VMware Cloud Director Availability Installation, Configuration, and Upgrade Guide in the Cloud

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VMware Cloud Director Availability 4.0

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https://docs.vmware.com/

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VMware Cloud Director Availability Overview in the Cloud

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The VMware Cloud Director Availability™ solution provides replication and failover capabilities for VMware Cloud Director™ and vCenter Server workloads at both the virtual machine and at the vApp level.

VMware Cloud Director Availability is available through the VMware Cloud Provider Program. The solution provides multi-tenant workload recovery to cloud sites and to on-premises environments. VMware Cloud Director Availability provides:

- A single-cloud site supports multiple-tenants.
- Replication management and monitoring from an on-premises site to a cloud site and reverse.
- Replication and recovery of vApps and virtual machines between VMware Cloud Director sites.
- Failback of recovered in the cloud workloads to the on-premises site.
- Migration of protected virtual machines in the cloud site back to the on-premises site.
- Self-service protection and failover workflows per virtual machine.
- Single installation package as a Photon-based virtual appliance.
- 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.
- A single-site VMware Cloud Director Availability can migrate virtual machines and vApps between Virtual Data Centers belonging to a single VMware Cloud Director organization.
- 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 Cloud Replicator 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.
- A single installation package, distributed as a Photon-based virtual appliance to deploy all VMware Cloud Director Availability components.

Deployment Architecture in the Cloud

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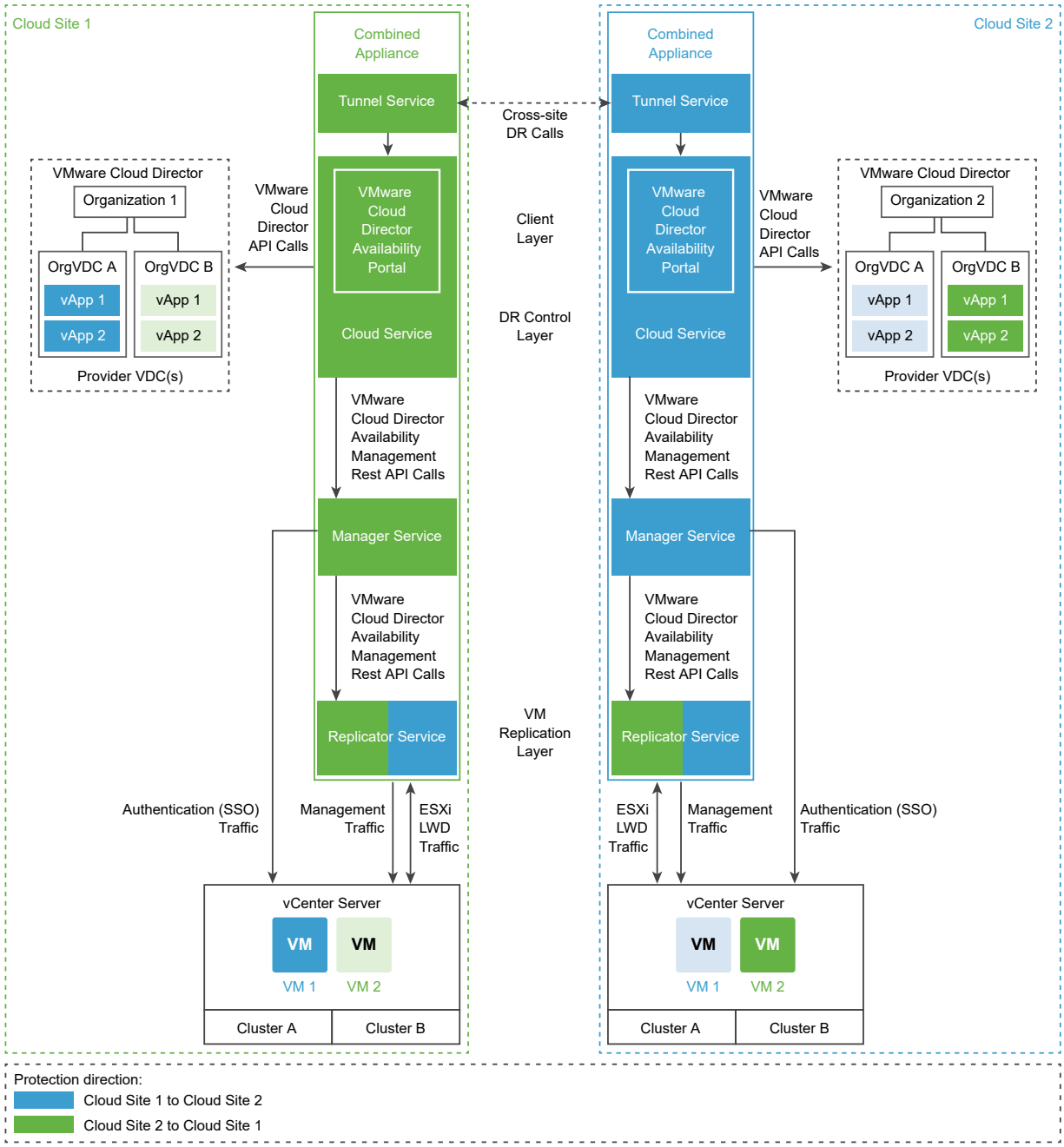
The cloud deployment architecture of VMware Cloud Director Availability relies on symmetrical replication operations between cloud environments. Deploying multiple VMware Cloud Director Availability instances under one VMware Cloud Director™ allows granular access to multiple provider virtual data centers (PVDC) representing separate sites.

Test and Development Deployment

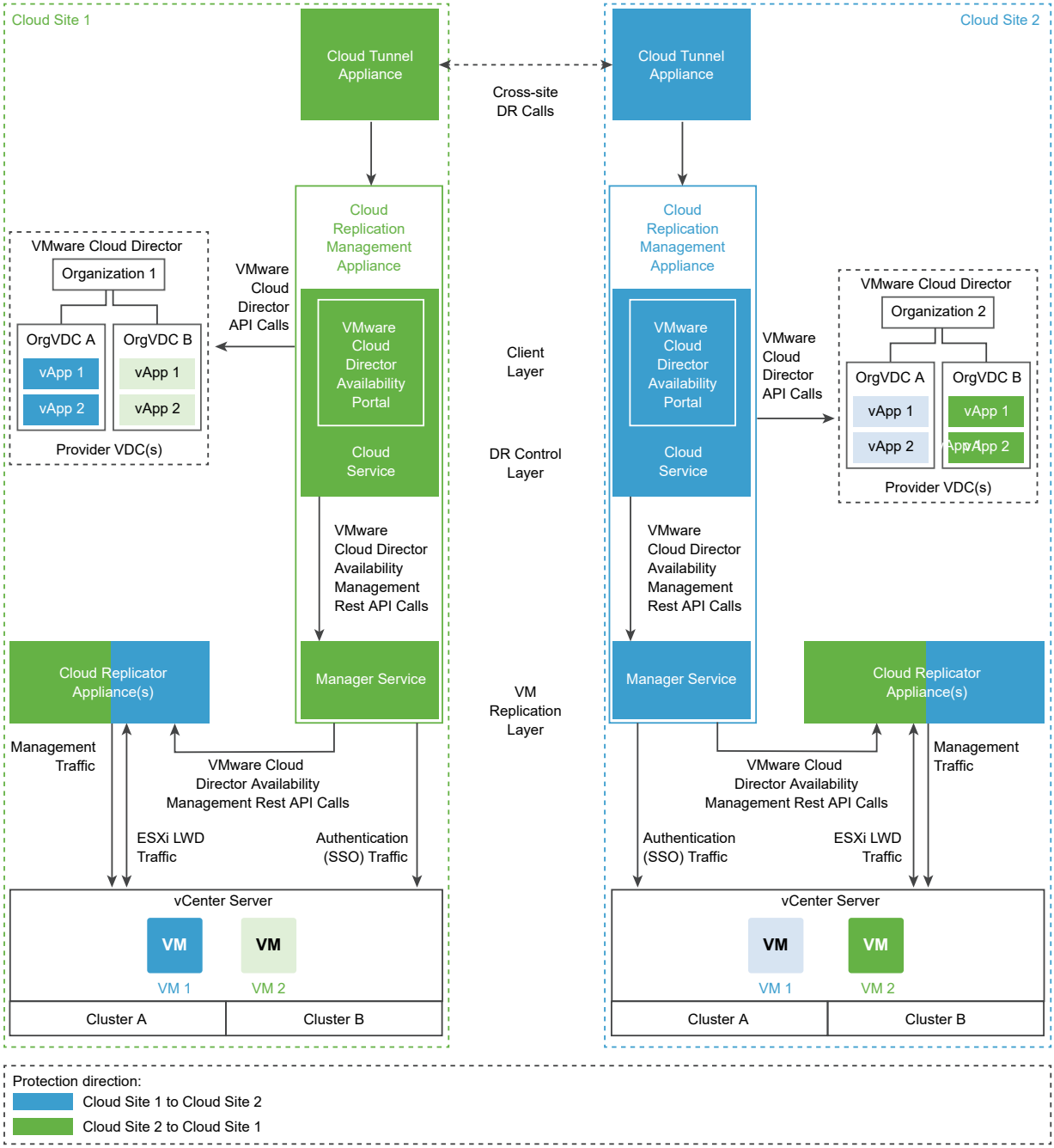
In a test and a development environment, you can deploy the simplest architecture. In the cloud site, a single Combined Appliance hosts the Tunnel Service, the Manager Service, the Cloud Service, and the Replicator Service.



The components with no color in the diagrams represent existing components in the VMware Cloud Director environments. The colored components represent the VMware Cloud Director Availability services deployed during the installation and initial configuration. The color of the components indicates which services participate for each replication direction. VMware Cloud Director Availability always places the replication at the destination site. For example, a protection from Cloud Site 1 to Cloud Site 2 uses the VMware Cloud Director Availability services of Cloud Site 2.

Production Deployment

In a production environment, you deploy and configure a Cloud Tunnel Appliance, a Cloud Replication Management Appliance and one or more Cloud Replicator Appliances.

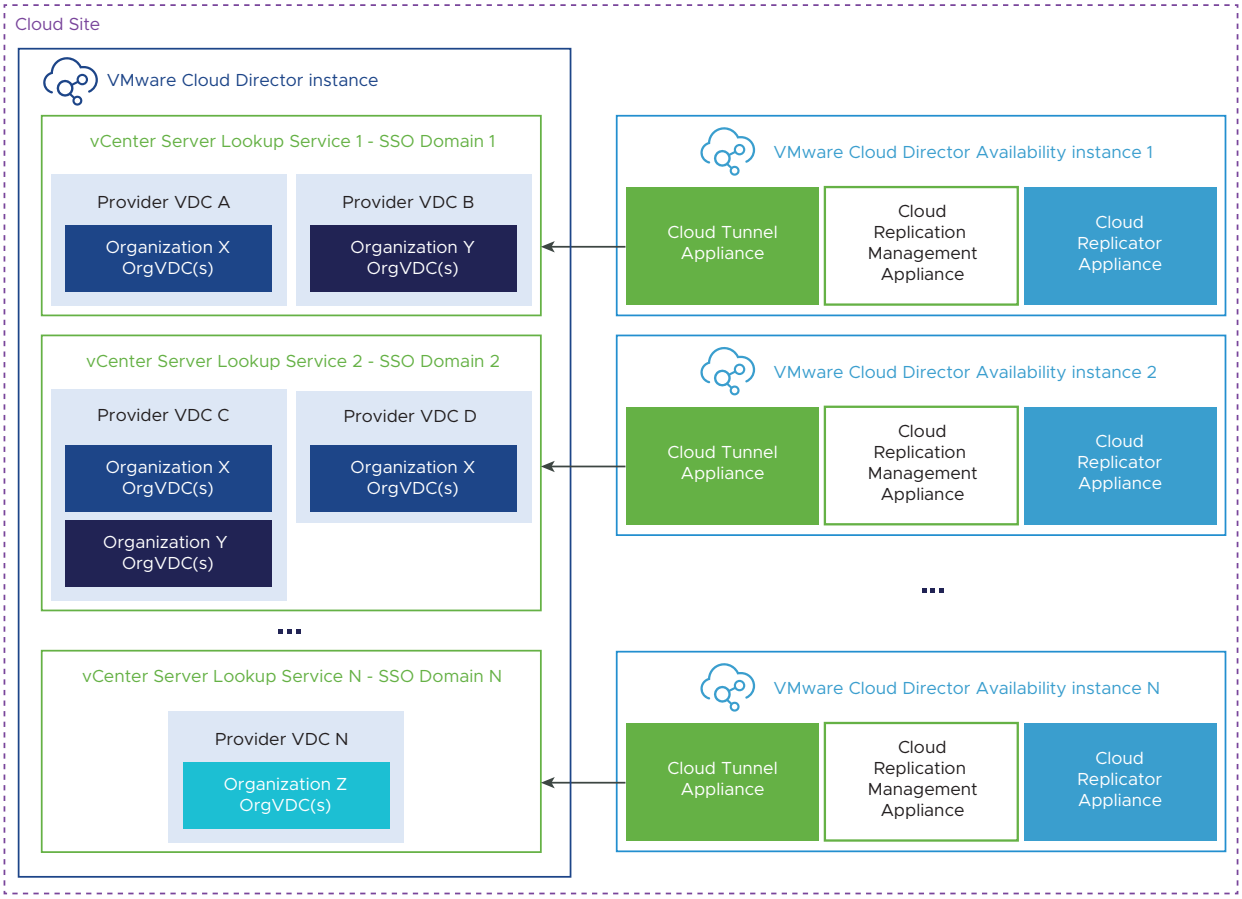


For information about the network connectivity between the services and the cloud sites, see Network Requirements and for information about each service, see Chapter 3 Services.

Deploying Multiple VMware Cloud Director Availability Instances in VMware Cloud Director

In a production cloud site, you can deploy one or more VMware Cloud Director Availability instances, distributed in Provider VDCs.

- Each VMware Cloud Director Availability instance connects to one vCenter Server Lookup service for one Single Sign-On (SSO) domain and can access all the organization virtual data centers (OrgVDC) of the organizations, part of the PVDC.
- A single VMware Cloud Director instance manages all VMware Cloud Director Availability instances, for both a replication source or a replication destination. Each VMware Cloud Director Availability instance registers as a plug-in with its local site name in VMware Cloud Director.
- In VMware Cloud Director Availability, each PVDC represents a cloud site and the replication traffic can transit directly and securely between each site. In each VMware Cloud Director Availability instance, the service provider controls the accessible PVDC for that instance.



- In SSO domain 1, VMware Cloud Director Availability instance 1 connects to vCenter Server Lookup service 1 and can access the organization virtual data centers of organizations X and Y, part of PVDC A and B, respectively.

- In SSO domain 2, VMware Cloud Director Availability instance 2 connects to vCenter Server Lookup service 2 and can access the organization virtual data centers of organizations X and Y, part of PVDC C and the organization virtual data center of organization X, part of PVDC D.
- In SSO domain N, VMware Cloud Director Availability instance N connects to vCenter Server Lookup service N and can access the organization virtual data center of organization Z, part of PVDC N.

Services

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The VMware Cloud Director Availability services can coexist on one virtual appliance or on dedicated appliances.

Table 3-1. VMware Cloud Director Availability Services

Service Name	Service Description
Replicator Service	Exposes the low-level HBR primitives as REST APIs.
Manager Service	A management service operating with vCenter Server-level concepts for managing the replication workflow.
Cloud Service with an embedded VMware Cloud Director Availability Tenant Portal	Provides the main interface for replication operations and operates with VMware Cloud Director-level concepts and works with vApps and virtual machines. The embedded VMware Cloud Director Availability Tenant Portal provides the tenants and the service providers of the VMware Cloud Director Availability Provider Portal with a graphic user interface to operate with VMware Cloud Director Availability.
Tunnel Service	The single point that channels all the site traffic: both management and replication data (LWD traffic).

For information about the VMware Cloud Director Availability appliances, see Deployment Requirements.

Each service provides a dedicated service management interface for configuration and administration.

You perform an initial configuration by using the Manager Service, the Replicator Service, and the Cloud Service service management interfaces. After VMware Cloud Director Availability is deployed and configured, tenants can access the VMware Cloud Director Availability Tenant Portal. For information about the network connectivity between the services, see Network Requirements and for diagrams showing all services in the cloud site and a diagram showing multiple VMware Cloud Director Availability instances, see Chapter 2 Deployment Architecture in the Cloud.

Table 3-2. Replication Services

Service Name	Service Description
vSphere Replication Server and vSphere Replication Filter	Receives and records the delta information for each replicated workload. During a cloud-to-cloud replication, only the delta information is sent from one ESXi host to another ESXi host.
Lightweight Delta Protocol Service (LWD Proxy)	A proprietary replication protocol service. Verifies that each incoming replication data stream comes only from the authorized source LWD Proxy instance. Also verifies that each outgoing replication data stream goes only to an authorized destination LWD Proxy instance.

Table 3-3. External Components

Component Name	Component Description
VMware Cloud Director	Service providers can build secure, multi-tenant private clouds. Pools infrastructure resources into virtual data centers. Exposes them to tenant users through Web portals and programmatic interfaces as fully automated, catalog-based services.
Platform Services Controller	Provides common infrastructure services to the vSphere environment. Services include licensing, certificate management, and authentication with VMware vCenter® Single Sign-On.

Installing and Configuring the Cloud Appliances

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First you deploy the VMware Cloud Director Availability appliances. Then you perform an initial configuration of each appliance so that all the components in the disaster recovery infrastructure are visible and able to connect.

This chapter includes the following topics:

Installation Requirements in the Cloud

Before you start deploying and configuring the cloud VMware Cloud Director Availability appliances, verify that your cloud site environment meets the specific requirements.

Interoperability

Before pairing VMware Cloud Director Availability sites, verify the interoperability of the disaster recovery infrastructure between the source site and the destination site.

You can pair sites that have mismatching VMware Cloud Director Availability versions deployed. For more information about the source site VMware Cloud Director Availability interoperability with the disaster recovery infrastructure in the destination site, see Managing Connections Between Cloud Sites.

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.

Deployment Requirements

Before installing VMware Cloud Director Availability, verify that your environment satisfies the following requirements.

Deployment Types and Hardware Requirements

You deploy all VMware Cloud Director Availability appliances by using a single installation OVA file in all cloud sites.

Depending on scale and deployment goals, you can select various deployment types. The following table describes the VMware Cloud Director Availability appliances in a cloud site and their hardware requirements.

Table 4-1. VMware Cloud Director Availability Appliances

Appliance Type	Description and Services	Hardware Requirements
Cloud Replication Management Appliance	A dedicated appliance, that runs the following VMware Cloud Director Availability services: ■ Manager Service ■ Cloud Service with embedded VMware Cloud Director Availability Tenant Portal You deploy the Cloud Replication Management Appliance to configure replications from and to VMware Cloud Director™.	■ 2 vCPUs ■ 4 GB RAM ■ 10 GB Storage
Cloud Replicator Appliance	A dedicated appliance for the Replicator Service that handles the replication traffic for a site. For large-scale environments, you can deploy more than one Cloud Replicator Appliance per cloud site.	■ 4 vCPUs ■ 6 GB RAM ■ 10 GB Storage
Cloud Tunnel Appliance	A dedicated appliance for the Tunnel Service.	■ 2 vCPUs ■ 2 GB RAM ■ 10 GB Storage
Combined Appliance	An all-in-one appliance deployment type, only suitable for testing and evaluation environments. The Combined Appliance includes all VMware Cloud Director Availability services: ■ Manager Service ■ Replicator Service ■ Cloud Service with embedded VMware Cloud Director Availability Tenant Portal ■ Tunnel Service	■ 4 vCPUs ■ 6 GB RAM ■ 10 GB Storage

For information about each service, see Chapter 3 Services and for the network connectivity between the services, see Network Requirements.

In the on-premises sites, a separate OVA file is used to deploy the VMware Cloud Director Availability On-Premises Appliance. When installing VMware Cloud Director Availability on-premises, only the Replicator Service deploys in the VMware Cloud Director Availability On-Premises Appliance.

VMware Cloud Director Availability Deployment Requirements

- Use the resource vCenter Server Lookup service instance, when in a single site several vCenter Server instances are dedicated for different tasks:
  - vCenter Server instances dedicated for management operations.
  - vCenter Server instances dedicated as VMware Cloud Director 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 Replicator Service and the Cloud Service, and optionally, the Tunnel Service and the Manager Service, with the vCenter Server Lookup service, provided by the Platform Services Controller used by the resource vCenter Server instances.
- In each cloud site, deploy one or more Cloud Replication Management Appliances per a VMware Cloud Director server group. The server group in VMware Cloud Director consists of a VMware Cloud Director cell and a resource vCenter Server with at least one ESXi host.
- VMware Cloud Director Availability verifies the host name of VMware Cloud Director in the VMware Cloud Director certificate. The `CommonName` or at least one of the entries in the `Subject Alternative Name` must match the FQDN or IP of VMware Cloud Director used when registering VMware Cloud Director in VMware Cloud Director Availability.
- VMware Cloud Director vApps discovery and adoption must be disabled. For more information, see Discovering and Adopting vApps in the VMware Cloud Director documentation.
- 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 Replicator Service to the same virtual port group. Using this configuration, the replication traffic between the ESXi hosts and the Replicator Service instances 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.

VMware Cloud Director Availability Storage Requirements

For a successful failover, the destination storage must accommodate double the source virtual machine disk size.

- Example required space in the datastore, for a source virtual machine with a 2 TB virtual disk. When the replication is created, VMware Cloud Director Availability allocates 2 TB in the destination storage. VMware Cloud Director Availability allocates additional 2 TB when starting a failover task. After finishing the failover task, the additional 2 TB space is unallocated.
- Example for a VMware vSAN storage, with the same virtual machine. The same storage implication applies, where the vSAN must accommodate double the virtual machine disk size. When the replication is created in this example, VMware Cloud Director Availability allocates 2 TB multiplied by the vSAN_Protection_Level_Disk_Space_Penalty. When starting a failover task, additional 2 TB are allocated multiplied by the vSAN_Protection_Level_Disk_Space_Penalty. For more information, see About vSAN Policies and Planning Capacity in vSAN in the vSphere documentation.

VMware Cloud Director Availability Supported Topologies

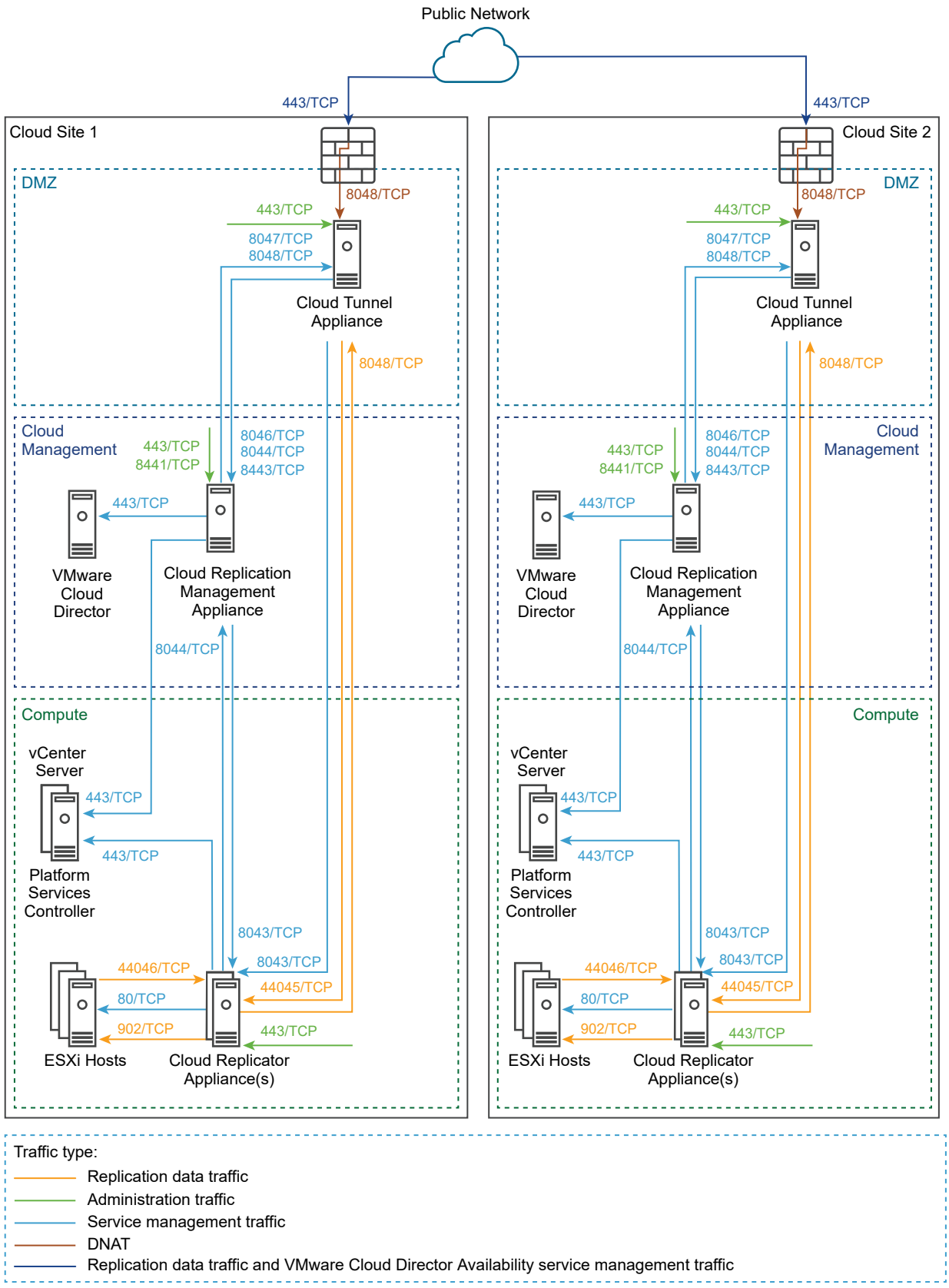
The resource vCenter Server instances within a VMware Cloud Director site must be within the same single sign-on domain. All Replicator Service, Manager Service, Cloud Service, and Tunnel Service instances within the respective site must be configured with that same single sign-on domain. For diagrams showing all services in the cloud site and a diagram showing multiple VMware Cloud Director Availability instances, see Chapter 2 Deployment Architecture in the Cloud.

Network Requirements

Before you start deploying and configuring VMware Cloud Director Availability, ensure that the required network ports are opened and allow the VMware Cloud Director Availability services communication within a site and between cloud sites.

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

The following network diagram shows the data flow direction and the data traffic type. The diagram also shows the required network ports for communication between the VMware Cloud Director Availability appliances and the disaster recovery infrastructure for a deployment with two cloud sites.


Public Network
443/TCP
443/TCP
Cloud Site 1
Cloud Site 2
DMZ
DMZ
8048/TCP
8048/TCP
443/TCP
8047/TCP
8048/TCP
Cloud Tunnel Appliance
443/TCP
8047/TCP
8048/TCP
Cloud Tunnel Appliance
8048/TCP
8048/TCP
Cloud Management
443/TCP
8441/TCP
8046/TCP
8044/TCP
8443/TCP
443/TCP
VMware Cloud Director
Cloud Replication Management Appliance
8044/TCP
Cloud Management
443/TCP
8441/TCP
8046/TCP
8044/TCP
8443/TCP
443/TCP
VMware Cloud Director
Cloud Replication Management Appliance
8044/TCP
Compute
vCenter Server
443/TCP
443/TCP
Platform Services Controller
8043/TCP
44046/TCP
8043/TCP
80/TCP
44045/TCP
902/TCP
443/TCP
ESXi Hosts
Cloud Replicator Appliance(s)
Compute
vCenter Server
443/TCP
443/TCP
Platform Services Controller
8043/TCP
44046/TCP
8043/TCP
80/TCP
44045/TCP
902/TCP
443/TCP
ESXi Hosts
Cloud Replicator Appliance(s)
Traffic type:
Replication data traffic
Administration traffic
Service management traffic
DNAT
Replication data traffic and VMware Cloud Director Availability service management traffic

VMware Cloud Director Availability components must be able to communicate with each other and with the disaster recovery infrastructure:

VMware Cloud Director Availability Appliances Connectivity

On an appliance-level, VMware Cloud Director Availability appliances must be able to communicate with each other and with the disaster recovery infrastructure:

- The Cloud Replication Management Appliance must have a TCP access to all the Cloud Replicator Appliances in both local, and in remote sites, to VMware Cloud Director, and to the resource vCenter Server, where the resource vCenter Server Lookup service is hosted.
- The Cloud Replicator Appliance must have a TCP access to the Cloud Replication Management Appliance, to the same resource vCenter Server, and to the same resource vCenter Server Lookup service.

VMware Cloud Director Availability Services Connectivity

On a service level, VMware Cloud Director Availability services must be able to communicate with each other and with the disaster recovery infrastructure:

- The Cloud Service must have a TCP access to the Manager Service, to VMware Cloud Director, to vCenter Server, and to Platform Services Controller, depending on where the vCenter Server Lookup service is hosted.
- The Manager Service must have a TCP access to all the Replicator Services in both local, and in remote sites and to the vCenter Server Lookup service.
- All the Replicator Services must have a TCP access to the Manager Service, to vCenter Server, and to the vCenter Server Lookup service.

Note The VMware Cloud Director Availability services use end-to-end encryption for the communication across sites. For example, when a Replicator Service on site 1 is communicating to a Replicator Service on site 2, VMware Cloud Director Availability expects that the TLS session is terminated at each Replicator Service.

VMware Cloud Director Availability does not support any TLS terminating products or solutions placed between the appliances, for example, VMware NSX® Edge™ instances, HAProxy, Nginx, Fortinet, and others. If such solutions 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.

Table 4-2. Firewall Rules for External Communication

Original Destination	Translated Destination	Original Destination Port	DNAT Translated Port	Protocol	Description
Public Network/ Uplink Interface	Cloud Tunnel Appliance	443	8048	TCP	Used for incoming replication management and replication data traffic from public networks to the Tunnel Service. This service then routes the traffic to the local services.

Users Requirements

Before you start deploying and configuring VMware Cloud Director Availability, verify that the service users meet the following requirements.

Cloud Service Users Requirements

The Cloud Service makes a difference between admin users and regular users. To start a session with administrator privileges, the credentials you enter for both of the VMware Cloud Director™ sites must belong to the **ADMINISTRATORS** or **VRADMINISTRATORS** group. For example, the `Administrator@vsphere.local` single sign-on user you enter when logging into the management portal, is a member of the **ADMINISTRATORS** group.

VMware Cloud Director Availability User Sessions Requirements

Each VMware Cloud Director Availability user session is guaranteed to have a VMware Cloud Director user and VMware Cloud Director organization associated with the session.

To manage VMware Cloud Director Availability workloads and the local Cloud Service appliance as a service provider, you start a user session as a VMware Cloud Director**system administrator** by using VMware Cloud Director user name and password. **System administrator** users can manage any local and monitor any remote VMware Cloud Director Availability inventory workload. To manage VMware Cloud Director Availability workloads in the remote sites, you must authenticate as a system administrator to the remote site.

For disaster recovery workflows and managing local VMware Cloud Director Availability workloads as a tenant user, you start a user session as a VMware Cloud Director organization administrator by using VMware Cloud Director credentials. As an organization administrator, for disaster recovery workflows in the local site, you can manage any local VMware Cloud Director Availability workload, and can monitor any remote VMware Cloud Director Availability workload that belongs to the respective VMware Cloud Director organization. To manage remote VMware Cloud Director Availability workloads, you must authenticate to the corresponding remote organization.

The following table lists Cloud Service disaster recovery operations that require sessions on either of the sites, or both.

Table 4-3. Cloud Service Replication Operations with Required Sessions

Operation	Incoming Replication		Outgoing Replication	
	Required Session on Source Site	Required Session on Destination Site	Required Session on Source Site	Required Session on Destination Site
`start`	Yes	Yes	Yes	Yes
`stop`	No	Yes	Yes	Yes
`reconfigure`	No	Yes	Yes	Yes
`failover`	No	Yes	Yes	Yes
`migrate`	Yes	Yes	Yes	Yes
`sync`	No	Yes	Yes	Yes
`pause`	No	Yes	Yes	Yes
`resume`	No	Yes	Yes	Yes
`reverse`	Yes	Yes	Yes	Yes
`failover test`	No	Yes	Yes	Yes
`failover test cleanup`	No	Yes	Yes	Yes

For more information about authenticating to remote sites, see *Authenticating to Remote Sites* in the *VMware Cloud Director Availability User Guide*.

Deploying in the Cloud

In a cloud environment with VMware Cloud Director™, you can deploy VMware Cloud Director Availability. By using a single OVA file, you deploy the VMware Cloud Director Availability appliances either by using the vSphere Client, or VMware OVF Tool.

The VMware Cloud Director Availability appliances come as preconfigured virtual machines that are optimized for running the VMware Cloud Director Availability services.

The VMware Cloud Director Availability cloud appliances are distributed with a name of the form `VMware-Cloud-Director-Availability-Provider-`*`release.number.xxxx-build_number`*`_OVF10.ova`.

Deploy the Cloud Appliances by Using the vSphere Client

In the vSphere Client, you can deploy all VMware Cloud Director Availability appliances from a single `.ova` file.

Prerequisites

- Download the `VMware-Cloud-Director-Availability-Provider-`*`release.number.xxxxxxx-build_sha`*`_OVF10.ova` file, containing the binaries for the VMware Cloud Director Availability cloud appliances.
- If using a version of vSphere earlier than 6.5, install the Client Integration Plug-in to use the **Deploy OVF Template** option in the vSphere Web Client.

Procedure

1. Log in to vCenter Server by using the vSphere Client.
2. Navigate to a target object where you want to deploy the VMware Cloud Director Availability services.

   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.
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 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 0VF 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 appliance deployment type configuration and click **Next**.

   For more information about the appliance deployment types, see Deployment Requirements.
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 of the appliance and click **Next**.

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

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

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

   You must change the initial **root** user password when you log in for the first time.

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

   If you do not enable SSH, you can configure the appliance later. For more information, see *Allow SSH Access* in the *VMware Cloud Director Availability Administration Guide* document.

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

   Important In the disaster recovery infrastructure, ensure that in the all instances of vCenter Server, ESXi, VMware Cloud Director, Platform Services Controller, and all cloud VMware Cloud Director Availability appliances use the same NTP server.

13 On the **Ready to complete** page, review the settings, optionally select **Power on after deployment** 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 Cloud Appliances by Using the OVF Tool

In the VMware OVF tool console, you can use a single .OVA installation file to deploy the VMware Cloud Director Availability appliances. You define deployment parameters in the OVF Tool console and run the deployment script.

Prerequisites

- Download the VMware-Cloud-Director-Availability-Provider-*release.number.xxxxxxx-build_sha*_OVF10.ova file, containing the binaries for the VMware Cloud Director Availability cloud appliances.
- Verify that the VMware OVF Tool is installed and configured. For more information, see https://code.vmware.com/tool/ovf.

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-Provider-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 a VMware Cloud Director Availability appliance.

To select the deployment type for the appliance that you are deploying, set the `--deploymentOption` argument to `cloud`, `tunnel`, `replicator`, or `combined`.

The following example command deploys a combined VMware Cloud Director Availability appliance and sets a static IP address.

```
#./ovftool/ovftool --name="${VMNAME}" --datastore="${VSPHERE_DATASTORE}" --acceptAllEulas
--powerOn --X:enableHiddenProperties --X:injectOvfEnv --X:waitForIp
--ipAllocationPolicy=fixedPolicy --deploymentOption=combined --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 VMware Cloud Director Availability appliance.

Installation Checklist

Follow the interactive installation checklist that guides you through the required steps of the installation process.

The interactive installation checklist guides you through the required steps to set up all VMware Cloud Director Availability appliances.

The installation checklist is available in a Cloud Replication Management Appliance or in a Combined Appliance.

Use the Installation Checklist

To follow a complete setup guide, you can use the interactive installation checklist.

Procedure

1. Log in to the management interface of the Cloud Replication Management 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. If you did not complete the initial setup wizard, on the **Getting Started** page click the **Access the installation checklist** link.

   Alternatively, navigate your browser to `https://Appliance-IP-Address/ui/guide/checklist`.
3. In the **Select Installation Type** page, select the deployment type of the appliance and click **Next**.

   The **Installation and configuration checklist** page opens and the installation checklist highlights the installation step that is pending. For more information, see Configuring the Cloud Appliances.
4. Perform the highlighted procedure in the step and when you are ready, mark it as completed by clicking **Done**.

   The installation checklist verifies the configuration for some of the steps and provides you with feedback.
5. Follow the remaining steps through the end of the installation checklist. When you complete all steps, you see the following confirmation message:

   `You have completed all installation steps.`

Resume an Incomplete Installation

Closing the installation checklist at any time does not interrupt the installation progress. Resume following the steps at a later stage by returning to the installation checklist. The installation checklist shows the current installation state, verifies the completed steps, and shows the remaining steps to complete the installation.

Prerequisites

Procedure

1 To return to the installation checklist, in the browser go to the following address, depending on the appliance deployment type.

Appliance Deployment Type	Installation Checklist URL
Combined Appliance	`https://Appliance-IP-Address/ui/guide/checklist/combined`
Cloud Replication Management Appliance	`https://Appliance-IP-Address/ui/guide/checklist/dedicated`

The installation checklist shows the completed and verified steps.

2 Resume the installation with the pending step highlighted by the installation checklist. When you are ready, to mark the step as completed click **Done**.

The installation checklist verifies the configuration for some of the steps and provides you with feedback.

3 Follow the remaining steps through the end of the installation checklist. When you complete all steps, you see the following confirmation message:

`You have completed all installation steps.`

Configuring the Cloud Appliances

To configure the VMware Cloud Director Availability solution, in a single cloud site you perform an initial configuration of the Manager Service, the Cloud Service, the Replicator Service, and the Tunnel Service. Then you register the services in the cloud site, and pair cloud sites.

As a best practice, configure all services in one cloud site: first register the Replicator Service with the Manager Service in the same site, and to allow for pairing, perform an initial configuration and registration of the second cloud site.

After configuring a VMware Cloud Director Availability service, you can validate that the setup is complete by opening the service management interface to the **System Monitoring** page. On that page, the entries are green to indicate successfully configured services, and red entries indicate an incomplete setup.

Procedure

1 Configure the Cloud Service

Enter a site name as an identifier of the Cloud Service instance and register the Cloud Service with the vCenter Server Lookup service, and with the VMware Cloud Director™ instance.

2 Configure the Manager Service

Register the Manager Service with the vCenter Server Lookup service.

3 Configure the Replicator Service

Register the Replicator Service with the vCenter Server Lookup service.

4 Register the Replicator Service with the Manager Service in the Cloud Site

Register the Replicator Service with the Manager Service in the same cloud site.

5 Configure the Tunnel Service

Change the initial password of the Tunnel Service appliance **root** user. Optionally, to allow a single sign-on login to the Tunnel Service, register the Tunnel Service with the vCenter Server Lookup service.

6 Enable the Tunnel Service

Register the Tunnel Service with the Cloud Service.

7 Add an Additional Replicator Service Instance

Depending on your deployment requirements, you can add more Replicator Service instances to your disaster recovery environment.

Configure the Cloud Service

Enter a site name as an identifier of the Cloud Service instance and register the Cloud Service with the vCenter Server Lookup service, and with the VMware Cloud Director™ instance.

Procedure

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

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 **Run initial setup wizard**.

The **Initial Setup** wizard opens.

5 On the **Site Details** page, configure the Cloud Service instance site and click **Next**.

a In the **Site Name** text box, enter a site name for this Cloud Service instance.

Important The site name is used as an identifier of this instance of Cloud Service and cannot be changed later.

b (Optional) In the **Service Endpoint address** text box, enter the VMware Cloud Director Availability Service Endpoint address.

You can provide the VMware Cloud Director Availability Service Endpoint address after you complete the configuration.

c (Optional) In the **Site Description** text box, enter a description for the site.

6 On the **Lookup Service** page, register the Cloud Service with vCenter Server Lookup service.

a Enter the *lookup-service-IP-address* and to autocomplete the address as `https://`*Lookup-Service-IP-address*`:443/lookupservice/sdk` press Tab.

b Click **Next**.

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

7 On the **VMware Cloud Director** page, register the Cloud Service with VMware Cloud Director.

During the registration, the Cloud Service installs the plug-ins named `Setup DRaaS and Migration` and `Availability (`*localSite*`)` in VMware Cloud Director.

a Enter the VMware Cloud Director URL as `https://`*VMware-Cloud-Director-IP-Address*`:443/api`.

b Enter the VMware Cloud Director **System administrator** credentials, for example use *administrator@system*.

c Click **Next**.

d Verify the thumbprint and accept the SSL certificate of the VMware Cloud Director instance.

8 On the **Licensing** page, enter a valid VMware Cloud Director Availability™ license key and click **Next**.

9 (Optional) On the **CEIP** page, to **Join the VMware Customer Experience Improvement Program**, select the check box and click **Next**.

For more information on the VMware Customer Experience Improvement Program, see Customer Experience Improvement Program.

10 On the **Ready To Complete** page, review the Cloud Service configuration summary and click **Finish**.

11 Verify that the Cloud Service configuration is correct.

   a In the left pane, click **System Monitoring**.

   b Under **Service status**, verify that **Lookup Service connectivity** shows a green check status.

   c On the **System Monitoring**page, you can see the remaining configurations to complete the Cloud Service service configuration.

What to do next

You can now perform an initial configuration of Manager Service. For more information, see Configure the Manager Service.

Configure the Manager Service

Register the Manager Service with the vCenter Server Lookup service.

Procedure

1 In a Web browser, go to `https://Appliance-IP-Address:8441/ui/admin`.

2 Log in as the **root** user.

3 In the left pane, click **Configuration** and next to **Lookup service address** click **Edit**.

4 In the **Lookup Service Details** window, enter the vCenter Server Lookup service address.

   a Press Tab and autocomplete the address as `https://Lookup-Service-IP-address:443/lookupservice/sdk`.

   b Click **Apply**.

   c Accept the SSL certificate of the vCenter Server Lookup service.

5 Verify that the vCenter Server Lookup service connectivity is operational.

   a In the left pane, click **System Monitoring**.

   b Under **Service status**, verify that **Lookup Service connectivity** shows a green check status.

What to do next

You can now perform an initial configuration of Replicator Service. For more information, see Configure the Replicator Service.

Configure the Replicator Service

Register the Replicator Service with the vCenter Server Lookup service.

Procedure

1 In a Web browser, go to the Replicator Service service management interface for your deployment type.

Deployment type	Service Management Interface
Combined Appliance	`https://Appliance-IP-Address:8440/ui/admin`
Cloud Replicator Appliance	`https://Replicator-Appliance-IP-Address/ui/admin`

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

   b Click **Login**.

2 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.

3 In the left pane, click **Configuration** and next to **Lookup service address** click **Edit**.

4 In the **Lookup Service Details** window, enter the vCenter Server Lookup service address.

   a Press Tab and autocomplete the address as `https://Lookup-Service-IP-address:443/lookupservice/sdk`.

   b Click **Apply**.

   c Accept the SSL certificate of the vCenter Server Lookup service.

5 Verify that the vCenter Server Lookup service connectivity is operational.

   a In the left pane, click **System Monitoring**.

   b Under **Service status**, verify that **Lookup Service connectivity** shows a green check status.

What to do next

You can now register Replicator Service with Manager Service. For more information, see Register the Replicator Service with the Manager Service in the Cloud Site.

Register the Replicator Service with the Manager Service in the Cloud Site

Register the Replicator Service with the Manager Service in the same cloud site.

Prerequisites

Verify that in the same site you have configured a Replicator Service instance and a Manager Service instance.

Procedure

1 Log in to the Manager Service service management interface.

   a In a Web browser, go to `https://`*`Appliance–IP–Address`*`:8441/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 **Replicators**.

3 On the **Replicators administration** page, click **New**.

4 In the **New Replicator** window, enter the details for the new Replicator Service instance and click **Add**.

Option	Description
Site	Select the site where the Replicator Service instance is deployed.
Description	You can optionally add a description for the Replicator Service instance you register.
API URL	The Replicator Service instance API endpoint address.
Appliance Password	The **root** user password for the Replicator Service appliance.
SSO Admin Username	A user with administrative privileges in the local site single sign-on domain, for example *Administrator@VSPHERE.LOCAL*.
SSO Password	The password for the administrative user.

   If you enter the FQDN of Replicator Service, the interface always shows the IP address of Replicator Service.

5 Accept the SSL certificate of the Replicator Service.

   On the **Replicators administration** page, you now see a green check status for the new Replicator Service instance added to the Manager Service instance.

6 Verify that the Replicator Service connectivity is operational.

   a In the left pane, click **System Monitoring**.

   b Under **Local replicators**, verify that **Service connectivity** shows a green check status.

Configure the Tunnel Service

Change the initial password of the Tunnel Service appliance **root** user. Optionally, to allow a single sign-on login to the Tunnel Service, register the Tunnel Service with the vCenter Server Lookup service.

Procedure

1 In a Web browser, go to the Tunnel Service service management interface for your deployment type.

Deployment type	Service Management Interface
Combined Appliance	`https://`*`Appliance-IP-Address`*`:8442/ui/admin`
Cloud Tunnel Appliance	`https://`*`Tunnel-Appliance-IP-Address`*`/ui/admin`

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

   b Click **Login**.

2 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.

3 (Optional) Register the Tunnel Service with the vCenter Server Lookup service.

   Optionally, allow a single sign-on login to the Tunnel Service by registering the Tunnel Service with the vCenter Server Lookup service.

   a In the left pane, click **Configuration** and next to **Lookup service address** click **Edit**.

   b Press Tab and autocomplete the address as `https://`*`Lookup-Service-IP-address`*`:443/lookupservice/sdk`.

   c Click **Apply** and accept the SSL certificate of the vCenter Server Lookup service.

   d In the left pane, click **System Monitoring** and under **Service status**, verify that **Lookup Service connectivity** shows a green check status.

What to do next

You can now enable the tunneling service communication with the VMware Cloud Director Availabilityservices. For more information, see Enable the Tunnel Service.

Enable the Tunnel Service

Register the Tunnel Service with the Cloud Service.

Prerequisites

- Verify that in all cloud sites the Replicator Service instance is locally registered to the Manager Service instance, before registering Cloud Service instances in all cloud sites with Tunnel Service to enable the tunneling service communication.
- Verify that the Tunnel Service instance is configured. For more information, see Configure the Tunnel Service.

Procedure

1. Log in to the management interface of the Cloud Replication Management 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 **Configuration** and next to **Tunnel address** click **Edit**.
3. In the **Tunneling settings** window, edit the Tunnel Service settings and click **Apply**.

Option	Description
Enable tunneling for VMware Cloud Director Availabilityservices communication	Select to enable Tunnel Service.
Tunnel address	Enter the local Tunnel Service service API endpoint. By default, this address is with port **8047**. For example, **https://Tunnel-Appliance-IP-address:8047**.
Appliance user	The Tunnel Service appliance **root** user.
Password	The password for the Tunnel Service appliance **root** user.

4. Accept the Tunnel Service SSL certificate.
5. Verify that the Tunnel Service connectivity is operational.
   a. In the left pane, click **System Monitoring**.
   b. Under **Service status**, verify that **Tunnel connectivity** shows a green status.

What to do next

If you paired sites before enabling Tunnel Service, you must re-pair all sites.

Add an Additional Replicator Service Instance

Depending on your deployment requirements, you can add more Replicator Service instances to your disaster recovery environment.

Prerequisites

- Configure the Replicator Service, Manager Service, Cloud Service, and the Tunnel Service in your disaster recovery environment.
- Deploy a new Cloud Replicator Appliance. For more information, see Deploy the Cloud Appliances by Using the vSphere Client and Deploy the Cloud Appliances by Using the OVF Tool.
- Configure the new Cloud Replicator Appliance. For more information, see Configure the Replicator Service.
- Register the new Cloud Replicator Appliance to the local Cloud Replication Management Appliance. For more information, see Register the Replicator Service with the Manager Service in the Cloud Site.

Procedure

1 Add a Replicator Service instance.

   a In a Web browser, go to `https://`*`Cloud-Replication-Management-Appliance-IP-Address`*`:8441/ui/admin`.

   b Log in as **root**.

   c In the left pane, click **Replicator Services**.

   d In the **Replicator Services administration** page, click **New**.

   The **New Local Replicator Service** window shows.

   e In the **Service Endpoint address** text box, enter the Cloud Replicator Appliance IP address and port **8043**.

   For example, `https://`*`Cloud-Replicator-Appliance-IP-address`*`:8043`.

   f In the **Appliance Password** text box, enter the appliance **root** password that you set during the initial Replicator Service configuration.

   g In the **SSO Admin Username** text box, enter the user name of the single sign-on domain administrator user.

   For example, use ***administrator@vsphere.local***.

   h In the **SSO Password** text box, enter the password of the single sign-on domain administrator user.

   i (Optional) In the **Description** text box, add a description for the Replicator Service.

j Click **Add**.

k Verify the thumbprint and accept the Replicator Service SSL certificate.

2 To start using the new Replicator Service instance, re-pair the cloud site with all paired cloud sites.

On-premises sites running version 3.5 or later, in up to 30 minutes detect the new Cloud Replicator Appliance instance and automatically reconfigure the VMware Cloud Director Availability On-Premises Appliance to start using the new Replicator Service instance. Alternatively, for the on-premises sites to start immediately using the new Replicator Service instance, re-pair these on-premises sites for the VMware Cloud Director Availability On-Premises Appliance instances to learn about the new Cloud Replicator Appliance instance.

Note On-premises sites running version 3.0, cannot automatically re-pair and the re-pair with the new Replicator Service instance must be performed manually.

Results

A new Replicator Service instance is added to the VMware Cloud Director Availability environment.

What to do next

- To use the new Replicator Service instance, re-pair all sites.
- To add another Replicator Service instance, repeat this procedure.

Customer Experience Improvement Program

You can configure VMware Cloud Director Availability™ to participate in VMware's Customer Experience Improvement Program ("CEIP"). When you join CEIP, VMware receives anonymous information to improve the quality, reliability, and functionality of VMware products and services.

This product participates in VMware's Customer Experience Improvement Program ("CEIP"). Details regarding the data collected through CEIP and the purposes for which it is used by VMware are set forth at the Trust & Assurance Center at http://www.vmware.com/trustvmware/ceip.html. To join or leave the CEIP for this product, please see Join or Leave the Customer Experience Improvement Program.

Categories of Information That VMware Receives

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

Details regarding the data collected through CEIP and the purposes for which it is used by VMware are set forth at the Trust & Assurance Center at http://www.vmware.com/trustvmware/ceip.html.

To join or leave the CEIP for this product, please see Join or Leave the Customer Experience Improvement Program.

Join or Leave the Customer Experience Improvement Program

You can configure VMware Cloud Director Availability to join the Customer Experience Improvement Program (CEIP), or leave the CEIP at any time.

Procedure

1. Log in to the management interface of the Cloud Replication Management 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 **Configuration**.
3. Under **Customer Experience Improvement Program participation**, next to **Participate in CEIP** click **Edit**.
4. In the **Participate in CEIP** window, to join or leave the CEIP for this product, please configure the following and click **Apply**.
   - To join the CEIP, select the **Join the VMware Customer Experience Improvement Program** check box.
   - To leave the CEIP, deselect the **Join the VMware Customer Experience Improvement Program** check box.

Upgrading in the Cloud

5

Choose an upgrade method that is available for the currently installed version. Select the upgrade files source repository and upgrade each appliance in the cloud site, according to a specific order.

Upgrade Paths

To upgrade to the latest version of VMware Cloud Director Availability in the cloud site, choose an upgrade method according to the current version that is installed.

Current Version	Next Version	Available Upgrade Method
4.0	4.0.1	■ You can upgrade by using the 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.
3.5.x 3.0.x	4.0	■ You can upgrade by using the 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 procedures.

Note Before upgrading, verify that the configuration is prepared as per the Pre-Upgrade Configuration in the Cloud procedure.

After upgrading, to complete the upgrade sequence follow the Post-Upgrade Configuration in the Cloud procedure.

Select an Upgrade Repository

To upgrade to the latest VMware Cloud Director Availability version, for each appliance select to download the upgrade files from a source repository.

Source Repository	Description
An ISO image	Use an upgrade ISO file mounted in the virtual appliance CD-ROM drive for environments where the Internet access is restricted.
A specified repository	To upgrade multiple appliances or when the appliances are deployed 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/4.1/` as an online upgrade repository.

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

This chapter includes the following topics:

Upgrade Sequence

To upgrade successfully to VMware Cloud Director Availability 4.0, in all sites take snapshots of all VMware Cloud Director Availability appliances and upgrade each appliance according to a specific order.

Upgrade the VMware Cloud Director Availability sites in the following order:

1 In the local cloud site, upgrade all the VMware Cloud Director Availability appliances.

2 In remote cloud sites, upgrade all the VMware Cloud Director Availability appliances.

3 Upgrade all the VMware Cloud Director Availability On-Premises Appliance nodes.

In a VMware Cloud Director Availability cloud site, upgrade all the appliances according to the following procedure:

Prerequisites

Important

- Verify that before starting the upgrade, current snapshots of all the appliances exist in the site.
- Verify that before starting the upgrade, 60% free disk space, or more exists on all the appliances in the site.

- Verify that the sites are prepared for replication interruptions and Recovery Point Objective (RPO) violations.

Procedure

1. Power off the Cloud Tunnel Appliance and all Cloud Replicator Appliance nodes in the local cloud site.
2. Upgrade the Cloud Replication Management Appliance and after a successful upgrade, power off the appliance.
3. Power on a Cloud Replicator Appliance node.
   a. Upgrade the Cloud Replicator Appliance node.
   b. After a successful upgrade, power off the upgraded Cloud Replicator Appliance node.
   c. Repeat this step for all the remaining Cloud Replicator Appliance nodes in the local cloud site.
4. Power on the Cloud Tunnel Appliance.
   a. Upgrade the Cloud Tunnel Appliance.
   b. After a successful upgrade, power on the upgraded Cloud Replication Management Appliance and all the upgraded Cloud Replicator Appliance nodes.

      All the VMware Cloud Director Availability appliances in the local cloud site are upgraded and powered on.

Results

The VMware Cloud Director Availability cloud site is upgraded.

What to do next

After upgrading the local cloud site, the remote cloud sites, and upgrading the VMware Cloud Director Availability On-Premises Appliance nodes, you can start using the new VMware Cloud Director Availability version.

Pre-Upgrade Configuration in the Cloud

Before upgrading, if in version 3.0.x configuration you left the default selection to discover the VMware Cloud Director address automatically, you must manually enter the VMware Cloud

Director address and the **System** user credentials for VMware Cloud Director. If you are running version 3.5.x or newer, skip this pre-upgrade configuration.

Follow this procedure only if discover the VMware Cloud Director Service address automatically is selected as the default in version 3.0.x. If before upgrading to version 3.5.x you selected to enter details for the VMware Cloud Director Service manually and provided the VMware Cloud Director URL, skip this procedure and proceed with upgrading.

Procedure

1. Log in to the management interface of the Cloud Replication Management 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 **Configuration**.
3. Under **Service endpoints**, next to **VMware Cloud Director address** click **Edit**.
4. In the **VMware Cloud Director Details** window, enter the Endpoint address and the **System** user credentials used for all administrative operations.
   a. Select to enter details for the VMware Cloud Director Service manually.
   b. Enter the VMware Cloud Director Endpoint URL address as `https://`*`VMware.Cloud.Director.IP.address`*`:443/api`.
   c. Enter the VMware Cloud Director **System administrator** credentials and click **Apply**.

      Use *administrator@system*, where *system* is the VMware Cloud Director organization name.
   d. Verify the thumbprint and accept the VMware Cloud Director SSL certificate.

Results

The VMware Cloud Director details are configured.

What to do next

You can proceed with the upgrade method you chose and selecting an upgrade repository.

Management Interface Upgrading

To upgrade from VMware Cloud Director Availability 4.0, you can use the management interface of each of the cloud appliances, select an upgrade repository, and follow the updated management interface upgrade procedures for the selected repository.

- If upgrading from version 4.0 or later, you can follow the updated procedures in the current chapter and use the cloud appliance management interface for the upgrade. Alternatively, you can use the appliance command-line interface for the upgrade by following the updated Command-Line Upgrading procedures.
- If upgrading from version 3.0.x to version 4.0, you can follow the legacy Management Interface Upgrading procedures. Alternatively, you can follow the legacy Command-Line Upgrading procedures.
- If upgrading from version 3.0 to version 4.0, you must follow the legacy Command-Line Upgrading procedures.

Upgrade by Using an ISO Image

In the cloud appliances management interface, you can upgrade from VMware Cloud Director Availability 4.0 to the latest version by using an `.iso` image file containing the upgrade binaries that you mount to the CD-ROM drive of the virtual appliances.

Follow the updated procedure bellow when upgrading from VMware Cloud Director Availability 4.0. If you are upgrading from version 3.x to 4.0, follow the legacy Upgrade by Using an ISO Image procedure.

Prerequisites

- Follow a strict order when upgrading the VMware Cloud Director Availability appliances. For more information, see Upgrade Sequence.
- 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 each of the VMware Cloud Director Availability appliances.
   a. Log in to the vSphere Client on 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 VMware Cloud Director Availability appliance 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 VMware Cloud Director Availability virtual machine and select the **Connected** option.

3 By using the cloud appliances console, mount the `.iso` file inside the guest operating system of each of the VMware Cloud Director Availability appliances.

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

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

```
mount /mnt/cdrom
```

4 Log in to the service management interface of each VMware Cloud Director Availability appliance.

a Open a Web browser and according to the upgrade order go to each appliance management interface address.

Upgrade Order	VMware Cloud Director Availability Appliance	Management Interface Address
First	Cloud Replication Management Appliance	`https://`*`Appliance-IP-Address`*`/ui/admin`
Repeat for all instances	Cloud Replicator Appliance	`https://`*`Replicator-IP-Address`*`/ui/admin`
Last	Cloud Tunnel Appliance	`https://`*`Tunnel-IP-Address`*`/ui/admin`

b Log in by using the **root** user credentials.

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

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

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

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

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

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

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

d In 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 and restart the VMware Cloud Director Availability appliance.

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 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.

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

d Restart the appliance.

```
reboot
```

9 Unmount the `.iso` file.

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

Results

After validating that the upgrade is successful, repeat this procedure for the next appliance, until you upgrade all cloud appliances, according to the upgrade order in the table.

What to do next

After you upgrade all the VMware Cloud Director Availability appliances, finish the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration in the Cloud.

Upgrade by Using a Specified Repository

In the cloud appliances management interface, you can upgrade from VMware Cloud Director Availability 4.0 to the latest version by specifying an online or a local repository that contains the upgrade binaries.

Follow the updated procedure bellow when upgrading from VMware Cloud Director Availability 4.0. If you are upgrading from version 3.x to 4.0, follow the legacy Upgrade by Using a Specified Repository procedure. For information about the upgrade in the cloud site, see Chapter 5 Upgrading in the Cloud.

Prerequisites

- Follow a strict order when upgrading the VMware Cloud Director Availability appliances. For more information, see Upgrade Sequence.
- Verify that each VMware Cloud Director Availability appliance has a network access to the specified repository.

Procedure

1. (Optional) 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 service management interface of each VMware Cloud Director Availability appliance.

a Open a Web browser and according to the upgrade order go to each management interface address.

Upgrade Order	VMware Cloud Director Availability Appliance	Management Interface Address
First	Cloud Replication Management Appliance	`https://Appliance-IP-Address/ui/admin`
Repeat for all instances	Cloud Replicator Appliance	`https://Replicator-IP-Address/ui/admin`
Last	Cloud Tunnel Appliance	`https://Tunnel-IP-Address/ui/admin`

b Log in by using the **root** user credentials.

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

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

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

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

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

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

- If the appliance has Internet access, enter `https://packages.vmware.com/vcav/4.1/`.
- 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 In the **Available updates** page, select an update and click **Next**.

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

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

The VMware Cloud Director Availability 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 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.`

Results

After validating that the upgrade is successful, repeat this procedure for the next appliance, until you upgrade all cloud appliances, according to the upgrade order in the table.

What to do next

After you upgrade all the VMware Cloud Director Availability appliances, finish the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration in the Cloud.

Command-Line Upgrading

To upgrade from VMware Cloud Director Availability 4.0 you can use the command-line interface of each of the cloud appliances, select an upgrade repository, and follow the updated command-line upgrade procedures for the selected repository.

- If upgrading from version 4.0 or later, you can follow the updated procedures in the current chapter and use the cloud appliance command-line interface for the upgrade. Alternatively, you can use the appliance management interface for the upgrade by following the updated Management Interface Upgrading procedures.
- If upgrading from version 3.0.x to version 4.0, you can follow the legacy Management Interface Upgrading procedures. Alternatively, you can follow the legacy Command-Line Upgrading procedures.
- If upgrading from version 3.0 to version 4.0, you must follow the legacy Command-Line Upgrading procedures.

Command-Line Upgrade by Using an ISO Image

From the cloud appliances command-line interface, you can upgrade from VMware Cloud Director Availability 4.0 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.

You must perform this procedure multiple times, to upgrade each VMware Cloud Director Availability appliance. Follow the updated command-line procedure bellow when upgrading from VMware Cloud Director Availability 4.0. If you are upgrading from version 3.x to 4.0, follow the legacy Command-Line Upgrade by Using an ISO Image procedure.

Prerequisites

- Follow a strict order when upgrading the VMware Cloud Director Availability appliances. For more information, see Upgrade Sequence.
- 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 in a VMware Cloud Director Availability 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 VMware Cloud Director Availability 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 VMware Cloud Director Availability virtual machine and select the **Connected** option.

   Repeat this step to mount the `.iso` file in all remaining VMware Cloud Director Availability appliances.
3. Upgrade a VMware Cloud Director Availability appliance.
   a. Connect to the appliance console either by using a Secure Shell (SSH) client or by using the vSphere Client and log in as the **root** user.
   b. Mount the `.iso` file inside the guest operating system.

   ```
   mount /mnt/cdrom
   ```

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

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

d Install the upgrade.

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

In the `/var/log/upgrade.log` file, you can verify that the upgrade is successful.

e After the upgrade completes, restart the appliance.

```
reboot
```

Repeat this step to upgrade all remaining VMware Cloud Director Availability appliances.

What to do next

After you upgrade all the VMware Cloud Director Availability appliances, finish the upgrade with a post-upgrade configuration. For more information, see Post-Upgrade Configuration in the Cloud.

Post-Upgrade Configuration in the Cloud

After upgrading all VMware Cloud Director Availability components in both the local and in the remote sites, you perform post-upgrade steps. When upgrading to version 4.0, reload the management interface and update the license key. Enter the VMware Cloud Director details and, optionally, re-enable the tunneling service, and re-establish the trust between the cloud sites.

Prerequisites

- If upgrading from version 3.0, to re-enable the Tunnel Service instance, see Enable the Tunnel Service.
- If upgrading from version 3.0, to re-establish the cloud to cloud trust, see *VMware Cloud Director Availability Administration Guide*.

Procedure

1 Log in to the management interface of the Cloud Replication Management 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 If upgrading to version 4.0, you must reload the management interface and update the license key.

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

      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 **Licensing**, next to **License key** click **Edit**.

   c Enter the license key and click **Apply**.

   d Verify that you see no errors for the **License key** entry.

3 Reinstall the latest version of the VMware Cloud Director Availability plug-in for VMware Cloud Director.

   Skipping the plug-in installation in VMware Cloud Director results in the error message `The requested API version is not supported by the server.`

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

   b Under **Service endpoints**, next to **VMware Cloud Director address** click **Edit**.

   c Enter the VMware Cloud Director URL as `https://`*`VMware Cloud Director–IP–address`*`:443/api`.

   d Enter the VMware Cloud Director **System administrator** credentials and click **Apply**.

      For example, use *administrator@system*, where *system* is the VMware Cloud Director organization name.

   e Verify the thumbprint and accept the VMware Cloud Director SSL certificate.

4 If upgrading from version 3.0, re-enable the Tunnel Service instance.

5 If upgrading from version 3.0, re-pair all cloud sites to re-establish the trust between the cloud sites.

Results

The upgrade in the cloud site is complete and VMware Cloud Director Availability is ready for replications. For more information, see the *VMware Cloud Director Availability User Guide* document.