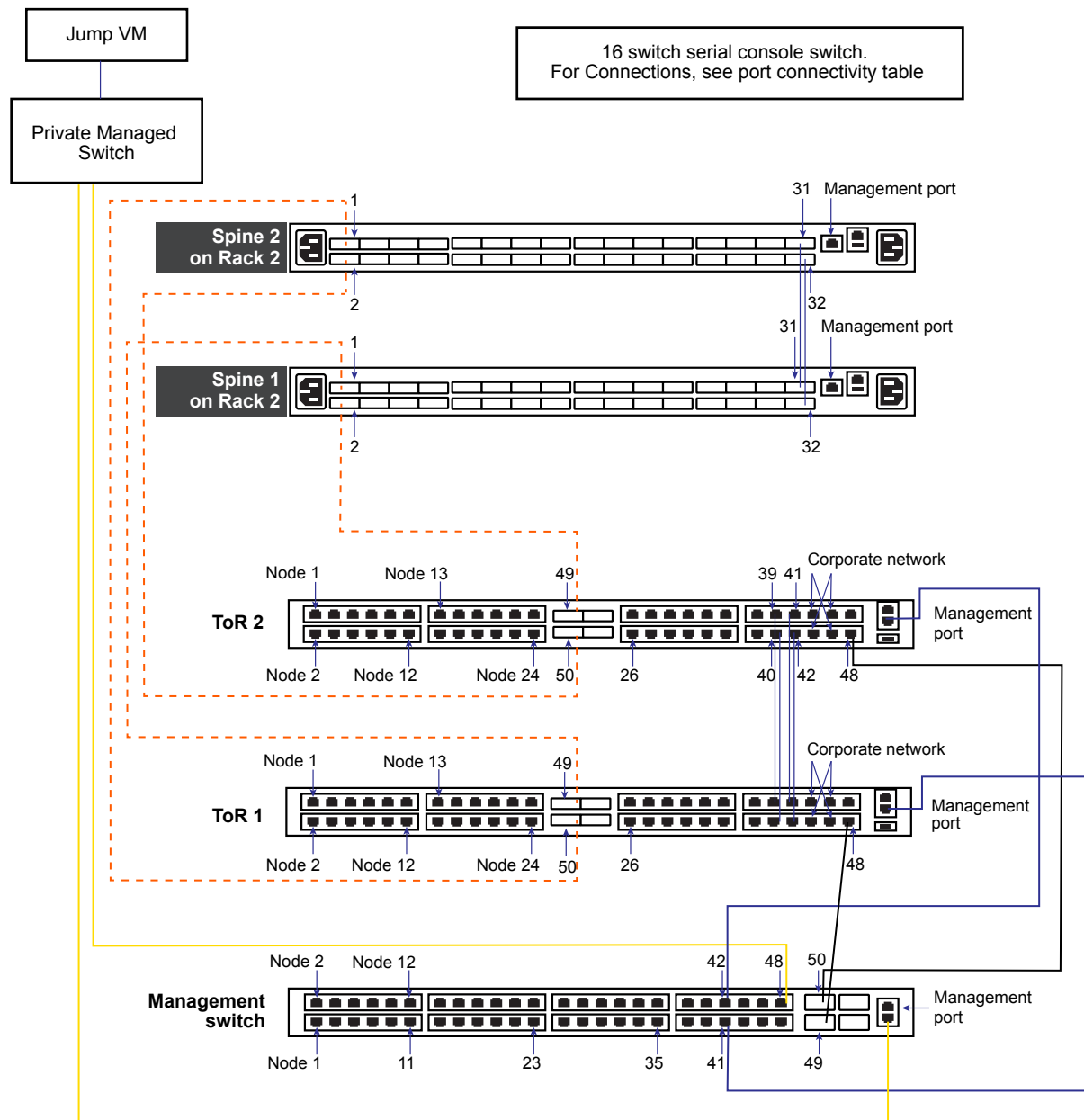
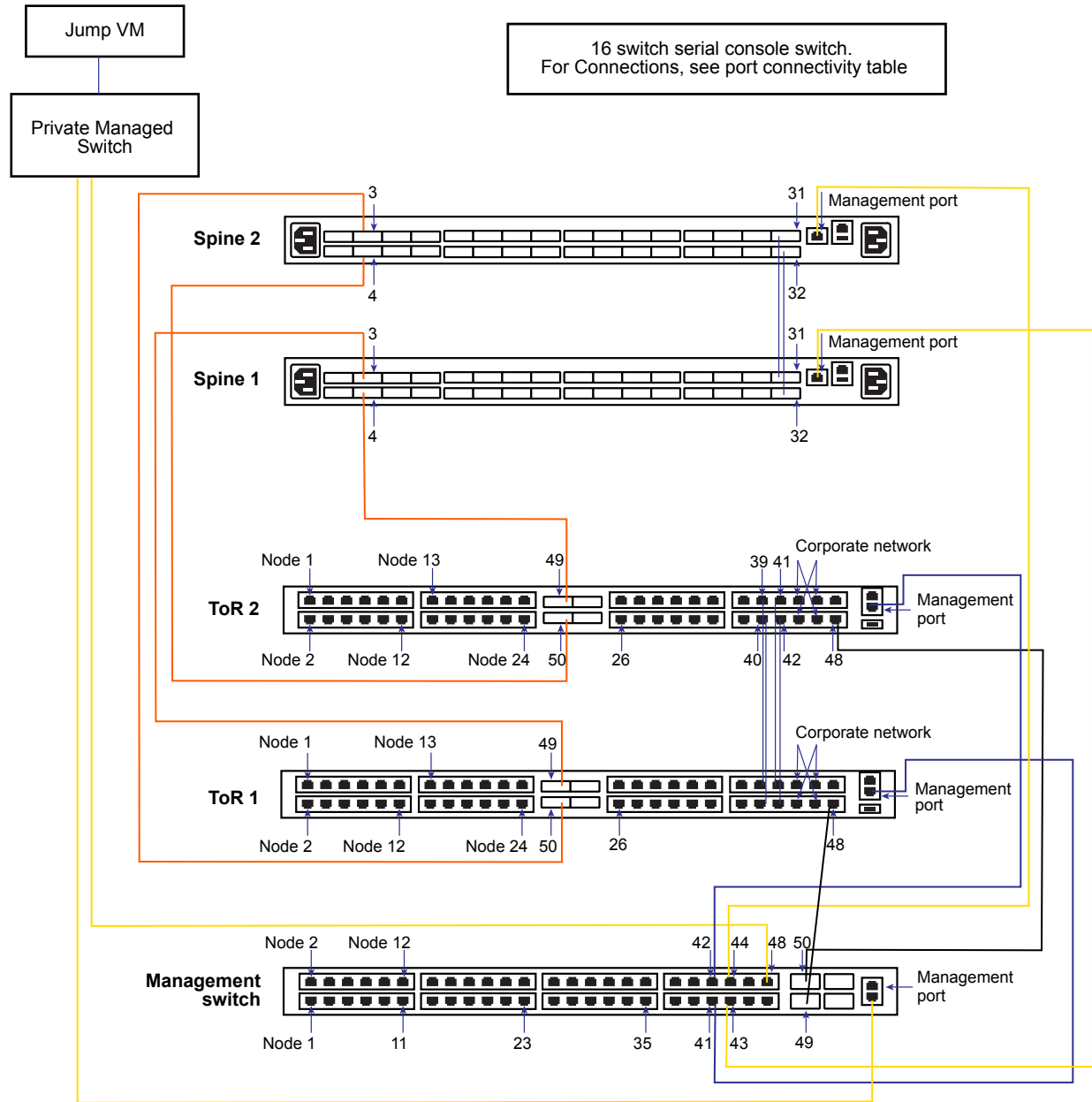


Figure 16-4. Wiremap for rack 2 with Cisco ToR Switches and Quanta Management Switch


Rack Component Ports

Refer to the tables below for port connectivity information using Cisco 9372PX as the illustrative example. Connections in your environment may vary based on the actual switches being used.

Console Serial Switch

Port Number	Connects To
1	Management switch console port
2	ToR 1 console port7

Port Number	Connects To
3	ToR 2 console port
4	Spine 1 console port
5	Spine 2 console port
6	PDU 1
7	PDU 2
8	PDU 3
9	PDU 4
10 - 16	Not connected

Spine 2 (Rack 2 only)

Port Number	Speed	Connects To
1	40 Gbps	Rack 2 ToR 1 port 50
2	40 Gbps	Rack 2 ToR 2 port 50
3	40 Gbps	Rack 1 ToR 1 port 50
4	40 Gbps	Rack 1 ToR 2 port 50
5	40 Gbps	Rack 3 ToR 1 port 50
6	40 Gbps	Rack 3 ToR 2 port 50
7	40 Gbps	Rack 4 ToR 1 port 50
8	40 Gbps	Rack 4 ToR 2 port 50
9	40 Gbps	Rack 5 ToR 1 port 50
10	40 Gbps	Rack 5 ToR 1 port 50
11	40 Gbps	Rack 6 ToR 1 port 50
12	40 Gbps	Rack 6 ToR 1 port 50
13	40 Gbps	Rack 7 ToR 1 port 50
14	40 Gbps	Rack 7 ToR 1 port 50
15	40 Gbps	Rack 8 ToR 1 port 50
16	40 Gbps	Rack 8 ToR 1 port 50

Spine 1 (Rack 2 only)

Port Number	Speed	Connects To
1	40 Gbps	Rack 2 ToR 1 port 49
2	40 Gbps	Rack 2 ToR 2 port 49
3	40 Gbps	Rack 1 ToR 1 port 49
4	40 Gbps	Rack 1 ToR 2 port 49

Port Number	Speed	Connects To
5	40 Gbps	Rack 3 ToR 1 port 49
6	40 Gbps	Rack 3 ToR 2 port 49
7	40 Gbps	Rack 4 ToR 1 port 49
8	40 Gbps	Rack 4 ToR 2 port 49
9	40 Gbps	Rack 5 ToR 1 port 49
10	40 Gbps	Rack 5 ToR 1 port 49
11	40 Gbps	Rack 6 ToR 1 port 49
12	40 Gbps	Rack 6 ToR 1 port 49
13	40 Gbps	Rack 7 ToR 1 port 49
14	40 Gbps	Rack 7 ToR 1 port 49
15	40 Gbps	Rack 8 ToR 1 port 49
16	40 Gbps	Rack 8 ToR 1 port 49

ToR 2 (e.g. Cisco 9372PX)

Port Number	Speed	Connects To
1 - 32	10 Gbps	node 1 - node 32 where port 1 connects to node 1, port 2 connects to node 2, and so on
33 - 38	NA	Not connected
39 - 42	10 Gbps	ToR 1 ports 39 - 42
43 - 47	10 Gbps	Corporate network as required (see note below table)
48	1Gbps	Management switch port 50
49	40 Gbps	Spine 1 port 2
50	40 Gbps	Spine 2 port 2
51 - 52	40 Gbps	Corporate network as required (see note below table)
Management	1 Gbps	Management switch port 42

Note Depending on the switches in your environment, connect two 40 Gbps ports or multiple 10 Gbps ports to your corporate network.

ToR 1 (e.g. Cisco 9372PX)

Port Number	Speed	Connects To
1 - 32	10 Gbps	Node 1 - node 32 where port 1 connects to node 1, port 2 connects to node 2, and so on
33 - 38	NA	Not connected
39 - 42	10 Gbps	ToR 2 ports 39 - 42

Port Number	Speed	Connects To
43 - 47	10 Gbps	Corporate network as required (see note below table)
48	1Gbps	Management switch port 49
49	40 Gbps	Spine 1 port 1
50	40 Gbps	Spine 2 port 1
51 - 52	NA	Corporate network as required (see note below table)
Management	1 Gbps	Management switch port 41

Note Depending on the switches in your environment, connect two 40 Gbps ports or multiple 10 Gbps ports to your corporate network.

Management Switch

Port Number	Speed	Connects To
1 - 32	1 Gbps	Node 1 - Node 32 where port 1 connects to node 1, port 2 connects to node 2, and so on
33 - 40	NA	Not connected
41	1Gbps	ToR 1 management port
42	1Gbps	ToR 2 management port
43	1Gbps	Spine 1 management port
44	1Gbps	Spine 2 management port
45-47	NA	Not connected
48	1Gbps	Private managed switch
49	10 Gbps	ToR 1 port 48
50	10 Gbps	ToR 2 port 48
51-52	NA	Not connected
Management port		Private managed switch

Note PDU ports are not reflected in the table above.

Troubleshooting Cloud Foundation for Data Center System Administrators

17

You can troubleshoot issues that you might experience after you install and deploy your Cloud Foundation environment.

This chapter includes the following topics:

- [Collect Logs for Your Cloud Foundation Environment](#)
- [Unable to Browse to the Software Stack Web Interfaces Using their Fully Qualified Domain Names](#)
- [Decommission Workflow Stops Responding at Task Named Enter Hosts Maintenance Mode](#)
- [VDI Workload Creation Fails at the Import DHCP Relay Agents Task](#)
- [Update Fails While Exiting Maintenance Mode](#)

Collect Logs for Your Cloud Foundation Environment

Use the SoS tool to collect the logs for various software components in the environment. This Python tool resides in each SDDC Manager virtual machine in your Cloud Foundation environment.

After running the SoS tool, you can examine the resulting logs to troubleshoot issues, or provide to VMware Technical Support if requested. VMware Technical Support might request these logs to help resolve technical issues when you have submitted a support request. The diagnostic information collected using the SoS tool includes logs for the various VMware software components and software products deployed in your Cloud Foundation environment.

To collect the logs, run the SoS tool without specifying any component-specific options. To collect logs for a specific component, run the tool with the appropriate options. For a description of the SoS tool's options, see [Supportability and Serviceability \(SoS\) Tool and Options](#).

Prerequisites

You must have the root account credentials for the SDDC Manager instances in your Cloud Foundation environment. In each management domain, the SDDC Manager instance is the one whose virtual machine name starts with vrm. See [Credentials for Logging In To the SDDC Manager \(vrm\) Virtual Machine](#).

When you run the tool from one rack and are collecting all logs for all racks, you must also provide the root account password for the other racks when prompted by the tool. If you want to collect logs only from a specific rack, you can run the tool using the `--rack rackname` option to have the tool collect the logs only from that rack. See [Supportability and Serviceability \(SoS\) Tool and Options](#) for a description of that option.

Note Running the tool in the SDDC Manager instance that is assigned the VIP address is the best practice. You log in to that SDDC Manager instance using the root account credentials.

For a description of the VIP address and how to determine which SDDC Manager instance the VIP address is currently assigned to, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

Procedure

- 1 Using the root account, connect and log in, for example by SSH, to one of the SDDC Manager instances.

In a multirack environment, you can use any of the SDDC Manager instances in your installation's racks, although running the tool on the instance that has the VIP address is preferred. When you run the SoS tool from the SDDC Manager instance on one rack, the tool prompts for the root credentials for the instances on the other racks, collects log information from all of the racks, and writes the output to the filesystem of the instance where the command was initiated.

- 2 Change to the `/opt/vmware/evosddc-support` directory.

- 3 Depending on whether you have VDI workload domains in your environment, type the appropriate command to collect the logs and save to a named directory in the filesystem:

Option	Description
No VDI workload domains in the environment	<p>Type command</p> <pre>./sos --log-dir <i>named-output-dir</i></pre> <p>Where <i>named-output-dir</i> is the name of the directory to which you want to save the output files.</p>
VDI workload domains in the environment	<p>Type command</p> <pre>./sos --vdi-pass <i>admin-password-for-VDI-environment-server-components</i> --log-dir <i>named-output-dir</i></pre> <p>Where <i>admin-password-for-VDI-environment-server-components</i> is the administrative account's password used by the server components in the VDI environment and <i>named-output-dir</i> is the name of the directory to which you want to save the output files</p>

Note By default, before writing the output to the directory, the tool deletes the prior run's output files that might be present. If you want to retain the older output files, specify the `--no-clean-old-logs` option.

If you do not specify the `--log-dir` option, the tool writes the output to the `/var/tmp` directory in the SDDC Manager VM where the command is run.

The tool displays `Welcome to SoS log collection utility!`, the output directory, `sos.log` file location, and messages about the tool's progress, for example:

```
rack-1-vrm-1:/opt/vmware/evosddc-support # ./sos --log-dir /home/sos-logs --vdi-pass VDIadminpwd
Welcome to SoS(Supportability and Serviceability) utility!
Logs: /home/sos-logs/sos-2016-10-26-19-54-48-8666
Log file: /home/sos-logs/sos-2016-10-26-19-54-48-8666/sos.log
Progress : 0%, Initiated log collection
```

If this is a multirack installation, you are prompted to enter the password for the SDDC Manager VM on each rack:

```
rack-1-vrm-1:/opt/vmware/evosddc-support # ./sos --log-dir /home/sos-logs
Welcome to SoS(Supportability and Serviceability) utility!
Please enter password for VRM (192.168.100.130):
```

The tool collects the log files from the various software components in all of the racks and writes the output to the directory named in the `--log-dir` option. Inside that directory, the tool generates output in a specific directory structure.

The following example shows the output files to the rack-1 subdirectory level, for an installation consisting of one physical rack with six ESXi hosts, configured with a DNS subdomain of subdomain.example.com, and having one VDI workload domain. The SoS tool command was run on 1 November 2016. The command included the option `--log-dir /home/sos-logs` to have the SoS tool write the output to the `/home/sos-logs` directory in the VRM VM's filesystem.

Note This example shows the results only down to the level of the rack-1 subdirectory. For details on the files the SoS tool creates in the output directories when collecting logs, see [Component Log Files Collected By the SoS Tool](#).

```
/home/sos-logs
sos-2016-11-01-21-22-46-17555
  sos.log
  rack-1
    esx
    hms
      N0_hms_logs_2016-11-01_09-25-22.zip #Directories with files, one per ESXi host
      N1_hms_logs_2016-11-01_09-25-35.zip
      N2_hms_logs_2016-11-01_09-25-38.zip
      N3_hms_logs_2016-11-01_09-25-29.zip
      N4_hms_logs_2016-11-01_09-25-23.zip
      N5_hms_logs_2016-11-01_09-25-29.zip
    loginsight
      loginsight-agent-rack-1-vc-1.subdomain.example.com-2016-11-01--21.31.26.zip #Directories with files, one per
vCenter Server instance
      loginsight-agent-rack-1-vc-2.subdomain.example.com-2016-11-01--21.32.09.zip
    nsx
    psc
    switch
    vc
    vdi
    vrm.properties
    vrops
      1,2,3-full-0.zip #Directory with files
    zk
    hms.tar.gz
    vrm-datetimestamp.tgz
```

When the environment has more than one rack, the output includes directories for each rack, according to the naming pattern rack-1, rack-2, rack-3, and so on. For details about the output files and directories the SoS tool typically creates, see [Component Log Files Collected By the SoS Tool](#).

What to do next

Change to the output directory to examine the collected log files.

Supportability and Serviceability (SoS) Tool and Options

The SoS tool is a command-line Python tool used primarily to perform log collection and take configuration backups from all of the components in your Cloud Foundation environment.

The SoS tool is installed in `/opt/vmware/evosddc-support` in the SDDC Manager instance's file system. Only the root account can run the SoS tool. To run a command, change to the `/opt/vmware/evosddc-support` directory and type `./sos` followed by the options required for your desired operation.

Note When using the tool to collect logs, initiating the command in the SDDC Manager instance that has the VIP address assigned to it is preferred.

When using the tool to take configuration backups:

- Initiating the command in the SDDC Manager instance is assigned the VIP address saves backup configurations for all of the racks in the installation.
- Initiating the command in an SDDC Manager instance that is not assigned the VIP address saves backup configurations only for the rack in which that instance is deployed.

For a description of the VIP address and how to determine to which SDDC Manager instance has it, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

```
./sos --option-1 --option-2 --option-3 ... --option-n
```

To list the available command options, use the `--help` long option or the `-h` short option.

```
./sos --help
./sos -h
```

Log files for the vRealize Log Insight agent in vCenter Server are collected when vCenter Server log files are collected.

Note You can specify some options in the conventional GNU/POSIX syntax, using `--` for the long option and `-` for the short option.

SoS Options for Information About the SoS Tool

Use these options to see information about the SoS tool itself.

Table 17-1. SoS Information Options

Option	Description
<code>--help</code> <code>-h</code>	Provides a summary of the available SoS tool options
<code>--version</code> <code>-v</code>	Provides the SoS tool's version number.

SoS Tool Options Used When Retrieving Support Log Files

Use these options when retrieving support logs from your environment's various components.

- To collect all logs from all components except VDI-specific components, you can run the SoS tool without specifying any component-specific options.
- To collect logs for a specific component, run the tool with the appropriate options.
- When you have a VDI workload domain in the environment and you want the SoS tool to collect logs from the VDI-specific server components, you must include the `--vdi-pass vdi-password` option. The SoS tool uses the specified *vdi-password* to log in as the Administrator user to the VDI environment's server VMs and retrieve their support bundles, such as the View Composer instances, View Connection Server instances, security server instances, App Volumes instances, and AD Domain Server VM.

For steps to collect all logs, see [Collect Logs for Your Cloud Foundation Environment](#).

Table 17-2. SoS Tool Log File Options

Option	Description
<code>--log-dir logdirectory</code>	Use this option to specify an output directory to which the SoS tool will write the log files, such as <code>/home/sos-logs</code> . If this option is not specified, the tool writes the output files to <code>/var/tmp</code> in the VM's filesystem in which the command was run. For a description of the output directory structure, see Component Log Files Collected By the SoS Tool .
<code>--no-clean-old-logs</code>	Use this option to prevent the tool from removing any output from a previous collection run. By default, the SoS tool. By default, before writing the output to the directory, the tool deletes the prior run's output files that might be present. If you want to retain the older output files, specify this option.
<code>--vdi-pass vdi-password</code>	You must specify this option if you want the logs collected from any VDI workload domains' server VMs in the environment. For <i>vdi-password</i> , specify the password used for the account for logging in to View Administrator, the VDI environment's Web interface.
<code>--esx-logs</code>	Use this option to collect logs from the ESXi hosts only.
<code>--vc-logs</code>	Use this option to collect logs from the vCenter Server instances only. The logs from the vRealize Log Insight agents corresponding to the vCenter Server instances are also collected when this option is used.
<code>--switch-logs</code>	Use this option to collect logs from the switches only. Logs from all switches are collected: management, ToR, and, if a multirack installation, spine switches.
<code>--vrm-logs</code>	Use this option to collect logs from the SDDC Manager instances only.
<code>--zk-logs</code>	Use this option to collect logs from the Zookeeper server instances only. Zookeeper server processes run in each of the infrastructure virtual machines, the ones with ISVM in their names. These ISVM VMs run in your installation's primary rack. For more details about Zookeeper in the environment, see the <i>VMware Cloud Foundation Overview and Bring-Up Guide</i> .
<code>--cassandra-logs</code>	Use this option to collect logs from the Apache Cassandra database only. Apache Cassandra processes run in each of the infrastructure virtual machines, the ones with ISVM in their names. These ISVM VMs run in your installation's primary rack.

Table 17-2. SoS Tool Log File Options (Continued)

Option	Description
<code>--via-logs</code>	When the VIA virtual machine is reachable from the SDDC Manager instance where you are issuing the SoS tool command to collect the logs, you can use this option to collect logs only from the VIA virtual machine.
<code>--psc-logs</code>	Use this option to collect logs from the Platform Services Controller instances only.
<code>--nsx-logs</code>	Use this option to collect logs from the NSX Manager and NSX Controller instances only.
<code>--li-logs</code>	When there are vRealize Log Insight instances in your installation, use this option to collect logs from those instances only.
<code>--vrops-logs</code>	When there are vRealize Operations Manager instances in your installation, use this option to collect logs from those instances only.
<code>--hms-logs</code>	Use this option to collect logs from the HMS software component only.
<code>--rack <i>rackname</i></code>	In a multirack environment, use this option to collect logs from a specific rack. Without this option, the SoS tool collects logs from all of the racks in the environment.
<code>--vrm-ip <i>VRM-IP-address</i></code>	In a multirack environment, use this option to collect logs from an SDDC Manager instance different from the one in which you are running the SoS tool. You run the SoS tool in a specific SDDC Manager instance, usually the one in the primary rack. When you want to run the tool in one SDDC Manager instance but collect the logs from another instance, you use this option to specify that other instance's IP address. Without this option, the SoS tool collects logs from all of the SDDC Manager instances in the environment.
<code>--vrm-pwd <i>VRM-VM-root-password</i></code>	In a multirack environment, when running the SoS tool in one SDDC Manager instance to collect logs from another instance, use this option to specify the password for that other instance's root account. When running the SoS tool in one SDDC Manager instance to collect logs from another instance using the <code>--vrm-ip <i>VRMIP</i></code> option, the SoS tool authenticates into that other SDDC Manager instance using the root account to initiate log collection in that instance. The SoS tool requires the password of that other instance's root account to log in to that instance.
<code>--dump-only- vrm-java- threads</code>	Use this option to only collect the Java thread information from the SDDC Manager instances.
<code>--debug-mode</code>	Use this option to run the log collection process in debug mode.

SoS Tool Options Used for Backing Up Component Configurations

Use this option to create backup files of the configurations for various components. For the steps to run the tool using this option, see [Chapter 9 Back Up Component Configurations Using the SoS Tool](#).

When the environment has more than one rack and the command is initiated in the SDDC Manager instance that currently has the VIP address, the tool also initiates the backup command on the other racks. Each rack's output is written into its own SDDC Manager instance's filesystem. If you initiate the command in the SDDC Manager instance that does not have the VIP, the backup command is initiated only for that rack. For a description of how to determine which SDDC Manager instance has the VIP, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

By default, the tool writes the backup files for a rack into the `/var/tmp` directory in the filesystem of that rack's SDDC Manager instance. For example, the backup files for the one rack are written into its SDDC Manager instance's `/var/tmp` directory, the backup files for the second rack are written into its SDDC Manager instance's `/var/tmp` directory, and so on. When you log in to the first rack's SDDC Manager instance, change directories to the `/var/tmp` directory, and list the directory contents, you see the collected set of backups that the tool has written for that rack, for example:

```
rack-1-vrm-1:/var/tmp # ls -l
drwxr-xr-x 3 root root 4096 Nov 23 00:48 backup-2016-11-23-00-46-01-20678
drwxr-xr-x 3 root root 4096 Nov 23 03:48 backup-2016-11-23-03-48-15-6185
drwxr-xr-x 3 root root 4096 Nov 24 13:56 backup-2016-11-24-13-56-22-25040
drwxr-xr-x 3 root root 4096 Nov 25 12:24 backup-2016-11-25-12-22-54-17065
drwxr-xr-x 3 root root 4096 Nov 28 13:18 backup-2016-11-28-13-16-57-14030
drwxr-xr-x 3 root root 4096 Nov 28 18:37 backup-2016-11-28-18-35-33-12228
drwxr-xr-x 3 root root 4096 Nov 28 18:51 backup-2016-11-28-18-50-28-17743
drwxr-xr-x 3 root root 4096 Nov 29 13:12 backup-2016-11-29-13-10-56-8848
```

Then when you log in to the second rack's SDDC Manager instance, change directories to the `/var/tmp` directory, and list the directory contents, you see the collected set of backups that the tool has written for that second rack, for example:

```
rack-2-vrm-1:/var/tmp # ls -l
drwxr-xr-x 3 root root 4096 Nov 24 11:38 backup-2016-11-24-11-38-08-32210
drwxr-xr-x 3 root root 4096 Nov 24 13:56 backup-2016-11-24-13-56-32-14703
drwxr-xr-x 3 root root 4096 Nov 25 12:25 backup-2016-11-25-12-24-22-17923
drwxr-xr-x 3 root root 4096 Nov 25 20:46 backup-2016-11-25-20-45-20-28378
drwxr-xr-x 3 root root 4096 Nov 28 13:19 backup-2016-11-28-13-18-25-21909
drwxr-xr-x 3 root root 4096 Nov 28 18:36 backup-2016-11-28-18-34-52-23231
drwxr-xr-x 3 root root 4096 Nov 28 18:38 backup-2016-11-28-18-37-01-23891
drwxr-xr-x 3 root root 4096 Nov 28 18:53 backup-2016-11-28-18-51-56-29795
drwxr-xr-x 3 root root 4096 Nov 29 13:13 backup-2016-11-29-13-12-24-27142
```


Table 17-3. SoS Tool Backup Options

Option	Description
--backup	<p>Use this option to take a backup of the configurations of these components:</p> <ul style="list-style-type: none"> ■ ESXi hosts ■ Switches (management, ToR, spine) ■ The three infrastructure (ISVM) virtual machines' Zookeeper server instances and Cassandra datastore ■ SDDC Manager instances (the virtual machines, one per rack, that have vrm in their names) ■ The SDDC Manager instances' HMS software components <p>The output is written to the /var/tmp directory in each SDDC Manager instance's filesystem, following this directory structure:</p> <pre> backup-<i>datetimestamp</i> sos.log rack-1 esx configBundle-<i>hostname.domain.tgz</i> #One per host switch <i>ToR-or-spine-switch-ip-address-manufacturername-running-config.gz</i> #File named according to the switch's IP address and manufacturer cumulus-192.168.100.1.tgz #Management switch configuration file zk <i>isvm-ip-address</i> #Three directories in the zk directory, each named using the IP address of an ISVM VM, such as 192.168.100.43 cassandra-db-backup.tgz zk-db-backup.tgz vrm.properties hms_ib_inventory.json vrm.properties vrm.properties.vRack vrm-security.keystore hms.tar.gz #HMS component's configuration data vrm-<i>datetimestamp.tgz</i> #Postgres database configuration data </pre>

SoS Tool Options That Directly Alter the SDDC Manager Configuration

These SoS command options are used for specific troubleshooting tasks in very particular situations. These commands alter the SDDC Manager configuration by directly changing specific values set in the underlying distributed database.

Caution Using these options is not recommended unless under guidance from VMware Technical Support. Use these options only when VMware Technical Support instructs you to do so.

Table 17-4. SoS Tool Options that Directly Alter the SDDC Manager Configuration

Option	Description
<code>--change-ntp</code> <i>NTP-IP-address</i>	This option updates the SDDC Manager configuration to replace the existing NTP server IP address with a new one. During the bring-up process on the first rack in a Cloud Foundation installation, an NTP server IP address is entered in the bring-up wizard and is saved to the distributed database. This SoS tool option updates that stored NTP server IP address.
<code>--change-uplink-db</code> <i>uplink-port-1, uplink-port-2, ...</i>	This option changes the uplink port information that is stored in the distributed database This option is deprecated in this release. To update the uplink ports, use the Uplink screen in the SDDC Manager client. See Manage Uplink Connectivity Settings Using the SDDC Manager Client .
<code>--remove-esx-host-in-db</code> <i>ESXi-host-ip</i>	After decommissioning an ESXi host, this option updates the distributed database to remove the information for the ESXi host specified in the option, either by IP address or hostname. This option is deprecated in this release. To decommission an ESXi host from the environment, use the steps as documented in Replace Dead Host or SAS Controller or Expander when Host Belongs to a Workload Domain to decommission the ESXi host.
<code>--remove-esx-host-in-db</code> <i>ESXi-hostname</i>	

SoS Tool Options for Audit Data Collection and Diff Generation

These SoS commands are used for collecting audit data and to generate diff between collected audit data. Audit data consist of version and configuration details obtained from the various physical and logical components that constitute VMware Cloud Foundation, including racks, servers, switches, domains and VMs.

Note Audit tool options will work only after successful completion of second boot on the rack.

Table 17-5. SoS Tool Options for Audit Data Collection and Diff Generation

Option	Description
<code>--audit</code>	This option collects audit information from all the components of Cloud Foundation. By default, audit data is saved in the <code>/var/tmp/audit-compliance/audit</code> directory as a JSON file. The log file is saved under <code>/var/tmp/audit-compliance/logs</code> .
<code>--audit-diff</code>	This option generates a diff between two audit data JSON files. This options picks the latest and the penultimate audit data JSON files from the <code>/var/tmp/audit-compliance/audit</code> directory and generates the diff. By default, the diff is stored as a JSON file in the <code>/var/tmp/audit-compliance/diff</code> directory.

Table 17-5. SoS Tool Options for Audit Data Collection and Diff Generation (Continued)

Option	Description
<code>--audit-output-dir <path-to-audit-parent-directory></code>	<p>Use this option to save audit data JSON and diff JSON files to a directory other than the default <code>/var/tmp/audit-compliance</code> parent directory.</p> <hr/> <p>Note This option can be used with the <code>--audit</code> and <code>--audit-diff</code> options.</p> <hr/> <p>This option creates the following directory structure:</p> <ul style="list-style-type: none"> ■ <code>path-to-audit-parent-directory/audit-compliance</code> ■ <code>path-to-audit-parent-directory/audit-compliance/audit</code> ■ <code>path-to-audit-parent-directory/audit-compliance/diff</code> <p>Audit data JSON files are saved in the <code>path-to-audit-parent-directory/audit-compliance/audit</code> directory.</p> <p>Audit diff JSON files are saved in the <code>path-to-audit-parent-directory/audit-compliance/diff</code> directory.</p>
<code>--audit-files <full-path-to-audit-json-file-1> <full-path-to-audit-json-file-2></code>	<p>Use this option to generate a diff file between the two specific audit data JSON files.</p> <hr/> <p>Note This option must be with the <code>--audit-diff</code> option.</p> <hr/> <p>By allowing the user to specify the audit files to be diffed, this option bypasses the default behavior of the <code>-audit-diff</code> option, described above.</p>
<code>--no-audit</code>	<p>Use this option to prevent audit data collection during SoS log collection.</p> <p>By default, audit data collection runs when SoS log collection runs. This option prevents this default behavior.</p>

Component Log Files Collected By the SoS Tool

The SoS tool collects log files for various software components in your Cloud Foundation environment. For components that have their own utilities for gathering logs, the SoS tool invokes those utilities, and then collects the resulting log files from those components.

Components Covered by the SoS Tool

The SoS tool collects logs from these components within your Cloud Foundation installation:

- Management, ToR, and spine switches
- SDDC Manager instances (the virtual machines in each rack with names starting with `vrn`), including the life cycle management (LCM) logs
- HMS software component of SDDC Manager
- Infrastructure virtual machines (ISVM VMs, including the Zookeeper and Cassandra service logs)
- ESXi hosts
- vCenter Server instances
- Platform Services Controller instances
- NSX Manager and NSX Controller instances
- vRealize Log Insight instances deployed by SDDC Manager in the environment

- vRealize Operations Manager instances deployed by SDDC Manager in the environment
- Virtual machines used for the VDI workload domains' infrastructure, if any VDI workload domains exist in the environment
- VIA virtual machine, if reachable on the network from the SDDC Manager instance where the SoS tool is invoked

The SoS tool writes the component log files into an output directory structure within the filesystem of the SDDC Manager instance in which the command is initiated, for example:

```
/home/sos-logs
sos-timestamp
  sos.log
  rack-1
    esx
    hms
      Nm_hms_logs_timestamp.zip #Directory with files. One per ESXi host n
    loginsight
    loginsight-agent-vcenterFQDN-timestamp.zip #Directory with files. One per vCenter Server instance
    nsx
    psc
    switch
    vc
    vdi
    vrm.properties
    vrops
      1,2,3-full-0.zip #Directory with files
    zk
    hms.tar.gz
    vrm-timestamp.tgz
    via-timestamp.tgz #Written if the SoS tool can reach the VIA VM
  rack-2
    esx
    hms
      Nm_hms_logs_timestamp.zip
    loginsight-agent-vcenterFQDN-timestamp.zip
    nsx
    switch
    vc
    vdi
    vrops
    vrm.properties
    hms.tar.gz
    vrm-timestamp.tgz
  rack-3
    ...
  ...
  rack-n
```

esx Directory Contents

In each rack-specific directory, the esx directory contains the following diagnostic files collected for each ESXi host in the rack:

File	Description
<code>esx-IP-address.tgz</code>	Diagnostic information from running the <code>vm-support</code> command on the ESXi host. An example file is <code>esx-192.168.100.101.tgz</code> .
<code>SmartInfo-IP-address.txt</code>	S.M.A.R.T. status of the ESXi host's hard drive (Self-Monitoring, Analysis, and Reporting Technology). An example file is <code>SmartInfo-192.168.100.101.txt</code> .
<code>vsan-health-IP-address.txt</code>	Virtual SAN cluster health information from running the standard command <code>python /usr/lib/vmware/vsan/bin/vsan-health-status.pyc</code> on the ESXi host. An example file is <code>vsan-health-192.168.100.101.txt</code> .

hms Directory Contents

In each rack-specific directory, the `hms` directory contains subdirectories named `N0_hms_logs_timestamp.zip`, `N1_hms_logs_timestamp.zip`, `N2_hms_logs_timestamp.zip`, and so on, one subdirectory for each ESXi host in the rack.

An example of the files and subdirectories in the `hms` directory is:

```
hms
  hms_log_archiver.sh
  N0_hms_logs_2016-11-01_09-25-22.zip
  N1_hms_logs_2016-11-01_09-25-35.zip
  N2_hms_logs_2016-11-01_09-25-38.zip
  N3_hms_logs_2016-11-01_09-25-29.zip
  ...
```

The `hms_log_archiver.sh` file that appears in the `hms` directory is the script that obtains the HMS diagnostic files for each subdirectory. Each subdirectory contains the following files, where `Nn` refers to the file for the `n`th ESXi host.

File	Description
<code>Nn_hms_ib_timestamp.log</code>	HMS in-band (IB) log
<code>Nn_hms_oob_timestamp.zip</code>	HMS out-of-band (OOB) log files <code>hms.log</code> and <code>hms.log.1</code>
<code>Nn_hms_events_log_timestamp.log</code>	HMS events log file
<code>Nn_ServerInfo_timestamp.log</code>	HMS server info log file

loginsight Directory Contents

In each rack-specific directory, the `loginsight` directory contains the diagnostic information files collected from the vRealize Log Insight instance deployed on that rack, if any. Not every rack in the installation will have a vRealize Log Insight instance deployed on it.

File	Description
li.tgz	Compressed TAR file consisting of the vRealize Log Insight instance's /var/log directory.
loginsight-support-timestamp.tar.gz	Standard vRealize Log Insight compressed support bundle, created by the loginsight-support command.
repo.tar.gz	Compressed TAR file consisting of a mass export of the instance's repository buckets. created by running the /opt/vmware/bin/loginsight-dump-repo.sh in the vRealize Log Insight instance.

loginsight-agent-vcenterFQDN-timestamp.zip Directory Contents

Even though these directories' names end in .zip, each one is a directory of files. In each rack-specific directory, each of these directories contains the diagnostic information files for the vRealize Log Insight Linux agent configured for each vCenter Server instance in the rack. When a vRealize Log Insight instance is deployed in the Cloud Foundation environment, each vCenter Server instance is configured with the vRealize Log Insight Linux agent to collect events from that vCenter Server instance and forward them to the vRealize Log Insight instance. Because a vCenter Server instance is deployed for the rack's management domain and for any of that rack's VI or VDI workload domains, at least one or more of these loginsight-agent-vcenterFQDN-timestamp.zip directories appears in each of the log output's rack-specific directories.

The vRealize Log Insight Linux agent writes its own operation log files. The files in each loginsight-agent-vcenterFQDN-timestamp.zip directory result from the SoS tool running the /usr/lib/loginsight-agent/bin/loginsight-agent-support command to generate the standard vRealize Log Insight Linux agent support bundle.

File	Description
config/liagent.ini	Configuration file containing the preconfigured default settings for the agent.
config/liagent-effective.ini	The agent's effective configuration. This effective configuration is the liagent.ini dynamically joined with settings from the vRealize Log Insight server-side settings to form this liagent-effective.ini file.
log/liagent_timestamp_*.log	Detailed log files.
var/log/messages	If the agent is configured to collect messages from the vCenter Server instance's /var/log directory, this file is the collected messages log.

nsx Directory Contents

In each rack-specific directory, the nsx directory contains the diagnostic information files collected for the NSX Manager instances and NSX Controller instances deployed in that rack.

The number of files in this directory depends on the number of NSX Manager and NSX Controller instances that are deployed in the rack. In a given rack, each management domain has one NSX Manager instance and a minimum of three NSX Controller instances, and any VI or VDI workload domains in the rack each have one NSX Manager instance and at least three NSX Controller instances.

File	Description
VMware-NSX-Manager-tech-support- <i>nsxmanagerIPAddr</i> .tar.gz	Standard NSX Manager compressed support bundle, generated using the NSX for vSphere API POST https://nsxmanagerIPAddr/api/1.0/appliance-management/techsupportlogs/NSX , where <i>nsxmanagerIPAddr</i> is the IP address of the NSX Manager instance. An example is VMware-NSX-Manager-tech-support-10.0.0.8.tar.gz.
VMware-NSX-Controller-tech-support- <i>nsxmanagerIPAddr</i> - controller-controllerId.tgz	Standard NSX Controller compressed support bundle, generated using the NSX for vSphere API to query the NSX Controller technical support logs: GET https://nsxmanagerIPAddr/api/2.0/vdn/controller/controllerId/techsupportlogs , where <i>nsxmanagerIPAddr</i> is the IP address of the NSX Manager instance and <i>controllerId</i> identifies the NSX Controller instance. Examples are VMware-NSX-Controller-tech-support-10.0.0.8-controller-1.tgz, VMware-NSX-Controller-tech-support-10.0.0.8-controller-2.tgz, VMware-NSX-Controller-tech-support-10.0.0.8-controller-3.tgz

psc Directory Contents

In the rack-1 directory, the psc directory contains the diagnostic information files collected for the Platform Services Controller instances deployed in that rack.

Note In a Cloud Foundation environment, the two Platform Services Controller instances are deployed in the primary rack only. As a result, this psc directory only appears in the primary rack's log output. For the description of the primary rack, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

File	Description
vm-support-pscIPAddr.tar.gz	Standard Platform Services Controller support bundle downloaded from the Platform Services Controller instance with IP address <i>pscIPAddr</i> .

switch Directory Contents

In the rack-specific directory, the switch directory contains the diagnostic information files collected for that rack's switches.

Each physical rack in the installation has a management switch and two ToR switches. A multirack system additionally has two spine switches. The SoS tool writes the logs for the spine switches into the rack-1/switch subdirectory.

Only certain switch makers and models are supported for use in a Cloud Foundation installation. See the [VMware Cloud Foundation section](#) of the VMware Compatibility Guide for details on which switch makers and models are supported for this release.

File	Description
<code>cl_support_Management1_timestamp.tar.xz</code>	Standard support bundle collected from a management switch. In this release, the management switches run the Cumulus Linux operating system, and the SoS tool collects the switch's support bundle using the standard Cumulus <code>/usr/cumulus/bin/cl-support</code> support command.
<code>IPAddr-switchmaker-techsupport.gz</code>	Standard support bundle collected from a ToR or spine switch at IP address <i>IPAddr</i> and for switch maker <i>switchmaker</i> . The SoS tool collects the switch's support bundle using the appropriate command for the particular switch, such as <code>show tech-support</code> . The ToR switches typically have IP addresses 192.168.0.20 and 192.168.0.21. The spine switches typically have IP addresses 192.168.0.30 and 192.168.0.31.

vc Directory Contents

In each rack-specific directory, the `vc` directory contains the diagnostic information files collected for the vCenter Server instances deployed in that rack.

The number of files in this directory depends on the number of vCenter Server instances that are deployed in the rack. In a given rack, each management domain has one vCenter Server instance, and any VI or VDI workload domains in the rack each have one vCenter Server instance.

File	Description
<code>vc-vcsaFQDN-timestamp.tgz</code>	Standard vCenter Server support bundle downloaded from the vCenter Server Appliance instance having a fully-qualified domain name <i>vcsaFQDN</i> . The support bundle is obtained from the instance using the standard <code>vc-support.sh</code> command.

vdi Directory Contents

If the rack has a deployed VDI workload domain, the SoS tool creates a `vdi` directory in the log directory for that rack. The `vdi` directory contains the diagnostic information files collected for the VDI environment's VMware server components deployed in that rack.

The SoS tool collects the standard VMware support bundles from the VMware server components from Horizon 6 and App Volumes that are deployed as VMs for use by the VDI environment:

- View Connection Server instances, including when View Connection Server is deployed as a security server for the VDI environment. A security server is a special instance of View Connection Server as described in the [Horizon 6 product documentation](#). A security server is deployed for the VDI environment if the **Connect from anywhere** option was specified when the VDI workload domain was created.
- App Volumes Manager. The App Volumes Manager instance is deployed for the VDI environment if the **Implement App Volumes** option was specified when the VDI workload domain was created.

File	Description
<i>connHostname.vdm-sdct-timestamp-server.zip</i>	View Connection support bundle downloaded from the View Connection instances having hostname <i>connserverHostname</i> , such as con-1-1, con-1-2, and so on. The support bundle is obtained from the instance using the standard C:\Program Files\VMware View\Server\DCT\support.bat command for the View Connection Server.
<i>appvolsHostname-logs.zip</i>	App Volumes log files obtained from the App Volumes Manager instance having hostname <i>appvolsHostname</i> , such as appvolumes-1-1, appvolumes-1-2, and so on.

vrn.properties Directory Contents

In each rack-specific directory, the vrn.properties directory contains the following configuration files from the SDDC Manager instance deployed in the rack:

File	Description
hms_ib_inventory.json	SDDC Manager rack hardware inventory file, created during imaging of the rack. The SoS tool obtains this file from the SDDC Manager instance's /home/vrack/VMware/vRack directory.
vrn-security.keystore	SDDC Manager keystore file, from the SDDC Manager instance's /home/vrack/VMware/vRack directory.
vrn.properties	Properties file from the SDDC Manager client (webapp).
vrn.properties.vRack	Copy of the SDDC Manager vrn.properties file in the SDDC Manager instance's /home/vrack/VMware/vRack directory.

vrops Directory Contents

In each rack-specific directory, the vrops directory contains diagnostic information files collected from the vRealize Operations Manager instance deployed on that rack, if any.

To collect the vRealize Operations Manager support bundle, the SoS tool runs the Python generateSupportBundle.py script in the vRealize Operations Manager instance using the default filter –f=1,2,3. As described in [VMware KB article 2074601](#), with this default filter option, all logs, configuration files, and support dumps are collected, while cluster information is not included.

File	Description
1,2,3-full-0.zip	Even though this directory's name end in .zip, it is a directory of files resulting from generating the standard vRealize Operations Manager support bundle from the vRealize Operations Manager instance. To generate the vRealize Operations Manager support bundle, the SoS tool runs the Python generateSupportBundle.py script in the vRealize Operations Manager instance using the default filter –f=1,2,3. As described in VMware KB article 2074601 , with this default filter option, all logs, configuration files, and support dumps are collected, while cluster information is not included.
log	Log file of the vRealize Operations Manager support bundle generation process.
summary-0	Summary of the success or failure of each of the filter options (1, 2, 3) used in the support bundle generation process.
vrops_logs.tar	Archive of the log files obtained from the vRealize Operations Manager instance's filesystem in /usr/lib/vmware-vcops/user/log/*, /var/log/vmware/*, /var/log/vcops_logs/*, and /var/log/casa_logs/.*

zk Directory Contents

In the rack-1 directory, the zk directory contains three subdirectories, each containing the diagnostic information files collected for the SDDC Manager ISVM instances deployed in that rack.

Note In a Cloud Foundation environment, the three ISVM instances are deployed in the primary rack only. As a result, this zk directory only appears in the primary rack's log output. For the description of the primary rack, see [About the Primary Rack and the SDDC Manager Virtual IP Address](#).

The subdirectories in the zk directory are named according to the three ISVM instances' IP addresses, such as:

- 192.168.100.43
- 192.168.100.44
- 192.168.100.45

Each subdirectory contains two files.

File	Description
cassandra-bundle.tgz	Compressed TAR file containing the Cassandra database's logs and diagnostic information.
zk-bundle.tgz	Compressed TAR file containing the Zookeeper logs and diagnostic information.

hms.tar.gz Contents

Each rack-specific directory has an hms.tar.gz file.

File	Description
hms.tar.gz	Compressed file containing hms.tar, which contains the HMS software component's diagnostic information.

vrn- *timestamp* .tgz Contents

Each rack-specific directory has a vrn-*timestamp*.tgz file.

File	Description
vrn- <i>timestamp</i> .tgz	Compressed file containing vrn- <i>timestamp</i> .tar, which contains diagnostic information for SDDC Manager.

via- *timestamp* .tgz Contents

If the VIA virtual machine is reachable from the SDDC Manager instance where the SoS tool is invoked, the logs directory for that rack contains a via-*timestamp*.tgz file.

Under standard operating conditions, the VIA virtual machine is not reachable from the SDDC Manager instances in a Cloud Foundation installation. The VIA virtual machine is used to image a rack for use in a Cloud Foundation installation, and is reachable from that newly imaged rack's SDDC Manager instance at the end of the imaging process. You can use the SoS tool in the newly imaged rack's SDDC Manager instance to collect the VIA VM's logs at the end of the imaging process.

File	Description
<code>via-timestamp.tgz</code>	Compressed file containing <code>vrn-timestamp.tar</code> , which contains the VIA VM's diagnostic information.

Unable to Browse to the Software Stack Web Interfaces Using their Fully Qualified Domain Names

You point your browser to the fully qualified domain name (FQDN) of one of the VMware SDDC products in the Cloud Foundation software stack, but the login screen for that software product does not appear in the browser.

Problem

In the SDDC Manager client in your browser, you can see a list of the FQDN names that are assigned to the VMware SDDC products' Web interfaces on the Management Info area of the management domains. However, when you directly type one of those names into your browser, the login screen does not appear and the browser cannot complete the request.

Cause

The FQDN names contain a portion that is the value that was entered for the subdomain when you ran the Cloud Foundation bring-up process. For example, the FQDN for a rack's vCenter Server instance might be listed as `rack-1-vc-1.sddc.example.com`, where `sddc.example.com` is the full value that appeared in the bring-up wizard screens.

The SDDC Manager runs an internal DNS server so that it can guarantee that FQDN resolution works within the installation. If a delegation record was not configured in the specified root domain to point to the SDDC Manager DNS server for the specified Cloud Foundation zone, these FQDNs cannot be resolved.

You configure the zone delegation using the standard administration tools used by your company or organization to manage the DNS server that was specified in bring-up wizard, such as Server Manager on Microsoft Windows Server operating systems.

The following steps illustrate configuring the zone delegation using Server Manager on Windows 2008 Server.

Solution

- 1 In Microsoft Server Manager, expand the navigation tree to see the Forward Lookup Zones and the name of the root domain.
- 2 Right-click the root domain and click **New Delegation** in the pop-up menu.

The New Delegation wizard appears.

- 3 Start the wizard by clicking **Next** and typing the subdomain portion for your installation in the **Delegated domain** field.

The **Full qualified domain name (FQDN)** field automatically fills in.

- 4 Verify that the automatically filled-in name matches the portion in the VMware SDDC components' FQDN names that you are attempting to use in the browser to log in to those components' Web interfaces, and then click **Next** to proceed.
- 5 Click **Add** to specify the VIP address of the SDDC Manager virtual machine.
The New Name Server Record window appears.
- 6 Type the SDDC Manager virtual machine's VIP in the **Server the fully qualified domain name** field.
- 7 Click **Resolve**.
After you click **Resolve**, the IP address is listed in the **IP Addresses** list box and validated as OK if your DNS server can reach the SDDC Manager virtual machine.
- 8 If the IP address validates, click **OK** to proceed.
If the IP address does not validate, call support to request assistance.
The IP address is listed in the **Name servers** list box.
- 9 Click **Next** to proceed.
The delegation record has been created and you can click **Finish** to close the wizard.

Decommission Workflow Stops Responding at Task Named Enter Hosts Maintenance Mode

During the running of the workflow to decommission an ESXi host, the workflow's progress appears stuck at the task for putting the host in maintenance mode.

Problem

When you examine the progress of the decommission workflow on the Workflows page, you see the workflow has reached the task named `Enter hosts maintenance mode`. However, the workflow does not progress beyond that task.

Cause

During the decommission workflow, the workflow invokes the standard vSphere operation to put the host in maintenance mode. When the host you are decommissioning is part of a management domain or a workload domain, DRS is in force on that management or workload domain. If the host has VMs running on it, when the decommission workflow invokes the operation to put the host in maintenance mode, DRS is automatically invoked to migrate those VMs to another host.

In some situations, DRS might fail to automatically migrate all of the VMs off of the host. For example, if migrating all of the VMs to the other hosts in the underlying group might violate a VM/Host DRS or vSphere HA failover rule, then DRS does not migrate the VMs.

If VMs remain on the host, the host cannot enter maintenance mode and the decommission workflow cannot complete that task and progress to its next task. To resolve this situation, you can manually migrate the VMs to another host in the group and then use the Restart Workflow icon to restart the decommission workflow.

Solution

- 1 Verify that DRS has failed to automatically migrate VMs off the host by opening the vSphere Web Client and examining the recent tasks.
 - a In the SDDC Manager client, navigate to that host's Host Details page.
 - b Click the vCenter Server launch link to launch the vSphere Web Client.
 - c In the vSphere Web Client, locate the Enter maintenance mode task in the Recent Tasks pane. Confirm the status of the Enter maintenance mode task indicates it is waiting for all VMs to be powered off or migrated.
- 2 Locate the VMs that remain on the host by clicking **Related Objects > Virtual Machines** for the host.
- 3 Migrate each VM to another host in the workload domain until there are no VMs running on that host.
- 4 In the SDDC Manager client, restart the decommission workflow.
 - a Navigate to **System Status > Workflows** and expand the decommission workflow to see its details.
 - b Click **RESTART WORKFLOW**.

VDI Workload Creation Fails at the Import DHCP Relay Agents Task

When routing is not set up between your Cloud Foundation environment's management network and the data center network specified in the VDI workload domain creation wizard, the creation workflow fails at the Import DHCP Relay Agents task.

Problem

In the Workflows screen, you see that the creation workflow for your VDI workload domain environment has failed in the task Import DHCP Relay Agents.

Cause

When your Cloud Foundation installation's public management network cannot communicate with the VDI environment's data center network, the Import DHCP Relay Agents task will fail. During the creation workflow, SDDC Manager deploys a virtual machine used for DHCP relay on the data center network. This DHCP relay is used by the virtual desktops, which are also deployed in the data center network. However, the SDDC Manager virtual machine resides on the management network and must be able to communicate with the DHCP Relay VM. When routing has not been set up between the management network and the data center network specified in the VDI workload domain creation wizard such that the two VMs can communicate with each other, the workflow fails at this task.

Solution

- ◆ Verify that the SDDC Manager VM can communicate with the data center network.

One way to verify is to remotely log in to the SDDC Manager VM (the VRM VM), and try to ping the data center network.

- If the VRM VM can ping the data center network, then communication exists between the management network and the data center network, and the failed task is due to a different cause.
- If the VRM VM cannot ping the data center network, speak to your organization's networking administrator to have the necessary routing set up.

Update Fails While Exiting Maintenance Mode

vCenter Server and ESXi update on a host might fail in the task of exiting maintenance mode.

Problem

Sometimes during an ESXi and vCenter update process, a host might fail to exit maintenance mode, which results in a failed update process.

Cause

During an update, the system puts a host into maintenance mode to perform the update on that host, and then tells the host to exit maintenance mode after its update is completed. At that point in time, an issue on the host might prevent it from exiting maintenance mode.

Solution

- 1 Attempt to remove the host from maintenance mode in vSphere Web Client.
 - a In the vSphere Web Client, locate the host.
 - b Right-click the host name and select **Maintenance Mode > Exit Maintenance Mode**.
The vSphere Web Client reports any issues with the host regarding maintenance mode.
 - c Address any reported issues and remove the host from maintenance mode.
- 2 When the host has successfully existed from maintenance mode, return to the SDDC Manager interface.
- 3 Retry the update from the **Available Updates** list.