

vCloud Director Extender User's Guide

vCloud Director Extender 1.0



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vCloud Director Extender 1.0 User's Guide

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The vCloud Director Extender User's Guide provides information about installing, configuring, and managing vCloud Director Extender.

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 NSX®
- Virtual Infrastructure
- Secure Shell (SSH)
- Bash

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>.

Introduction to vCloud Director Extender

VMware vCloud Director Extender creates a hybrid cloud environment between an end-user on-premise data center, and a multi-tenant vCloud Director environment.

With vCloud Director Extender, you can connect an on-premise vCenter Server to a multi-tenant cloud environment managed by vCloud Director. You use vCloud Director Extender to securely and seamlessly migrate on-premise virtual machines, and extend your on-premise virtual network to the cloud.

During the vCloud Director Extender deployment, you install and configure system components in both the tenant and service provider environments. Once the service provider environment is configured, endpoint information must be provided to the tenant administrator.

vCloud Director Extender DC Extension provides a Layer 2 (L2) network stretching from the on-premise networks to the cloud networks.

With Warm Migration and Cutover, you migrate a powered on virtual machines to the cloud with a minimal downtime.

With Cold Migration, you migrate powered off virtual machines to the cloud with a minimal downtime.

vCloud Director Extender provides a simple scheduling capability for both types of migration and for Cutover operations.

You can perform multiple migrations of the same type by creating a Warm Migration or Cold Migration job.

Deploying vCloud Director Extender

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The vCloud Director Extender deployment consists of installing and configuring the Service Provider environment (vCloud Director) and the Tenant environment (vCenter Server).

vCloud Director Extender is delivered as a single OVA file. You deploy all vCloud Director Extender components in both service provider and tenant environments.

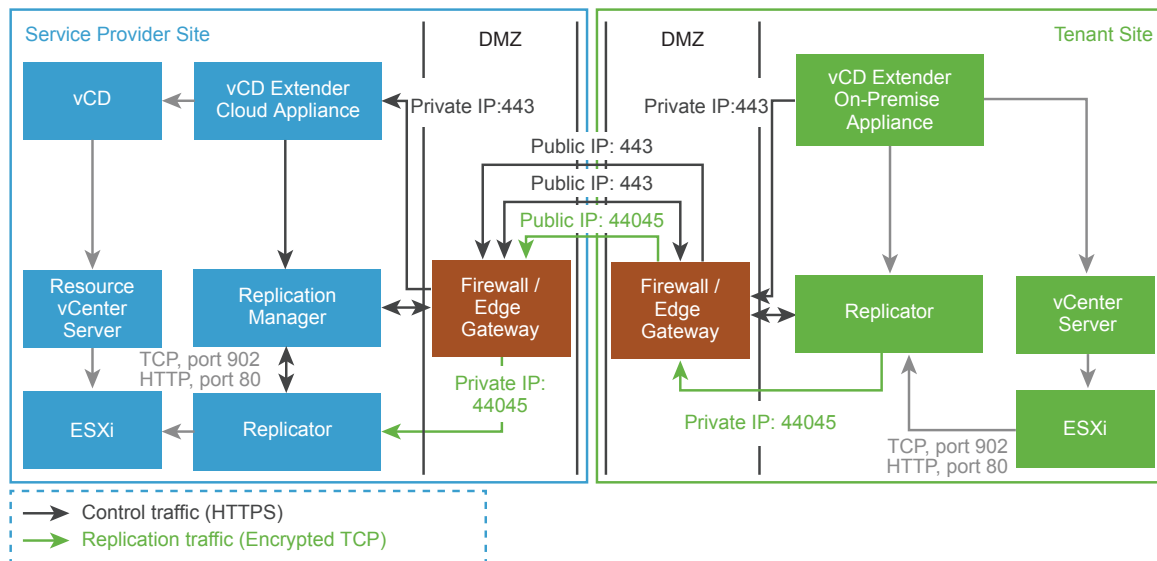
For a first-time configuration, the vCloud Director Extender Setup wizard takes you through the installation and configuration.

Deployment Architecture

The following diagram presents the data flow and network ports within and between vCloud Director Extender service provider and tenant environments.

As the deployment process is different for service providers and tenants, the firewall rules and network address translation must be configured to allow the traffic from and to the tenant and the service provider environment.

Various network ports are used by different components in both service provider and tenant components.



Service Provider Deployment

The cloud deployment consists of installing a vCloud Director Extender Cloud Appliance, a Replication Manager, and a Replicator as virtual appliances, and configuring these appliances by using the Cloud Service Setup UI. You access the Cloud Service Setup UI at https://vCD_Extender_Cloud_Appliance_IP/ui/mgmt/.

After the service provider environment is fully set, you must share the endpoint details with a tenant administrator. vCloud Director Extender components in the service provider site must be set and running, before the tenant administrator can proceed with installing and configuring the vCloud Director Extender components in the on-premise environment.

Service Provider Deployment Behind a Firewall

If you are deploying vCloud Director Extender behind a firewall in the service provider environment, you must provide two public IP addresses - one for the vCloud Director Extender Cloud Appliance and one for the Replication Manager.

- You configure an NAT rule, to allow traffic from the public IP address of the vCloud Director Extender Cloud Appliance *SP-Public-IP-1:443* to the private address of the vCloud Director Extender Cloud Appliance *vCD-Extender-Cloud-Appliance-IP:443*.
- You configure an NAT rule, to allow traffic from the public IP address of the Replication Manager *SP-Public-IP-2:443* to the private IP address of the Replication Manager *Replication-Manager-IP:443*
- You configure an NAT rule, to allow traffic from the public IP address of the Replicator *SP-Public-IP-2:44045* to the private IP address of the Replicator *Replicator-IP:44045*.

Tenant Deployment

The tenant, on-premise deployment consists of installing a vCloud Director Extender On-Premise Appliance and a Replicator as virtual appliances, and configuring these appliances by using the OnPrem Setup UI. You access the OnPrem Setup UI at https://vCD_Extender_OnPrem_Appliance_IP/ui/mgmt/.

Tenant Deployment Behind a Firewall

If you are deploying vCloud Director Extender behind a firewall in the tenant environment, you must provide one public IP address for the vCloud Director Extender On-Premise Appliance.

You configure an NAT rule, to allow traffic from the public IP address of the tenant Replicator *Public-Tenant-IP:443* to the private IP address of the tenant Replicator *Tenant-Replicator-IP:8043*.

This chapter includes the following topics:

- [vCloud Director Extender Components](#)
- [Service Provider Requirements](#)

- [Tenant Requirements](#)
- [\(Optional\) Configuring a Proxy Server](#)
- [Service Provider Installation and Configuration](#)
- [Tenant Installation and Configuration](#)

vCloud Director Extender Components

vCloud Director Extender includes multiple components that you must install and configure in a specific order. You use the management interface of each of the vCloud Director Extender appliances - Cloud Service Setup UI at https://vCD_Extender_Cloud_Appliance_IP/ui/mgmt/ and OnPrem Setup UI at https://vCD_Extender_OnPrem_Appliance_IP/ui/mgmt/ - to install and configure the vCloud Director Extender software.

You use the vCloud Director Extender OVA file to deploy the vCloud Director Extender Cloud Appliance and the vCloud Director Extender On-Premise Appliance. You use the Cloud Service Setup UI and the OnPrem Setup UI to install and configure the remaining vCloud Director Extender components.

Table 2-1. Service Provider Components

Component	Description
vCloud Director Extender Cloud Appliance that hosts the CX Cloud Service	You deploy the vCloud Director Extender Cloud Appliance in the service provider cloud environment by using the vCloud Director Extender OVA. The vCloud Director Extender Cloud Appliance hosts the CX Cloud Service and the Cloud Service Setup UI that you use for configuring the vCloud Director Extender cloud components.
Replication Manager	You deploy the Replication Manager in the service provider cloud environment. Replication Manager manages the Replicator and is responsible for configuring the Replicator hosts and staging the replication workflow.
Replicator	Replicator, also known as the Replicator, is a replication and recovery engine used for the virtual machines migration. Runs both on-premise and on a cloud provider side and takes care of the data transfer and monitoring.
NSX (NSX Manager and NSX Edge service gateways)	NSX is the network virtualization platform used in the service provider environment. For more information, see <i>NSX Installation Guide</i> .

Note During vCloud Director Extender configuration operations, the Cloud Service Setup UI deploys a dedicated VM for each component. A vCloud Director Extender installation consists of a minimum of four VMs, including at least one Replicator host per resource vCenter Server. Depending on the load, you might add additional Replicator instances for a resource vCenter Server. For more information, see [Add a New Replicator](#).

Table 2-2. Tenant Components

Component	Description
vCloud Director Extender On-Premise Appliance	The vCloud Director Extender On-Premise Appliance registers as the vCloud Director Extender plug-in to the on-premise vSphere Web Client.
Replicator	The Replicator is the replication and recovery engine used for VM migration. The Replicator runs both on-premise and on a cloud provider side and takes care of the data transfer and monitoring.
NSX (NSX Manager and NSX Edge service gateways)	<p>NSX is an optional component for the tenant environment. If NSX is deployed in the on-premise environment, you can extend both on-premise VLAN and VxLAN networks to a cloud VxLAN network.</p> <p>If NSX is not deployed in the tenant environment, vCloud Director Extender deploys an <i>NSX for vSphere Standalone Edge - Client 6.3.0</i> that is included in the vCloud Director Extender OVA file. For such environments, you can only extend a VLAN on-premise network to VxLAN network in the cloud.</p>

Service Provider Requirements

Before you install vCloud Director Extender, verify that you fulfill the product release, licensing, network, and access requirements.

Product Release and Licensing Requirements

Products	Requirements
vCloud Director	For information about the interoperability between vCloud Director and vCloud Director Extender, see VMware Product Interoperability Matrices .
NSX	The interoperability between NSX and vCloud Director Extender depends on the interoperability between vCloud Director and NSX. vCloud Director Extender supports all NSX versions that are interoperable with a supported vCloud Director version. For more information about the interoperability between NSX, vCloud Director, and vCloud Director Extender, see VMware Product Interoperability Matrices .
vSphere	<ul style="list-style-type: none"> ■ For information about the interoperability between vCenter Server and vCloud Director Extender, see VMware Product Interoperability Matrices. ■ VMware vSphere Essentials Plus Kit or above. ■ To download the vCloud Director Extender OVA file, you must have a valid vSphere license.

Network and Access Requirements

Category	Requirements
Network	<ul style="list-style-type: none"> The network bandwidth between on-premises and vCloud Director VDC must be 100 Mbps or higher. Assign static IP addresses to the virtual machines hosting vCloud Director Extender components and services. vCloud Director Extender does not run any preliminary checks to verify the validity of the static IP configurations that you provide during the configuration. <hr/> <p>Important vCloud Director Extender does not support DHCP network configuration.</p> <hr/> <ul style="list-style-type: none"> The CX Cloud Service appliance must be configured with a DNS server IP. Based on the source and destination networks, the number of edges deployed can vary. A best practice for configuring DC Extension in the service provider environment is to use an XL-Edge with 8 GB RAM, 6 CPUs, and 500 MB disk space.
User Access	<ul style="list-style-type: none"> For vCloud Director, a <i>cloud administrator</i> user with specific permissions is required. For more information, see Set Up Authorization for Organization Administrator User. For the Resource vCenter Server and Management vCenter Server instances, <i>vi-admin</i> permissions are required.

Tenant Requirements

Before you install vCloud Director Extender, verify that you fulfill the product release, licensing, network, and access requirements.

Product Release and Licensing Requirements

Products	Requirements
vSphere	<ul style="list-style-type: none"> For information about the interoperability between vCenter Server and vCloud Director Extender, see VMware Product Interoperability Matrices. VMware vSphere Essentials Plus Kit or above. To download the vCloud Director Extender OVA file, you must have a valid vSphere license.

Network and Access Requirements

Category	Requirements
Network	<ul style="list-style-type: none"> The network bandwidth between on-premises and vCloud Director VDC must be 100 Mbps or higher. Assign static IP addresses to the virtual machines hosting vCloud Director Extender components and services. vCloud Director Extender does not run any preliminary checks to verify the validity of the static IP configurations that you provide during the configuration. <hr/> <p>Important vCloud Director Extender does not support DHCP network configuration.</p> <hr/> <ul style="list-style-type: none"> Based on the source and destination networks you select, the number of edge instances can vary. Each X-Large edge requires 8 GB RAM, 6 CPUs, and 500 MB disk space.
User Access	<ul style="list-style-type: none"> A user account that has organization administrator rights for the target vCloud Director. For more information, see the <i>vCloud Director User's Guide</i>. For the source vCenter Server, <i>vi-admin</i> permissions are required.

(Optional) Configuring a Proxy Server

You can perform migrations through a proxy server when the vCloud Director Extender components do not have a direct connection to the Internet.

Cloud Provider Proxy Configuration

The proxy server configuration requires you to provide a public IP endpoint and configure rules to route the network traffic to vCloud Director Extender components.

Prerequisites for configuring the correct communication between the vCloud Director Extender components behind a proxy server:

- The vCloud Director Extender Cloud Appliance must be accessible from the tenant site.
- The tenant Replicator instances must be accessible from the cloud Replicator instances.
- The tenant Replicator instances must be accessible from the Replication Manager that is deployed in the cloud.
- The tenant Replicator instances can access the tenant ESXi hosts.
- The cloud Replicator instances can access the cloud ESXi hosts.
- The cloud Replication Manager must be able to access the tenant Replicator instances.

If the cloud Replicator instances are deployed behind the proxy server and are not accessible from the Replication Manager, you must configure the necessary firewall rules to open port 443 on all Replicator instances. For example, traffic must be allowed from *vCD-Extender-On-Premise-Appliance-IP:443* to *Proxy-Server-IP-Address:443*.

The Replication Manager must be accessible for all Replicator instances and the vCloud Director Extender On-Premise Appliance in the tenant environment. You must open port 8044 on the Replication Manager. For example, traffic must be allowed from *Replication-Manager-IP:8044* to *Proxy-Server-IP-Address2:8044*.

Tenant Proxy Configuration

The tenant Replicator instances must be accessible from the proxy server. Tenant proxy configuration, requires you to expose a public IP with port 443, that is mapped to the tenant Replicator private IP. For example, traffic must be allowed from *Tenant-Replicator-IP:443* to *Proxy-Server-IP-Address*.

Endpoint Proxy URL

While configuring the Replicator and Replication Manager instances, you optionally enter an Endpoint URL. If the Replicator or the Replication Manager is deployed behind the proxy server, you must enter the appropriate public IP address and port in the following format: *Public-IP-Address:Port-Number*. The default Replication Manager port is 8044, but you can configure the Replication Manager to use a custom port, as long as it is accessible through the proxy. For more information, see [Service Provider Configuration](#) and [Tenant Configuration](#).

Data Path

Make sure that the ESXi hosts in both tenant and provider environments are accessible on ports 902, 80, and 443. Replicator instances use ESXi port 902 for data path. Ports 80 and 443 are used for the management path.

Service Provider Installation and Configuration

To complete the service provider installation and configuration, you deploy a vCloud Director Extender Cloud Appliance from the vCloud Director Extender OVA file and use the Cloud Service Setup UI Wizard for the remaining installation, and configuration operations.

Install vCloud Director Extender Cloud Appliance

The vCloud Director Extender Cloud Appliance hosts the Cloud Service Setup UI that you use to install and configure vCloud Director Extender components in the service provider site.

Prerequisites

Download the vCloud Director Extender OVA file. You deploy the vCloud Director Extender Cloud Appliance and the vCloud Director Extender On-Premise Appliance by using the same vCloud Director Extender OVA file.

Procedure

- 1 Log in to the vSphere Web Client.
- 2 Right-click a target data center or folder and select **Deploy OVF Template**.
The deployment wizard opens.
- 3 Browse to the OVA file and click **Next**.
- 4 Enter a name for the appliance, select a deployment location, and click **Next**.
- 5 In the **Select a resource** page, select the target host, or cluster for the appliance, and click **Next**.
- 6 Verify the template details.
- 7 Read and accept the license agreements.
- 8 Select the virtual disk format and a target datastore location.
- 9 Select a network for the appliance.

- 10 In the Customize template page, select the CX Cloud Service deployment type, enable SSH, and enter a password for the system *root* user.

Note Set a strong password for the root user. If you do not fulfill all security requirements, the appliance deployment fails.

- a (Optional) Set Networking Properties.

Note You must assign a static IP to the virtual machine. DHCP deployment is not supported for production environments.

- b Click **Next**

- 11 Review the configuration information and click **Next**.

What to do next

After the vCloud Director Extender Cloud Appliance is deployed, power it on.

Note the IP address of the vCloud Director Extender Cloud Appliance, as you need it to access the Cloud Service Setup UI

Service Provider Configuration

You install and configure the remaining service provider components by using the Cloud Service Setup UI. For a first-time installation, use the Setup wizard.

Prerequisites

Verify that the vCloud Director Extender Cloud Appliance is powered on.

Procedure

- 1 In a Web browser, open the Cloud Service Setup UI at https://vCD_Extender_Cloud_Appliance_IP/ui/mgmt/.

- 2 Log in as *administrator*.

Use the password that you set during the vCloud Director Extender Cloud Appliance installation.

- 3 Click **Setup Wizard**.

Note Run the Setup wizard for your first-time configuration to install Replicator and Replication Manager hosts.

4 Follow the wizard prompts.

Setup	Description
Management vCenter Server	<p>Register the vCloud Director Extender Cloud Appliance to the Management vCenter Server.</p> <ul style="list-style-type: none"> ■ Enter a Management vCenter Server Name. ■ Enter the IP address of the Management vCenter Server. ■ Enter the Lookup Service URL <hr/> <p>Important If you are using an external Platform Services Controller (PSC), enter the address to the external Lookup service in the suggested syntax. If you are using an embedded PSC, you can skip this step.</p> <hr/> <ul style="list-style-type: none"> ■ Enter the vCenter Server administrator credentials and click Next. <hr/> <p>Note A pop-up window containing information about certificates might display. To continue, click Trust Certificates.</p>
vCloud Director	<p>Register the vCloud Director Extender Cloud Appliance to vCloud Director.</p> <ul style="list-style-type: none"> ■ Enter a vCloud Director Name. ■ Enter a vCloud Director IP address or fully qualified domain name. ■ Enter the vCloud Director system administrator credentials and click Next.
Resource vCenter Server	<p>Register the vCloud Director Extender Cloud Appliance to a Resource vCenter Server. If there is no separation between resource and management vCenter Server instances in your environment, enter the same details you provided for Management vCenter Server.</p> <ul style="list-style-type: none"> ■ To register a resource vCenter Server instance, click Update and enter administrator credentials. <hr/> <p>Important If you are using an external Platform Services Controller, enter the address to the external Lookup service in the suggested syntax. If you are using an embedded PSC, you can skip this step.</p>
Replication Manager	<p>Create a Replication Manager VM and register the Replication Manager to the Management vCenter Server.</p> <p>Enter the following details:</p> <ul style="list-style-type: none"> ■ a name for the Replication Manager ■ target Folder/Datacenter Name ■ target Host or Cluster Name ■ target Datastore Name ■ target Network Name ■ Do not select the DHCP check box and click Next. ■ After the Replication Manager is created, click Next.
Activate Replication Manager	<p>Prepare the Replication Manager for operational use.</p> <ul style="list-style-type: none"> ■ To activate the Replication Manager, set a password for the <i>root</i> user, and click Next. ■ After the Replication Manager is activated, click Next.

Setup	Description
Replicator	<p>Create a Replicator VM in a Resource vCenter Server.</p> <ul style="list-style-type: none"> Enter a Name for the Replicator VM. <hr/> <p>Note The wizard copies the configuration details from the Replication Manager configuration.</p> <ul style="list-style-type: none"> Do not select the DHCP check box and click Next. After the Replicator VM is created, click Next.
Activate Replicator	<p>Prepare the Replicator for operational use.</p> <ul style="list-style-type: none"> Set and confirm the <i>root</i> user password. Enter the resource vCenter Server details. <p>If you are using an external Platform Services Controller, enter the address to the external Lookup service in the suggested syntax. If you are using an embedded PSC, you can skip this step.</p> <p>Enter the vCenter Server Single Sign-On user name and password. The user you enter must be an <i>administrator</i> or part of the <i>administrators</i> group.</p> <ul style="list-style-type: none"> (Optional) Enter a Public Endpoint URL and Port. <hr/> <p>Note If you use a proxy server, you must fill in this text box. Provide the IP address and the port of the proxy service.</p> <ul style="list-style-type: none"> To activate the Replicator, click Next. Click Finish. <hr/> <p>Note Migration service configuration requires at least one Replicator per Resource vCenter Server on the cloud provider side. If necessary, deploy additional Replicator instances. For more information, see Add a New Replicator.</p>

You can review the configuration details by clicking the **vCenter Management**, **Cloud Resources**, **Replication Manager**, and **Replicators** tabs in the Cloud Service Setup UI.

Add a New Replicator

vCloud Director Extender requires at least one Replicator per Resource vCenter Server on the cloud provider site.

Depending on the concurrent migration jobs that you want to run, you might need to deploy additional Replicator appliances.

Procedure

- In the Cloud Service Setup UI, click **Replicators**.
- Click **Add New Replicator**.
- Enter a name for the Replicator that you are deploying.
- Enter a target Datacenter/Folder Name.
- Enter a target Host or Cluster Name.
- Enter a target Datastore Name.
- Enter a target Network Name.

- 8 Do not select the DHCP check box and click **OK**.

DHCP deployment is not supported for production installations.

A new Replicator is created. You can see the details in the **Current Replicators** list.

What to do next

You must now activate the new Replicator. For more information about activating a Replicator, see [Service Provider Configuration](#).

Set Up Authorization for Organization Administrator User

Before you can browse and extend networks with vCloud Director Extender, you must assign advanced networking permissions to the Organization Admin user.

Procedure

- 1 Get a valid vCloud Director API session.

```
curl -i -k -H "Accept:application/*+xml;version=1.5" -u 'user-name@System:password' -X POST
https://vcd-ip/api/sessions
```

- 2 Get the vCloud Director rights references.

```
curl -i -k -H "Accept:application/*+xml;version=1.5" -H 'x-vcloud-authorization:
14bdda8f67b1480fba16ce32d67cd284' -X GET https://vcd-ip/api/admin?fields=RightReferences
```

- 3 Get all the rights and save the list to an xml file.

```
curl -i -k -H "Accept:application/*+xml;version=1.5" -H 'x-vcloud-authorization:
828243f0fbab4b62b9f29b277d50aa27' -X GET https://vcd-
ip/api/admin/org/2b1a860f-9373-4948-943e-7f790d4295f3/rights
```

- 4 Add the following rights in the xml file:

```
<RightReference href="https://vcd-ip/api/admin/right/629c90fd-78a4-3929-98bd-57e4747d067b"
name="Hybrid Cloud Operations: View from-the-cloud tunnel" type="application/vnd.vmware.admin.right
+xml"/>
<RightReference href="https://vcd-ip/api/admin/right/b080bb50-cff1-3258-9683-842d34255a95"
name="Organization vDC Gateway: Configure Services" type="application/vnd.vmware.admin.right+xml"/>
<RightReference href="https://vcd-ip/api/admin/right/84ddb40f-a49a-35e1-918e-3f11507825d7"
name="Organization vDC Gateway: Configure Syslog" type="application/vnd.vmware.admin.right+xml"/>
<RightReference href="https://vcd-ip/api/admin/right/ff3fc70f-fd25-3c0a-9d90-e7ff82456be5"
name="Organization vDC Gateway: Configure System Logging" type="application/vnd.vmware.admin.right
+xml"/>
<RightReference href="https://vcd-ip/api/admin/right/9dc33fcb-346d-30e1-8ffa-cf25e05ba801"
name="Organization vDC Gateway: Convert to Advanced Networking"
type="application/vnd.vmware.admin.right+xml"/>
```


- 5 Update the vCloud Director rights by using the xml file.

```
curl -i -k -H "Accept: application/*;version=27.0" -H 'Content-type:
application/vnd.vmware.admin.org.rights+xml' -H 'x-vcloud-authorization:
828243f0fbab4b62b9f29b277d50aa27' -X PUT -d @path-to-xml
https://vcd-ip/api/admin/org/2b1a860f-9373-4948-943e-7f790d4295f3/rights
```

- 6 In the vCloud Director User Interface, navigate to **Role Properties: Organization Administrator**.
- 7 Under the **Gateway** category, select the appropriate rights to enable advanced networking for the Organization Administrator user.

Tenant Installation and Configuration

To complete the tenant installation and configuration, you deploy a vCloud Director Extender On-Premise Appliance from the vCloud Director Extender OVA file and use the OnPrem Setup UI Wizard for the remaining installation, and configuration operations.

Before you can continue with the tenant vCloud Director Extender installation and configuration, make sure that the service provider environment is configured and running. To configure the vCloud Director Extender tenant environment, you also must obtain the cloud site endpoint information from your service provider.

Install vCloud Director Extender On-Premise Appliance

The vCloud Director Extender On-Premise Appliance hosts the OnPrem Setup UI that you use to configure the replication infrastructure in the tenant site.

Prerequisites

- Download the vCloud Director Extender OVA file. You deploy the vCloud Director Extender Cloud Appliance and the vCloud Director Extender On-Premise Appliance by using the same vCloud Director Extender OVA file.

Verify that vCloud Director Extender Cloud Appliance is installed and configured in the service provider environment.

Procedure

- 1 Log in to the vSphere Web Client.
- 2 Right-click a target datacenter or folder and select **Deploy OVF Template**.
The deployment wizard opens.
- 3 Browse to the OVA file and click **Next**.
- 4 Enter a name for the appliance, select a deployment location, and click **Next**.
- 5 In the **Select a resource** page, select the target host, or cluster for the appliance, and click **Next**.
- 6 Verify the template details.
- 7 Read and accept the license agreements.

- 8 Select the virtual disk format and a target datastore location.
- 9 Select a network for the appliance.
- 10 In the Customize template page, select the CX Connector deployment type, enable SSH, and enter a password for the system *root* user.
 - a (Optional) Set Networking Properties.

Note You must assign a static IP to the virtual machine. DHCP deployment is not supported for production environments.

- b Click **Next**
- 11 Review the configuration information and click **Next**.

What to do next

After the vCloud Director Extender On-Premise Appliance is deployed, power it on.

Note the IP address of the vCloud Director Extender On-Premise Appliance, as you need it to access the OnPrem Setup UI.

Tenant Configuration

You install and configure the remaining tenant components by using the OnPrem Setup UI. For a first-time installation, use the Setup wizard.

Prerequisites

Verify that the vCloud Director Extender On-Premise Appliance VM is powered on.

Procedure

- 1 In a Web browser, open the OnPrem Setup UI at https://vCD_Extender_OnPrem_Appliance_IP/ui/mgmt.
- 2 Log in as *root*.

Use the password that you set during the vCloud Director Extender On-Premise Appliance installation.
- 3 Click **Setup Wizard**.

Note Run the Setup wizard for your first-time configuration to install Replicator.

4 Follow the prompts of the wizard.

Setup	Description
On-premise vCenter Server	<p>Register the vCloud Director Extender On-Premise Appliance to the on-premise vCenter Server.</p> <ul style="list-style-type: none"> Enter the on-premise vCenter Server Name. Enter the IP address or URL of the vCenter Server. (Optional) Enter the Lookup Service URL. <p>Important If you are using an external Platform Services Controller (PSC), enter the address to the external Lookup service in the suggested syntax. If you are using an embedded PSC, you can skip this step.</p> <ul style="list-style-type: none"> Enter the administrator credentials and click Next. <p>Note Certificates information pop-up window might appear. Click Trust Certificates.</p>
Register Plug-in with vCenter Server	<p>This process registers vCloud Director Extender as a plug-in to the on-premise vCenter Server. Register with a valid version number and click Next.</p> <p>Note If you need to re-register vCloud Director Extender Plug-in, make sure to use incremental version number.</p>
Replicator	<p>Create a Replicator VM and register it to the on-premise vCenter Server.</p> <ul style="list-style-type: none"> Enter a Name of the Replicator. Enter the target Folder/Datacenter Name. <p>Note You must provide the full multilevel schema path.</p> <ul style="list-style-type: none"> Enter the target Hosts or Cluster Name. Enter the target Datastore Name. Enter the target Network Name. Do not select the DHCP check box and click Next. After the Replicator is created, click Next.
Activate Replicator	<p>Prepare the Replicator for operational use.</p> <ul style="list-style-type: none"> Set and confirm a password. Enter the Lookup Service URL. Enter the Management vCenter Server SSO user name and password. The user you enter must be an <i>administrator</i> or part of the <i>administrators</i> group. (Optional) Enter the Public Endpoint URL and Port. Click Next.
Complete	<p>To complete the setup wizard, click Next and Finish.</p> <p>Note In the Management vCenter tab, the on-premise vCenter Server details appear. In the Replicators tab, you can see the details for the deployed Replicator appliance.</p>

What to do next

Run vCloud Director Extender.

Connect to a Provider Cloud

Before you can initiate migration jobs with vCloud Director Extender, you must set up a connection to a Provider Cloud.

Procedure

- 1 In the vSphere Web Client, navigate to **Home > Inventories > vCloud Director Extender**.
- 2 In the **Provider Clouds** tab, click **Add a Provider Cloud**.
- 3 Enter a Provider Cloud Name.
- 4 Enter a Provider Cloud URL.
- 5 Enter a vCD Extender Cloud Service URL and port.
- 6 Enter vCD Org Admin user name and password.
- 7 (Optional) You can test the connection to the Provider Cloud by clicking **Test**.
- 8 Click **Add**.
Certificates information pop-up window appears.
- 9 Review the hosts certificates information and click **Trust Certificates**.

The new provider cloud appears in the Provider Clouds tab.

You can connect to another provider cloud, edit provider cloud details by clicking **Edit a Provider Cloud** or delete the provider cloud entry by clicking **Delete** in the Provider Clouds tab.

What to do next

You can now proceed with performing migration operations. For more information, see [Initiate a Warm Migration](#) and [Initiate a Cold Migration](#).

Add Configuration Details for an L2 Appliance

Before you can configure DC Extensions, you must enter the L2 Appliance configuration details. When you extend a network, vCloud Director Extender deploys the L2 Appliance automatically and uses the current configuration details.

Procedure

- 1 In a Web browser, open the OnPrem Setup UI.
- 2 In the **DC Extensions** tab, in the L2 Appliance Configuration, click **Add Appliance Configuration**.
The L2 Appliance Configuration pop-up window appears.
- 3 Enter a target folder name and a data center name for the appliance.
- 4 Enter a target Cluster name or a Host name.
- 5 Enter a target datastore name.
- 6 Enter an Uplink Network name.

- 7 Enter an Uplink Network IP Pool and click **Add**.

Enter IPv4 IP addresses in dotted or delimited format.

Important The IP addresses you enter must be static IP addresses that are accessible from the cloud.

- 8 Enter a Default Gateway IP.
- 9 Enter a Prefix Length and click **Create**.

In the OnPrem Setup UI, a new configuration appears in the Current L2 Appliance Configuration.

What to do next

You can now configure a network extension. For more information, see [Extend a Network](#).

Configure an NSX Manager

If NSX is installed on-premise, you must register your on-premise NSX Manager to CX Connector. If NSX is not installed on-premise, you can skip this configuration.

Prerequisites

- Verify that NSX Manager instance is installed and configured in the on-premise environment. If NSX Manager is not deployed in the on-premise environment, vCloud Director Extender deploys an *NSX for vSphere Standalone Edge - Client 6.3.0* that is included in the vCloud Director Extender OVA file.
- Verify that you have finished the initial vCloud Director Extender tenant configuration by using the OnPrem Setup UI Setup wizard. For more information, see [Tenant Configuration](#).

Procedure

- 1 In a Web browser, open the OnPrem Setup UI at `https://vCD_Extender_OnPrem_Appliance_IP/ui/mgmt`.
- 2 Log in as *root*.
Use the password that you set during the vCloud Director Extender On-Premise Appliance installation.
- 3 In the **DC Extensions** tab, click **Add NSX Configuration**.
The NSX configuration pop-up window opens.
- 4 Enter a name, FQDN, administrator user name, and password for the on-premise NSX Manager, and click **OK**.

The NSX Manager configuration appears in the DC Extensions tab of the OnPrem Setup UI.

Working with vCloud Director Extender

3

You use the vCloud Director Extender Plug-in to perform migration operations, to configure a DC Extension, and to monitor overall system information.

You access the vCloud Director Extender by logging in to the vSphere Web Client and navigating to **Home > Inventories > vCloud Director Extender**.

The vCloud Director Extender Plug-in for vSphere supports both the vSphere Web Client and the HTML5 vSphere Client.

This chapter includes the following topics:

- [Migrating Virtual Machines](#)
- [DC Extensions](#)
- [vCloud Director Extender Logs Location](#)

Migrating Virtual Machines

With vCloud Director Extender, you can migrate your virtual machines from an on-premise vCenter Server to a cloud provider environment. You can migrate virtual machines both when they are powered on and powered off depending on the available downtime.

You can initiate virtual machines migration jobs only from a tenant vCenter Server on-premise. With vCloud Director Extender migration jobs, tenants can preserve their current IP and MAC address scheme after the migration completes.

Note Preserving IP and MAC address scheme after a migration is only possible, if you extend a private, on-premise, virtual network to cloud VDC networks by using the DC Extension feature of vCloud Director Extender.

Migration of an entire data center is a slow process and is often done in stages. To ensure a minimal downtime of client applications, vCloud Director Extender provides flexibility in the different types of migrations.

You can choose from two types of migration.

- With Warm Migration, you can keep your virtual machines active while the migration runs, and ensure minimal downtime. After the migration completes, you start a manual Cutover to make the virtual machines available on the cloud provider site and finalize the migration. Cutover is a process of powering on the virtual machines at the cloud provider site, after the warm migration completes. The Cutover operation includes a final sync and import of a migrated VM into a destination Org VDC's vApp and an optional powering on of the VM.
- With Cold Migration, you power off your virtual machines and start the migration. No cutover process is required in this case, you can select whether to power on the virtual machines from the migration setup menu.

During the Migration lifecycle, a migration goes through various states. The following table can help you understand vCloud Director Extender migration states.

Table 3-1. vCloud Director Extender Migration States

State	Description
CREATED	Initial state that indicates that a migration is started.
INITIAL SYNC IN PROGRESS	An initial full sync is in progress. Information is being transferred from the source on-premise to the target cloud environment.
INITIAL SYNC COMPLETED	The initial full sync is completed successfully.
CREATINGVM	A VM is being created in the cloud resource vCenter Server. This is the migration state after a cold migration, or when a cutover operations is started.
CREATEVM_COMPLETED	A VM is successfully created in the cloud resource vCenter Server.
IMPORTINGVM	A VM is migrated to the cloud resource vCenter Server and is being imported to vCloud Director.
IMPORTVM_COMPLETED	VM is successfully imported to the target vCloud Director.
CANCELED	The migration is canceled. No data is sent to the cloud.
SUSPENDED	The migration is suspended. You can manually resume operation.
IMPORTVM_FAILED	Importing the VM to vCloud Director failed.
CREATEVM_FAILED	Creating a VM in the cloud environment failed.

Initiate a Warm Migration

By performing a warm migration, you migrate a powered on virtual machine from an on-premise vCenter Server to an Org vDC in the cloud.

By performing a warm migration, you create a placeholder VM in the cloud and carry out an initial synchronization between the VM that runs on-premise and the placeholder VM in the cloud.

Prerequisites

- Verify that you have sufficient space available in the target storage profile.
- You must have a defined Org vDC network.

- Verify that the VM that you are migrating is powered on.

Procedure

- 1 In the vSphere Web Client, navigate to **Home > Inventories > vCloud Director Extender**.
- 2 In the **Migrations** tab, click **New Migration**.
- 3 Select **Warm migration** and click **Next**.
- 4 Select the VM that you want to migrate and click **Next**.

When you select a VM, the system verifies if the selected VM is powered on.

If you select a VM that is powered off, the system returns an error, and you cannot proceed until you select a powered on VM.

- 5 Select a Target Cloud, a target vDC, a target storage profile, a target network, and whether you want to group all virtual machines that you are migrating into a single vApp, and click **Next**.
- 6 (Optional) You can initiate the migration at a specific time.
- 7 Select a target Recovery Point Objective (RPO).
- 8 Select the disk type.
- 9 (Optional) Enter a tag for the migration job that you are initiating.
- 10 Click **Start**.

The migration operation is initiated and a new warm migration job appears in the Migrations tab in a Created state.

What to do next

After the warm migration job completes, the warm migration job goes into a cutover-ready status and you can initiate a manual cutover. For more information, see [Initiate a Cutover](#).

Initiate a Cutover

By Performing a cutover to a virtual machine, you finalize a warm migration. The Cutover operation includes a final sync and import of a migrated VM into a destination Org VDC's vApp and an optional powering on of the VM.

Prerequisites

Verify that the VM you are performing a Cutover operation to, is in a cutover-ready state.

Procedure

- 1 In the vSphere Web Client, navigate to **Home > Inventories > vCloud Director Extender**.
- 2 In the **Migrations** tab, click **Start Cutover**.
- 3 Select a Target Cloud.
- 4 Select if you want to power on the target VMs after cutover.

- 5 (Optional) Enter a tag for the migration job that you are initiating.
- 6 Select VM or VMs that you want to cut over and click **Start**.
- 7 Confirm that you want to cut over this migration by clicking **OK**.

A new Cutover job appears in the Migrations tab, in a Cutting over status. After the cutover job finishes, the job status changes to Completed.

After the cutover job finishes, the source VM is powered off and the VM in the cloud is ready to be used. When powered on, the VM in the cloud processes all transactions that were earlier processed by the VM on-premise.

Initiate a Cold Migration

By performing a cold migration, you migrate a powered off virtual machine from an on-premise vCenter Server to an Org vDC in the cloud.

By initiating a Cold Migration, you start simultaneous file transfer and cutover processes, so no manual operations are required after the migration completes.

During a cold migration, the Replication Manager creates a VM instance in the resource vCenter Server in the cloud.

Prerequisites

Power off the virtual machine that you about to migrate.

Procedure

- 1 In the vSphere Web Client, navigate to **Home > Inventories > vCloud Director Extender**.
- 2 In the **Migrations** tab, click **New Migration**.
- 3 Select **Cold migration** and click **Next**.
- 4 Select the VM that you want to migrate and click **Next**.

When you select a VM, the system verifies if the selected VM is powered off.

If you select a VM that is powered on, the system returns an error, and you cannot proceed until you select a powered off VM.

- 5 Select a Target Cloud, a target vDC, a target storage profile, a target network, and whether you want to group all VMs that you are migrating into a single vApp, and click **Next**.
- 6 (Optional) You can initiate the migration at a specific time.
- 7 (Optional) Select if you want to power on the VM after the migration operation completes.
- 8 Select the disk type.
- 9 (Optional) Enter a tag for the migration job that you are initiating.
- 10 Click **Start**.

The migration job is initiated and a new cold migration job appears in the Migrations tab.

What to do next

You can monitor the progress of the migration job in the Migrations tab.

DC Extensions

With the vCloud Director Extender DC Extensions, you can extend one or multiple L2 networks from the on-premise VDC to a network in the cloud.

vCloud Director Extender uses NSX Edge to extend the networks. The type of the L2 VPN Edge deployed on-premise depends on whether NSX is installed or not. The number of edges deployed can vary based on the source and destination networks selected for extension. Configuring a DC Extension with L2 VPN is optional for VM migration operations.

To extend an on-premise network to the cloud, fulfill the following prerequisites:

- Configure an L2 Appliance. For more information, see [Add Configuration Details for an L2 Appliance](#).
- Deploy the vCloud Director Extender On-Premise Appliance to the tenant vCenter Server.
- Configure at least one vCloud Director VDC.
- Configure at least one Org VDC network as a subinterface the Advanced Edge Gateway.

Extend a Network

By extending an on-premise network to the cloud, you can roll out migrations in stages, ensuring a minimal downtime. With DC Extensions, you can also preserve your IP and MAC address scheme after migrations.

Prerequisites

- Verify that the edge has advance gateway networking and VDC network sub interface enabled on vCloud Director.
- Verify that you have configured an L2 Appliance.

Procedure

- 1 In the vSphere Web Client, navigate to **Home > Inventories > vCloud Director Extender**.
- 2 In the **DC Extensions** tab, click **New Extensions**.

If an L2 Appliance is not configured, you receive an error and must configure an L2 Appliance before you can extend a network.

Note If you extend a new network from the same on-premise VDC edge to another network on a different cloud-provider VDC-edge, a single on-premise VDC edge is connected to a single cloud provider VDC edge. A new edge and a trunk port group are created, the trunk port group being attached to the new edge.

- 3 Enter a name for the extended network.
- 4 Select a source data center.
- 5 Select a source network.
- 6 (Optional) Select if you want to enable an egress in the source site.

If you select to enable an egress in the source site, the source gateway can forward traffic outside of the extended network.

- 7 Select a Provider cloud.
- 8 Select a target VDC.
- 9 Select a target network.
- 10 (Optional) Select if you want to enable an egress in the target site.

If you select to enable an egress in the target site, the target gateway can forward traffic outside of the extended network.

- 11 Click **Start**.

Automatic checks are run to verify if L2 VPN gateways exist and vCloud Director Extender creates a port group and deploys a new, standalone NSX Edge appliance.

After the initial configuration processes complete, a new network appears in the DC Extensions tab in a Connected status. For more information about Managing DC Extensions, see [Managing DC Extensions](#).

Managing DC Extensions

After the initial configuration processes complete, a new network appears in the DC Extensions tab in a Connected status.

DC Extension Statuses

The following table can help you understand the various statuses of DC Extensions.

Table 3-2. DC Extension Statuses

Status	Description
CONNECTING	A connection from the on-premise to the cloud environment is being established.
CONNECTED	The connection between on-premise and cloud environments is successfully established.
DISCONNECTING	The network between on-premise and cloud environments is being disconnected.
DISCONNECTED	Network extension is disconnected.
FAILED	Establishing a connection between on-premise and cloud environments failed.

Table 3-2. DC Extension Statuses (Continued)

Status	Description
REMOVING	Network extension is being deleted.
DROPPED	Network extension is dropped.

DC Extension Operations

After you extend a network, you can perform Disconnect Extension and Remove Extension operations. If you disconnect a network extension, you can also perform a Connect Extension operation. The following table can help you understand the different network extension operations that you can perform with vCloud Director Extender.

Table 3-3. DC Extension Operations

Operation	Description
Connect Extension	The operation allows the user to reconnect a disconnected connection. During the Connect Extension operation, network configuration is pushed to the respective network edges.
Disconnect Extension	This operation allows tenant administrators to disconnect the network extension. The Disconnect Extension operation removes the respective configuration from the on-premise and cloud edge instances.
Remove Extension	This operation removes a DC Extension and deletes all network configurations from both on-premise and cloud environments.

vCloud Director Extender Logs Location

You can use the vCloud Director Extender logs for troubleshooting aid.

To access vCloud Director Extender logs, you must establish an SSH connection to the affected VM.

Table 3-4. Logs Location

Component	Logs Location
vCloud Director Extender Cloud Appliance	/opt/vmware/mobility-service/logs
vCloud Director Extender On-Premise Appliance	/opt/vmware/mobility-service/logs
Replication Manager	/opt/vmware/h4/manager/log/
Replicator	/opt/vmware/h4/replicator/log/replicator
HBR Service (Running on the Replicator VM)	/var/log/vmware/

Troubleshooting Virtual Private Networks (VPN)

For troubleshooting DC Extension networking issues, see the *NSX Troubleshooting Guide*, *Troubleshooting Virtual Private Networks (VPN)* chapter in the *VMware NSX for vSphere* documentation set.