Installation, Configuration, and Upgrade Guide in On-Premises and Provider Site

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VMware Cloud Director Availability 4.5

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VMware Cloud Director Availability overview in on-premises and in provider vCenter Server site

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VMware Cloud Director Availability™ is a Disaster Recovery-as-a-Service (DRaaS) solution. VMware Cloud Director Availability On-Premises Appliance protects and migrates vSphere workloads between the on-premises vCenter Server instance and either a provider vCenter Server site or a cloud site backed by VMware Cloud Director™.

VMware Cloud Director Availability is available through the VMware Cloud Provider Program. This solution provides multi-tenant workload protection and recovery between various cloud sites and with on-premises vCenter Server sites. Choose one of the two VMware Cloud Director Availability deployment types, depending on whether the destination cloud site is backed by VMware Cloud Director:

On-premises site to cloud site backed by VMware Cloud Director

Replication management and monitoring between on-premises sites and multi-tenant cloud sites backed by VMware Cloud Director, by using a VMware Cloud Director Availability On-Premises Appliance at each on-premises vCenter Server site. For information about this architecture, see Deployment Architecture On-Premises.

vSphere DR and migration between vCenter Server sites

VMware Cloud Director Availability On-Premises Appliance version 4.4 and later have an additional appliance role that can replicate between an on-premises vCenter Server site and a cloud vCenter Server site. For this, during the initial on-premises appliance deployment, select its role as On-Premises to Cloud vCenter Replication Appliance. Then pair the new on-premises appliance with a vCenter Replication Management Appliance, deployed, licensed, and metered in the cloud vCenter Server instance. For information about this architecture, see Deployment Architecture and Requirements for vSphere DR and Migration.

Since VMware Cloud Director Availability 4.4, during the on-premises appliance deployment in the on-premises vCenter Server instance, select its role for replicating with a cloud site:

On-Premises to Cloud Director Replication Appliance

Pairs with a cloud site backed by VMware Cloud Director. For more information, see Chapter 4 Installing and Configuring an On-Premises to Cloud Director Replication Appliance.

On-Premises to Cloud vCenter Replication Appliance

Pairs to a cloud vCenter Server site, running vCenter Replication Management Appliance. For more information, see Chapter 3 Installing and Configuring the Appliances for vSphere DR and Migration.

As a **provider**, in the cloud vCenter Server site you can deploy:

vCenter Replication Management Appliance

Pairs to another cloud vCenter Server site, running vCenter Replication Management Appliance. Allows pairing from On-Premises to Cloud vCenter Replication Appliance. For more information, see Chapter 3 Installing and Configuring the Appliances for vSphere DR and Migration.

VMware Cloud Director Availability provides:

- Test failover or failover on-premises workloads to the cloud site and failback of recovered in the cloud workloads back to the on-premises site.
- Migration of protected virtual machines in the cloud site back to the on-premises site and vice versa.
- Self-service protection and failover workflows per virtual machine.
- One vApp or virtual machine replicates to a one destination site. That is, the same source workload can replicate only on a single destination.
- Each deployment can serve as both a source and a recovery site. There are no dedicated source and destination sites.
- Symmetrical replication flow that can be started from either the source or the recovery site.
- Built-in secure tunneling that requires no incoming allowed ports in the firewall in the on-premises site.
- Built-in end-to-end TLS encryption of the replication traffic that is terminated at each VMware Cloud Director Availability appliance.
- Optional compression of the replication traffic.
- VMware Cloud Director Availability vSphere Client Plug-In integration with the existing vSphere environment.
- Support for multiple vCenter Server and ESXi versions.
- Single installation package, distributed as a Photon-based virtual appliance.

Interoperability and vSphere Product Edition

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Before deploying and pairing VMware Cloud Director Availability, first verify the interoperability between VMware Cloud Director Availability and ESXi, the vSphere product edition, and the other VMware products in the disaster recovery infrastructure and the interoperability between the source site and the destination site versions.

VMware Cloud Director Availability interoperability matrices

Before installing VMware Cloud Director Availability, verify the supported versions of ESXi and vSphere. For interoperability information between VMware Cloud Director Availability and other VMware products, see Product Interoperability Matrix.

vSphere product edition

All sites participating in a replication must run vSphere product editions that include the vSphere Replication feature in their licenses. The ESXi hosts in all paired on-premises sites and in all paired cloud sites must run one of the following vSphere product editions that include the vSphere Replication feature:

- vSphere Essentials Plus
- vSphere Standard
- vSphere Enterprise
- vSphere Enterprise Plus
- vSphere Desktop

Note Cannot replicate virtual machines to or from ESXi hosts that do not include the vSphere Replication feature in their licenses. Attempting to configure a replication for virtual machines to or from such a host causes failure for the replication with the following error message.

```
Operation aborted due to an unexpected error.
```

This issue occurs when in the source or in the destination site the underlying vSphere environment uses, for example, a vSphere Essentials license. To successfully replicate, configure the underlying environments with licenses that support the vSphere Replication feature in all participating sites.

For information about the license requirements for vSphere Replication, see vSphere Replication Licensing in the *vSphere Replication* documentation.

Paired sites versions interoperability

You can pair sites that have mismatching VMware Cloud Director Availability versions deployed. For information about the source site VMware Cloud Director Availability interoperability with the disaster recovery infrastructure in the destination site, select your version and see Managing Pairing with Cloud Director Sites in the *Administration Guide*.

Metering cloud sites

As a **provider**, you must meter the consumption data of each cloud site instance of VMware Cloud Director Availability by adding the Service Endpoint of the appliances in VMware vCloud® Usage Meter. For more information, see Usage Meter Integration.

Installing and Configuring the Appliances for vSphere DR and Migration

3

To replicate vSphere workloads between vCenter Server instances, in the provider vCenter Server instance deploy and license a vCenter Replication Management Appliance, optionally deploy one or more Replicator Appliance instances, and in the tenant vCenter Server instance deploy a On-Premises to Cloud vCenter Replication Appliance.

- For vSphere DR and migration between vCenter Server sites, install and configure VMware Cloud Director Availability as a new deployment in both the provider and the tenant vCenter Server instances by following this current chapter.
- Alternatively, for on-premises replication with cloud sites backed by VMware Cloud Director, to install and configure VMware Cloud Director Availability, see the Chapter 4 Installing and Configuring an On-Premises to Cloud Director Replication Appliance chapter.

This chapter includes the following topics:

Deployment Architecture and Requirements for vSphere DR and Migration

To protect or migrate vSphere workloads between two vCenter Server sites, deploy two VMware Cloud Director Availability appliances, in each respective vCenter Server instance. Before installing each appliance, verify that each site meets the deployment requirements. Also, allow the network communication within the site and between the sites.

vSphere DR and migration

Between two vCenter Server instances, any user that is a member of **ADMINISTRATORS**, or **VRADMINISTRATORS**, or **VRUSERS** can protect or migrate vSphere workloads after pairing the following VMware Cloud Director Availability appliances in each site, deployed and configured by a user member of **ADMINISTRATORS**. Configuring the appliances with the local vCenter Server Lookup service creates the groups **VRADMINISTRATORS** and **VRUSERS** in the local vCenter Server instance.

Appliances Deployment

- To replicate workloads between provider vCenter Server and tenant vCenter Server, deploy and configure the following appliances, then pair them.

  vCenter Replication Management Appliance

  In the provider vCenter Server instance, as a vSphere **administrator** user deploy, license, and configure a vCenter Replication Management Appliance, then add it for metering in VMware vCloud® Usage Meter.

  Optionally, after configuring the vCenter Replication Management Appliance, the provider can add one or more Replicator Appliance instances for scaling the replication performance.

  On-Premises to Cloud vCenter Replication Appliance

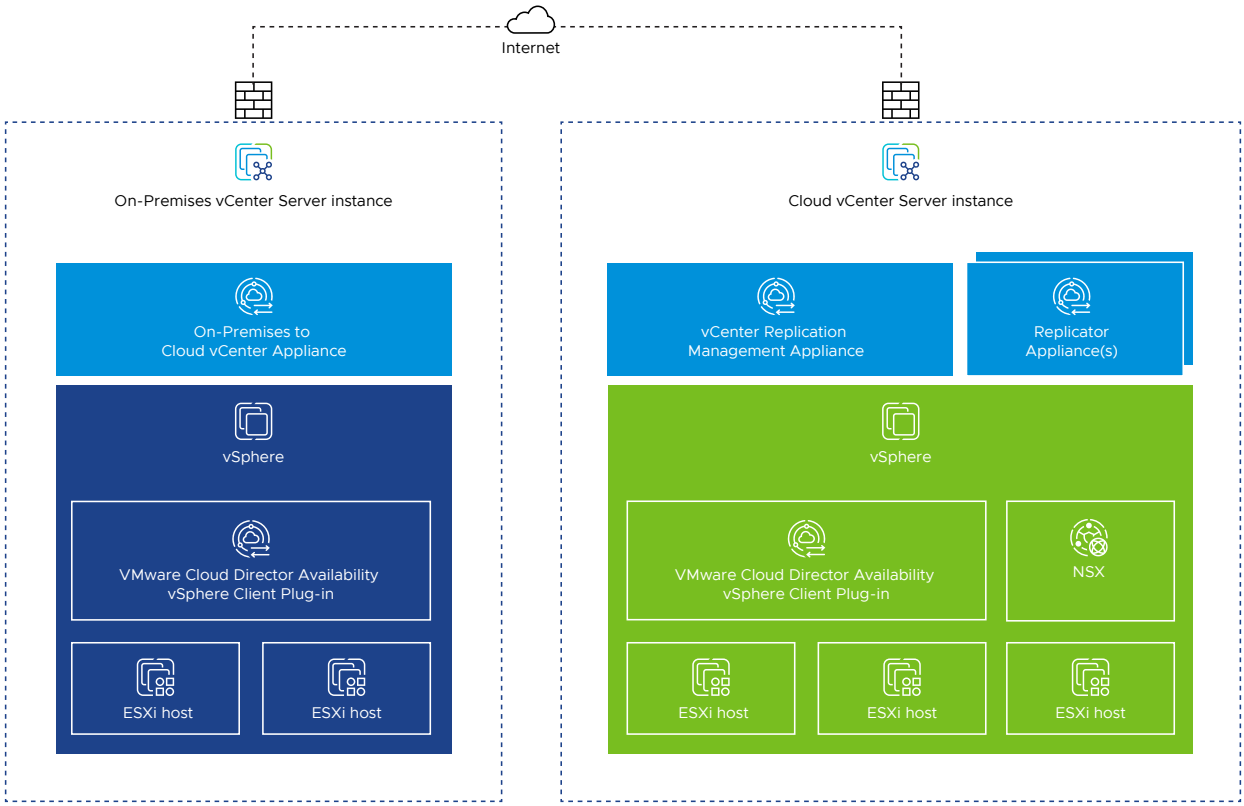
  In the tenant vCenter Server instance, as a vSphere **administrator** user, only deploy and configure an On-Premises to Cloud vCenter Replication Appliance.

  - For information about deploying both appliances in each vCenter Server instance, see Deploy the Appliances for vSphere DR and Migration.
  - For information about licensing, configuring, metering, and pairing the appliances, see Configure and Pair Both Appliances.

- Alternatively, to replicate workloads between provider vCenter Server instances, deploy, license, and configure a vCenter Replication Management Appliance in each provider vCenter Server instance. Then add the appliances for metering in vCloud Usage Meter. Finally, pair both appliances, similarly to the example for pairing a tenant and a provider instance.

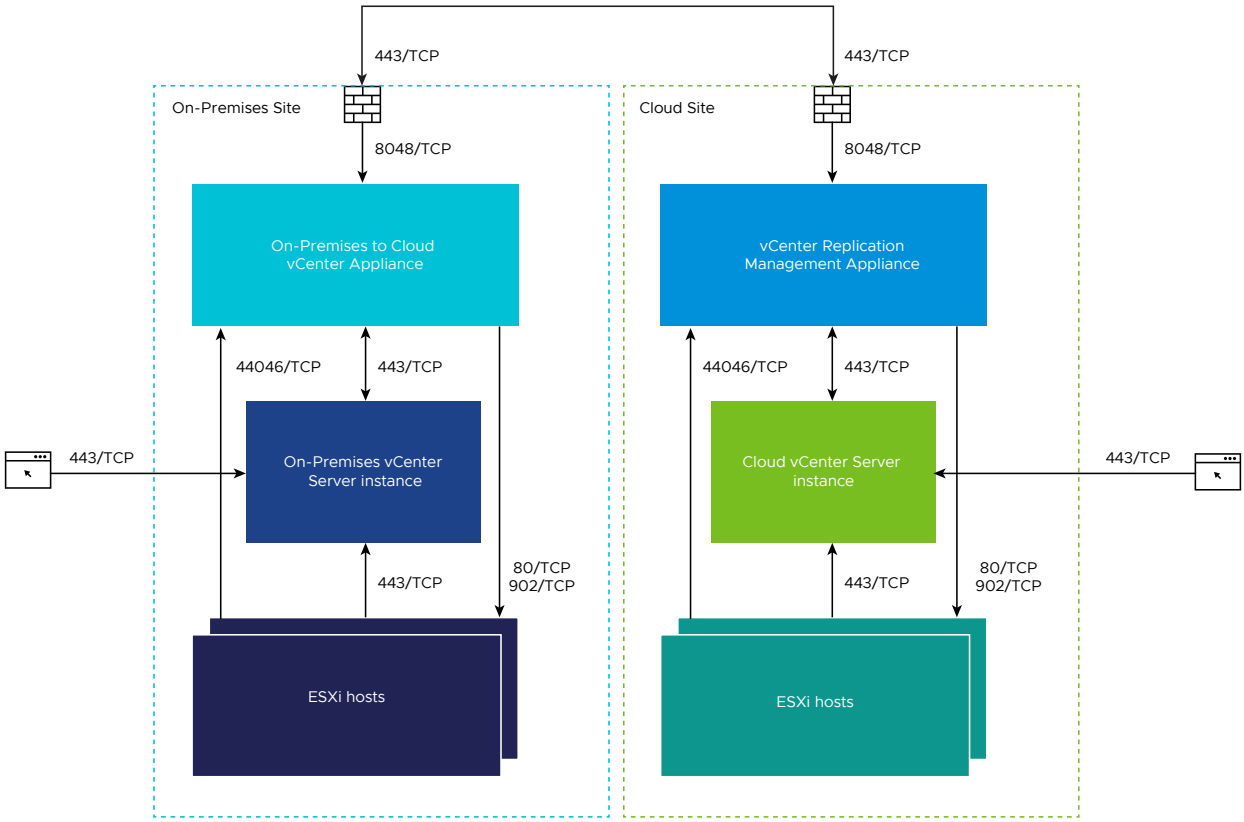
  Optionally, after configuring the appliances, the provider can add one or more Replicator Appliance instances in each provider site for scaling the replication performance.

The following architecture diagram shows an On-Premises to Cloud vCenter Replication Appliance, a vCenter Replication Management Appliance, and optionally, one or more Replicator Appliance instances, deployed in each respective vCenter Server instance.



Network Requirements

The following diagram shows the network connections and the required network ports for the communication between the vCenter Replication Management Appliance, the On-Premises to Cloud vCenter Replication Appliance, and the disaster recovery infrastructure.



Both appliances expect to receive pairing requests on port 8048/TCP and depending on whether pairing them over a public network or whether pairing them directly over a private network:

Table 3-1. Pairing Network Requirements

Pairing Prerequisites	Private Network Pairing	Public Network Pairing
Destination Network Address Translation (DNAT)	Do not configure DNAT rules.	First, configure a DNAT rule for translating the public *Service-Endpoint-IP-address*:443 to the private *Appliance-IP-address*:8048
In the **New Pairing** window enter:	For **Service Endpoint**, enter ***Appliance-IP-adress*:8048**.	For **Service Endpoint**, enter the public ***Service-Endpoint-IP-address*:443**.

For a full list of the required firewall ports to be opened, see VMware Cloud Director Availability Network Ports.

Connectivity Requirements

The two appliances in each site must be able to communicate with each other and with the disaster recovery infrastructure in the sites. The appliances must have TCP access to the ESXi hosts, to the vCenter Server instance, where the vCenter Server Lookup service is hosted, and to the remote VMware Cloud Director Availability appliance in the remote site.

Note VMware Cloud Director Availability uses end-to-end encryption for the communication across sites. For example, when the On-Premises to Cloud vCenter Replication Appliance is communicating to the vCenter Replication Management Appliance, VMware Cloud Director Availability expects that the TLS session is terminated at both appliances.

VMware Cloud Director Availability does not support any TLS terminating products or solutions placed between the appliances, for example, HAProxy, Nginx, Fortinet, and others. If such tools are in place, they must be configured in pass-thru mode, also known as TCP mode, to prevent from interfering with the TLS traffic of VMware Cloud Director Availability.

Hardware Requirements

From a hosting perspective, the appliances are virtual machines with the following hardware requirements:

- 8 vCPUs
- 8 GB RAM
- 10 GB Storage

These same hardware requirements apply for:

- vCenter Replication Management Appliance and for Replicator Appliance
- On-Premises to Cloud vCenter Replication Appliance

Deployment Requirements

Dedicated ESXi replication VMkernel interfaces

For production sites, to isolate the replication data traffic in the ESXi hosts, dedicate a VMkernel interface for that. By default, ESXi handles the replication data traffic through its management VMkernel interface. Since one VMkernel adapter must handle one traffic type, separate the management traffic from the replication traffic by creating a dedicated replication VMkernel interface.

In every ESXi host that is used as a replication source or as a replication destination, when creating a VMkernel interface dedicated for the replication traffic, use the following tags:

- For replication sources, to configure each ESXi host for the outgoing replication traffic, select `vSphere Replication`. For more information, see Set Up a VMkernel Adapter for vSphere Replication Traffic on a Source Host in the *vSphere Replication* documentation.
- For replication destinations, to configure each ESXi host for the incoming replication traffic, select `vSphere Replication NFC`.

To keep the replication traffic between the ESXi hosts and the appliance instances in the same broadcast domain, configure the dedicated replication VMkernel interface in its own IP subnet and connect each appliance instance to the same virtual port group. As a result, the uncompressed replication traffic avoids crossing a router and saves network bandwidth.

Deploy the Appliances for vSphere DR and Migration

By using the vSphere Client, in providers vCenter Server instances, deploy vCenter Replication Management Appliance and optionally, deploy one or more Replicator Appliance instances. Similarly, in tenants vCenter Server instances, deploy On-Premises to Cloud vCenter Replication Appliance by using the OVA files for each appliance.

Deploy two VMware Cloud Director Availability appliances, depending on the desired topology and on the available licensing:

- For replicating workloads between a provider vCenter Server instance and a tenant vCenter Server instance:
  - In the provider vCenter Server, deploy and license one vCenter Replication Management Appliance, and optionally, one or more Replicator Appliance instances.
  - In the tenant vCenter Server, deploy one On-Premises to Cloud vCenter Replication Appliance.
- Alternatively, for replicating workloads between provider vCenter Server instances, deploy and license one vCenter Replication Management Appliance in each provider vCenter Server instance, and optionally, one or more Replicator Appliance instances in each provider site.

Prerequisites

- Verify that the disaster recovery environment in each site meets the deployment requirements. For information about each appliance prerequisites, see Deployment Architecture and Requirements for vSphere DR and Migration.
- Download the installation files, containing the binaries for the two appliances.
  - To deploy the provider appliances, download the `VMware-Cloud-Director-Availability-Provider-`*`release.number.xxxxxxx-build-sha`*`_OVF10.ova` file.
  - To deploy the tenant On-Premises to Cloud vCenter Replication Appliance, download the `VMware-Cloud-Director-Availability-On-Premises-`*`release.number.xxxxxxx-build-sha`*`_OVF10.ova` file.

Procedure

- In a provider vCenter Server instance, deploy a vCenter Replication Management Appliance, and optionally, repeat this step and deploy one or more Replicator Appliance instances.
  a Log in to the provider vCenter Server instance by using the vSphere Client and authenticate as a vSphere **administrator** user.
  b Navigate to a target object where you want to deploy the provider appliances.

    As a target object you can use: a data center, a folder, a cluster, a resource pool, or a host.
  c Right-click the target object and from the drop-down menu select **Deploy OVF Template**.

    The **Deploy OVF Template** wizard opens. The following steps depend on the vSphere version that you use.
  d On the **Select an OVF template** page, browse to the downloaded file location and click **Next**.
  e On the **Select a name and folder** page, enter a name for the cloud on-premises appliance, select its deployment location, and click **Next**.
  f On the **Select a compute resource** page, select a host, or cluster as a destination compute resource for running the appliance on, and click **Next**.
  g On the **Review details** page, verify that the selected template details are correct and click **Next**.
  h On the **License agreements** page, select the **I accept all license agreements** check box and click **Next**.
  i On the **Configuration** page, select the deployment configuration for the appliance type and click **Next**.
    - To deploy the all-in-one provider appliance, select **vCenter Replication Management Appliance**. This appliance contains all services required for replication, including one Replicator Service instance.
    - Optionally, to deploy an additional Replicator Service instance, select **Replicator Appliance**. To scale the replication performance, deploy multiple Replicator Service instances. For more information, see Add an Additional Replicator Appliance Instance.

    Once selected, the appliance role changes only by redeploying the appliance.
  j On the **Select storage** page, select the virtual disk format and the storage policy for the appliance and click **Next**.
  k On the **Select networks** page, optionally configure the network settings and click **Next**.

    For information about configuring the network settings after the deployment is complete, see the *Administration Guide*.

l On the **Customize template** page, customize the deployment properties of the appliance and click **Next**.

Option	Description
Root Password	Enter and confirm the initial password for the appliance **root** user. Later, when logging in for the first time as the **root** user, the appliance requires changing this initial password.
NTP Server	Enter an NTP server hostname or IP address. **Important** In the disaster recovery environment, ensure that both vCenter Server instances in the source and in the destination, the ESXi hosts, and the VMware Cloud Director Availability appliances all use the same NTP server.
Hostname	Enter the appliance hostname. Leave blank if DHCP is desired.
Address	Enter the IP address of the appliance. Leave blank if DHCP is desired.
Gateway	Enter the gateway of the appliance network. Leave blank if DHCP is desired.
MTU	Enter the maximum transmission unit of the network. Leave blank if DHCP is desired.
DNS servers	Enter DNS servers for the appliance network. Leave blank if DHCP is desired.
Search domains	Enter the search domains for the appliance network. Leave blank if DHCP is desired.

m On the **Ready to complete** page, review the settings and begin the installation process by clicking **Finish**.

The **Recent Tasks** pane shows a new task for initializing the provider appliance deployment. After the task is complete, the new appliance is created in the selected vCenter Server resource.

- In a tenant vCenter Server instance, deploy an On-Premises to Cloud vCenter Replication Appliance.
  a Log in to the tenant vCenter Server instance by using the vSphere Client and authenticate as a vSphere **administrator** user.
  b Repeat the previous steps for deploying the On-Premises to Cloud vCenter Replication Appliance.
  c On the **Configuration** page, select the **On-Premise to Cloud vCenter Replication Appliance** deployment configuration as the appliance type, then complete the remaining wizard steps.

  Once selected, the appliance role changes only by redeploying the appliance. For information about the alternative On-Premises to Cloud Director Replication Appliance role, see Chapter 4 Installing and Configuring an On-Premises to Cloud Director Replication Appliance.

The **Recent Tasks** pane shows a new task for initializing the tenant appliance deployment. After the task is complete, the new appliance is created in the selected vCenter Server resource.

Results

The appliances are deployed in each vCenter Server site and are ready for their initial configuration.

Configure and Pair Both Appliances

In their management interfaces, configure both appliances by first changing their initial root user password set during each appliance deployment. Then register each appliance with the local vCenter Server Lookup service in each site. Finally, pair the on-premises appliance with the provider site.

Prerequisites

Verify that in both vCenter Server instances, each appliance is deployed and powered on. For information about the appliance requirements and deployment, see Deploy the Appliances for vSphere DR and Migration.

Procedure

1. Repeat the following steps for each appliance and configure both appliances.
2. In a Web browser, go to **`https://Appliance-IP-address`**.
3. Log in by using the **root** user password that you set during the OVA deployment.
4. If you log in to the appliance for the first time, you must change the initial **root** user password.
   a. Enter the initial **root** user password that you set during the OVA deployment.
   b. Enter and confirm a new password.

      The password that you enter must be a secured password with a minimum of eight characters and it must consist of:

      - At least one lowercase letter.
      - At least one uppercase letter.
      - At least one number.
      - At least one special character, such as & # %.

   c. Click **Apply**.

      The **Getting Started** tab opens.
5. To configure this appliance for the first time, click **Run the initial setup wizard**.

6 In the **Initial Setup** window, configure the site name, the local vCenter Server Lookup service, and its credentials.

Option	Description
Site name	Enter a name for this site. **Important** This site name is used as an identifier and cannot be changed later without impacting the active replications.
Lookup Service Address	Enter the IP address or the FQDN of the local vCenter Server Lookup service in this site and press Tab, auto-completing the address as `https://Lookup-Service-IP-or-FQDN:443/lookupservice/sdk`. **Note** To use the VMware Cloud Director Availability vSphere Client Plug-In, go to the URL of the vSphere Client by using the same method - an IP address or an FQDN. Match the configuration in the **Lookup Service Address** text box.
SSO Admin Username	Enter the vSphere **administrator** **`single sign-on (SSO)`** user name for the vCenter Server Lookup service. This user must belong to the **ADMINISTRATORS** group. **Important** For all vSphere DR and migration workflows the principal is this user. That is, this user owns all replications, meaning all users that see the replication have full control over it. For information about the required vSphere privileges, see Users Roles Rights and Sessions in the *Security Guide*.
Password	Enter the vSphere **administrator** user password for the vCenter Server Lookup service.

a As a **provider**, for the vCenter Replication Management Appliance, in the **License Key** text box, enter the VMware Cloud Director Availability license.

When deploying On-Premises to Cloud vCenter Replication Appliance, skip this step as this appliance requires no licensing for operations.

b To complete the initial setup, click **Apply**.

c Verify the thumbprint and accept the SSL certificate of the local vCenter Server Lookup service in this site.

This appliance is configured. Before pairing, repeat the above steps and similarly configure the remaining appliance until both appliances are configured and ready for pairing.

7 As a **provider**, before allowing pairing, you must add each vCenter Replication Management Appliance instance for metering in vCloud Usage Meter.

For information about adding the appliance instances in vCloud Usage Meter, see vCloud Usage Meter Integration.

On-Premises to Cloud vCenter Replication Appliance is not metered.

8 After configuring both appliances, pair the On-Premises to Cloud vCenter Replication Appliance to the vCenter Replication Management Appliance.

On-premises to provider pairing is managed only from the on-premises site. The On-Premises to Cloud vCenter Replication Appliance does not require a publicly available address for pairing to the provider.

Note When pairing, depending on the appliance type you can pair:

- On-Premises to Cloud vCenter Replication Appliance instances to vCenter Replication Management Appliance in a single pairing step, initiated and completed from the on-premises site.
- vCenter Replication Management Appliance with another vCenter Replication Management Appliance instance. Then complete the pairing from the remote vCenter Replication Management Appliance.

Attempting to pair On-Premises to Cloud vCenter Replication Appliance with another On-Premises to Cloud vCenter Replication Appliance shows the following error message in the **New Pairing** window: `Sites are not allowed to pair or start replication. Check site(s) licensing.` However, the pairing remains visible and must be manually deleted from both sides. Attempting to create a replication between such paired on-premises sites gets prevented by an error checking the licensing of the sites.

a In the left pane, click **Peer Sites**.

b To complete the pairing with the provider, on the **Peer Sites** page, click **New pairing**.

c In the **New Pairing** window, enter the pairing details of the provider site then click **Pair**.

Option	Description
Public Service Endpoint	■ Enter the address of the Public Service Endpoint **:443** of the vCenter Replication Management Appliance. ■ Alternatively, enter port **8048** when both appliances reside in the same network.
SSO Username	Enter the user name of the single-sign-on user from the provider site for the pairing. For example, enter **Administrator@vsphere.local**. To pair the on-premises appliance with the provider site it is recommended to use a less-privileged user that belongs to the **VRUSERS** group in the provider site. Alternatively, you can still use a user member of the **VRADMINISTRATORS** or the **ADMINISTRATORS** groups in the provider site. For information about these groups, see Users Roles Rights and Sessions in the *Security Guide*.
SSO Password	Enter the password of the remote single-sign-on user in the provider site.
Description	Optionally, enter a description for this pair.

d Verify the thumbprint and accept the SSL certificate of the vCenter Replication Management Appliance.

Both appliances paired with each other and are ready for replications.

Results

After the vCenter Replication Management Appliance integrated with VMware vCloud® Usage Meter for metering, both vCenter Server sites are ready for replications between each other.

What to do next

After adding the vCenter Replication Management Appliance in vCloud Usage Meter, you can now create and manage replications between both vCenter Server sites by accessing either of the following two interfaces:

- Log in to any of the two vCenter Server sites by using the vSphere Client and authenticating in one of the following ways, then access the VMware Cloud Director Availability vSphere Client Plug-In.

  Note Ensure that the user has sufficient privileges granted to see and interact with vSphere workloads.

  - To authenticate as a **tenant**, for pairing or replicating workloads, log in by using single sign-on user credentials that belong to the **VRUSERS** group that VMware Cloud Director Availability created by registering with the vCenter Server Lookup service.
  - To authenticate a session with **administrator** privileges, log in by using single sign-on user credentials that belong to the **ADMINISTRATORS** or **VRADMINISTRATORS** groups.

    For example, the **`Administrator@vsphere.local`** single sign-on user is a member of the **ADMINISTRATORS** group.
  - Any single sign-on users that do not belong to any of these three groups cannot authenticate.
- Alternatively, go to `https://Appliance-IP-address/ui/admin` of either of the newly paired VMware Cloud Director Availability appliances management interfaces and log in by using single sign-on user credentials that belong to the **ADMINISTRATORS** or **VRADMINISTRATORS** groups, or alternatively by using the password for the built-in **root** user of the appliances.

For information about accessing the appliances, creating and managing replications, and monitoring, see the *User Guide*.

Add an Additional Replicator Appliance Instance

As a **provider**, depending on the deployment requirements, you can add more Replicator Appliance instances to the vSphere DR and migration environment after configuring the vCenter Replication Management Appliance.

After configuring the vCenter Replication Management Appliance it provides all necessary services for vSphere DR and migration with a remote vCenter Server site. To further scale the replication performance, in addition to the Replicator Service instance that operates in the vCenter Replication Management Appliance, you can deploy one or more Replicator Appliance instances, each running one Replicator Service.

Prerequisites

- Deploy one or more Replicator Appliance instances by using the `VMware-Cloud-Director-Availability-Provider-release.number.xxxxxxx-build-sha_OVF10.ova` file. For more information, see Deploy the Appliances for vSphere DR and Migration.
- Verify that the vCenter Replication Management Appliance in the disaster recovery environment is already configured. For information about configuring the appliance, see Configure and Pair Both Appliances.

Procedure

1. Log in to the service management interface of the vCenter Replication Management Appliance.
   a. In a Web browser, go to `https://Replication-Management-Appliance-IP-Address/ui/admin`.
   b. Select **Appliance login** or **SSO login** and enter the **root** or the ***single sign-on*** user credentials.
   c. Click **Login**.
2. In the left pane under **Configuration**, click **Replicator Services**.
3. On the **Replicator Services administration** page, click **New**.
4. In the **New Local Replicator Service** window, enter the details for the new Replicator Service instance then click **Add**.
   a. Enter the address and the **root** user password of the new Replicator Appliance then click **Test Connection**.
   b. Verify and accept the SSL certificate of the new Replicator Service instance.

c Enter the single-sign-on user credentials for the single sign-on domain in the local site.

d Optionally, if you deployed multiple Replicator Appliance instances, to register the additional ones click **Add a Replicator Service instance** then repeat entering the configuration details for each one.

Option	Description
Lookup Service Address	Shows the IP address or the hostname of the vCenter Lookup Service in the provider data center.
Replicator API Service Endpoint	Enter the IP address and port **8043** of the newly deployed Replicator Appliance instance. For example, enter `https://Replicator-Appliance-IP-address:8043`.
Replicator Service Root Password	Enter the **root** user password for the new Replicator Appliance as set during the OVA deployment of the new appliance then click **Test Connection**.
New Password	If you did not log in to the new Replicator Appliance, you must now change the initial **root** user password: Enter a new password for the **root** user of the new appliance. The password that you enter must be a secured password with a minimum of eight characters and it must consist of: ■ At least one lowercase letter. ■ At least one uppercase letter. ■ At least one number. ■ At least one special character, such as & # %.
Confirm Password	Confirm the new password for the **root** user of the new appliance, matching the above entry.
SSO User name	Enter a user with administrative privileges in the local site single sign-on domain. For example, enter ***Administrator@VSPHERE.LOCAL***.
SSO password	Enter the password for the single sign-on administrative user.
Description	Optionally, enter a description for the new Replicator Service instance you are registering.

On the **Replicator Services administration** page, you now see a green check status for the newly added Replicator Service instances.

5 Verify that the connectivity to the new Replicator Service instances is operational.

a In the left pane under **System**, click **System Health**.

b Under **Local Replicator Services**, verify that for the new Replicator Service instances **Service connectivity** shows a green check status.

Results

The Replicator Service instances are added to the provider VMware Cloud Director Availability site. The paired sites automatically detect the new Replicator Appliance instances and automatically reconfigure to start using the new Replicator Service instances.

Installing and Configuring an On-Premises to Cloud Director Replication Appliance

4

To replicate vSphere workloads between an on-premises vCenter Server instance and a provider cloud site backed by VMware Cloud Director, in the tenant vCenter Server deploy a VMware Cloud Director Availability On-Premises Appliance instance and during deployment select the On-Premises to Cloud Director Replication Appliance role then pair it with the provider site.

- For on-premises replication with cloud sites backed by VMware Cloud Director, install and configure VMware Cloud Director Availability in the on-premises vCenter Server instance by following this current chapter.
- Alternatively, for vSphere DR and migration between vCenter Server sites, to install and configure VMware Cloud Director Availability as a new deployment see the Chapter 4 Installing and Configuring an On-Premises to Cloud Director Replication Appliance chapter.

This chapter includes the following topics:

Deployment Architecture On-Premises

To protect or migrate vSphere workloads between cloud sites and on-premises vCenter Server deploy one or multiple On-Premises to Cloud Director Replication Appliance instances. The following architecture diagram of the VMware Cloud Director Availability solution shows the protection direction to and from an on-premises site and a cloud site.

In an on-premises vCenter Server environment, every organization **Administrator** can protect or migrate on-premises workloads to and from a paired cloud site.

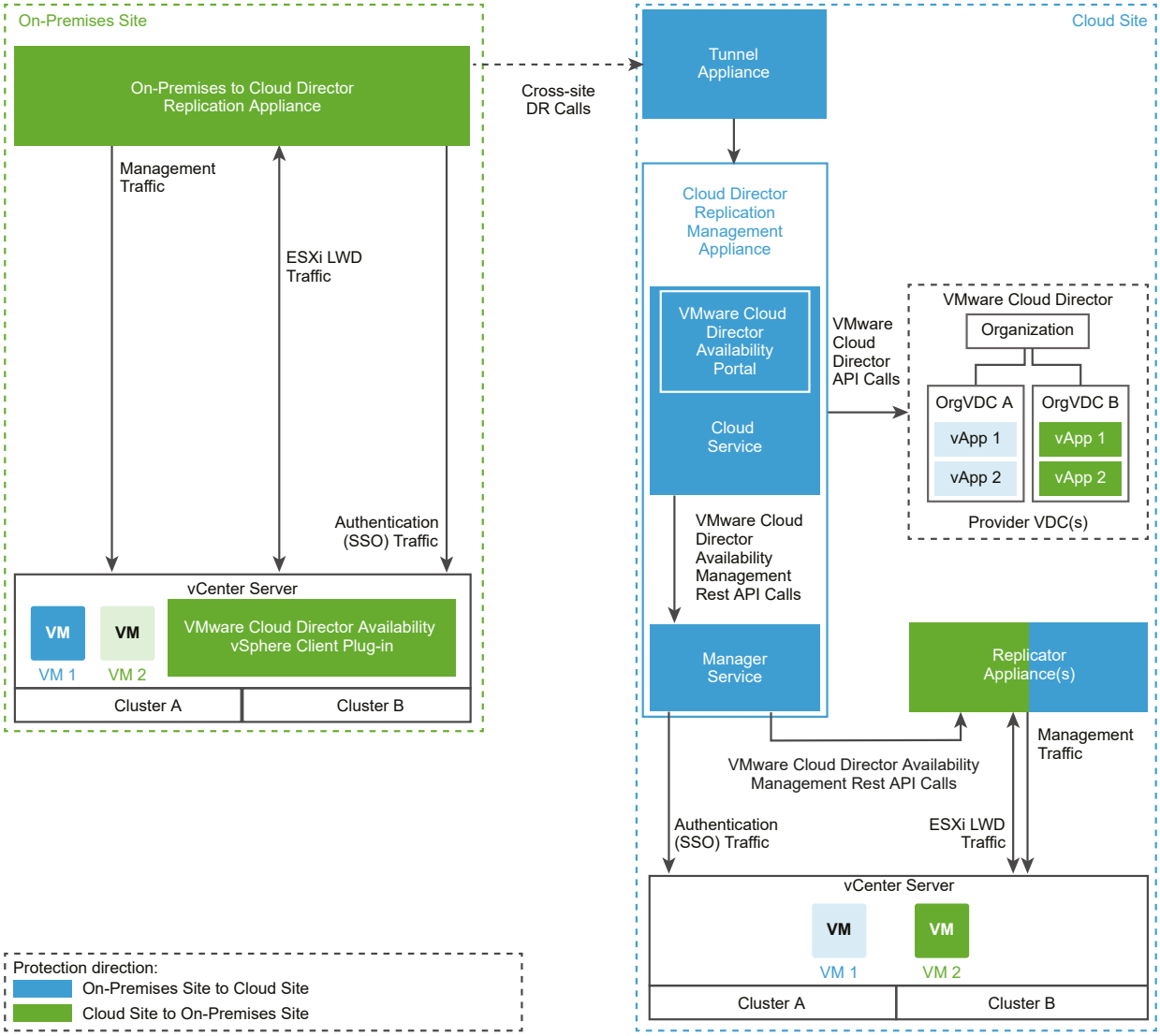
On-premises Appliance Deployment

In the on-premises site, deploy and configure one or more On-Premises to Cloud Director Replication Appliance instances as a vSphere **Administrator** user. Internally, each on-premises appliance instance contains a Replicator Service and a Tunnel Service.

Note With more than one On-Premises to Cloud Director Replication Appliance instance paired with the same organization in the same cloud site, you see the number of replications, recent tasks, traffic, and disk usage of all the on-premises appliance instances paired with the cloud organization, similar to VMware Cloud Director.

In the diagram, the cells without color show the existing components in the on-premises environment. The colored cells show the VMware Cloud Director Availability services that deploy during the On-Premises to Cloud Director Replication Appliance installation and configuration procedures.

VMware Cloud Director Availability always initiates the network connection from the on-premises site to the cloud site.



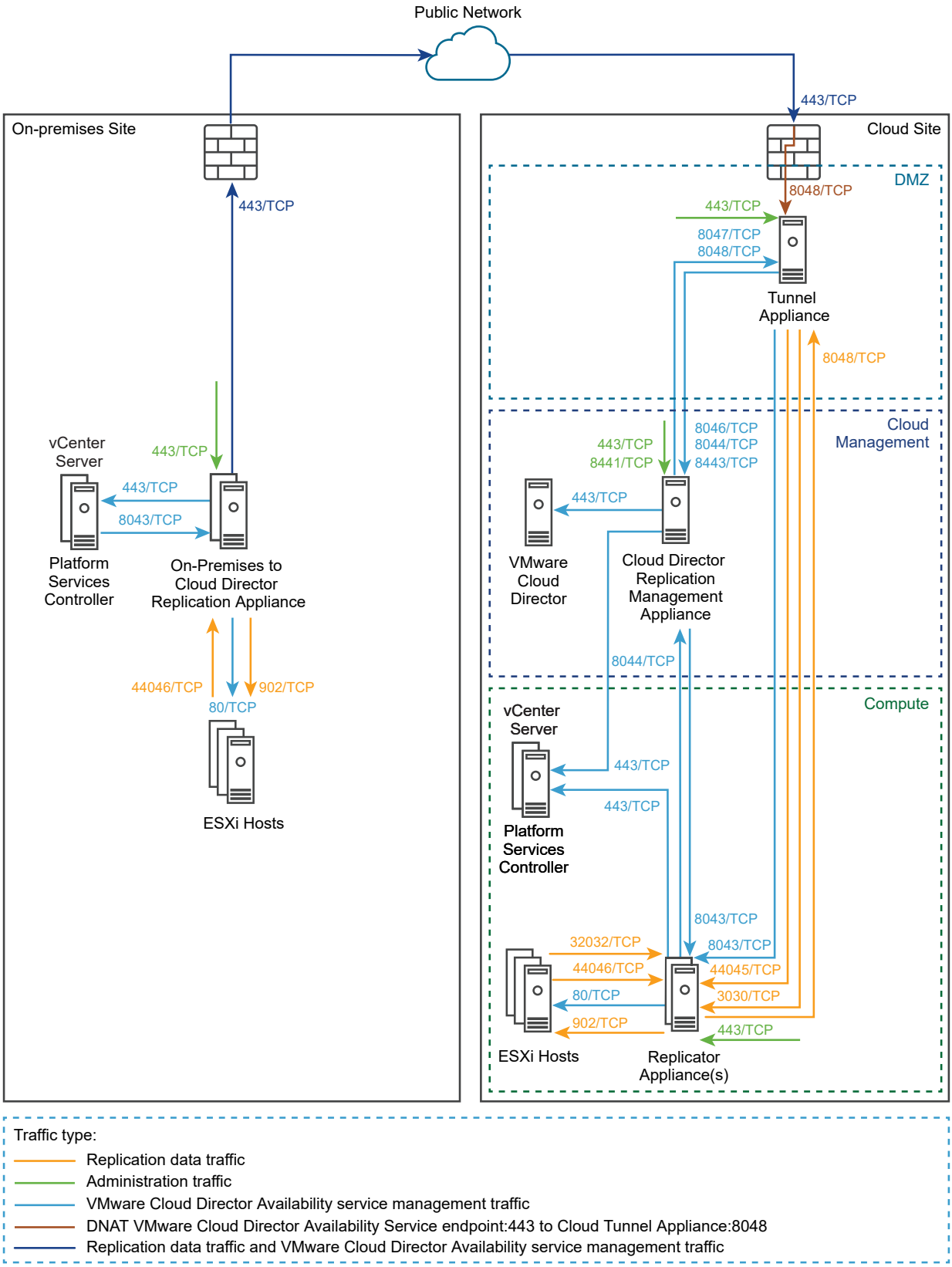
Deployment Requirements On-Premises

Before installing the On-Premises to Cloud Director Replication Appliance, verify that the on-premises site meets the deployment requirements. Also, allow the network communication within the on-premises site and to the cloud site.

Network Requirements

To get a list of the required firewall ports to be opened, see VMware Cloud Director Availability Network Ports.

The following diagram shows the direction of the data flow and the type of data traffic. The diagram also shows the required network ports for the communication between the On-Premises to Cloud Director Replication Appliance and the disaster recovery infrastructure.


Public Network
443/TCP
On-premises Site
443/TCP
vCenter Server
443/TCP
443/TCP
8043/TCP
Platform Services Controller
On-Premises to Cloud Director Replication Appliance
44046/TCP
902/TCP
80/TCP
ESXi Hosts
Cloud Site
DMZ
8048/TCP
443/TCP
8047/TCP
8048/TCP
Tunnel Appliance
8048/TCP
Cloud Management
443/TCP
8441/TCP
8046/TCP
8044/TCP
8443/TCP
443/TCP
VMware Cloud Director
Cloud Director Replication Management Appliance
8044/TCP
Compute
vCenter Server
443/TCP
443/TCP
Platform Services Controller
8043/TCP
32032/TCP
8043/TCP
44046/TCP
44045/TCP
80/TCP
3030/TCP
902/TCP
443/TCP
ESXi Hosts
Replicator Appliance(s)
Traffic type:
Replication data traffic
Administration traffic
VMware Cloud Director Availability service management traffic
DNAT VMware Cloud Director Availability Service endpoint:443 to Cloud Tunnel Appliance:8048
Replication data traffic and VMware Cloud Director Availability service management traffic

Connectivity Requirements

The VMware Cloud Director Availability appliances must be able to communicate with each other and with the disaster recovery infrastructure. The On-Premises to Cloud Director Replication Appliance must have a TCP access to the resource vCenter Server, where the resource vCenter Server Lookup service is hosted and to all the Replicator Appliance(s) in the cloud site.

Note VMware Cloud Director Availability uses end-to-end encryption for the communication across sites. For example, when the On-Premises to Cloud Director Replication Appliance is communicating to the Replicator Service in the cloud site, VMware Cloud Director Availability expects that the TLS session is terminated at both the On-Premises to Cloud Director Replication Appliance and the cloud site Replicator Service.

VMware Cloud Director Availability does not support any TLS terminating products or solutions placed between the appliances, for example, HAProxy, Nginx, Fortinet, and others. If such tools are in place, they must be configured in pass-thru mode, also known as TCP mode, to prevent from interfering with the TLS traffic of VMware Cloud Director Availability.

Hardware Requirements

From a hosting perspective, the On-Premises to Cloud Director Replication Appliance is a virtual machine with the following hardware requirements since VMware Cloud Director Availability 4.5:

- 8 vCPUs
- 8 GB RAM
- 10 GB Storage

Deployment Requirements

- In the ESXi hosts, a VMkernel interface can be dedicated for the replication traffic. By default, ESXi handles the replication traffic through its management VMkernel interface. As a good practice, you can separate the management traffic from the replication traffic by creating a dedicated replication VMkernel interface. Use the following tags when creating a VMkernel interface for the replication traffic:
  - Use the `vSphere Replication` tag to configure the ESXi host for the outgoing replication traffic.
  - Use the `vSphere Replication NFC` tag to configure the ESXi host for the incoming replication traffic.

Configure the replication VMkernel interface in its own IP subnet and connect the On-Premises to Cloud Director Replication Appliance to the same virtual port group. Using this configuration, the replication traffic between the ESXi hosts and the On-Premises to Cloud Director Replication Appliance stays in the same broadcast domain. As a result, uncompressed replication traffic avoids crossing a router and saves the network bandwidth. For information about configuring a dedicated replication VMkernel interface, see Set Up a VMkernel Adapter for vSphere Replication Traffic on a Source Host in the vSphere Replication documentation.

- If more than one vCenter Server instances exist in the on-premises site:
  - vCenter Server instances dedicated for management operations
  - vCenter Server instances dedicated for resources

  VMware Cloud Director Availability uses the resource vCenter Server instances to locate and authenticate to resources and create or edit inventory objects. Register the On-Premises to Cloud Director Replication Appliance with the vCenter Server Lookup service, provided by the Platform Services Controller used by the resource vCenter Server instances.

Deploying the On-Premises to Cloud Director Replication Appliance

In an on-premises environment, use VMware Cloud Director Availability™ after deploying a On-Premises to Cloud Director Replication Appliance from a single `OVA` file, either by using the vSphere Client, or by using VMware OVF Tool.

The On-Premises to Cloud Director Replication Appliance comes as a preconfigured virtual machine that is optimized for running the VMware Cloud Director Availability services.

The appliance has a name in the form `VMware-Cloud-Director-Availability-On-Premises-`*`x.x.x.xxxx-yyyyyyyy`*`_OVF10.ova`, where *x.x.x* represents the product version and *yyyyyyyy* the build number.

Note After deploying the appliance, for the first time only power it on from vSphere. Attempting to power it on for the first time from the ESXi user interface results in errors and that require redeploying the appliance from the scratch and powering it on from vSphere.

Deploy the On-Premises to Cloud Director Replication Appliance by Using the vSphere Client

In the vSphere Client, you can deploy the On-Premises to Cloud Director Replication Appliance by using a single `.ova` file.

Prerequisites

- Download the `VMware-Cloud-Director-Availability-On-Premises-`*`release.number.xxxxxxx-build_sha`*`_OVF10.ova` file, containing the appliance binaries.

- If using vSphere Client earlier than version 6.5, install the Client Integration Plug-in to use **Deploy OVF Template** in the vSphere Web Client.

Procedure

1. Log in to the vCenter Server by using the vSphere Client.
2. Navigate to a target object where you want to deploy the On-Premises to Cloud Director Replication Appliance.

   As a target object you can use: a data center, a folder, a cluster, a resource pool, or a host.
3. Right-click the target object and from the drop-down menu select **Deploy OVF Template**.

   The **Deploy OVF Template** wizard opens. The following steps depend on the vSphere version that you use.
4. On the **Select an OVF template** page, browse to the `.ova` file location and click **Next**.
5. On the **Select a name and folder** page, enter a name for the on-premises appliance, select a deployment location, and click **Next**.
6. On the **Select a compute resource** page, select a host, or cluster as a compute resource to run the appliance on, and click **Next**.
7. On the **Review details** page, verify the `OVF` template details and click **Next**.
8. On the **License agreements** page, select the **I accept all license agreements** check box and click **Next**.
9. On the **Configuration** page, select the **On-Premises to Cloud Director Replication Appliance** deployment configuration for the appliance type and click **Next**.

   Once selected, the appliance role changes only by redeploying the appliance. For information about the alternative On-Premises to Cloud vCenter Replication Appliance role, see Chapter 3 Installing and Configuring the Appliances for vSphere DR and Migration.
10. On the **Select storage** page, select the virtual disk format and the storage policy for the appliance and click **Next**.
11. On the **Select networks** page, optionally configure the network settings and click **Next**.

    For more information about configuring the network settings after the deployment is complete, see *Network Settings Configuration* in the *Administration Guide* document.

12 On the **Customize template** page, customize the deployment properties of the on-premises appliance and click **Next**.

   a Enter and confirm the initial password for the appliance **root** user.

   When you log in for the first time, you must change the initial **root** user password.

   b Select the **Enable SSH** check box.

   If you do not enable SSH, you can configure the appliance later. For more information to allow the SSH access, see the *Administration Guide* document.

   c In the **NTP Server** section, enter the NTP server address for the appliance to use.

   Important In your disaster recovery environment, ensure that vCenter Server, ESXi, Platform Services Controller, VMware Cloud Director, and the VMware Cloud Director Availability appliance all use the same NTP server.

13 On the **Ready to complete** page, review the settings, and to begin the `.ova` installation process, click **Finish**.

Results

The **Recent Tasks** pane shows a new task for initializing the `.ova` deployment. After the task is complete, the new appliance is created on the selected resource.

Deploying by Using the VMware OVF Tool

To deploy VMware Cloud Director Availability by using the VMware OVF Tool, define deployment parameters and run a deployment script.

Defining the OVF Tool Parameters for Deployment

Before you deploy the VMware Cloud Director Availability appliances, you must define the specific VMware OVF Tool parameters for deployment.

The following table describes the parameters you must define when deploying the VMware Cloud Director Availability appliances by using the VMware OVF Tool scripts.

Parameter	Description
`OVA`	The local client path to the installation `OVA` package. For example, use `OVA="`*`local_client_path`*`/VMware-Cloud-Director-Availability-`*`Deployment-release.number-xxxx-build_number`*`_OVF10.ova"`, where *Deployment* is **`Provider`** or **`On-Premises`**.
`VMNAME`	Virtual machine name.
`VSPHERE_DATASTORE`	The `VSPHERE_DATASTORE` value is the datastore name as it is displayed in the .
`VSPHERE_NETWORK`	The name of the network on which the appliance to run.
`VSPHERE_ADDRESS`	The IP address of the vCenter Server instance on which you deploy the appliance.
`VSPHERE_USER`	User name for a vCenter Server administrator.

Parameter	Description
VSPHERE_USER_PASSWORD	Password for a vCenter Server administrator.
VSPHERE_LOCATOR	The VSPHERE_LOCATOR value contains the target data center name, the tag *host*, the name of the target cluster, and the IP address or the fully qualified domain name (FQDN) of the target ESXi host. The VSPHERE_LOCATOR value depends on the topology of your vSphere environment. Following are examples for valid VSPHERE_LOCATOR values. ■ */data-center-name*/host/*cluster-1-name*/*ESXi-host-fully-qualified-domain-name* ■ */data-center-name*/host/*cluster-2-name*/*ESXi-host-IP-address* If the target ESXi host is not part of a cluster, skip the *cluster-name* element, as shown in the following examples. ■ */data-center-name*/host/*ESXi-host-fully-qualified-domain-name* ■ */data-center-name*/host/*ESXi-host-IP-address* For more information about the VSPHERE_LOCATOR value, run the `./ovftool --help locators` command.

Deploy the On-Premises to Cloud Director Replication Appliance by Using the OVF Tool

In the VMware OVF Tool console, you can deploy a On-Premises to Cloud Director Replication Appliance by using a single .OVA installation file. You define deployment parameters in the OVF Tool console and run the deployment script.

Prerequisites

- Download the VMware-Cloud-Director-Availability-On-Premises-*release.number.xxxxxxx-build_sha*_OVF10.ova file, containing the appliance binaries.
- Verify that the VMware OVF Tool is installed and configured. For more information, see https://code.vmware.com/tool/ovf.
- Before running the deployment command, see Deployment Requirements On-Premises.

Procedure

1 Log in to a server where the OVF Tool is running, by using a Secure Shell (SSH) client.

2 Define deployment parameters in the OVF Tool console by running the following commands.

```
# VMNAME="Name-to-be-Assigned-to-the-VM"

# VSPHERE_DATASTORE="vSphere-datastore"

# VSPHERE_NETWORK="VM-Network"

# OVA="local_client_path/VMware-Cloud-Director-Availability-On-Premises-release_number-xxx-build_number_OVF10.ova"

# VSPHERE_USER="vCenter-Server-admin-user"

# VSPHERE_USER_PASSWORD="vCenter-Server-admin-user-password"
```

```
# VSPHERE_ADDRESS="vCenter-Server-IP-address"

# VSPHERE_LOCATOR="vSphere-locator"
```

3 Deploy the On-Premises to Cloud Director Replication Appliance.

The following example script deploys a On-Premises to Cloud Director Replication Appliance and sets a static IP address.

```
# echo $VMNAME

#./ovftool/ovftool --name="${VMNAME}" --datastore="${VSPHERE_DATASTORE}" --acceptAllEulas
--powerOn --X:enableHiddenProperties --X:injectOvfEnv --X:waitForIp
--ipAllocationPolicy=fixedPolicy --machineOutput --noSSLVerify
--overwrite --powerOffTarget "--net:VM Network=${VSPHERE_NETWORK}" --diskMode=thin
--prop:guestinfo.cis.appliance.root.password='Your-Root-Password'
--prop:guestinfo.cis.appliance.ssh.enabled=True
--prop:guestinfo.cis.appliance.net.ntp='Your-NTP-Servers-IP-Addresses(comma-separated)'
--prop:net.hostname='Appliance-Hostname'
--prop:net.address='IP-In-CIDR-Notation'
--prop:net.gateway='Your-Gateway-IP'
--prop:net.mtu='Your-MTU'
--prop:net.dnsServers='Your-DNS-Servers-IP-Addresses(comma-separated)'
--prop:net.searchDomains='Your-DNS-Search-Domains(comma-separated)'
"${OVA}" "vi://${VSPHERE_USER}:${VSPHERE_USER_PASSWORD}@${VSPHERE_ADDRESS}$
{VSPHERE_LOCATOR}"
```

The console outputs the IP address of the On-Premises to Cloud Director Replication Appliance.

Configuring the On-Premises to Cloud Director Replication Appliance

After deploying the On-Premises to Cloud Director Replication Appliance, to enable pairing, you must first configure the appliance. To perform the initial configuration, navigate to the management interface of the on-premises appliance.

Configure the On-Premises to Cloud Director Replication Appliance

To configure the On-Premises to Cloud Director Replication Appliance by using the appliance management interface, you must first change the initial **root** user password that you set during the OVA deployment. Then you register the on-premises appliance with the vCenter Server Lookup service.

Prerequisites

- Verify that the On-Premises to Cloud Director Replication Appliance is installed and powered on. For more information, see Deploying the On-Premises to Cloud Director Replication Appliance.

- Verify that the cloud provider enabled the replication policy for your organization.
- Verify that the Service Endpoint address from the cloud provider is obtained.

Procedure

1 In a Web browser, go to **`https://On-Prem-Appliance-IP-address`**.

2 Log in by using the **root** user password that you set during the OVA deployment.

3 If you log in to the appliance for the first time, you must change the initial **root** user password.

   a Enter the initial **root** user password that you set during the OVA deployment.

   b Enter and confirm a new password.

   The password that you enter must be a secured password with a minimum of eight characters and it must consist of:

   - At least one lowercase letter.
   - At least one uppercase letter.
   - At least one number.
   - At least one special character, such as & # %.

   c Click **Apply**.

   The **Getting Started** tab opens.

4 Click **Pair now**.

   The **New Cloud Pairing** wizard opens.

5 On the **Site Details** page, enter a name that identifies this on-premises site to the cloud provider and click **Next**.

Option	Description
Site name	Enter a name for the on-premises site. **Important** This site name is used as an identifier and cannot be changed later without impacting the active replications.
Description	Optionally, enter a description for this on-premises site that identifies it to the cloud provider.

6 On the **Lookup Service** page, enter the connection details for the vCenter Server Lookup service.

Option	Description
Lookup Service Address	Enter the IP address or the FQDN of the vCenter Server Lookup service and press Tab, auto-completing the address as `https://Lookup-Service-IP-or-FQDN:443/lookupservice/sdk`. **Note** To use the VMware Cloud Director Availability vSphere Client Plug-In without errors, when going to the URL of the on-premises vSphere Client, use the same method - an IP address or an FQDN. Match the configuration in the **Lookup Service Address** text box.
SSO Admin Username	Enter the **`single sign-on`** user name for the vCenter Server Lookup service.
Password	Enter the **`single sign-on`** user password for the vCenter Server Lookup service.

a To establish a connection with the vCenter Server Lookup service, click **Next**.

b Verify the thumbprint and accept the SSL certificate of the vCenter Server Lookup service.

7 On the **Cloud Service Details** page, pair the On-Premises to Cloud Director Replication Appliance with the cloud provider and click **Next**.

Option	Description
Service Endpoint address	Enter the address of the cloud site's Service Endpoint:443 as provided by the cloud provider and press Tab, auto-completing the address as `https://` Service Endpoint`-IP-or-FQDN`.
Organization Admin	Enter the user name of a VMware Cloud Director **organization administrator**. For example, use ***`admin@org`***.
Organization Password	Enter the ***`password`*** of the VMware Cloud Director **organization administrator** user.

Option	Description
Allow access from Cloud	**Activated access from the cloud site:** Allows privileged VMware Cloud Director users like the cloud provider and the organization administrators without authenticating to the on-premises site to perform operations from the VMware Cloud Director Availability Tenant Portal: ■ Browse and discover on-premises workloads to replicate them to the cloud site. ■ Reverse existing replications from the cloud site to the on-premises site. ■ Replicate cloud site workloads to the on-premises site. **Deactivated cloud site access:** ■ Configuring a new replication requires users to explicitly authenticate to the on-premises VMware Cloud Director Availability Tenant Portal. ■ Cannot reverse existing replications to the on-premises site. ■ Allows privileged VMware Cloud Director users to modify existing replications and perform migrate or failover.
Allow log collection from Cloud	■ To simplify troubleshooting, activate log collection from the cloud site. This allows the cloud provider and the organization administrators without authenticating to each paired on-premises appliance to obtain its logs. ■ Leave cloud site log collection deactivated to require authenticating to the on-premises appliance management interface for downloading the on-premises appliance logs.

If the cloud site does not use a valid CA-signed certificate, verify the thumbprint and accept the SSL certificate of the Service Endpoint.

8 On the **Ready To Complete** page, optionally, configure the on-premises local placement, and to complete the wizard click **Finish**.

- You can now configure on-premises to cloud replications and you can leave the **Configure local placement now** toggle deactivated.
- To enable the cloud to on-premises replications now by configuring the local placement, activate the **Configure local placement now** toggle.

What to do next

If you skipped configuring local placement in the last step of the wizard, you can proceed with Configure Local Placement.

Configure Local Placement

To enable replications from the cloud to the on-premises site, in the on-premises appliance you must configure the local placement settings.

Follow this procedure only if you skipped **Configure local placement now** during the initial setup wizard of the On-Premises to Cloud Director Replication Appliance. If configuring On-Premises to Cloud vCenter Replication Appliance skip this chapter and see Chapter 3 Installing and Configuring the Appliances for vSphere DR and Migration.

Note When using replication seed, the datastores of the seed disks are reused and the network connections of the original virtual machine are reapplied.

Procedure

1 Log in to the management interface of the appliance.
   a In a Web browser, go to `https://Appliance-IP-address/ui/admin`.
   b Select **Appliance login** or **SSO login** and enter the **root** or the ***single sign-on*** user credentials.
   c Click **Login**.
2 In the left pane under **Configuration**, click **Settings**.
3 Under **Site settings**, next to **Placement to newly recovered VMs on this site** click **Edit**.
4 Complete the **Configure Placement** wizard.
   a On the **VM Folder** page, select the destination location for storing the recovered virtual machines and click **Next**.
   b On the **Compute Resource** page, select the destination compute resource for the recovered virtual machines and click **Next**.
   c On the **Default Network** page, optionally select the default network that the virtual machines automatically connect to after their failover and click **Next**.

      If you skip selecting a default network, the incoming virtual machine replications are recovered with their NIC adapters disconnected. The supported networks types are: standard networks, distributed port groups, and NSX networks (opaque networks).
   d On the **Datastore** page, select the datastore in which to store the replicated virtual machines and their disk files and click **Next**.

      Datastore clusters are not supported for the on-premises local placement and the clusters do not show for selection.
   e On the **Ready To Complete** page, verify that the selected placement configuration is correct and click **Finish**.

Results

The **Placement to newly recovered VMs on this site** section expands, showing the placement configuration.

What to do next

You can start creating and managing replications from the on-premises site by accessing one of the interfaces:

- Log in to the on-premises vCenter Server instance by using vSphere Client, authenticate with the single sign-on **administrator** credentials then access the VMware Cloud Director Availability vSphere Client Plug-In. For more information, see the *User Guide* document.
- Navigate to the Service Endpoint of the cloud site and log in by using VMware Cloud Director **organization administrator** credentials.

Upgrading On-Premises and Provider Site

5

Follow the upgrade path and choose an upgrade method for the currently installed VMware Cloud Director Availability version. After following the prerequisites, choose a source repository for the upgrade files then perform the upgrade.

Note

- **vSphere DR and migration between vCenter Server sites requires upgraded versions in both sites**

  Upgrade both sites to version 4.5, then the tenant site must re-pair with the provider site. For example:

VMware Cloud Director Availability 4.4	VMware Cloud Director Availability 4.5
On-Premises to Cloud vCenter Replication Appliance 4.4 currently paired to vCenter Replication Management Appliance 4.4.	On-Premises to Cloud vCenter Replication Appliance 4.5 **re-paired** to vCenter Replication Management Appliance 4.5.
vCenter Replication Management Appliance 4.4 currently paired with vCenter Replication Management Appliance 4.4	vCenter Replication Management Appliance 4.5 paired with vCenter Replication Management Appliance 4.5

  After upgrading one of the sites, the existing replications continue to replicate and can be recovered in case of disaster, but the paired site must be upgraded before creating new replications or new pairing and before performing any administrative operations and other day 2 management tasks.

  Prerequisite for re-establishing tenant trust with the provider after upgrade for vSphere DR and migration

  After upgrading both sites to version 4.5, the tenant site must **Re-pair** with the provider site. For information about re-pairing from the tenant site, see step 3 in Repair sites.
- Also for vSphere DR and migration, if using a single-sign-on administrator user with custom privileges in vSphere, you must add the StorageViews.View privilege. For information about the required vSphere privileges, see Users Roles Rights and Sessions in the *Security Guide*.

Upgrade Paths

For on-premises site upgrade to the latest version, use the following upgrade methods, according to the currently installed version.

Current Version	Next Version	Upgrade Method
4.3.x or 4.4.x	4.5	■ You can upgrade by using the appliance management interface, see the updated Management Interface Upgrading procedures. ■ Alternatively, you can upgrade by using the command-line interface, see the updated Command-Line Upgrading procedures.
4.2.x or 4.3.x	4.4.x	
4.0.x or 4.1.x	4.2.1*	
3.0.x or 3.5.x	4.0	■ You can upgrade by using the appliance management interface, see the legacy Management Interface Upgrading procedures. ■ Alternatively, you can upgrade by using the command-line interface, see the legacy Command-Line Upgrading procedures.
3.0	4.0	You must upgrade only by using the command-line interface, see the legacy Command-Line Upgrading On-Premises procedures.

* To upgrade to the latest version, when performing a two-step upgrade from 4.1.x or from 4.0.x, upgrade to version 4.2.1 as the intermediate upgrade. For more information, see the Upgrade Path of the On-Premises to Cloud Director Replication Appliance in the *VMware Product Interoperability Matrix*.

Important

- Before upgrading the On-Premises to Cloud Director Replication Appliance:
  - Ensure that you have not manually enabled the Photon repository of the appliance.

    To verify for enabled repositories, open an SSH connection to the appliance, log in by using the **root** user credentials and run the following command:

    ```
    yum -v repolist all | grep enabled
    ```

    When no repository is active, the command returns no result and you can proceed with the upgrade.
  - Ensure that you have not installed any packages or third-party software or made any manual modifications of `yum` configuration files.
- To complete the upgrade sequence, see Post-Upgrade Configuration.
- Attempting to upgrade from version 4.0.x directly to version 4.3 appears to proceed with the upgrade while performing no upgrade. The `/var/log/upgrade.log` file shows `Direct upgrades from 4.0.x are not supported! Upgrade to latest from 4.2 code line first and then you'll be able to upgrade to later versions.`

Upgrade Repository

To upgrade VMware Cloud Director Availability, you can configure the appliance to download the upgrade files from one of the following source repositories.

Repository	Description
An ISO image	Use an upgrade ISO file mounted in the virtual appliance CD-ROM drive for environments without an external Internet access.
A specified repository	To upgrade multiple appliances or after deploying the appliances in different datastores, specify a repository as a content source: ■ You can specify a local repository where you can upload the upgrade files, for environments where the network restricts the online Internet access to the appliances. ■ Alternatively, with available Internet access, specify `https://packages.vmware.com/vcav/4.5/` as an online upgrade repository.

Note Cannot upgrade by selecting the option **Official Online Repository** for versions 4.0.x since Apr 2021. To upgrade by using the management interface, either select an ISO image or specify a repository.

This chapter includes the following topics:

- Management Interface Upgrading
- Command-Line Upgrading
- Post-Upgrade Configuration

Management Interface Upgrading

To upgrade VMware Cloud Director Availability, you can use the management interface of the appliance, select an upgrade repository, and follow the updated management interface upgrade procedures for the selected repository.

Upgrade by Using the Default Repository

In the appliance management interface, you can upgrade to the latest version by using the default VMware repository.

Prerequisites

Verify that the appliance has an external Internet access to the VMware repository.

Procedure

1. Log in to the management interface of the appliance.
   a. In a Web browser, go to **`https://Appliance-IP-address/ui/admin`**.
   b. Select **Appliance login** or **SSO login** and enter the **root** or the ***`single sign-on`*** user credentials.
   c. Click **Login**.
2. In the left pane, click **Settings**.
3. Under **Version**, next to **Product version** click **Check for updates**.

4 To upgrade, complete the **Update** wizard.

Note Proceed with the upgrade only after taking a snapshot of the appliance.

a On the **Repository** page, select **Use Official Online Repository** and click **Next**.

b On the **Available updates** page, select an update and click **Next**.

c On the **Release notes** page, read the notes for this release and click **Next**.

d On the **EULA Review** page, to accept the end-user license agreement click **Next**.

e On the **Ready for update** page, click **Finish** and wait for the installation process to complete.

The appliance automatically restarts.

5 After the appliance restarts, verify that the upgrade is successful.

When the upgrade process finishes, in the left pane in **System Tasks**, you might see a red **Update** task that failed with messages like `Operation aborted due to an unexpected error` or `Task aborted due to service reboot`, while the upgrade is successful.

a Connect to the appliance console either by using a Secure Shell (SSH) client or by using the appliance console in the vSphere Client and log in as the **root** user.

b Open the upgrade log file.

```
less /var/log/upgrade.log
```

c Verify that the upgrade log finishes with the following log entry.

```
The upgrade was successful! Scheduling reboot in 15 seconds.
```

What to do next

After you upgrade the appliance, complete the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration.

Upgrade by Using a Specified Repository

In the appliance management interface, you can upgrade VMware Cloud Director Availability to the latest version by specifying an online or a local repository that contains the upgrade binaries.

Prerequisites

Verify that the appliance has a network access to the specified repository.

Procedure

1 If the network restricts the appliances online Internet access, prepare a local repository with the upgrade files.

   a To host the upgrade files inside the internal network, install and configure a local Web server.

   b Download the `VMware-Cloud-Director-Availability-`*`release.number.xxxxxxx-build_sha`*`.iso` file, that contains the VMware Cloud Director Availability *release.number* Upgrade Disk Image.

   c To access the image file contents, mount the downloaded `.iso` file to a local computer.

   d Copy the `update` directory to the local Web server.

   The `update` directory contains the manifest files and the `dnf` subdirectory.

2 Log in to the management interface of the appliance.

   a In a Web browser, go to **`https://`*`Appliance-IP-address`*`/ui/admin`**.

   b Select **Appliance login** or **SSO login** and enter the **root** or the ***single sign-on*** user credentials.

   c Click **Login**.

3 In the left pane, click **Settings**.

4 Under **Version**, next to **Product version** click **Check for updates**.

5 Upgrade the appliance by completing the **Update** wizard.

   Note Proceed with the upgrade only after taking a snapshot of the appliance.

   a On the **Repository** page, select **Use Specified Repository**.

   b On the **Repository URL** text box, specify the repository URL address and click **Next**.

      - If the appliance has Internet access, enter the following URL and specify the target version `https://packages.vmware.com/vcav/`*`4.4`*.
      - Alternatively, enter the URL address of the local repository pointing to the `update/dnf` directory of the local Web server. For example, enter `http://`*`local-Web-server-address`*`/update/dnf`.

   c On the **Available updates** page, select an update and click **Next**.

   d On the **Release notes** page, read the notes for this release and click **Next**.

   e On the **EULA Review** page, to accept the end-user license agreement click **Next**.

   f On the **Ready for update** page, click **Finish** and wait for the installation process to finish.

   The appliance automatically restarts.

6 After the appliance restarts, verify that the upgrade is successful.

When the upgrade process finishes, in the left pane in **System Tasks**, you might see a red **Update** task that failed with messages like `Operation aborted due to an unexpected error` or `Task aborted due to service reboot`, while the upgrade is successful.

a Connect to the appliance console either by using a Secure Shell (SSH) client or by using the appliance console in the vSphere Client and log in as the **root** user.

b Open the upgrade log file.

```
less /var/log/upgrade.log
```

c Verify that the upgrade log finishes with the following log entry.

```
The upgrade was successful! Scheduling reboot in 15 seconds.
```

What to do next

After you upgrade the appliance, complete the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration.

Upgrade by Using an ISO Image

In the appliance management interface, you can upgrade VMware Cloud Director Availability to the latest version by using an `.iso` file containing the upgrade binaries that you mount to the CD-ROM drive of the virtual appliance.

Prerequisites

- Download the `VMware-Cloud-Director-Availability-`*`release.number.xxxxxxx-build_sha`*`.iso` file, that contains the VMware Cloud Director Availability *release.number* Upgrade Disk Image.

Procedure

1 Copy the `.iso` file to a datastore that is accessible from the vCenter Server instance that you use with VMware Cloud Director Availability.

2 Mount the `.iso` file to the appliance.

a Log in to the on-premises vCenter Server by using the vSphere Client.

b Locate the virtual machine that hosts the appliance.

c Right-click the virtual machine and select **Edit Settings**.

d On the **Virtual Hardware** tab, select **CD/DVD Drive > Datastore ISO File**.

e Follow the prompts to add the CD/DVD drive to the virtual machine and select the **Connected** option.

3 By using the virtual appliance console, mount the `.iso` file inside the guest operating system of the appliance.

   a Connect to the appliance console either by using a Secure Shell (SSH) client or by using the appliance console in the vSphere Client and log in as the **root** user.

   b Mount the `.iso` file inside the guest operating system of the appliance.

   ```
   mount /mnt/cdrom
   ```

4 Log in to the management interface of the appliance.

   a In a Web browser, go to **`https://Appliance-IP-address/ui/admin`**.

   b Select **Appliance login** or **SSO login** and enter the **root** or the ***`single sign-on`*** user credentials.

   c Click **Login**.

5 In the left pane, click **Settings**.

6 Under **Version**, next to **Product version** click **Check for updates**.

7 Upgrade the appliance by completing the **Update** wizard.

   Note Proceed with the upgrade only after taking a snapshot of the appliance.

   a On the **Repository** page, select **Use CDROM Updates** and click **Next**.

   b On the **Available updates** page, select an update and click **Next**.

   c On the **EULA Review** page, to accept the end-user license agreement click **Next**.

   d On the **Ready for update** page, click **Finish** and wait for the installation process to finish.

8 After the upgrade finishes, verify that the upgrade is successful.

When the upgrade process finishes, in the left pane in **System Tasks**, you might see a red **Update** task that failed with messages like `Operation aborted due to an unexpected error` or `Task aborted due to service reboot`, while the upgrade is successful.

a Connect to the appliance console either by using a Secure Shell (SSH) client or by using the appliance console in the vSphere Client and log in as the **root** user.

b Open the upgrade log file.

```
less /var/log/upgrade.log
```

c Verify that the upgrade log finishes with the following log extract.

- When starting the upgrade from version 4.0.x, the appliance automatically restarts.

```
Complete!
Nothing left to do.
...
The upgrade was successful! Scheduling reboot in 15 seconds..
```

- When starting the upgrade from version 4.0.0.x, after the upgrade finishes you must restart the appliance.

```
Complete!
Verifying...              ########################################
Preparing...              ########################################
    package filesystem-1.1-4.ph3.x86_64 is already installed
Bad exit code: 256
{
  "code": "BadExitCode",
  "msg": "",
  "args": [
    "256"
  ]
}
```

After you see this upgrade log extract, restart the appliance.

```
reboot
```

9 Unmount the `.iso` file.

a In the vSphere Client, shut down the virtual machine that hosts the appliance.

b Right-click the virtual machine and select **Edit Settings**.

c In the **Virtual Hardware** tab, select **CD/DVD Drive** and deselect **Connected** and **Connect At Power On**.

d Power on the virtual machine that hosts the appliance.

What to do next

After you upgrade the appliance, complete the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration.

Command-Line Upgrading

To upgrade VMware Cloud Director Availability by using the command-line interface of the appliance, select an upgrade repository, and follow the updated command-line procedures for the selected repository.

Command-Line Upgrade by Using an ISO Image

From the appliance command-line interface, you can upgrade VMware Cloud Director Availability to the latest version by using an `.iso` file containing the upgrade binaries that you mount to the CD-ROM drive of the virtual appliance.

Prerequisites

- Download the `VMware-Cloud-Director-Availability-`*`release.number.xxxxxxx-build_sha`*`.iso` file, that contains the VMware Cloud Director Availability *release.number* Upgrade Disk Image.

Procedure

1. Copy the `.iso` file to a datastore that is accessible from the vCenter Server instance that you use with VMware Cloud Director Availability.
2. Mount the `.iso` file to the appliance.
   a. Log in to the vSphere Client in the site where you want to upgrade VMware Cloud Director Availability.
   b. On the **Home** page, click **Hosts and Clusters**.
   c. Right-click the virtual machine that hosts the appliance and select **Edit Settings**.
   d. On the **Virtual Hardware** tab, select **CD/DVD Drive > Datastore ISO File**.
   e. Follow the prompts and add the CD/DVD drive to the virtual machine and select the **Connected** option.
3. Connect to the VMware Cloud Director Availability appliance by using a Secure Shell (SSH) client.
   a. Open an SSH connection to *Appliance-IP-Address*.
   b. Authenticate as the **root** user.

4 Upgrade the appliance.

Note Proceed with the upgrade only after taking a snapshot of the appliance.

a Mount the `.iso` file inside the guest operating system.

```
mount /mnt/cdrom
```

b Review the end-user license agreement (EULA) and if you accept the EULA, press q.

```
python3 /mnt/cdrom/update/iso-upgrade.py eula | less
```

c Install the upgrade.

```
python3 /mnt/cdrom/update/iso-upgrade.py
```

After successfully completing, the upgrade outputs `Complete!` both in the console and in the `/var/log/upgrade.log` file.

d After the upgrade completes, restart the appliance.

```
reboot
```

What to do next

After you upgrade the appliance, complete the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration.

Post-Upgrade Configuration

After upgrading the appliance, complete the upgrade by reconfiguring the on-premises appliance with the vCenter Server Lookup service.

Procedure

1 Log in to the management interface of the appliance.

a In a Web browser, go to **`https://Appliance-IP-address/ui/admin`**.

b Select **Appliance login** or **SSO login** and enter the **root** or the ***single sign-on*** user credentials.

c Click **Login**.

2 Reconfigure the appliance with the vCenter Server Lookup service.

   a In the left pane, click **Settings**.

      To ensure that you load the upgraded management interface and to avoid the `The requested resource was not found` error message, clear the browser cache. You can press Ctrl+F5 or Ctrl+Shift+R (Cmd+Shift+R for Mac) or clear the cache in the browser settings.

   b Under **Service endpoints** next to **Lookup Service Address**, click **Edit**.

   c In the **Lookup Service Details** window, enter the single sign-on user name and password, and click **Apply**.

3 After upgrading to version 4.2 or later, uninstall the version 4.1.0 of VMware Cloud Director Availability vSphere Client Plug-In.

   a Log in to the vSphere Client as a vCenter Server **Administrator** user.

   b In the vSphere Client home page, click **Administration > Solutions > Client Plugins**.

   c Select and deactivate the VMware Cloud Director Availability plug-in version 4.1.0.

      Note The VMware Cloud Director Availability plug-in with the current version remains active, deployed, and ready for use.

Results

The appliance is successfully upgraded and you can configure new replications. For more information, see the *User Guide*.