Installing and Configuring vCloud Availability On-Premises

11 APR 2019
VMware vCloud Availability 3.0
You can find the most up-to-date technical documentation on the VMware website at:
https://docs.vmware.com/
If you have comments about this documentation, submit your feedback to
docfeedback@vmware.com
# Contents

1. About Installing and Configuring VMware vCloud Availability On-Premises  
   | Updated Information  | 5 |

2. Overview of VMware vCloud Availability  
   | On-Premises Deployment Architecture  | 6 |

3. Installing and Configuring vCloud Availability  
   | vCloud Availability On-Premises Requirements  | 10 |
   | Deploy an On-Premises vCloud Availability Appliance by Using the vSphere Client  | 12 |
   | Deploy VMware vCloud Availability On-Premises Using the OVF Tool  | 13 |
   | Configure the On-Premises vCloud Availability Appliance  | 15 |
   | Configure Local Placement  | 16 |

4. Managing vCloud Availability On-Premises  
   | Unpair On-Premises and Cloud Site  | 18 |
   | Unregister the vCloud Availability vSphere Client Plug-In  | 19 |
About Installing and Configuring VMware vCloud Availability On-Premises

The Installing and Configuring VMware vCloud Availability On-Premises document provides information on how to install, configure, and administer the VMware vCloud Availability solution.

Intended Audience

This information is intended for VMware Cloud Provider Program service providers and experienced system administrators who are familiar with virtual machine technology and data center operations including but not limited to the following areas:

- VMware vSphere®
- VMware vCloud Director®
- VMware vCloud® Availability
- Secure Shell (SSH)
- Bash Scripting

VMware Technical Publications Glossary

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

This *Installing and Configuring VMware vCloud Availability On-Premises* document is updated with each release of the product or when necessary.

This table provides the update history of the *Installing and Configuring VMware vCloud Availability On-Premises* document.

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 MAY 2019</td>
<td>Added the following topic:</td>
</tr>
<tr>
<td></td>
<td>- Unregister the vCloud Availability vSphere Client Plug-In</td>
</tr>
<tr>
<td></td>
<td>Updated the information in the following topics:</td>
</tr>
<tr>
<td></td>
<td>- vCloud Availability On-Premises Requirements</td>
</tr>
<tr>
<td></td>
<td>- Unpair On-Premises and Cloud Site</td>
</tr>
<tr>
<td>18 APR 2019</td>
<td>Updated the information in the following topics:</td>
</tr>
<tr>
<td></td>
<td>- Deploy an On-Premises vCloud Availability Appliance by Using the vSphere Client</td>
</tr>
<tr>
<td></td>
<td>- Configure the On-Premises vCloud Availability Appliance</td>
</tr>
<tr>
<td></td>
<td>- Configure Local Placement</td>
</tr>
<tr>
<td></td>
<td>- Unpair On-Premises and Cloud Site</td>
</tr>
<tr>
<td>11 APR 2019</td>
<td>Initial release.</td>
</tr>
</tbody>
</table>
Overview of VMware vCloud Availability

The VMware vCloud Availability solution provides replication and failover capabilities for vCloud Director and vCenter Server workloads at both VM and vApp level.

The service operates through a VMware Cloud Provider Program, and depending on the installation type, it provides recovery for clouds and on-premises environments. The VMware vCloud Availability provides:

- Replication management and monitoring of replications from an on-premises site to a cloud site and back.
- Failback recovered in the cloud workloads to the on-premises site.
- Migration of protected VMs in the cloud site back to the on-premises appliance.
- Self-service protection and failover workflows per virtual machine (VM).
- Single installation package as a Photon-based virtual appliance.
- The capability of each deployment to serve as both source and recovery vCloud Director instance (site). There are no dedicated source and destination sites.
- Symmetrical replication flow that can be started from either the source or the recovery vCloud Director site.
- Replication and recovery of vApps and VMs between vCloud Director sites.
- Using a single-site vCloud Availability installation, you can migrate vApps and VMs between Virtual Data Centers that belong to a single vCloud Director Organization.
- Built-in Secure Tunneling requires no incoming open ports on the on-premises site.
- Integration with existing vSphere environments.
- Multi-tenant support.
- Built-in encryption or encryption and compression of replication traffic.
- Support for multiple vCenter Server and ESXi versions.

On-Premises Deployment Architecture

The architecture of the VMware vCloud Availability solution shows replication operations between cloud and on-premises environments.
Each organization admin within a tenant vCenter Server environment can support the recovery for on-premises vSphere workloads and failover the recovered VMs from the cloud back to the on-premises site. The TCP connection is always initiated from the on-premises site to the cloud site.

**Test and Development Deployment**

For test and development purposes service providers employ the simplest architecture where all vCloud Availability services are deployed and configured on a single appliance in the cloud site. In the on-premises site, vSphere administrators deploy and configure one or more on-premises vCloud Availability appliances. A single appliance employs the vCloud Availability Replicator and the vCloud Availability Tunnel services.
The components with no color in the following diagrams represent existing components in the vCloud Director and on-prem environments. The remaining colored cells represent vCloud Availability services that you deploy during vCloud Availability appliance installation and configuration procedures.
### Production Deployment

For production deployments, service providers deploy and configure a vCloud Availability Tunnel, an appliance hosting the vCloud Availability vApp Replication Manager, and vCloud Availability Replication Manager services, and a dedicated vCloud Availability Replicator appliance. In the on-premises site, vSphere administrators deploy and configure one or more on-premises vCloud Availability appliances. A single appliance employs a vCloud Availability Replicator and a vCloud Availability Tunnel.

![Diagram of vCloud Availability architecture]
Installing and Configuring vCloud Availability

After you deploy and set up a service provider cloud site, you install and configure the on-premises vCloud Availability appliance to enable VM protection from on-premises vCenter Server environment to the cloud and reverse.

This chapter includes the following topics:

- vCloud Availability On-Premises Requirements
- Deploy an On-Premises vCloud Availability Appliance by Using the vSphere Client
- Deploy VMware vCloud Availability On-Premises Using the OVF Tool
- Configure the On-Premises vCloud Availability Appliance
- Configure Local Placement

vCloud Availability On-Premises Requirements

Before you start deploying and configuring the vCloud Availability appliance, verify that your on-premises environment complies with the following requirements.

Deployment Requirements

- If your ESXi hosts have more than one vmkernel network interface (vmk), make sure that vSphere Replication NFC Traffic is enabled. This setting is required for routing the replication traffic.

An ESXi host may have a dedicated vmk for replication traffic in its own broadcast domain. If vSphere Replication NFC Traffic is enabled on the dedicated vmk interface, the vCloud Availability Replicator must be connected to the same broadcast domain. The vSphere Replication NFC Traffic cannot be routed if it is not in the default TCP stack.

If vSphere Replication NFC Traffic is not enabled, you might get timeout errors during the replication setup or reconfiguration. For more information about enabling vSphere Replication NFC Traffic, see Set Up a VMkernel Adapter for vSphere Replication Traffic on a Target Host in the VMware vSphere Replication Administration Guide.

- The VMware vCloud Availability services perform a host name certificate verification. Therefore, it is expected that the CommonName or at least one of the entries in the Subject Alternative Name of the vCloud Director certificate matches the vCloud Director address (FQDN or IP) that is used during vCloud Director registration.
Firewall Port Component Configurations

The following diagram shows the data flow between network ports and the ports in the on-premises site.

The following table shows the firewall rules required in the on-premises site for the vCloud Availability appliance to communicate with the rest of the infrastructure. If you add more than one vCloud Availability Replicator in the on-premises site, the firewall rules per vCloud Availability Replicator remain as initially configured.
### Table 3-1. Firewall Rules for On-Premises Communication

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
<th>Port</th>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCloud Availability Replicator</td>
<td>ESXi Hosts</td>
<td>90</td>
<td>TCP</td>
<td>Used by the vCloud Availability Replicator service for replication traffic to the destination ESXi hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>TCP</td>
<td>Used by the vCloud Availability Replicator service for replication traffic to the destination ESXi hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80</td>
<td>TCP</td>
<td>Used for single sign-on and Lookup Service communication when vSphere 5.5 or later is used in the respective site.</td>
</tr>
<tr>
<td>vCloud Availability Replicator</td>
<td>VMware Platform Services Controller®</td>
<td>44</td>
<td>TCP</td>
<td>Used by the local vCloud Availability vApp Replication Manager service or the vCloud Availability Replicator service for communication with the local vCenter Server.</td>
</tr>
<tr>
<td>vCloud Availability Replicator</td>
<td>vCenter Server</td>
<td>44</td>
<td>TCP</td>
<td>Used by the local vCloud Availability vApp Replication Manager service or the vCloud Availability Replicator service for communication with the local vCenter Server.</td>
</tr>
<tr>
<td>vCenter Server</td>
<td>vCloud Availability Replicator</td>
<td>80</td>
<td>TCP</td>
<td>Enables vCloud Availability plug-in in vSphere Client to communicate with vCloud Availability Replicator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43,</td>
<td>TCP</td>
<td>Enables vCloud Availability plug-in in vSphere Client to communicate with vCloud Availability Replicator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80</td>
<td>TCP</td>
<td>Enables vCloud Availability plug-in in vSphere Client to communicate with vCloud Availability Replicator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48</td>
<td>TCP</td>
<td>Enables vCloud Availability plug-in in vSphere Client to communicate with vCloud Availability Replicator.</td>
</tr>
<tr>
<td>ESXi Hosts</td>
<td>vCloud Availability Replicator</td>
<td>31</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>03</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>04</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5,</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>04</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>TCP</td>
<td>Used by the ESXi hosts for replication traffic to the destination vCloud Availability Replicator service.</td>
</tr>
</tbody>
</table>

### Deploy an On-Premises vCloud Availability Appliance by Using the vSphere Client

You install the on-premises vCloud Availability appliance by using a single OVA file.

**Prerequisites**

- If your vSphere version is earlier than 6.5, install the Client Integration Plug-in to be able to use the Deploy OVF Template option in the vSphere Web Client.

**Procedure**

1. Log in to your vCenter Server by using the vSphere Client.
2 Right-click the target location where you want to deploy the vCloud Availability appliance.
   As a target location you can use a data center, folder, cluster, resource pool, or host.

3 From the drop-down menu, select **Deploy OVF Template**.
   The **Deploy OVF Template** wizard opens.

4 In the **Select an OVF template** page, browse to the
   `VMware-vCloud-Availability-OnPrem-
   release_number--xxx--build_number_0VF10.ova` file location and click **Next**.

5 Enter a name for the on-premises appliance.

6 Select a data center, a data center folder that contains the host, or a cluster on which you want to
   deploy the appliance, and click **Next**.

7 Review the OVF template settings and click **Next**.

8 Accept the terms in the license agreement and click **Next**.

9 Select a datastore as a destination on which you want the appliance to run, and click **Next**.

10 From the drop-down menu, select the virtual disk format and the storage policy for the appliance.

11 (Optional) Configure the network settings and click **Next**.

12 Customize the deployment properties of the vCloud Availability appliance and click **Next**.
   a (Optional) Select the **Enable SSH** check box.
   b In the **NTP Server** section, enter an NTP server address for the appliance.
      
      **Important** Use the same NTP server across vCenter Server, ESXi, vCloud Director, the
      Platform Services Controller, and the vCloud Availability appliance.
   c Enter and confirm the password for the **root** user of the appliance.
      You change the **root** user password when you perform the initial configuration of the
      vCloud Availability appliance.

13 To complete the wizard and start the OVA deployment, click **Finish**.

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.

**Deploy VMware vCloud Availability On-Premises Using the OVF Tool**

To deploy on-premises the VMware vCloud Availability service, define deployment parameters in your
OVF Tool user session, and run the deployment script.

You install a vCloud Availability appliance by using a single installation OVA package for **on-prem**
deployment.
Prerequisites

- Install and configure the OVF Tool.

Procedure

1. Open an SSH session to the server where the OVF Tool is installed and configured.
2. Define deployment parameters in the OVF Tool console by running the following commands.

   ```bash
   # VMNAME="Name-to-be-Assigned-to-the-VM"
   # VSPHERE_DATASTORE="vSphere-datastore"
   # VSPHERE_NETWORK="VM-Network"
   # OVA="local_client_path/vCloud-Availability-OnPrem-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 vCloud Availability appliance.

   The following example command deploys a vCloud Availability appliance on-premises and sets a static IP address.

   ```bash
   # echo $VMNAME
   # ./ovftool/ovftool --name="${VMNAME}" --datastore="${VSPHERE_DATASTORE}" --acceptAllEulas
   --powerOn --X:enableHiddenProperties --X:injectOvfEnv --X:waitForIp
   --ipAllocationPolicy=fixedPolicy --machineOutput --noSSLSVerify
   --overwrite --powerOffTarget "--net:VM Network=${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-server-ip-address'
   --prop:vami.DNS.VMware_vCloud_Availability='Your-DNS-Server-Address'
   --prop:vami.domain.VMware_vCloud_Availability='Your-Domain-Name'
   --prop:vami.gateway.VMware_vCloud_Availability='Your-Gateway-IP-Address'
   --prop:vami.ip0.VMware_vCloud_Availability='IP-to-be-Assigned-to-the-Appliance'
   --prop:vami.netmask0.VMware_vCloud_Availability='Your-Netmask-Address'
   --prop:vami.searchpath.VMware_vCloud_Availability='Your-Search-Path-Address'
   "${OVA}" "vi://${VSPHERE_USER}:${VSPHERE_USER_PASSWORD}@${VSPHERE_ADDRESS}${VSPHERE_LOCATOR}"
   
   The system prints the IP address of the vCloud Availability appliance.
Configure the On-Premises vCloud Availability Appliance

To configure the on-premises appliance, you change the initial root user password that you set during the OVA deployment, and register the on-premises appliance with a vCenter Server Lookup service.

Prerequisites
- Install and power on the on-premises vCloud Availability appliance.
- Verify that the cloud provider enabled the replication policy for your organization.
- Obtain the vCloud Availability Public API endpoint address from the cloud provider.

Procedure
1. In a Web browser, navigate to https://On-Prem-Appliance-IP-address/ui/admin.
2. Log in by using the root user password that you set during the OVA deployment.
   The Appliance Password window opens.
3. Change the initial root user password.
   a. Enter the initial root user password set during the OVA deployment.
   b. Enter and confirm a new password.
      Create a secured password with a minimum of eight characters and containing at least one of each of the following characters:
      - Lowercase: a b c
      - Uppercase: A B C
      - Numeric: 1 2 3
      - Special: & # %
   c. Click Apply.
      The Getting Started tab displays.
4. Click Run initial setup wizard.
   The Initial Setup wizard opens.
5. On the Site Details page, enter a Site Name, optionally enter a Site Description, and click Next.
6. On the Lookup service details page, enter lookup-service-IP-address, single sign-on user name and password, and click Next.
7. Accept the SSL certificate of the vCenter Server Lookup service and click Next.
On the Cloud Details page, pair the on-premises vCloud Availability appliance and the cloud organization.

a. Enter the vCloud Availability Public API endpoint address.
b. Enter the vCloud Director user@org user name and password.
c. (Optional) Select Allow Access from Cloud.

By selecting this option you allow the cloud provider and the organization administrators to execute the following operations from the vCloud Availability Portal without authenticating to the on-premises site.

- Discover on-premises workloads and replicate them to the cloud.
- Reverse existing replications to the on-premises site.
- Replicate cloud workloads to the on-premises site.

By leaving this option deselected, only users authenticated to the on-premises vCloud Availability Portal can configure new replications and existing replications cannot be reversed from the vCloud Availability Portal.

Accept the SSL certificate of the vCloud Availability Public API endpoint and click Next.

You can optionally join the VMware Customer Experience Improvement Program, confirm your choice, and click Next.

On the Ready to complete page, optionally select to configure local placement and complete the initial setup wizard.

- You can configure data center to cloud replications, leave Configure local placement now deselected, and click Finish.
- To enable cloud to data center replications, select Configure local placement now and click Finish.

Note For more information, see Configure Local Placement.

The on-premises vCloud Availability appliance is configured and after you log in to the vCloud Availability vApp Replication Manager appliance and navigate to Sites, you can see both cloud and on-premises sites available.

What to do next

If you skipped configuring local placement in the initial wizard, you can do that next. Or you can unpair the on-premises from the cloud vCloud Availability appliance, see Unpair On-Premises and Cloud Site.

Configure Local Placement

To enable replications between cloud and on-premises sites, you must specify local placement settings.

Follow this procedure if you skipped Configure local placement now during the initial setup wizard of the on-premises vCloud Availability appliance.
Procedure

1. In a Web browser, navigate to https://On-Prem-Appliance-IP-address/ui/admin.
2. Log in by using the root user password that you changed during the initial setup of the appliance.
3. In the left pane, click Configuration.
4. On the Site details page, next to Placement newly recovered VMs on this site click Configure.
   The Configure Placement wizard opens.
   
   **Note**  For the next two steps, ensure that you select the leaf object from the navigation tree.

5. Select a location for storing the recovered virtual machines.
6. Select a compute resource for the recovered virtual machines at the destination site.
7. Choose which network the virtual machines connect to after their failover.
8. Select a datastore for the virtual machines disk files.
9. Review the settings and to complete the configuration click Finish.
   To view the placement setup summary, expand Placement.

What to do next

You can start creating and managing VM replications from the on-premises site to the cloud and reverse by accessing one of the following interfaces.

- Log in to your vCenter Server by using vSphere Client, authenticate with the Single Sign-On administrator credentials and access the on-premises vCloud Availability plug-in. For more information, see Accessing the vCloud Availability Plug-In in the vCloud Availability User's Guide documentation.
- Navigate to the cloud portal vCloud Availability Public API endpoint and log in by using the organization administrator credentials.
Managing vCloud Availability
On-Premises

After installing and configuring the on-premises vCloud Availability appliance, you can unpair the cloud sites from the on-premises site and unregister the on-premises vCloud Availability appliance from vCenter Server.

This chapter includes the following topics:

- Unpair On-Premises and Cloud Site
- Unregister the vCloud Availability vSphere Client Plug-In

Unpair On-Premises and Cloud Site

To remove the established trust between the on-premises site and the cloud site, you unpair the cloud site from the on-premises vCloud Availability appliance.

Prerequisites

- Delete all configured replications between the on-premises site and the cloud site.

Procedure

1. Log in to your on-premises appliance by using the management interface.
   a. In a Web browser, navigate to `https://On-Prem-Appliance-IP-address/ui/admin`.
   b. Log in by using the following credentials.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>User name</td>
<td>root</td>
</tr>
<tr>
<td>Password</td>
<td>root_user_password</td>
</tr>
</tbody>
</table>

2. In the left pane, click Configuration.

3. In the Pairing section, click Unpair.

4. In the Unpair from cloud site dialog box, enter your organization administrator credentials and click Apply.

   The cloud site is removed from the on-premises appliance.

The pairing between the on-premises site and the cloud site is removed.
What to do next

You can remove the established connection between the on-premises appliance and vCenter Server in **Unregister the vCloud Availability vSphere Client Plug-In**, or you can pair the on-premises appliance and the cloud vCloud Availability Replicator again, from the on-premises site.

### Unregister the vCloud Availability vSphere Client Plug-In

To remove the established connection between the on-premises vCloud Availability appliance and vCenter Server, unregister the vCloud Availability vSphere Client Plug-In from the vCenter Server Lookup service, remove the installation files, and restart the vSphere Client.

**Procedure**

1. **Unregister the vCloud Availability vSphere Client Plug-In from the vCenter Server Lookup service by using a Secure Shell (SSH) client.**
   
   a. Open an SSH connection to the vCenter Server instance and log in as the **root** user.
   
   b. List vCloud Availability vSphere Client Plug-In registrations in the vCenter Server Lookup service and make a note of the listed **Service Id** value to use in the next command.

      ```
      ```

   c. Unregister the vCloud Availability vSphere Client Plug-In from the vCenter Server Lookup service.

      ```
      /usr/lib/vmidentity/tools/scripts/lstool.py unregister --url http://localhost:7080/lookupservice/sdk --user 'SSO user name' --password 'SSO password' --id <Service Id>
      ```

   Provide the SSO **credentials** and use the **Service Id** value obtained in the previous command.

   d. Verify that the plugin is successfully unregistered and ensure that no result is displayed.

      ```
      ```
After you unregister the vCloud Availability vSphere Client Plug-In, remove the installation files and restart the vSphere Client.

a Remove the vCloud Availability vSphere Client Plug-In installation folders and files.

```
rm -rf /etc/vmware/vsphere-ui/cm-service-packages/com.vmware.cis.vsphereclient.plugin/com.vmware.h4.vsphere.client-3.0.0 /etc/vmware/vsphere-ui/cm-service-packages/com.vmware.cis.vsphereclient.plugin/com.vmware.h4.ngc.client-3.0.0
```

b Restart the vSphere Client.

- If you use vCenter Server 6.7, run the following command.

```
vmon-cli -r vsphere-ui
```

- If you use vCenter Server 6.5, run the following commands.

```
  service-control --stop vsphere-ui
  service-control --start vsphere-ui
```

The vCloud Availability vSphere Client Plug-In is unregistered from the vCenter Server Lookup service and the vCenter Server Lookup service is unregistered from the on-premises appliance configuration.

**What to do next**

You can use the on-premises vCloud Availability appliance only after you rerun the initial appliance configuration. If the on-premises site is still paired with a cloud site, use the same configuration values as for the initial configuration before the first pairing.