

VMware Cloud Foundation on Dell EMC VxRail Admin Guide

VMware Cloud Foundation 3.7



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About VMware Cloud Foundation on Dell EMC VxRail

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The VMware Cloud Foundation on Dell EMC VxRail Administration Guide provides information on managing the integration of VMware Cloud Foundation and Dell EMC VxRail. As this product is an integration of VMware Cloud Foundation and Dell EMC VxRail, the expected results are obtained only when the configuration is done from both the products. This guide covers all the information regarding the VMware Cloud Foundation workflow. For the instructions on configuration to be done on Dell EMC VxRail, this guide provides links to the Dell EMC VxRail documentation.

Intended Audience

The *VMware Cloud Foundation on Dell EMC VxRail Administration Guide* is intended for the system administrators of the VxRail environments who want to adopt VMware Cloud Foundation. The information in this document is written for experienced data center system administrators who are familiar with:

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

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

- Dell EMC VxRail Manager
- VMware vSphere®
- VMware vCenter Server® and VMware vCenter Server® Appliance™
- VMware Platform Services Controller™
- VMware vRealize® Log Insight™
- VMware Horizon®
- VMware App Volumes™
- vRealize Operations Manager
- vRealize Automation

Related Publications

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

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

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

Administering VMware Cloud Foundation on Dell EMC VxRail

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VMware Cloud Foundation on Dell VMC VxRail enables VMware Cloud Foundation SDDC Manager on top of the Dell EMC VxRail platform.

An administrator of an VMware Cloud Foundation on Dell EMC VxRail system performs tasks such as:

- Manage certificates.
- Add capacity to your system.
- Configure and provision the systems and the workload domains that are used to provide service offerings.
- Manage provisioned workload domains.
- Monitor alerts and the health of the system.
- Troubleshoot issues and prevent problems across the physical and virtual infrastructure.
- Perform life cycle management on the software components.

Imaging of the Management Nodes

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Image the management nodes by using Dell EMC RASR (Rapid Appliance Self Recovery) process. Ensure that you update the RASR image in each server node SD card before you start the imaging process.

For information on how to image the VxRail nodes, contact Dell EMC Support.

VxRail First Run for the Management Cluster

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The VxRail first run for the management cluster consists of the following tasks:

- The discovery of the VxRail Nodes occurs. All the nodes that were imaged are detected.
- Upload the JSON configuration file. Trigger the validation.
- All the configuration inputs are validated.
- The VxRail Bring Up tasks get triggered one by one on the VxRail Manager VMs.

The following components are deployed and enabled:

- vCenter
- Platform Services Controller (PSC)
- VSAN
- VxRail Manager

Click **Manage VxRail** to log in to the VMware vCenter server.

For information on VxRail First Run, contact Dell EMC Support.

Change the Network Binding Type for the Management Network Port Group

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Dell EMC VxRail configures the management network port with static binding which is the default setting. But as per the VMware Validated Design guidelines, you need to change the binding type to ephemeral for the management network port.

To change the binding type for the management network port:

Prerequisites

- 1 Log in to vCenter Server Appliance through vSphere Web client (Flash version).
- 2 Navigate to **Networking->Distributed Switch**.
- 3 Right click the **Management Network Port** group and click **Edit Settings**.
- 4 Verify if the network binding type is static binding and note down the VLAN ID.

Procedure

- 1 In vCenter Server Appliance, click **Networking**.
- 2 Select **Distributed Switch > Distributed Port Group**.
Right-click **New Distributed Port Group**, update **Name** as **TempGroup** and keep the configuration same as the management network port group.
- 3 Change **VLAN type** from **None** to **VLAN**.
- 4 Update **VLAN ID** to that of the management network port group.
- 5 Click **Next** and review the configurations.
- 6 Click **Finish**.
A new port group, **TempGroup**, is created and is shown in the port group list of the distributed switch.
- 7 Click **Hosts and Clusters**.
- 8 Select the first host of the cluster and click **Configure**.
- 9 Click **Virtual Switches > Distributed Switch**.
- 10 Click the **Migrate physical to virtual network adapters to this distributed switch** option.

- 11 In the **Migrate Networking** pop up screen, select only **Manage VMkernel adapters**.
Click **Next**.
- 12 Select the VMkernel network adapter associated with the management network.
- 13 Click **Assign port group**.
- 14 Select **TempGroupAssign destination port group** pop up screen and click **OK**.
Click **Next**.
- 15 Confirm **Overall impact** status as **No impact**. Click **Finish**.
- 16 Repeat steps 8 to 15 for all the other hosts of the cluster.
- 17 Click **Networking**.
- 18 Right-click **Management Network** and click **Edit Settings**.
In the **Edit Settings** screen, change **Port binding** from **Static binding** to **Ephemeral - no binding**.
- 19 Select **VLAN** and make sure **VLAN type** is **VLAN ID** is the same.
- 20 Click **Hosts and Clusters**.
Select the first host of the cluster and click **Configure**.
- 21 Select **Virtual Switches > Distributed Switch**.
- 22 Click the **Migrate physical to virtual network adapters to this distributed switch** option.
- 23 In the **Migrate Networking** pop up screen, select only **Manage VMkernel adapters**.
Click **Next**.
- 24 Select the VMkernel network adapter associated with the management network.
- 25 Click **Assign port group**.
- 26 Select the **Management Network in Assign destination port group** pop up screen and click **OK**.
Click **Next**.
- 27 Confirm **Overall impact status** as **No impact**. Click **Finish**.
- 28 Repeat steps 21 to 27 for all the other hosts of the cluster.
- 29 Click **Networking**.
- 30 Select **Distributed Switch > TempGroup**.
- 31 Right-click **TempGroup** and click **Delete**.
- 32 Click **Yes** in **Delete Distributed Port Group** pop up UI screen.

Externalize the VMware vCenter

By default, VMware vCenter server is internal to the VxRail cluster. But as per the VVD guidelines, it needs to be external for VCF on VxRail.

To convert the embedded VxRail VMware vCenter server to a customer-managed VMware vCenter server for VMware Validated Design, contact Dell EMC Support.

Deploy the Cloud Foundation Builder VM

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You must deploy the Cloud Builder VM on the vCenter that VxRail has deployed.

To deploy the Cloud Foundation Builder VM:

Prerequisites

The Cloud Builder VM must have network access to all hosts on the management network.

Procedure

- 1 Download the Cloud Builder VM OVA on the Windows machine.
- 2 Log in to the VMware vCenter Server Appliance by using the VMware vSphere Web client.
- 3 In the navigator, select **Cluster**. Right click and select **Deploy OVF template**.
- 4 Select **Local File**. Click **Choose** to browse and select the OVA from your local file system.
- 5 Click **Next**.
- 6 Provide a name for the Cloud Foundation Builder VM. Click **Next**.
- 7 On the Select a Compute Resource page, select the VxRail cluster for the Cloud Builder VM. Click **Next**.
- 8 Review the deployment details and click **Next**.
- 9 On the License agreements dialog box, click **I agree** and then click **Next**.
- 10 On the Select storage page, you have to select the VSAN datastore.
- 11 On the Select networks dialog box, select **Management Network** and then click **Next**.
- 12 On the Customize template dialog box, enter the following information for the Cloud Builder VM:
 - Admin user name and password: The admin user name cannot be one of the following pre-defined user names:
 - root
 - bin
 - daemon
 - messagebus
 - systemd-bus-proxy

- systemd-journal-gateway
- systemd-journal-remote
- systemd-journal-upload
- systemd-network
- systemd-resolve
- systemd-timesync
- nobody
- sshd
- named
- rpc
- tftp
- ntp
- smmsp
- cassandra

The admin password must be a minimum of 8 characters and include at least one uppercase, one lowercase, one digit, and one special character .

- Root password: The root password must be a minimum of 8 characters and include at least one uppercase, one lowercase, one digit, and one special character.
- Hostname: Enter the host name for the virtual appliance.
- IP address: Enter an unused IP address for the virtual appliance.
- Subnet Mask: Enter the subnet mask such as 255.255.255.0.
- Default Gateway: Enter the default gateway for the virtual appliance.
- DNS Domain
- DNS Domain Search Paths
- IP address of the primary and secondary DNS servers (comma separated)
Do not specify more than two servers.
- NTP servers (comma separated)
- SKU: For VCF on VxRail deployment, enter vcf-vxrail.

13 Click **Next**.

14 Review the deployment details and click **Finish**.

15 After the deployment, the cloud builder VM is powered off by default. You need to power it on before performing the SSH to the VM.

- 16** Ensure that you can ping the ESXi hosts.
- 17** Verify that the Cloud Builder VM has access to the required external services, such as DNS and NTP by performing forward and reverse DNS lookups for each host and the specified NTP servers.

Initiate the Cloud Foundation Bring-Up Process

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During bring-up, the management domain is created on the ESXi hosts specified in the deployment configuration spreadsheet. The Cloud Foundation software components are automatically deployed, configured, and licensed using the information provided.

Procedure

- 1 Log in to the Cloud Builder VM with your admin credentials by navigating to `https://Cloud_Builder_VM_IP`.
- 2 Verify that the criteria mentioned in the bring-up checklist have been met. Select **Check All** and click **Next**.
- 3 Read the End-User License Agreement and accept it. Click **Next**.
- 4 You can download the deployment parameter sheet. The deployment parameter spreadsheet provides a mechanism to specify the required deployment information specific to your environment. This includes information about your networks, hosts, license keys, and other information. The spreadsheet is downloaded from the Cloud Builder VM. The completed spreadsheet is then converted to a JSON file. The deployment parameter spreadsheet can be reused to deploy multiple Cloud Foundation instances of the same version. Click **Download Deployment Parameter Sheet**. Complete the worksheet.
- 5 To upload the config file, click **Upload**. You can choose the `.xlsx` or `.json` file for updating the configuration. Ensure that all the IP addresses are reserved in the DNS. Select the completed parameter sheet and click **Upload**.
- 6 After the file is uploaded, click **Validate** to validate the uploaded file.

The following audit tasks are performed and validation results are displayed on the UI.

- JSON Spec Validation: Validates the completeness and correctness of the specifications of JSON.
- Well-Formed JSON File: Validates JSON correctness, syntax, null values, and missing fields or components.
- Password validation
Validates specified passwords. Checks for minimum length, invalid characters, and format.
- ESXi host version validation

Validates ESXi version installed on the hosts and compares against the VCF-EMS manifest located in `/opt/evosddc/bundle/scripts/manifest.json` on the Cloud Foundation Builder VM.

- Cloud Builder Readiness: Validates whether the requirements to run the Cloud Foundation Builder VM are met.

- License key format

Validates format, validity, and expiry for ESX, VSAN, vCenter Server, NSX, and Log Insight license keys.

- ESXi Host Readiness

- Network configuration: Validates CIDR to IP address validity, IP addresses in use, gateways, invalid or missing VLANs, invalid or missing MTU, and network spec availability for all components.

- Time Synchronization: Validates the time on the components is synchronized with the NTP server in the SDDC Manager.

- Host and IP DNS records: Validates SSH access and policy, NTP configuration and policy, DNS configuration, VMNIC availability, vSwitch availability, VM network portgroup, and VLAN check on each host.

To access the bring-up log file, SSH to the Cloud Builder VM as root and open the `/opt/vmware/bringup/logs/vcf-bringup-debug.log` file.

If there is an error during the validation and the **Next** button is grayed out, you can either make corrections to the environment or edit the JSON file and upload it again. Then click **Re-Try** to perform the validation again.

If any warnings are displayed and you want to proceed, click **Acknowledge** and then click **Next**.

7 Click **Begin Bring-Up**.

During the bring-up process, the following tasks are completed.

- The second PSC controller, SDDC Manager, NSX components, and vRealize Log Insight are deployed.
- The management domain is created, which contains the management components - SDDC Manager, all vCenter Servers, and NSX Managers and Controllers.
- The VxRail Manager version is fetched.

The status of the bring-up tasks is displayed in the UI. You can download the list of tasks by clicking **Download**.

After bring-up is completed, a green bar is displayed indicating that bring-up was successful. A link to the SDDC Manager UI is also displayed.

If there are errors during bring-up, see [Troubleshooting Cloud Foundation Deployment](#) for guidance on how to proceed.

- 8 Navigate to the SDDC Manager Dashboard by clicking the link displayed on the UI.
- 9 Verify the following:
 - View the management domain details.
 - Log in to vCenter Server and verify the management cluster, vSAN cluster, and deployed VMs.
- 10 Power off the Cloud Builder VM.

If you no longer need the Cloud Foundation Builder VM, you can delete it. If you delete it now, you can always redeploy it later.

Manage Certificates

SDDC Manager allows the user to manage certificates of the VMware Cloud Foundation components except VxRail Manager. To change the VxRail Manager certificate, use the Dell EMC Solve procedures.

- When you update the vSphere components certificates using the SDDC Manager certificate management UI, you need to add new certificates in to VxRail Manager trust store. Follow the "Change the VxRail vSphere Components SSL Certificates for Internal vCSA" DELL EMC SolVe procedure to handle this case. For more information, refer Dell EMC documentation as follows:
 - Access [VxRail Appliance Solve Generator](#).
 - Select **'How To' Procedures > 'How To' Change other VxRail cluster settings > v4.7.110 > Import vSphere SSL certificates to VxRail Manager**
- When you change the VxRail Manager certificate with the external CA or some third party CA certificates using "Replace SSL Certificate on VxRail Manager" DELL EMC SolVe procedure, then you need to update the new certificates in the SDDC Manager trust store using the SDDC Manager APIs. For more information, see Dell EMC documentation as follows:
 - Access [VxRail Appliance Solve Generator](#).
 - Select **'How To' Procedures > 'How To' Change other VxRail cluster settings > v4.7.110 > Replace the VxRail Manager SSL Certificate**

For information on managing the certificates for VMware Cloud Foundation components, refer [Managing Certificates](#) in *VMware Cloud Foundation Operations and Administration Guide*.

Manage Passwords

You need to specify the passwords for your Cloud Foundation system's internal accounts as part of the bring-up procedure. You can also modify the passwords for these accounts using RESTful API calls.

You cannot rotate or change the ESXi and the VxRail Manager passwords from the SDDC Manager. You can only update the passwords in to the SDDC Manager internal database. To change the passwords and update the modified passwords in SDDC Manager through the password Manager UI, contact Dell EMC support.

Note

- VxRail management passwords are not stored in the SDDC Manager internal database.
 - Select the corresponding VxRail Manager or ESXi and then update the modified password.
-

Create a VxRail Virtual Infrastructure Workload Domain

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You have to create a VxRail Virtual Infrastructure (VI) workload domain before adding a cluster.

Deploy the vCenter server and make the domain ready for the cluster addition.

Note You can only perform one workload domain operation at a time. For example, while creating a new workload domain, you cannot add a cluster to any other workload domain.

Start the VI Configuration wizard and select the storage type for workload domain.

Procedure

- ◆ On the **SDDC Manager** Dashboard, click **+ Workload Domain** and then select **VI-VxRail Virtual Infrastructure Setup**.

Specify Name

Provide a name for the VxRail VI workload domain and organization.

Procedure

- 1 Type a name for the VI workload domain, such as **sfo01**. The name must contain between 3 and 20 characters.

It is a good practice to include location information in the name as resource object names (such as host and vCenter names) are generated on the basis of the VI workload domain name.
- 2 Type a name for the organization that requested or will use the virtual infrastructure, such as **Finance**. The name must contain between 3 and 20 characters.
- 3 Click **Next**.

Specify Compute Details

Specify the compute (vCenter) details for this workload domain.

Procedure

- 1 On the Compute page of the wizard, enter the vCenter IP address and DNS name.

Note Before updating the IP address in the wizard, ensure that you have reserved the IP addresses in the DNS.

- 2 Type the vCenter subnet mask and default gateway.
- 3 Type and re-type the vCenter Root password.
- 4 Click **Next**.

Review the Details

At the review step of the wizard, review the information about the 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.

Procedure

- 1 Scroll down the page to review the information.
- 2 Click **Finish** to begin the creation process.

The **Workload Domains** page appears and a notification is displayed letting you know that VI workload domain is being added. Click **View Task Status** to view the domain creation tasks and sub tasks.

If a task fails, you can fix the issue and re-run the task. If the workload domain creation fails, contact VMware Support.

The status will be activating until we add the primary cluster in to domain. When the VxRail VI workload domain is created, it is added to the workload domains table along with the already listed management domain.

The OEM license is assigned by default to the workload domains.

Add the Primary VxRail Cluster

The creation of primary cluster is a part of the creation of the workload domain.

Before adding the VxRail cluster, you need to perform the imaging of the workload domain nodes. Once you complete the imaging, perform the VxRail first run of the workload domain nodes using the external vCenter server.

- Create a local user in vCenter server as this is an external server deployed by VMware Cloud Foundation. This is required for the VxRail first run.
 - a Log in to the workload domain vCenter server Appliance through vSphere Web client.

- b Select **Menu > Administration > Single Sign On**.
 - c Click **Users and Groups**.
 - d Click **Users**.
 - e Select **Domain vSphere local**.
 - f Click **Add User**.
 - g In the **Add User** pop-up window, enter the values for the mandatory fields.
 - h Enter **Username** as vxadmin and **Password**. Confirm the **Password**.
 - i Click **Add**.
 - j Wait for the task to complete.
- Image the workload domain nodes. For information on imaging the nodes, contact Dell EMC Support.
 - Do a VxRail first run of the workload domain nodes using the external vCenter server. For information on VxRail first run, contact Dell EMC Support.
 - Once the validation is complete, trigger the build VxRail operation.
 - The cluster is created in VxRail.

To add the primary VxRail cluster to a workload domain:

Procedure

- 1 On the **SDDC Manager** Dashboard, click **Inventory > Workload Domains**. The **Workload Domains** page displays information for all workload domains.
- 2 In the workload domains table, hover your mouse over workload domain in the activating state. The primary cluster added to the activating domain. This means that the domain is not created and it is waiting for the addition of primary cluster. .

A set of three dots appear on the left of the workload domain name.
- 3 Click these three dots. Click **Add VxRail Cluster**.
- 4 The **Add VxRail Cluster to Workload Domain** page appears.
- 5 On the **VxRail Manager** page, a single VxRail cluster or multiple VxRail clusters in the vCenter are discovered. In case of multiple clusters, select a cluster. Click **Next**.
- 6 The **Discovered Host** page displays a list of the discovered hosts for that cluster. Update the SSH password for the discovered hosts for that cluster. Click the icon next to the name of the host to get more information about it. Click **Next**.
- 7 The Networking page displays all the networking details for the cluster.

Provide the VLAN ID.
- 8 Provide the NSX Manager details for the selected platform. Click **Next**.
- 9 Provide the NSX Controllers details for the selected platform. Click **Next**.

- 10 Enter the license keys for NSX for vSphere and VMware for VSAN. Click **Next**.
- 11 Review the details. Click **Finish**. The process of adding the VxRail cluster is triggered.

Expand a Workload Domain

After you add the primary cluster, you can add more clusters to expand the workload domain.

Before adding the VxRail cluster, you need to perform the imaging of the workload domain nodes. Once you complete the imaging, perform the VxRail first run of the workload domain nodes using the external vCenter server.

- Create a local user in vCenter server as this is an external server deployed by VCF. This is required for the VxRail first run.
- Image the workload domain nodes. For information on imaging the nodes, refer Dell EMC VxRail documentation.
- Do a VxRail first run of the workload domain nodes using the external vCenter server. For information on VxRail first run, refer Dell EMC VxRail documentation.
- Once the validation is complete, trigger the build VxRail operation.
- The cluster is created in VxRail.

This chapter includes the following topics:

- [Add the VxRail Cluster](#)
- [Expand the VxRail Cluster](#)

Add the VxRail Cluster

To add the VxRail cluster to a workload domain:

Procedure

- 1 On the **SDDC Manager** Dashboard, click **Inventory > Workload Domains**. The **Workload Domains** page displays information for all workload domains.
- 2 In the workload domains table, hover your mouse in the VxRail workload domain row.
A set of three dots appear on the left of the workload domain name.
- 3 Click these three dots. Click **Add VxRail Cluster**.
- 4 The **Add VxRail Cluster to Workload Domain** page appears.
- 5 On the **VxRail Manager** page, the VxRail cluster in the vCenter is discovered. Click **Next**.

- 6 The **Discovered Host** page displays a list of the discovered hosts for that cluster. Update the SSH password for the discovered hosts for that cluster. Click the icon next to the name of the host to get more information about it. Click **Next**.
- 7 The Networking page displays all the networking details for the cluster.
Provide the VLAN ID.
- 8 The NSX Manager details for the selected platform are displayed. Click **Next**.
- 9 The NSX Controllers details for the selected platform are displayed. Click **Next**.
- 10 Enter the license keys for NSX for vSphere and VMware for VSAN. Click **Next**.
- 11 Review the details. Click **Finish**. The process of adding the VxRail cluster is triggered.

Expand the VxRail Cluster

Once a cluster has been added to a workload domain, you can expand it further by adding hosts.

The process of expanding the VxRail cluster for a workload domain involves three steps:

- 1 Image the new node.
- 2 Discover and add new node to the cluster using the **Add VxRail hosts** option in the vCenter plug in of VxRail.
 - a Go to the vCenter for VxRail.
 - b Click on that particular cluster. You can view the configuration.
 - c Under the **Configure** tab, the Add VxRail Hosts page shows the list of the discovered hosts.
 - d Click **Add** to trigger the addition of hosts to that particular cluster.
 - e Provide the user credentials. Click **Next**.
 - f Review the Host IP address details. Click **Next**.
 - g Provide the ESXi credentials. Click **Next**.
 - h (Optional Step) If required, you can select the **Maintenance mode**. Click **Next**.
 - i Click **Validate**.
- 3 Add the host to the VMware Cloud Foundation domain cluster. The next section provides more details about this task.

Add the VxRail Hosts to the Cluster in VMware Cloud Foundation

Once the hosts have been added to the VxRail cluster, you can add them to the cluster in VMware Cloud Foundation.

Procedure

- 1 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.
The **Workload Domains** page displays information for all workload domains.
- 2 In the workload domains table, click the name of the workload domain that you want to expand.
The detail page for the selected workload domain appears.
- 3 Click the **Clusters** tab.
- 4 Click the name of the cluster where you want to add a host.
- 5 The details page for that particular cluster appears.
- 6 Click **Actions > Add VxRail Hosts**.
The **Add Host To VxRail Cluster** wizard appears.
- 7 You can see the list of the discovered hosts. Click **Add**.
- 8 Under the **tasks** tab in the **cluster details** page, you can see the status of the add host task. Wait until the action is complete before performing additional workload domain tasks.

Reduce a Workload Domain

You can reduce a workload domain by removing a host from a cluster in the workload domain or by deleting a cluster.

The two tasks involved in removing a host are:

- Remove the host from the VMware Cloud Foundation domain.
- Remove the host from the vCenter plug-in of VxRail.

This chapter includes the following topics:

- [Remove a Host from a Cluster in a Workload Domain](#)
- [Remove Host using the vCenter for VxRail](#)
- [Delete a VxRail Cluster](#)

Remove a Host from a Cluster in a Workload Domain

You can remove a host from a cluster in a workload domain through the **Workload Domains** page in the SDDC Manager Dashboard.

When a host is removed, the vSAN members are reduced. Ensure that you have enough hosts remaining to facilitate the configured vSAN availability. Failure to do so might result in the datastore being marked as read-only or in data loss.

Procedure

- 1 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.
The Workload Domains page displays information for all workload domains.
- 2 In the workload domains table, click the name of the workload domain that you want to modify.
The detail page for the selected workload domain appears.
- 3 Click the **Clusters** tab.
- 4 Click the name of the cluster from which you want to remove a host.
- 5 Click the **Hosts** tab.
- 6 Select the host to remove and click **Remove Selected Hosts**.

An alert appears, asking you to confirm or cancel the action. If the removal results in the number of hosts in the cluster being less than the minimum number of required hosts, you must click **Force Remove** to remove the host.

- 7 Click **Remove** to confirm the action.

The details page for the cluster appears with a message indicating that the host is being removed. When the removal process is complete, the host is removed from the hosts table.

Remove Host using the vCenter for VxRail

Once you remove the VxRail host in VMware Cloud Foundation domain, it is moved to the Maintenance mode in the vCenter for VxRail.

Perform the following tasks in the vCenter for VxRail:

Procedure

- 1 Right click the particular cluster and select **VxRail -> Remove VxRail Host**.
- 2 Provide the credentials. Click **Apply** to remove the host.

Delete a VxRail Cluster

You can delete a VxRail cluster from a workload domain.

You cannot delete the last cluster in a workload domain. Instead, delete the workload domain.

Prerequisites

Migrate or backup the VMs and data on the data store associated with the cluster to another location.

Procedure

- 1 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.
The Workload Domains page displays information for all workload domains.
- 2 Click the name of the workload domain that contains the cluster you want to delete.
- 3 Click the **Clusters** tab to view the clusters in the workload domain.
- 4 Hover your mouse in the cluster row you want to delete.
- 5 Click the three dots next to the cluster name and click **Delete VxRail Cluster**.
- 6 Click **Delete Cluster** to confirm that you want to delete the cluster.

The details page for the workload domain appears with a message indicating that the cluster is being deleted. When the removal process is complete, the cluster is removed from the clusters table.

Delete a Workload Domain

When you delete a workload domain, the clusters within that workload domain are deleted.

Caution Deleting a workload domain is an irreversible operation. All clusters and VMs within the workload domain are deleted and the underlying datastores are destroyed.

It can take up to 20 minutes for a workload domain to be deleted. During this process, you cannot perform any operations on workload domains.

Prerequisites

- Back up the data on the workload domain.
- Migrate the VMs that you want to keep to another workload domain.

Procedure

- 1 On the SDDC Manager Dashboard, click **Inventory > Workload Domains**.

The Workload Domains page displays information for all workload domains.

- 2 Hover your mouse in the workload domain row that where you want to delete.

When you select the workload domain, three vertical dots appear next to the name.

- 3 Click the dots and choose **Delete Domain**.

A confirmation window appears with details about the impact of deleting the workload domain, including how many hosts will be returned to the free pool.

- 4 Click **Delete Domain** to proceed.

The details page for the workload domain appears with a message indicating that the workload domain is being deleted. When the removal process is complete, the workload domain is removed from the domains table.

Stretching Clusters

The vSAN stretched cluster extends the cluster from one data site to two sites for high availability and load balancing. You can stretch the cluster on the management domain as well as the workload domain using the Supportability and Serviceability Utility (SoS).

You may want to stretch a cluster for the following reasons.

- **Planned maintenance**

You can perform a planned maintenance on an availability zone without any downtime and then migrate the applications after the maintenance is completed.

- **Automated recovery**

Stretching a cluster automatically initiates VM restart and recovery, and has a low recovery time objective for the majority of unplanned failures.

- **Disaster avoidance**

With a stretched cluster, you can prevent service outages before an impending disaster such as a hurricane or rising flood levels.

Prerequisites

You have to manually validate the parameters such as the FQDN of the hosts, status of the stretched cluster, and so on, before passing it to SoS.

Availability Zones

An availability zone is a collection of infrastructure components. Each availability zone is isolated from other availability zones to prevent the propagation of failure or outage across the data center. An availability zone runs on its own physically distinct, independent infrastructure, and is engineered to be highly reliable. Each zone should have independent power, cooling, network, and security. Additionally, these zones should be physically separate so that even uncommon disasters affect only one zone.

The physical distance between availability zones is short enough to offer low, single-digit latency (less than 5 ms) and large bandwidth (10 Gbps) between the zones. Hence, availability zones can either be two distinct data centers in a metro distance, or two safety or fire sectors (data halls) in the same large-scale data center.

The recommended minimum number of hosts in each availability zone is 4 hosts and the maximum is 15 hosts. If you are expanding a cluster, you must add hosts in pairs. Each host in the pair must have the same CPU, memory, and storage.

A region is a Cloud Foundation instance.

Note Cloud Foundation supports stretching a cluster across two availability zone within a region.

Supportability and Serviceability Utility

The SoS utility is a command-line Python tool that can be used for the following:

- Run health checks.
- On-demand vSAN partition cleanup.
- Collect logs for Cloud Foundation components.
- On-demand host cleanup.

To run the SoS utility, SSH in to the SDDC Manager VM using the **vcf** administrative user account, enter **su** to switch to the root user, and navigate to the `/opt/vmware/sddc-support` directory and type `./sos` followed by the options required for your desired operation.

```
./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
```

Note You can specify some options in the conventional GNU/POSIX syntax, using `--` for the long option and `-` for the short option.

Prerequisites for Stretching a Cluster

This section lists the prerequisites for preparing the cluster for stretching.

- Download the [Deployment for Multiple Availability Zones](#) document and read it to understand the requirements.
- Ensure that you have a vSAN Enterprise license, which is required for stretching a cluster.
- The management VLAN, vSAN VLAN, and vMotion VLAN between the two availability zones must be stretched.
- All VMs on an external network must be on a virtual wire. If they are on a VLAN, that VLAN must be stretched as well.
- Each availability zone must have its own vMotion, vSAN, and VXLAN networks.
- The VLAN IDs must be identical on both availability zones.
- Each stretched cluster requires a vSAN witness appliance in a third party location. The maximum RTT on the witness is 200ms.

- If you are stretching a cluster in a VI workload domain, you must stretch the management domain cluster first. vCenter Servers for all workload domains are in the management domain. Hence, you must protect the management domain to ensure that you can access and manage the workload domains.
- Ensure that you have enough hosts such that there is an equal number of hosts on each availability zone. This is to ensure that there are sufficient resources in case an availability zone goes down completely.
- The TCP port and the UDP ports needs to be open for witness traffic between the witness host and the vSAN cluster data nodes. See KB article [52959](#).

Cloud Foundation Networks

Network Name	Connectivity to AZ2	Minimum MTU	Maximum MTU
vSAN	L2	1500	9000
vMotion	L2	1500	9000
VXLAN (VTEP)	L2	1600	9000
Management	L2	1500	9000
Witness Management	L3	1500	9000
Witness vSAN	L3	1500	9000

Stretch A Cluster

VMware Cloud Foundation supports stretching a cluster across two availability zone within a region.

For more information on the availability zones, see [Availability Zones](#).

Note

- Dell EMC VxRail does not support stretching clusters over the L3 networks. As a result, the cluster needs to be stretched over L2.
- Command such as `--show-free-hosts` operations is not applicable for the Dell EMC VxRail environment. If you execute these commands, a warning will be thrown, 'Operation is not applicable for this platform!!'
- The **Import VxRail Host** to cluster operation is disabled for a stretched cluster

To stretch a cluster for VMware Cloud Foundation on Dell EMC VxRail, perform the following steps:

Procedure

- 1 Using SSH, log in to the SDDC Manager VM with the user name `vcf` and the password you specified in the deployment parameter sheet. Run the SoS tool to trigger the workflow to import the newly added hosts in the SDDC Manager inventory. Enter `su` to switch to the root user.

- 2 Prepare the workflow. Use the SoS commands to prepare the cluster. See *SoS Utility Options for vSAN Stretched Clusters* in [SoS Utility Options](#).

```
/opt/vmware/sddc-support/sos --prepare-stretch --sc-domain <valid_domain_name> --sc-cluster <valid cluster name which is a part of the domain to be stretched>
```

Once the workflow is triggered, track the task status in the SDDC Manager UI.

- 3 You have to deploy the witness in a different site. Add the witness host or the appliance to the management or the workload domain vCenter. Follow the steps listed below as described in [Deploying a vSAN Witness Appliance](#) to add a vSAN witness.

- a Deploy and Configure the vSAN Witness Host in Region B.
- b Add Static Routes for Both Availability Zones and the vSAN Witness Host.

If the default gateway in the vSAN network provided for the network pool does not provide routing between the two availability zones and the witness host, perform all the steps in this procedure.

- c Check connectivity between the vSAN vmkernel adapters in the two availability zones and the witness host by following the instructions in KB article [1003728](#). Resolve errors, if any, before proceeding to the next step.

- d "Configure vSAN Stretched Cluster for the Management Cluster in Region A"

In step 5 of the section "Update the vSphere High Availability Settings of the Management Cluster in Region A", set **Host failures cluster tolerates** to the number of hosts in AZ1.

Note Skip the section Update Host Profiles to Capture the vSAN Stretched Cluster Configuration.

- 4 Run the following command to stretch the cluster:

For Cloud Foundation 3.7:

```
/opt/vmware/sddc-support/sos --stretch-vsan --sc-domain <valid_domain_name> --sc-cluster <valid cluster name which is a part of the domain to be stretched> --sc-hosts <valid host names> --witness-fqdn <FQDN> --witness-vsan-ip <IP address> --witness-vsan-cidr <IP address>
```

For Cloud Foundation 3.7.1:

```
/opt/vmware/sddc-support/sos --stretch-vsan --sc-domain <valid_domain_name> --sc-cluster <valid cluster name which is a part of the domain to be stretched> --sc-hosts <valid host names> --witness-host-fqdn <witness host/appliance IP or fqdn> --witness-vsan-ip <witness host IP address> --witness-vsan-cidr <IP address with mask> --vsan-gateway-ip <vsan-gateway-ip-address>
```

Once you trigger the stretch cluster workflow, you have to provide the root password for the ESXi hosts.

The hosts in the Availability Zone 1 (AZ1) and the Availability Zone 2 (AZ2) are a part of the single cluster. Ensure that you name the hosts in AZ1 and AZ2 differently so that it is easy to identify. Power on the hosts that are rack mounted in AZ2 (or Region B) and log-in to VxRail Manager. As the hosts are in stretched L2 network, VxRail Manager in AZ1 would auto-discover the hosts. Perform cluster expansion by adding the hosts to the cluster already created in the previous steps.

- 5 Once the workflow is triggered, the task is tracked in the SDDC Manager UI.
- 6 Monitor the progress of the AZ2 hosts being added to the cluster.
 - a On the SDDC Manager Dashboard, click **View All Tasks**.
 - b Refresh the window to monitor the status.
- 7 Validate that stretched cluster operations are working correctly by logging in to the vSphere Web Client.
 - a Check the vSAN Health page.
 - 1 On the home page, click **Host and Clusters** and then select the stretched cluster (SDDC-Cluster1 in our example).
 - 2 Click **Monitor > vSAN > Health**.
 - 3 Click **Retest**.
 - 4 Fix errors, if any.
 - b Check the vSAN Storage Policy page.
 - 1 On the home page, click **Policies and Profiles > VM Storage Policies > vSAN Default Storage Policies**.
 - 2 Select the policy associated with the vCenter Server for the stretched cluster.
 - 3 Click **Monitor > VMs and Virtual Disks**.
 - 4 Click **Refresh**.
 - 5 Click **Trigger VM storage policy compliance check**.
 - 6 Check the **Compliance Status** column for each VM component.
 - 7 Fix errors, if any.

8 From VMware Cloud Foundation 3.7.1 onwards, you can expand the stretched cluster.

- a Use the VxRail vCenter plugin to add the additional hosts in AZ1 or AZ2 to the cluster by performing the VxRail Manager cluster expansion work flow. Refer to the Dell EMC VxRail documentation for more details.
- b Log in to SDDC Manager and run the SoS tool to trigger the workflow to import the newly added hosts in the SDDC Manager inventory. Run the following SoS command to expand the stretched cluster:

```
/opt/vmware/sddc-support/sos --expand-stretch-cluster --sc-domain <valid_domain_name>
--sc-cluster <valid cluster name which is a part of the domain to be stretched> --sc-
hosts <valid host names> --witness-host-fqdn < witness host/appliance IP or fqdn> --
witness-vsan-ip <witness host IP address> --witness-vsan-cidr <IP address with mask>
--vsan-gateway-ip <vsan-gateway-ip-address>
```

For both stretch and expand workflows, once the SoS command triggers, it will prompt for passwords for the hosts given as inputs so user has to keep them ready in advance. In case of the expand workflow, the user also has to provide fault domain info as an input for hosts. So keep the fault domain information ready.

Note

- Ensure that you have the fault domain information (preferred fault domain information) for the hosts
 - Ensure that the passwords are correct for each host.
 - For `--sc-hosts <valid host names>`, ensure that the multiple host names are separated by commas.
-

In the SoS tool, provide the root credential and the fault domain to which the host to be added for each host.

- c Once the workflow is triggered, track the task status in the SDDC Manager UI.

Unstretch a Cluster

From VMware Cloud Foundation 3.7.2 onwards, you can unstretch a management or a workload domain cluster that is already stretched.

Procedure

- 1 Log in to SDDC Manager and run the SoS tool to trigger the workflow to unstretch a cluster. See [SoS Utility Options for vSAN Stretched Clusters](#) in [SoS Utility Options](#).
- 2 Run the following SoS command to unstretch a cluster.

```
/opt/vmware/sddc-support/sos --unstretch-vsan --sc-domain <domain-name> --sc-cluster
<cluster-name>
```

Track the task status of this workflow in the SDDC Manager UI.

Lifecycle Management

Lifecycle Management (LCM) enables you to perform automated updates on Cloud Foundation services (SDDC Manager and internal services), VMware software (NSX for vSphere, vCenter Server, ESXi, and vRSCLM), and Dell EMC VxRail in your environment. You can download the update bundles and apply them manually or schedule them within your maintenance window allowing for flexibility in your application.

For more information on VMware Cloud Foundation Lifecycle Management, see [Patching and Upgrading Cloud Foundation](#).

The LCM bundles that are available are:

- **VxRail Partner Bundle:** You can download the Dell EMC VxRail partner bundle to update the VxRail appliance.
- **Patch Update Bundle:** A patch update bundle contains bits to update the appropriate Cloud Foundation software components in your management domain or VI workload domain. In most cases, a patch update bundle must be applied to the management domain before it can be applied to VI workload domains.
- **Cumulative Update Bundle:** With a cumulative update bundle, you can directly update the appropriate software in your workload domain to the version contained in the cumulative bundle rather than applying sequential updates to reach the target version.
- **Install Bundle:** If you have updated the management domain in your environment, you can download an install bundle with updated software bits for VI workload domains and vRealize suite components.

This chapter includes the following topics:

- [Download Bundle](#)
- [Use a Proxy Server to Download Upgrade Bundles](#)
- [Upgrade SDDC Manager, Cloud Appliances, and VxRail](#)
- [Update History](#)

Download Bundle

You must log in to My VMware account before downloading a bundle.

You must be logged in to My VMware account to download update bundles.

- 1 In the SDDC dashboard, click **Administration > Repository Settings** .

- 2 Enter the My VMware credentials as well as the Dell EMC credentials. Click **Authenticate**. You have to log into both My VMware and Dell EMC to update all the VMware Cloud Foundation and the VxRail components.

- 3 To access the bundles, you have two options:

- In the SDDC Manager Dashboard, navigate to the **Bundles** page. This page shows the available update bundles for the components.

- 1 Click **Repository > Bundles**.

- In the SDDC Manager Dashboard, navigate to the **Workload Domain** page.

- 1 Click **Inventory > Workload Domains**.

- 2 Click the name of a workload domain and then click the **Updates/Patches** tab.

The number next to the Updates/Patches tab indicates the available updates.

The **Available Updates** section displays all updates applicable to this workload domain.

Also, you can view the current versions running such as the VxRail current version.

- 4 To view the metadata details for an update bundle, click **View Details**. The bundle severity and detailed information about each component included in the bundle is displayed. If a bundle is a cumulative bundle, this information is displayed as well. The bundle severity levels are described in the table below.

Severity Value	Description
Critical	A problem may severely impact your production systems (including the loss of production data). Such impacts could be system down or HA not functioning.
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 which has 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.

- 5 Click **Schedule Download**. Select the date and time for the bundle download and click **Schedule**.

Use a Proxy Server to Download Upgrade Bundles

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

Procedure

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

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

Upgrade SDDC Manager, Cloud Appliances, and VxRail

The SDDC Manager is the first component to be upgraded on the management domain.

Procedure

- 1 On the SDDC Manager Dashboard, click > **Inventory**.
- 2 Click a domain and then click the **Updates/Patches** tab.
- 3 Click **Precheck** to validate that the appliance is ready to be updated.

Click **View Status** to see the update status for each component and the tests performed. Expand a test by clicking the arrow next to it to see further details.

If any of the tests fail, fix the issue and click **Retry Precheck**.

The precheck results are displayed below the Precheck button. Ensure that the precheck results are green before **Schedule** proceeding. A failed precheck may cause the update to fail.

- 4 Do either of the following:
 - a Click **Update Now**.
 - b Click **Schedule Download**. Select the date and time for the bundle download and click **Schedule**.

To view the update status, click **Update History > Actions > View Update Status**. After the bundle is downloaded, the **Schedule Update** button is displayed. Click **View Details** to see the version changes for each component that the bundle will apply.

- 5 After the update is completed successfully, log out of the SDDC Manager Dashboard and log back in.

Support for the Manual Upload of Bundles for VMware Cloud Foundation 3.7.1

Life Cycle Manager (LCM) polls the VMware depot to access update bundles. If you do not have internet connectivity, you have to manually upload the upgrade bundles.

You need to upload the following upgrade bundles for VMware Cloud Foundation on Dell EMC VxRail:

- Dell EMC VxRail bundle
- VMware bundle

Procedure

1 To upload a VxRail bundle:

- a Download the VxRail bundle from EMC depot or from VxRail Support.
- b Get the `partnerBundleMetadata.json` file for this bundle from VMware support.
- c Get the `softwareCompatibilitySets.json` file for this bundle from VMware support.
- d Copy the partner bundle to `/nfs/vmware/vcf/nfs-mount/bundle/depot/local/bundles`.
- e Copy the `partnerBundleMetadata.json` file to `/nfs/vmware/vcf/nfs-mount/bundle/depot/local/partnerBundleMetadata.json`.
- f Copy the `softwareCompatibilitySets.json` file to `lcm.depot.adapter.local.baseDir` i.e. `/nfs/vmware/vcf/nfs-mount/bundle/depot/local/softwareCompatibilitySets.json`
- g Ensure that all copied files are readable by `vcf_lcm` user and are owned by the `vcf` group.
- h Using SSH, log in to the SDDC Manager VM with the user name `vcf` and the password you specified in the deployment parameter sheet.
- i Run the following curl commands:
 - `curl -X PUT http://localhost/lcm/bundle/upload/compatibilitySets -H "Content-Type: application/json"`
 - `curl -X PUT http://localhost/lcm/bundle/upload/partnerBundleMetadata -H "Content-Type: application/json"`
 - `curl -X PUT http://localhost/lcm/bundle/upload/partnerBundle/{bundle_id} -H "Content-Type: application/json"`

Note You can obtain the `bundle_id` from the bundle details from the VMware Cloud Foundation UI.

Note For the VxRail 4.7.111 bundle, if you have used the above APIs, you have to rename the downloaded partner bundle to `DL93390_VxRail_4.7.111_Composite_Upgrade_Package_for_4.7.x.zip`.

- j Verify that the bundle shows in the bundle repository.

2 To upload the VMware bundle:

- a To upload the vCenter or the NSX bundle, follow the procedure in the [Download Specific Bundles](#) section.
- b Get the `softwareCompatibilitySets.json` file for this bundle from VMware support.
- c Using SSH, log in to the SDDC Manager VM with the user name `vcf` and the password you specified in the deployment parameter sheet.
- d Ensure that all copied files are readable by `vcf_lcm` user and are owned by the `vcf` group.
- e Run the following command:

```
curl -X PUT http://localhost/lcm/bundle/upload/compatibilitySets
```

- f Verify that the bundle shows in the bundle repository.

Support for the Manual Download of Bundles for VMware Cloud Foundation 3.7.2

LCM polls the VMware depot to access the update bundles. If you do not have internet connectivity in your Cloud Foundation system, you can use the Bundle Transfer utility to manually the bundles from the depot on your local computer and then upload them to SDDC Manager. The utility identifies applicable bundles based on the current software versions in your environment based on a marker file generated on the SDDC Manager VM.

Prerequisites

A Windows or Linux computer with internet connectivity for downloading the bundles. If it is a Windows computer, it must have Java 8 or later.

Procedure

- 1 Using SSH, log in to the SDDC Manager VM with the user name `vcf` and password you specified in the deployment parameter sheet.
- 2 Navigate to the `/opt/vmware/vcf/lcm/lcm-tools/bin` directory.
- 3 Generate a marker file by running the following command.

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

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

The output contains the directory where the marker file is generated.

- 4 Copy the `/opt/vmware/vcf/lcm/lcm-tools/bin` directory, and the `markerFile` and `markerFile.md5` files from the location displayed in the output of step 3 to a computer with internet access.

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

- 5 For the VxRail SKU, when you download the NSX or vCenter bundles, provide the additional argument of `withCompatibilitySets` which will let you download the compatibility sets along with the bundles. On the computer with internet access, run the following command.

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

where

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

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

- 6 When you download the VxRail bundles, provide the additional argument `downloadPartnerBundle`.

```
./lcm-bundle-transfer-util -download "downloadPartnerBundle"
                        -outputDirectory ${absolute-path-output-dir}
                        -depotUser ${vmwaredepotUser}
                        -depotUserPassword ${vmwareDepotPassword}
                        -pdu ${emcdepotuser}:${emcdepotpassword}
                        -markerFile ${absolute-path-markerFile}
                        -markerMd5File ${absolute-path-markerFile.md5}
```

- 7 Copy the downloaded `softwareCompatibilitySets.json` to `/nfs/vmware/vcf/nfs-mount/bundle/depot/local/softwareCompatibilitySets.json`.

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

For example:

```
scp -pr /Work/UpdateBundle vcf@SDDC_IP:/home/vcf/vCF231to232Bundle"
```

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

```
chown vcf_lcm:vcf -R /opt/vmware/vcf/vCF231to232Bundle
chmod -R 0777 /opt/vmware/vcf/vCF231to232Bundle
```

- 10 In the SDDC Manager VM, upload the bundle files to the internal LCM repository.

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

where *absolute-path-output-dir* is the directory where the bundle files have been be uploaded, or /opt/vmware/vcf/vCF231to232Bundle as shown in the previous step.

The utility uploads the bundles specified in the `deltaFileDownloaded` file. The console displays upload status for each bundle.

- 11 For the VxRail bundles, perform the following:

- a Copy the partner bundle to /nfs/vmware/vcf/nfs-mount/bundle/depot/local/bundles.
- b Copy `partnerBundleMetadata.json` to /nfs/vmware/vcf/nfs-mount/bundle/depot/local/partnerBundleMetadata.json.
- c Copy `softwareCompatibilitySets.json` to /nfs/vmware/vcf/nfs-mount/bundle/depot/local/softwareCompatibilitySets.json
- d In the SDDC Manager VM, upload the bundle files to the internal LCM repository.

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

Update History

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

Procedure

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

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

Image-Based Backup and Restore

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For an image-based backup of the SDDC Manager, use a solution compatible with the VMware vSphere Storage APIs - Data Protection (formerly known as VMware vStorage APIs for Data Protection or VADP).

vSphere Storage APIs - Data Protection compatible backup software connects to the vCenter servers in the management domain to perform the backup to a remote site. In the event of failure, the backup software connects to the vCenter servers in the management domain to restore the VMs. If the management domain is lost, the vCenter servers are no longer available and must be restored first. Choosing a backup software that supports Direct Restore to a ESXi host allows restoring the vCenter servers.

For an SDDC Manager backup, connect your backup with the management domain vCenter Server. Configure the product to take non-quiesced backups of SDDC Manager. To reduce the backup time and storage cost, use incremental backups in addition to full ones.

Configuring Customer Experience Improvement Program

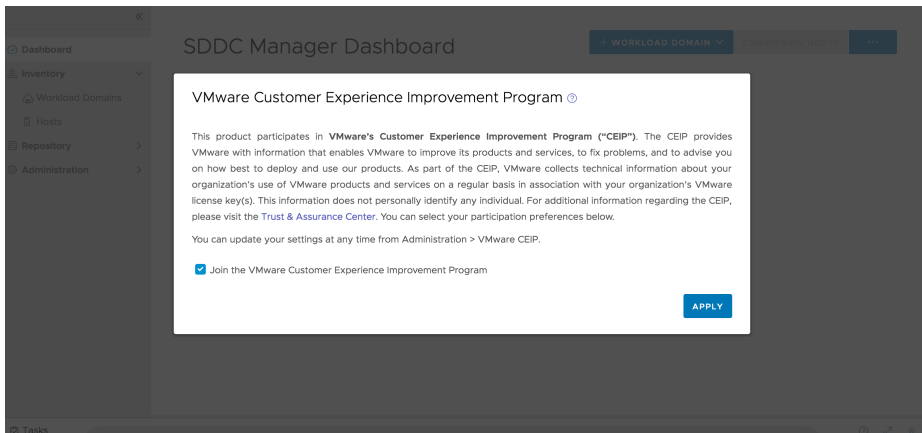
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This product participates in VMware Customer Experience Improvement Program (CEIP).

The CEIP provides VMware with information that enables VMware to improve its products and services, to fix problems, and to advise you on how best to deploy and use our products. As part of the CEIP, VMware collects the technical information about your organization's use of the VMware products and services regularly in association with your organization's VMware license keys. This information does not personally identify any individual. For additional information regarding the CEIP, refer to the Trust & Assurance Center at <http://www.vmware.com/trustvmware/ceip.html>.

You can enable or disable CEIP across all the SDDC components deployed in VMware Cloud Foundation by the following methods:

- When you log into SDDC Manager for the first time, a pop-up window appears. The **Join the VMware Customer Experience Program** option is selected by default. Deselect this option if you do not want to enable CEIP. Click **Apply**.



- You can enable or disable CEIP from the Administration tab on the SDDC Manager dashboard.

Note When you join CEIP, the **Enable VMware Customer Experience Improvement Program** task is shown in the floating task bar of the SDDC dashboard. Similarly when you leave CEIP, the **Disable VMware Customer Experience Improvement Program** task is displayed. This task bar is available on all the screens of VMware Cloud Foundation.

To enable or disable CEIP from the **Administration** tab, perform the following steps:

Procedure

- 1 On the SDDC Manager Dashboard, click **Administration > VMware CEIP**.
- 2 To enable CEIP, select the **Join the VMware Customer Experience Improve Program** option.
- 3 To disable CEIP, deselect the **Join the VMware Customer Experience Improve Program** option.