

# vCenter Server Installation and Setup

17 APR 2018

VMware vSphere 6.7

vCenter Server 6.7



vmware®

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# About vCenter Server Installation and Setup

*vCenter Server Installation and Setup* describes how to install and configure VMware vCenter Server<sup>®</sup>, and deploy the VMware vCenter<sup>®</sup> Server Appliance<sup>™</sup>.

*vSphere Installation and Setup* is intended for experienced administrators who want to install and configure vCenter Server, and deploy and configure the vCenter Server Appliance.

This information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and data center operations. The information about using the Image Builder and VMware vSphere<sup>®</sup> Auto Deploy<sup>™</sup> is written for administrators who have experience with Microsoft PowerShell and VMware vSphere<sup>®</sup> PowerCLI<sup>™</sup>.

## vSphere Web Client and vSphere Client

Instructions in this guide reflect the vSphere Client (an HTML5-based GUI). You can also use the instructions to perform most of the tasks by using the vSphere Web Client (a Flex-based GUI).

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**Note** In vSphere 6.7, most of the vSphere Web Client functionality is implemented in the vSphere Client. For an up-to-date list of the unsupported functionality, see [Functionality Updates for the vSphere Client](#).

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## 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 vSphere Installation and Setup

# 1

vSphere 6.7 provides various options for installation and setup. To ensure a successful vSphere deployment, understand the installation and setup options, and the sequence of tasks.

The two core components of vSphere are ESXi and vCenter Server. ESXi is the virtualization platform on which you can create and run virtual machines and virtual appliances. vCenter Server is a service that acts as a central administrator for ESXi hosts connected in a network. vCenter Server lets you pool and manage the resources of multiple hosts.

You can install vCenter Server on a Windows virtual machine or physical server, or deploy the vCenter Server Appliance. The vCenter Server Appliance is a preconfigured Linux-based virtual machine optimized for running vCenter Server and the vCenter Server components. You can deploy the vCenter Server Appliance on ESXi hosts 6.0 or later, or on vCenter Server instances 6.0 or later.

Starting with vSphere 6.0, all prerequisite services for running vCenter Server and the vCenter Server components are bundled in the VMware Platform Services Controller™. You can deploy vCenter Server with an embedded or external Platform Services Controller, but you must always install or deploy the Platform Services Controller before installing or deploying vCenter Server.

For detailed information about the ESXi installation process, see *VMware ESXi Installation and Setup*.

This chapter includes the following topics:

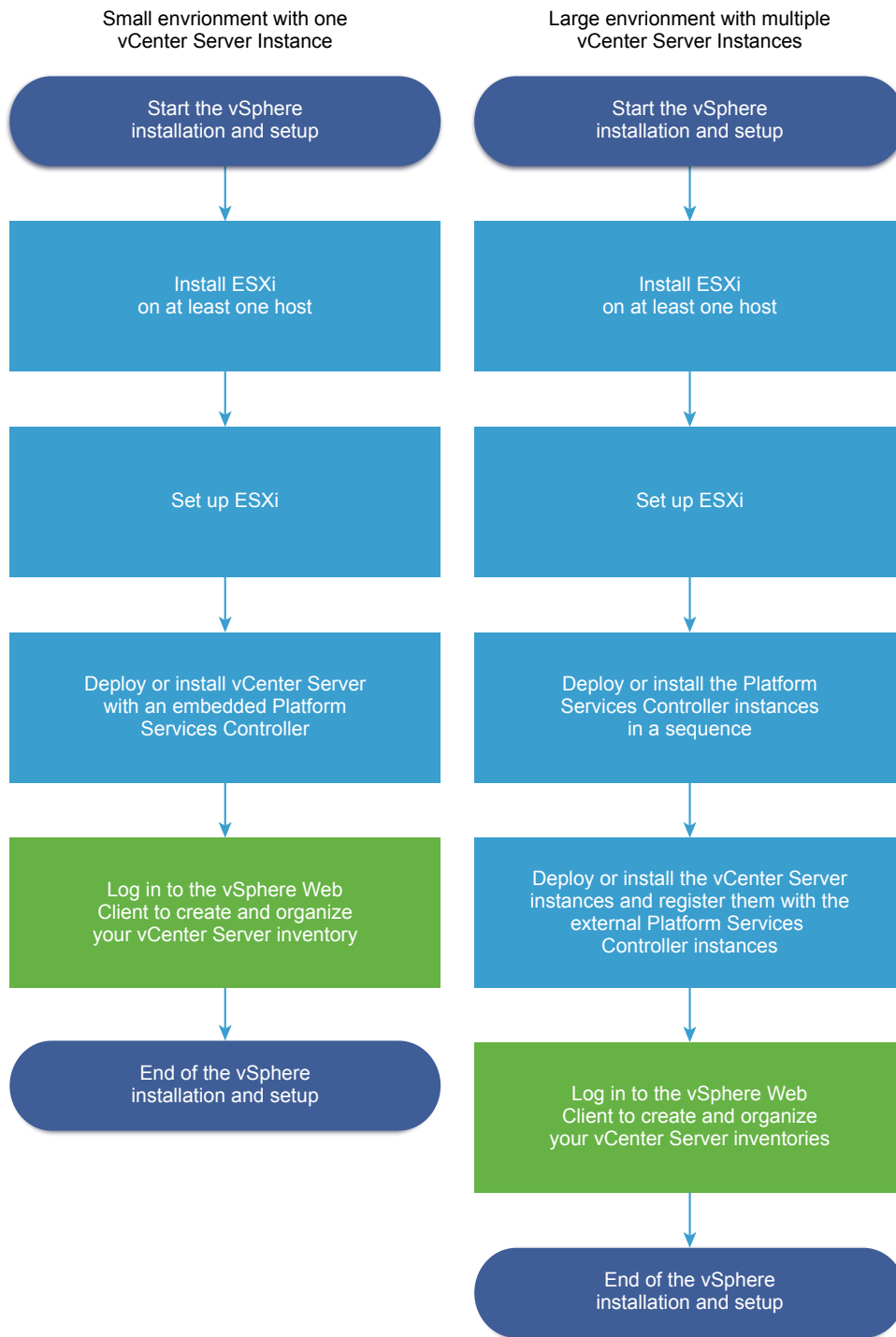
- [Overview of the vSphere Installation and Setup Process](#)
- [vCenter Server Components and Services](#)
- [Overview of the vCenter Server Appliance](#)
- [vCenter Server and Platform Services Controller Deployment Types](#)
- [Understanding vSphere Domains, Domain Names, and Sites](#)
- [Deployment Topologies with External Platform Services Controller Instances and High Availability](#)
- [vCenter Enhanced Linked Mode](#)

## Overview of the vSphere Installation and Setup Process

vSphere is a sophisticated product with multiple components to install and set up. To ensure a successful vSphere deployment, understand the sequence of tasks required.

Installing vSphere includes the following tasks:

Figure 1-1. vSphere Installation and Setup Workflow



- 1 Read the vSphere release notes.
- 2 Install ESXi.

**Note** See *VMware ESXi Installation and Setup* for detailed information about the ESXi installation process.

- 3 Configure the ESXi boot and network settings, the direct console, and other settings. See *VMware ESXi Installation and Setup* for information.
- 4 Consider setting up a syslog server for remote logging, to ensure sufficient disk storage for log files. Setting up logging on a remote host is especially important for hosts with limited local storage. See *VMware ESXi Installation and Setup*
- 5 Determine the vCenter Server and Platform Services Controller deployment model that is suitable for your environment.

vCenter Server with an embedded Platform Services Controller deployment is suitable for small-scale environments. vCenter Server with an external Platform Services Controller deployment is suitable for environments with several vCenter Server instances. See [vCenter Server and Platform Services Controller Deployment Types](#).

- 6 Deploy or install vCenter Server and Platform Services Controller.

You can deploy the vCenter Server Appliance or Platform Services Controller appliance on an ESXi host or vCenter Server instance, or you can install vCenter Server and Platform Services Controller on a Windows virtual machine or physical server.

You can deploy or install multiple vCenter Server instances connected in Enhanced Linked Mode configuration by registering them to a common or different joined Platform Services Controller instances.

- Deploy the vCenter Server Appliance or Platform Services Controller appliance.
  - 1 Review the topics in [System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance](#) and verify that your system meets the hardware and software requirements for deploying the appliance.
  - 2 Determine the deployment method to use.
 

You can use the GUI method to deploy the appliance interactively. You can use the CLI method to perform a silent deployment of the appliance. See [GUI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#) and [CLI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#).
  - 3 Use the topic [Required Information for Deploying a vCenter Server Appliance or Platform Services Controller Appliance](#) to create a worksheet with the information you need for the GUI deployment, or use the topic [Prepare Your JSON Configuration File for CLI Deployment](#) to create your JSON templates for the CLI deployment.
  - 4 Deploy the appliance.
- Install vCenter Server or Platform Services Controller on a Windows virtual machine or physical server.
  - 1 Verify that your system meets the hardware and software requirements for installing vCenter Server. See [vCenter Server for Windows Requirements](#).
  - 2 (Optional) Set up an external vCenter Server database. See [Preparing vCenter Server Databases for Install](#).



For an environment with up to 20 hosts and 200 virtual machines, you can use the bundled PostgreSQL database. For production and large scale environments, set up an external database, because the migration from the embedded PostgreSQL database to an external database is not a trivial manual process.

- 3 Create a worksheet with the information you need for installation. See [Required Information for Installing vCenter Server or Platform Services Controller on Windows](#).
- 4 Install vCenter Server with an embedded Platform Services Controller, Platform Services Controller, or vCenter Server with an external Platform Services Controller.
- 7 Connect to vCenter Server from the vSphere Web Client. See [Chapter 6 After You Install vCenter Server or Deploy the vCenter Server Appliance](#).
- 8 Configure the vCenter Server Appliance or vCenter Server instance. See *vCenter Server Appliance Configuration* and *vCenter Server and Host Management*.

## vCenter Server Components and Services

vCenter Server provides a centralized platform for management, operation, resource provisioning, and performance evaluation of virtual machines and hosts.

When you install vCenter Server with an embedded Platform Services Controller, or deploy the vCenter Server Appliance with an embedded Platform Services Controller, vCenter Server, the vCenter Server components, and the services included in the Platform Services Controller are deployed on the same system.

When you install vCenter Server with an external Platform Services Controller, or deploy the vCenter Server Appliance with an external Platform Services Controller, vCenter Server and the vCenter Server components are deployed on one system, and the services included in the Platform Services Controller are deployed on another system.

The following components are included in the vCenter Server and vCenter Server Appliance installations:

- The VMware Platform Services Controller group of infrastructure services contains vCenter Single Sign-On, License service, Lookup Service, and VMware Certificate Authority.
- The vCenter Server group of services contains vCenter Server, vSphere Web Client, vSphere Auto Deploy, and vSphere ESXi Dump Collector. vCenter Server for Windows also contains the VMware vSphere Syslog Collector. The vCenter Server Appliance also contains the VMware vSphere Update Manager Extension service.

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**Note** Starting with vSphere 6.5, all vCenter Server services and some Platform Services Controller services run as child processes of the VMware Service Lifecycle Manager service.

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## Services Installed with VMware Platform Services Controller

**vCenter Single Sign-On** The vCenter Single Sign-On authentication service provides secure authentication services to the vSphere software components. By using vCenter Single Sign-On, the vSphere components communicate with each other through a secure token exchange mechanism, instead of requiring each component to authenticate a user separately with a directory service like Active Directory. vCenter Single Sign-On constructs an internal security domain (for example, vsphere.local) where the vSphere solutions and components are registered during the installation or upgrade process, providing an infrastructure resource. vCenter Single Sign-On can authenticate users from its own internal users and groups, or it can connect to trusted external directory services such as Microsoft Active Directory. Authenticated users can then be assigned registered solution-based permissions or roles within a vSphere environment.

vCenter Single Sign-On is required with vCenter Server.

**vSphere License Service** The vSphere License service provides common license inventory and management capabilities to all vCenter Server systems that are connected to a Platform Services Controller or multiple linked Platform Services Controllers.

**VMware Certificate Authority** VMware Certificate Authority (VMCA) provisions each ESXi host with a signed certificate that has VMCA as the root certificate authority, by default. Provisioning occurs when the ESXi host is added to vCenter Server explicitly or as part of the ESXi host installation process. All ESXi certificates are stored locally on the host.

For information about all Platform Services Controller services and capabilities, see *Platform Services Controller Administration*.

## Services Installed with vCenter Server

These additional components are installed silently when you install vCenter Server. The components cannot be installed separately as they do not have their own installers.

**PostgreSQL** A bundled version of the VMware distribution of PostgreSQL database for vSphere and vCloud Hybrid Services.

**vSphere Web Client** The vSphere Web Client lets you connect to vCenter Server instances by using a Web browser, so that you can manage your vSphere infrastructure.

<b>vSphere Client</b>	The new user interface that lets you connect to vCenter Server instances by using a Web browser. The terminology, topology, and workflow are closely aligned with the same aspects and elements of the vSphere Web Client user interface.
<b>vSphere ESXi Dump Collector</b>	The vCenter Server support tool. You can configure ESXi to save the VMkernel memory to a network server, rather than to a disk, when the system encounters a critical failure. The vSphere ESXi Dump Collector collects such memory dumps over the network.
<b>VMware vSphere Syslog Collector</b>	<p>The vCenter Server on Windows support tool that enables network logging and combining of logs from multiple hosts. You can use the vSphere Syslog Collector to direct ESXi system logs to a server on the network, rather than to a local disk. The recommended maximum number of supported hosts to collect logs from is 30. For information about configuring vSphere Syslog Collector, see <a href="http://kb.vmware.com/kb/2021652">http://kb.vmware.com/kb/2021652</a>.</p> <p>The vCenter Server Appliance uses the built-in Rsyslog service of the Linux OS. For information how to redirect the log files to another machine with the Appliance Management Interface, see <i>vCenter Server Appliance Configuration</i>.</p>
<b>vSphere Auto Deploy</b>	The vCenter Server support tool that can provision hundreds of physical hosts with ESXi software. You can specify the image to deploy and the hosts to provision with the image. Optionally, you can specify host profiles to apply to the hosts, and a vCenter Server location (folder or cluster) for each host.
<b>VMware vSphere Update Manager Extension</b>	Update Manager enables centralized, automated patch and version management for VMware vSphere and offers support for VMware ESXi hosts, virtual machines, and virtual appliances. The VMware vSphere Update Manager Extension is an optional service of only the vCenter Server Appliance 6.7.

## Overview of the vCenter Server Appliance

The vCenter Server Appliance is a preconfigured Linux-based virtual machine that is optimized for running vCenter Server and the associated services.

The vCenter Server Appliance reduces the deployment time of vCenter Server and the associated services, and provides a low-cost alternative to the Windows-based vCenter Server installation.

The vCenter Server Appliance package contains the following software:

- Project Photon OS<sup>®</sup> 1.0
- The Platform Services Controller group of infrastructure services
- The vCenter Server group of services

- PostgreSQL
- VMware vSphere Update Manager Extension

Version 6.7 of the vCenter Server Appliance is deployed with virtual hardware version 10, which supports 64 virtual CPUs per virtual machine in ESXi.

The vCenter Server Appliance uses the embedded PostgreSQL database that has the scalability of up to 2,000 hosts and 35,000 virtual machines. During the deployment, you can choose the vCenter Server Appliance size for your vSphere environment size and the storage size for your database requirements.

Starting with vSphere 6.5, the vCenter Server uses the VMware vSphere Update Manager Extension service. An external VMware Update Manager instance on Windows is no longer required for vSphere centralized automated patch and version management. For information about the vCenter Server and Platform Services Controller services, see [vCenter Server Components and Services](#).

Starting with vSphere 6.5, the vCenter Server Appliance supports high availability. For information about configuring vCenter Server Appliance in a vCenter High Availability cluster, see [vSphere Availability](#).

Starting with vSphere 6.5, the vCenter Server Appliance and Platform Services Controller appliance support file-based backup and restore. For information backing up and restoring, see [Chapter 4 File-Based Backup and Restore of vCenter Server Appliance](#).

For information about the vCenter Server Appliance maximums, see the *Configuration Maximums* documentation.

## vCenter Server and Platform Services Controller Deployment Types

You can deploy the vCenter Server Appliance or install vCenter Server for Windows with an embedded or external Platform Services Controller. You can also deploy a Platform Services Controller as an appliance or install it on Windows. If necessary, you can use a mixed operating systems environment.

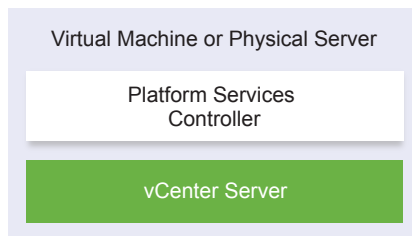
Before you deploy the vCenter Server Appliance or install vCenter Server for Windows, you must determine the deployment model that is suitable for your environment. For each deployment or installation, you must select one of the three deployment types.

**Table 1-1. vCenter Server and Platform Services Controller Deployment Types**

Deployment Type	Description
vCenter Server with an embedded Platform Services Controller	All services that are bundled with the Platform Services Controller are deployed together with the vCenter Server services on the same virtual machine or physical server.
Platform Services Controller	Only the services that are bundled with the Platform Services Controller are deployed on the virtual machine or physical server.
vCenter Server with an external Platform Services Controller (Requires external Platform Services Controller)	Only the vCenter Server services are deployed on the virtual machine or physical server. You must register such a vCenter Server instance with a Platform Services Controller instance that you previously deployed or installed.

## vCenter Server with an Embedded Platform Services Controller

Using an embedded Platform Services Controller results in a standalone deployment that has its own vCenter Single Sign-On domain with a single site. vCenter Server with an embedded Platform Services Controller is suitable for small environments. You cannot join other vCenter Server or Platform Services Controller instances to this vCenter Single Sign-On domain.

**Figure 1-2. vCenter Server with an Embedded Platform Services Controller**

Installing vCenter Server with an embedded Platform Services Controller has the following advantages:

- The connection between vCenter Server and the Platform Services Controller is not over the network, and vCenter Server is not prone to outages caused by connectivity and name resolution issues between vCenter Server and the Platform Services Controller.
- If you install vCenter Server on Windows virtual machines or physical servers, you need fewer Windows licenses.
- You manage fewer virtual machines or physical servers.

Installing vCenter Server with an embedded Platform Services Controller has the following disadvantages:

- There is a Platform Services Controller for each product which might be more than required and which consumes more resources.
- The model is suitable only for small-scale environments.

You can configure the vCenter Server Appliance with an embedded Platform Services Controller in vCenter High Availability configuration. For information, see *vSphere Availability*.

**Note** After you deploy or install vCenter Server with an embedded Platform Services Controller, you can reconfigure the deployment type and switch to vCenter Server with an external Platform Services Controller.

See [Reconfigure a Standalone vCenter Server with an Embedded Platform Services Controller to a vCenter Server with an External Platform Services Controller](#).

## Platform Services Controller and vCenter Server with an External Platform Services Controller

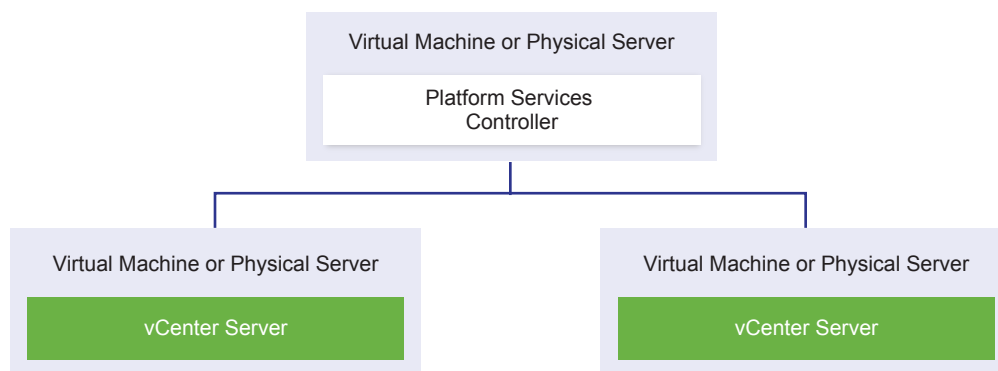
When you deploy or install a Platform Services Controller instance, you can create a vCenter Single Sign-On domain or join an existing vCenter Single Sign-On domain. Joined Platform Services Controller instances replicate their infrastructure data, such as authentication and licensing information, and can span multiple vCenter Single Sign-On sites. For information, see [Understanding vSphere Domains, Domain Names, and Sites](#).

For information about managing the Platform Services Controller services, see *Platform Services Controller Administration*.

You can register multiple vCenter Server instances with one common external Platform Services Controller instance. The vCenter Server instances assume the vCenter Single Sign-On site of the Platform Services Controller instance with which they are registered. All vCenter Server instances that are registered with one common or different joined Platform Services Controller instances are connected in Enhanced Linked Mode.

See [Enhanced Linked Mode for vCenter Server or vCenter Server Appliance with an External Platform Services Controller](#).

**Figure 1-3. Example of Two vCenter Server Instances with a Common External Platform Services Controller**



Installing vCenter Server with an external Platform Services Controller has the following advantages:

- Fewer resources consumed by the shared services in the Platform Services Controller instances.
- The model is suitable for large-scale environments.

Installing vCenter Server with an external Platform Services Controller has the following disadvantages:

- The connection between vCenter Server and Platform Services Controller might have connectivity and name resolution issues.
- If you install vCenter Server on Windows virtual machines or physical servers, you need more Microsoft Windows licenses.
- You must manage more virtual machines or physical servers.

For information about the Platform Services Controller and vCenter Server maximums, see the *Configuration Maximums* documentation.

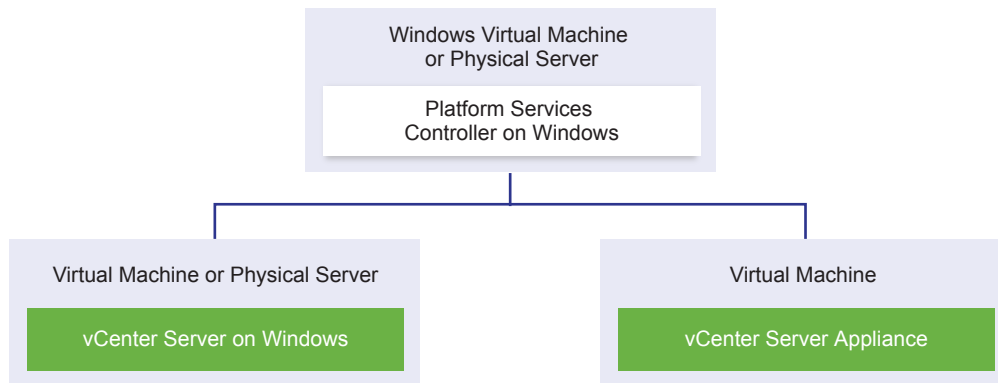
For information about the deployment topologies and Platform Services Controller high availability, see [Deployment Topologies with External Platform Services Controller Instances and High Availability](#).

For information about configuring the vCenter Server Appliance with an external Platform Services Controller in vCenter High Availability configuration, see *vSphere Availability*.

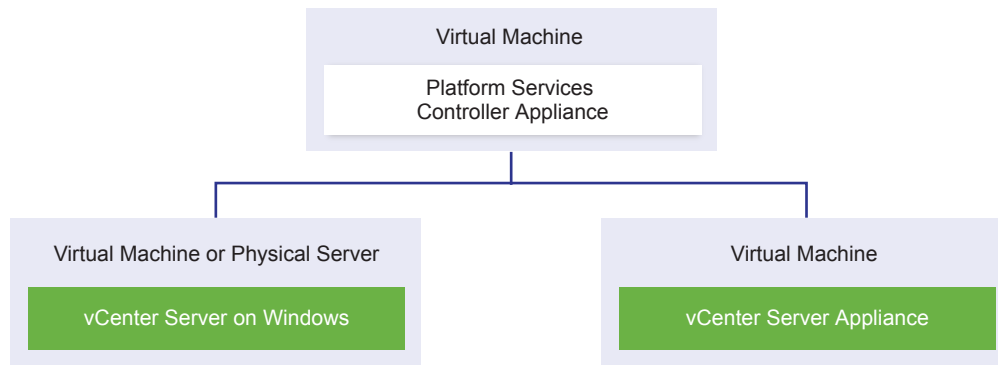
## Mixed Operating Systems Environment

A vCenter Server instance installed on Windows can be registered with either a Platform Services Controller installed on Windows or a Platform Services Controller appliance. A vCenter Server Appliance can be registered with either a Platform Services Controller installed on Windows or a Platform Services Controller appliance. Both vCenter Server and the vCenter Server Appliance can be registered with the same Platform Services Controller.

**Figure 1-4. Example of a Mixed Operating Systems Environment with an External Platform Services Controller on Windows**



**Figure 1-5. Example of a Mixed Operating Systems Environment with an External Platform Services Controller Appliance**



**Note** To ensure easy manageability and maintenance, use only appliances or only Windows installations of vCenter Server and Platform Services Controller.

## Understanding vSphere Domains, Domain Names, and Sites

Each Platform Services Controller is associated with a vCenter Single Sign-On domain. The domain name defaults to vsphere.local, but you can change it during installation of the first Platform Services Controller. The domain determines the local authentication space. You can split a domain into multiple sites, and assign each Platform Services Controller and vCenter Server instance to a site. Sites are logical constructs, but usually correspond to geographic location.

### Platform Services Controller Domain

When you install a Platform Services Controller, you are prompted to create a vCenter Single Sign-On domain or join an existing domain.

The domain name is used by the VMware Directory Service (vmdir) for all Lightweight Directory Access Protocol (LDAP) internal structuring.

With vSphere 6.0 and later, you can give your vSphere domain a unique name. To prevent authentication conflicts, use a name that is not used by OpenLDAP, Microsoft Active Directory, and other directory services.

**Note** You cannot change the domain to which a Platform Services Controller or vCenter Server instance belongs.

After you specify the name of your domain, you can add users and groups. It usually makes more sense to add an Active Directory or LDAP identity source and allow the users and groups in that identity source to authenticate. You can also add vCenter Server or Platform Services Controller instances, or other VMware products, such as vRealize Operations, to the domain.



## Platform Services Controller Sites

You can organize Platform Services Controller domains into logical sites. A site in the VMware Directory Service is a logical container for grouping Platform Services Controller instances within a vCenter Single Sign-On domain.

Starting with vSphere 6.5, sites become important. During Platform Services Controller failover, the vCenter Server instances are affinized to a different Platform Services Controller in the same site. To prevent your vCenter Server instances from being affinized to a Platform Services Controller in a distant geographic location, you can use multiple sites.

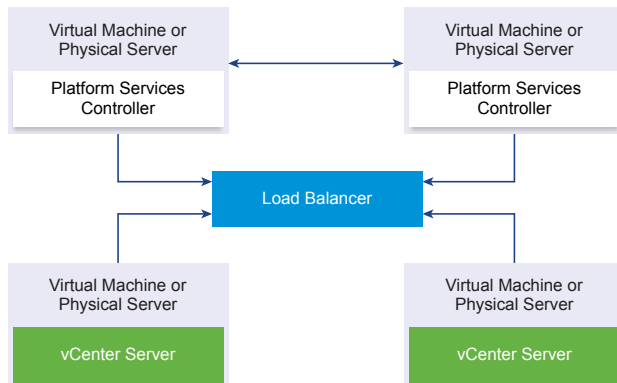
You are prompted for the site name when you install or upgrade a Platform Services Controller. See the *vCenter Server Installation and Setup* documentation.

## Deployment Topologies with External Platform Services Controller Instances and High Availability

To ensure Platform Services Controller high availability in external deployments, you must install or deploy at least two joined Platform Services Controller instances in your vCenter Single Sign-On domain. When you use a third-party load balancer, you can ensure an automatic failover without downtime.

### Platform Services Controller with a Load Balancer

Figure 1-6. Example of a Load Balanced Pair of Platform Services Controller Instances



You can use a third-party load balancer per site to configure Platform Services Controller high availability with automatic failover for this site. For information about the maximum number of Platform Services Controller instances behind a load balancer, see the *Configuration Maximums* documentation.

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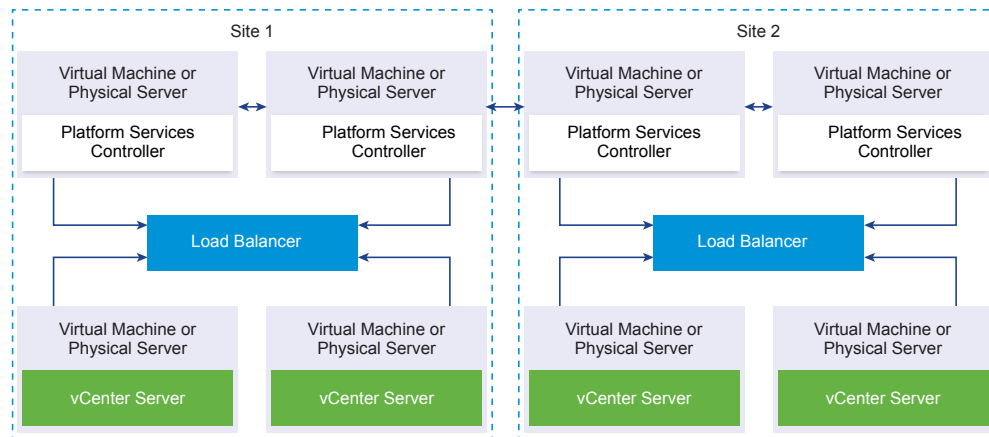
**Important** To configure Platform Services Controller high availability behind a load balancer, the Platform Services Controller instances must be of the same operating system type. Mixed operating systems Platform Services Controller instances behind a load balancer are unsupported.

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The vCenter Server instances are connected to the load balancer. When a Platform Services Controller instance stops responding, the load balancer automatically distributes the load among the other functional Platform Services Controller instances without downtime.

## Platform Services Controller with Load Balancers Across vCenter Single Sign-On Sites

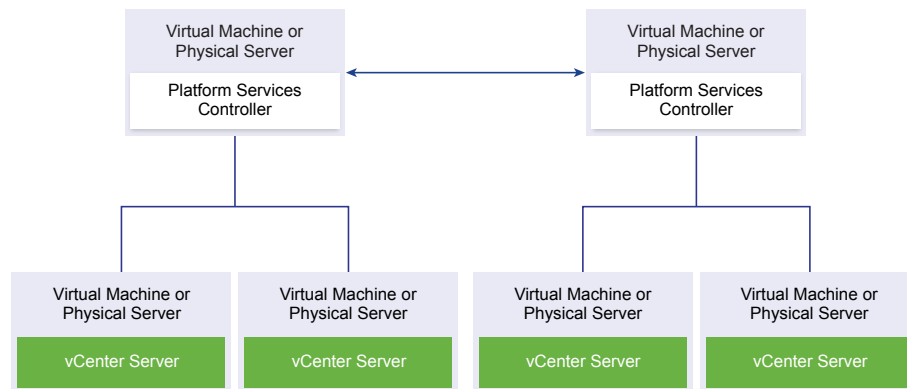
Figure 1-7. Example of Two Load Balanced Pairs of Platform Services Controller Instances Across Two Sites



Your vCenter Single Sign-On domain might span multiple sites. To ensure Platform Services Controller high availability with automatic failover throughout the domain, you must configure a separate load balancer in each site.

## Platform Services Controller with No Load Balancer

Figure 1-8. Example of Two Joined Platform Services Controller Instances with No a Load Balancer



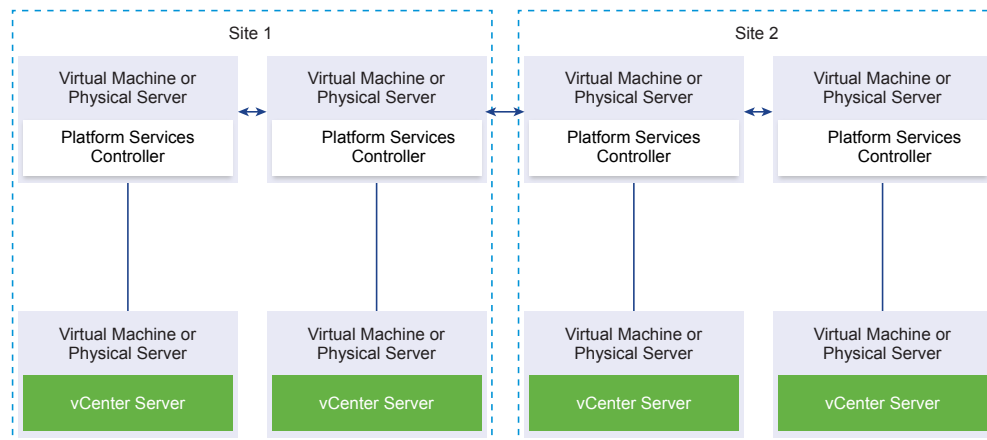
When you join two or more Platform Services Controller instances in the same site with no load balancer, you configure Platform Services Controller high availability with a manual failover for this site.

When a Platform Services Controller instance stops responding, you must manually fail over the vCenter Server instances that are registered to it. You fail over the instances by repointing them to other functional Platform Services Controller instances within the same site. See [Repoint vCenter Server to Another External Platform Services Controller in the Same Domain](#).

**Note** If your vCenter Single Sign-On domain includes three or more Platform Services Controller instances, you can manually create a ring topology. A ring topology ensures Platform Services Controller reliability when one of the instances fails. To create a ring topology, run the `/usr/lib/vmware-vmdir/bin/vdcrepadmin -f createagreement` command against the first and last Platform Services Controller instance that you have deployed.

## Platform Services Controller with No Load Balancer Across vCenter Single Sign-On Sites

**Figure 1-9. Example of Two Joined Pairs of Platform Services Controller Instances Across Two Sites with No Load Balancer**



Your vCenter Single Sign-On domain might span multiple sites. When no load balancer is available, you can manually repoint vCenter Server from a failed to a functional Platform Services Controller within the same site. See [Repoint vCenter Server to Another External Platform Services Controller in the Same Domain](#).

## vCenter Enhanced Linked Mode

vCenter Enhanced Linked Mode allows you to log in to any single instance of vCenter Server Appliance or vCenter Server and view and manage the inventories of all the vCenter Server systems in the group.

You can join up to ten vCenter Server Appliance systems and eight vCenter Server systems with vCenter Enhanced Linked Mode.

You can create a vCenter Enhanced Linked Mode group only during the deployment of vCenter Server Appliance or installation of vCenter Server. You cannot create a vCenter Enhanced Linked Mode group after you install vCenter Server or after you deploy the vCenter Server Appliance.

## vCenter Embedded Linked Mode for a vCenter Server Appliance with Embedded Platform Services Controller

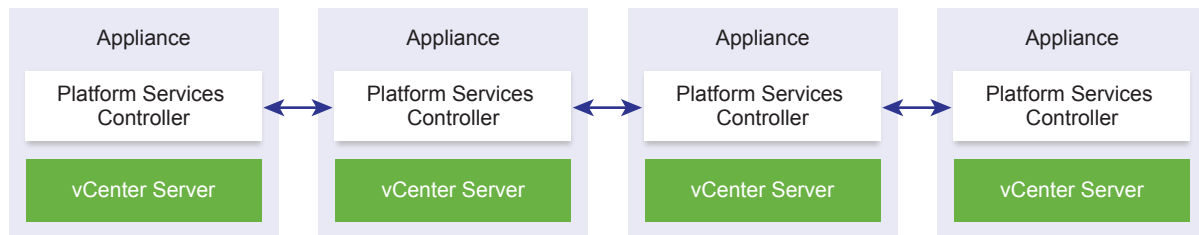
vCenter Embedded Linked Mode is enhanced linked mode support for vCenter Server Appliance with an embedded Platform Services Controller.

With vCenter Embedded Linked Mode, you can connect a vCenter Server Appliance with an embedded Platform Services Controller together to form a domain. vCenter Embedded Linked Mode is not supported for Windows vCenter Server installations. vCenter Embedded Linked Mode is suitable for most deployments.

Other features of vCenter Embedded Linked Mode include:

- No external Platform Services Controller, providing a more simplified domain architecture than enhanced linked mode.
- A simplified backup and restore process.
- A simplified HA process, removing the need for load balancers.
- Up to ten vCenter Server Appliances can be linked together using vCenter Embedded Linked Mode and displayed in a single inventory view.
- For a vCenter High Availability (vCenter HA) cluster, three nodes are considered one logical vCenter Server node. This represents ten times the vCenter HA clusters in a vCenter Embedded Linked Mode for a total of 30 VMs.

**Figure 1-10. Embedded Linked Mode**




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**Note** Embedded linked mode is not supported for Windows vCenter Server installations.

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### Joining a vCenter Embedded Linked Mode Domain

You can join a vCenter Server with an embedded Platform Services Controller to another embedded node during deployment of the vCenter Server Appliance.

For example, suppose you have two vCenter Servers with embedded Platform Services Controller systems.

If you are deploying the vCenter Server Appliances with the UI Installer:

- 1 For Appliance 1, deploy the vCenter Server Appliance as an instance on ESXi Host 1. Synchronize the time settings with ESXi Host 1.

- 2 For Appliance 2, deploy the vCenter Server Appliance as an instance on ESXi Host 1 and configure the time settings so that Appliance 2 are synchronized with ESXi Host 1. In stage 2 you select to join the vCenter Single Sign-On server of the deployed appliance on Machine 1. For specific instructions, see [Stage 2 - Set up the Newly Deployed vCenter Server Appliance with an Embedded Platform Services Controller](#).

If you are deploying the vCenter Server Appliances with the CLI:

- 1 Configure the JSON configuration template `embedded_vCSA_on_VC.json` (or `embedded_vCSA_on_ESXi.json`) for Appliance 1 as an instance on ESXi Host 1. See [Prepare Your JSON Configuration File for CLI Deployment](#) for specific instructions on preparing the JSON configuration file.
- 2 Deploy Appliance 1 by running the `vcsa-cli-installer` command. See [Deploy a vCenter Server Appliance or Platform Services Controller Appliance by Using the CLI](#) for instructions.
- 3 Configure the JSON configuration template `embedded_vCSA_replication_on_VC.json` for Appliance 2 as an instance on ESXi Host 1. Enter the hostname of the first embedded node in the `replication_partner_hostname` field in the `sso` section.
- 4 Deploy Appliance 2 by running the `vcsa-cli-installer` command on the `embedded_vCSA_replication_on_VC.json` file.

## Enhanced Linked Mode for vCenter Server or vCenter Server Appliance with an External Platform Services Controller

Enhanced Linked Mode connects multiple vCenter Server systems together by using one or more Platform Services Controllers.

Enhanced Linked Mode lets you view and search across all linked vCenter Server systems and replicate roles, permissions, licenses, policies, and tags.

When you install vCenter Server or deploy the vCenter Server Appliance with an external Platform Services Controller, you must first install the Platform Services Controller. During installation of the Platform Services Controller, you can select whether to create a vCenter Single Sign-On domain or join an existing domain. You can select to join an existing vCenter Single Sign-On domain if you have already installed or deployed a Platform Services Controller instance and have created a vCenter Single Sign-On domain. When you join an existing vCenter Single Sign-On domain, the infrastructure data between the existing Platform Services Controller and the new Platform Services Controller is replicated.

With Enhanced Linked Mode, you can connect not only vCenter Server systems running on Windows but also many vCenter Server Appliances. You can also have an environment where multiple vCenter Server systems and vCenter Server Appliances are linked together.

If you install vCenter Server with an external Platform Services Controller, you first must deploy the Platform Services Controller on one virtual machines or physical server and then deploy vCenter Server on another virtual machine or physical server. While installing vCenter Server, you must select an existing external Platform Services Controller. You cannot select an existing Platform Services Controller that is a part of an embedded installation. For more information about the supported topologies, see [vCenter Server and Platform Services Controller Deployment Types](#).

# Deploying the vCenter Server Appliance and Platform Services Controller Appliance

## 2

You can deploy the vCenter Server Appliance with an embedded or external Platform Services Controller to manage your vSphere environment. You can deploy a Platform Services Controller appliance and register external deployments and Windows installations of vCenter Server Appliance with this Platform Services Controller appliance.

You can deploy the vCenter Server Appliance or Platform Services Controller appliance on an ESXi host 5.5 or later, or on an ESXi host or DRS cluster from the inventory of a vCenter Server instance 5.5 or later.

For information about the software included in the vCenter Server Appliance 6.7, see [Overview of the vCenter Server Appliance](#).

For information about the software and hardware requirements for deploying the vCenter Server Appliance and Platform Services Controller appliance, see [System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance](#).

The vCenter Server Appliance installer contains executable files for GUI and CLI deployments, which you can use alternatively.

- The GUI deployment is a two stage process. The first stage is a deployment wizard that deploys the OVA file of the appliance on the target ESXi host or vCenter Server instance. After the OVA deployment finishes, you are redirected to the second stage of the process that sets up and starts the services of the newly deployed appliance.
- The CLI deployment method involves running a CLI command against a JSON file that you previously prepared. The CLI installer parses the configuration parameters and their values from the JSON file and generates an OVF Tool command that automatically deploys and sets up the appliance.

---

**Important** For topologies with external Platform Services Controller instances, you must deploy the replicating Platform Services Controller instances in a sequence. After the successful deployment of all Platform Services Controller instances in the domain, you can perform concurrent deployments of multiple vCenter Server appliances that point to a common external Platform Services Controller instance.

---

The vCenter Server Appliance and Platform Services Controller appliance have the following default user names:

User Name	Description
root	Use this user name to log in to the appliance operating system and the Appliance Management Interface. You set the password while deploying the virtual appliance.
administrator@your_domain_name	Use this user name for vCenter Single Sign-On login. You set the password while creating the vCenter Single Sign-On domain. You create a vCenter Single Sign-On domain during the deployment of a vCenter Server Appliance with an embedded Platform Services Controller or the first Platform Services Controller instance in a new vCenter Single Sign-On domain. After you create a vCenter Single Sign-On domain, only the administrator@your_domain_name user has the privileges required to log in to vCenter Single Sign-On and vCenter Server. The administrator@your_domain_name user can proceed as follows: <ul style="list-style-type: none"> <li>■ Add an identity source in which additional users and groups are defined to vCenter Single Sign-On.</li> <li>■ Give permissions to the users and groups.</li> </ul> For information about adding identity sources and giving permissions to the users and groups, see <i>Platform Services Controller Administration</i> .

For information about upgrading and patching the vCenter Server Appliance and Platform Services Controller appliance, see *vSphere Upgrade*.

For information about configuring the vCenter Server Appliance and Platform Services Controller appliance, see *vCenter Server Appliance Configuration*.

Starting with vSphere 6.5, vCenter Server supports mixed IPv4 and IPv6 environment. If you want to set up the vCenter Server Appliance to use an IPv6 address version, use the fully qualified domain name (FQDN) or host name of the appliance. To set up an IPv4 address, the best practice is to use the FQDN or host name of the appliance, because the IP address can change if assigned by DHCP.

This chapter includes the following topics:

- [System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance](#)
- [Preparing for Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#)
- [Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance](#)
- [GUI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#)
- [CLI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#)

## System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance

You can deploy the vCenter Server Appliance or Platform Services Controller appliance on an ESXi host 5.5 or later, or on a vCenter Server instance 5.5 or later. Your system must also meet specific software and hardware requirements.

When you use Fully Qualified Domain Names, verify that the client machine from which you are deploying the appliance and the network on which you are deploying the appliance use the same DNS server.

Before you deploy the appliance, synchronize the clocks of the target server and all vCenter Server and Platform Services Controller instances on the vSphere network. Unsynchronized clocks might result in authentication problems and can cause the installation to fail or prevent the appliance services from starting. See [Synchronizing Clocks on the vSphere Network](#).

## Hardware Requirements for the vCenter Server Appliance and Platform Services Controller Appliance

When you deploy the vCenter Server Appliance, you can select to deploy an appliance that is suitable for the size of your vSphere environment. The option that you select determines the number of CPUs and the amount of memory for the appliance. The size of the Platform Services Controller appliance is the same for all environment sizes.

### Hardware Requirements for the vCenter Server Appliance

The hardware requirements for a vCenter Server Appliance depend on the size of your vSphere inventory.

**Table 2-1. Hardware Requirements for a vCenter Server Appliance with an Embedded or External Platform Services Controller**

	Number of vCPUs	Memory
Tiny environment (up to 10 hosts or 100 virtual machines)	2	10 GB
Small environment (up to 100 hosts or 1,000 virtual machines)	4	16 GB
Medium environment (up to 400 hosts or 4,000 virtual machine)	8	24 GB
Large environment (up to 1,000 hosts or 10,000 virtual machines)	16	32 GB
X-Large environment (up to 2,000 hosts or 35,000 virtual machines)	24	48 GB

**Note** If you want to add an ESXi host with more than 512 LUNs and 2,048 paths to the vCenter Server Appliance inventory, you must deploy a vCenter Server Appliance for a large or x-large environment.

### Hardware Requirements for the Platform Services Controller Appliance

The hardware requirements for a Platform Services Controller appliance are 2 vCPUs and 4 GB memory.



## Storage Requirements for the vCenter Server Appliance and Platform Services Controller Appliance

When you deploy the vCenter Server Appliance or Platform Services Controller appliance, the ESXi host or DRS cluster on which you deploy the appliance must meet minimum storage requirements. The required storage depends not only on the size of the vSphere environment and the storage size, but also on the disk provisioning mode.

### Storage Requirements for the vCenter Server Appliance

The storage requirements are different for each vSphere environment size and depend on your database size requirements.

**Table 2-2. Storage Requirements for a vCenter Server Appliance with an Embedded or External Platform Services Controller**

	Default Storage Size	Large Storage Size	X-Large Storage Size
Tiny environment (up to 10 hosts or 100 virtual machines)	250 GB	775 GB	1650 GB
Small environment (up to 100 hosts or 1,000 virtual machines)	290 GB	820 GB	1700 GB
Medium environment (up to 400 hosts or 4,000 virtual machine)	425 GB	925 GB	1805 GB
Large environment (up to 1,000 hosts or 10,000 virtual machines)	640 GB	990 GB	1870 GB
X-Large environment (up to 2,000 hosts or 35,000 virtual machines)	980 GB	1030 GB	1910 GB

**Note** The storage requirements include the requirements for the VMware Update Manager that runs as a service in the vCenter Server Appliance.

### Storage Requirements for the Platform Services Controller Appliance

The storage requirement for a Platform Services Controller appliance is 60 GB.

## Software Requirements for the vCenter Server Appliance and Platform Services Controller Appliance

The VMware vCenter Server Appliance and Platform Services Controller appliance can be deployed on ESXi hosts 5.5 or later, or on vCenter Server instances 6.0 or later.

You can deploy the vCenter Server Appliance or Platform Services Controller appliance by using the GUI or CLI installer. You run the installer from a network client machine that you use to connect to the target server and deploy the appliance on the server. You can connect directly to an ESXi 6.x host on which to deploy the appliance. You can also connect to a vCenter Server 6.x instance to deploy the appliance on an ESXi host or DRS cluster that resides in the vCenter Server inventory.

For information about the requirements for network client machine, see [System Requirements for the vCenter Server Appliance Installer](#).

## Required Ports for vCenter Server and Platform Services Controller

The vCenter Server system, both on Windows and in the appliance, must be able to send data to every managed host and receive data from the vSphere Web Client and the Platform Services Controller services. To enable migration and provisioning activities between managed hosts, the source and destination hosts must be able to receive data from each other.

If a port is in use or is blacklisted, the vCenter Server installer displays an error message. You must use another port number to proceed with the installation. There are internal ports that are used only for inter-process communication.

VMware uses designated ports for communication. Additionally, the managed hosts monitor designated ports for data from vCenter Server. If a built-in firewall exists between any of these elements, the installer opens the ports during the installation or upgrade process. For custom firewalls, you must manually open the required ports. If you have a firewall between two managed hosts and you want to perform source or target activities, such as migration or cloning, you must configure a means for the managed hosts to receive data.

---

**Note** In Microsoft Windows Server 2008 and later, firewall is enabled by default.

---

**Table 2-3. Ports Required for Communication Between Components**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
22	TCP	System port for SSHD.	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
53		DNS service	Windows installations and appliance deployments of Platform Services Controller	No

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**Table 2-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
80	TCP	<p>vCenter Server requires port 80 for direct HTTP connections. Port 80 redirects requests to HTTPS port 443. This redirection is useful if you accidentally use http://server instead of https://server. WS-Management (also requires port 443 to be open).</p> <p>If you use a Microsoft SQL database that is stored on the same virtual machine or physical server as the vCenter Server, port 80 is used by the SQL Reporting Service. When you install or upgrade vCenter Server, the installer prompts you to change the HTTP port for vCenter Server. Change the vCenter Server HTTP port to a custom value to ensure a successful installation or upgrade.</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
88	TCP	Active Directory server. This port must be open for host to join Active Directory. If you use native Active Directory, the port must be open on both vCenter Server and Platform Services Controller.	Windows installations and appliance deployments of Platform Services Controller	No
389	TCP/UDP	<p>This port must be open on the local and all remote instances of vCenter Server. This is the LDAP port number for the Directory Services for the vCenter Server group. If another service is running on this port, it might be preferable to remove it or change its port to a different port. You can run the LDAP service on any port from 1025 through 65535.</p> <p>If this instance is serving as the Microsoft Windows Active Directory, change the port number from 389 to an available port from 1025 through 65535.</p>	Windows installations and appliance deployments of Platform Services Controller	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to Platform Services Controller</li> </ul>

**Table 2-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
443	TCP	<p>The default port that the vCenter Server system uses to listen for connections from the vSphere Web Client. To enable the vCenter Server system to receive data from the vSphere Web Client, open port 443 in the firewall.</p> <p>The vCenter Server system also uses port 443 to monitor data transfer from SDK clients.</p> <p>This port is also used for the following services:</p> <ul style="list-style-type: none"> <li>■ WS-Management (also requires port 80 to be open)</li> <li>■ Third-party network management client connections to vCenter Server</li> <li>■ Third-party network management clients access to hosts</li> </ul> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	<ul style="list-style-type: none"> <li>■ vCenter Server to vCenter Server</li> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
514	TCP/UDP	<p>vSphere Syslog Collector port for vCenter Server on Windows and vSphere Syslog Service port for vCenter Server Appliance</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
636	TCP	<p>vCenter Single Sign-On LDAPS</p> <p>For backward compatibility with vSphere 6.0 only.</p>	<p>Windows installations and appliance deployments of Platform Services Controller</p>	<p>During upgrade from vSphere 6.0 only. vCenter Server 6.0 to Platform Services Controller 6.5</p>

**Table 2-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
902	TCP/UDP	<p>The default port that the vCenter Server system uses to send data to managed hosts. Managed hosts also send a regular heartbeat over UDP port 902 to the vCenter Server system. This port must not be blocked by firewalls between the server and the hosts or between hosts.</p> <p>Port 902 must not be blocked between the VMware Host Client and the hosts. The VMware Host Client uses this port to display virtual machine consoles</p> <p><b>Important</b> You can change this port number during the vCenter Server installations on Windows.</p>	Windows installations and appliance deployments of vCenter Server	No
1514	TCP	<p>vSphere Syslog Collector TLS port for vCenter Server on Windows and vSphere Syslog Service TLS port for vCenter Server Appliance</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
2012	TCP	Control interface RPC for vCenter Single Sign-On	Windows installations and appliance deployments of Platform Services Controller	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> <li>■ Platform Services Controller to Platform Services Controller</li> </ul>
2014	TCP	<p>RPC port for all VMCA (VMware Certificate Authority) APIs</p> <p><b>Important</b> You can change this port number during the Platform Services Controller installations on Windows.</p>	Windows installations and appliance deployments of Platform Services Controller	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
2015	TCP	DNS management	Windows installations and appliance deployments of Platform Services Controller	Platform Services Controller to Platform Services Controller

**Table 2-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
2020	TCP/UDP	Authentication framework management  <b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.	Windows installations and appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
5480	TCP	Appliance Management Interface Open endpoint serving all HTTPS, XMLRPS and JSON-RPC requests over HTTPS.	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
6500	TCP/UDP	ESXi Dump Collector port  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
6501	TCP	Auto Deploy service  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
6502	TCP	Auto Deploy management  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
7080, 12721	TCP	Secure Token Service  <b>Note</b> Internal ports	Windows installations and appliance deployments of Platform Services Controller	No
7081	TCP	VMware Platform Services Controller Web Client  <b>Note</b> Internal port	Windows installations and appliance deployments of Platform Services Controller	No
8200, 8201, 8300, 8301	TCP	Appliance management  <b>Note</b> Internal ports	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
8084	TCP	vSphere Update Manager SOAP port The port used by vSphere Update Manager client plug-in to connect to the vSphere Update Manager SOAP server.	Appliance deployments of vCenter Server	No

**Table 2-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
9084	TCP	vSphere Update Manager Web Server Port The HTTP port used by ESXi hosts to access host patch files from vSphere Update Manager server.	Appliance deployments of vCenter Server	No
9087	TCP	vSphere Update Manager Web SSL Port The HTTPS port used by vSphere Update Manager client plug-in to upload host upgrade files to vSphere Update Manager server.	Appliance deployments of vCenter Server	No
9443	TCP	vSphere Web Client HTTPS	Windows installations and appliance deployments of vCenter Server	No

To configure the vCenter Server system to use a different port to receive vSphere Web Client data, see the *vCenter Server and Host Management* documentation.

For more information about firewall configuration, see the *vSphere Security* documentation.

## DNS Requirements for the vCenter Server Appliance and Platform Services Controller Appliance

When you deploy the vCenter Server Appliance or Platform Services Controller appliance, similar to any network server, you can assign a fixed IP address and an FQDN that is resolvable by a DNS server so that clients can reliably access the service.

When you deploy the vCenter Server Appliance or Platform Services Controller appliance with a static IP address, you ensure that in case of system restart, the IP address of the appliance remains the same.

Before you deploy the vCenter Server Appliance or Platform Services Controller appliance with a static IP address, you must verify that this IP address has a valid internal domain name system (DNS) registration.

When you deploy the vCenter Server Appliance, the installation of the Web server component that supports the vSphere Web Client fails if the installer cannot look up the fully qualified domain name (FQDN) for the appliance from its IP address. Reverse lookup is implemented using PTR records.

If you plan to use an FQDN for the appliance system name, you must verify that the FQDN is resolvable by a DNS server.

You can use the `nslookup` command to verify that the DNS reverse lookup service returns an FQDN when queried with the IP address and to verify that the FQDN is resolvable.

```
nslookup -nosearch -nodefname FQDN_or_IP_address
```

If you use DHCP instead of a static IP address for the vCenter Server Appliance or Platform Services Controller appliance, verify that the appliance name is updated in the domain name service (DNS). If you can ping the appliance name, the name is updated in DNS.

Ensure that the ESXi host management interface has a valid DNS resolution from the vCenter Server and all vSphere Web Client instances. Ensure that the vCenter Server has a valid DNS resolution from all ESXi hosts and all vSphere Web Clients.

## vSphere Web Client Software Requirements

Make sure that your browser supports the vSphere Web Client.

The vSphere Web Client 6.7 requires Adobe Flash Player v. 16 to 23. For best performance and the most recent security updates, use Adobe Flash Player 23.

VMware has tested and supports the following guest operating systems and browser versions for the vSphere Web Client. For best performance, use Google Chrome.

**Table 2-4. Supported Guest Operating Systems and Minimum Browser Versions for the vSphere Web Client**

Operating system	Browser
Windows	Microsoft Internet Explorer v. 10.0.19 and later. Mozilla Firefox v. 39 and later. Google Chrome v. 34 and later.
Mac OS	Mozilla Firefox v. 39 and later. Google Chrome v. 34 and later.

## Preparing for Deployment of the vCenter Server Appliance and Platform Services Controller Appliance

Before you deploy the vCenter Server Appliance or Platform Services Controller appliance, you must download the vCenter Server Appliance installer ISO file and mount it to a network virtual machine or physical server from which you want to perform the deployment.

The machine from which you deploy the appliance must run on a Windows, Linux, or Mac operating system that meets the operating system requirements. See [System Requirements for the vCenter Server Appliance Installer](#).

### System Requirements for the vCenter Server Appliance Installer

You can run the vCenter Server Appliance GUI or CLI installer from a network client machine that is running on a Windows, Linux, or Mac operating system of a supported version.

To ensure optimal performance of the GUI and CLI installers, use a client machine that meets the minimum hardware requirements.



**Table 2-5. System Requirements for the GUI and CLI Installers**

Operating System	Supported Versions	Minimum Hardware Configuration for Optimal Performance
Windows	<ul style="list-style-type: none"> <li>■ Windows 7, 8, 8.1, 10</li> <li>■ Windows 2012 x64 bit</li> <li>■ Windows 2012 R2 x64 bit</li> <li>■ Windows 2016 x64 bit</li> </ul>	4 GB RAM, 2 CPU having 4 cores with 2.3 GHz, 32 GB hard disk, 1 NIC
Linux	<ul style="list-style-type: none"> <li>■ SUSE 12</li> <li>■ Ubuntu 14.04</li> </ul>	4 GB RAM, 1 CPU having 2 cores with 2.3 GHz, 16 GB hard disk, 1 NIC <b>Note</b> The CLI installer requires 64-bit OS.
Mac	<ul style="list-style-type: none"> <li>■ macOS v10.9, 10.10, 10.11</li> <li>■ macOS Sierra</li> </ul>	8 GB RAM, 1 CPU having 4 cores with 2.4 GHz, 150 GB hard disk, 1 NIC

**Note** For client machines that run on Mac 10.11, concurrent GUI deployments of multiple appliances are unsupported. You must deploy the appliances in a sequence.

**Note** Visual C++ redistributable libraries need to be installed to run the CLI installer on versions of Windows older than Windows 10. The Microsoft installers for these libraries are located in the `vcsa-cli-installer/win32/vcredist` directory.

**Note** Deploying the vCenter Server Appliance with the GUI requires a minimum resolution of 1024x768 to properly display. Lower resolutions can truncate the UI elements.

## Download and Mount the vCenter Server Appliance Installer

VMware releases the vCenter Server Appliance ISO image, which contains GUI and CLI installers for the vCenter Server Appliance and Platform Services Controller appliance.

With the GUI and CLI executable files that are included in the vCenter Server Appliance installer, you can:

- Deploy the vCenter Server Appliance and Platform Services Controller appliance.
- Upgrade the vCenter Server Appliance and Platform Services Controller appliance.
- Migrate Windows installations of vCenter Server, vCenter Single Sign-On, and Platform Services Controller to the vCenter Server Appliance and Platform Services Controller appliance.
- Restore a vCenter Server Appliance from a file-based backup.

### Prerequisites

- Create a My VMware account at <https://my.vmware.com/web/vmware/>.
- Verify that your client machine meets the system requirements for the vCenter Server Appliance installer. See [System Requirements for the vCenter Server Appliance Installer](#).

**Procedure**

- 1 From the VMware Web site at <https://my.vmware.com/web/vmware/downloads>, download the vCenter Server Appliance ISO image.

`VMware-VCSA-all-version_number-build_number.iso`

- 2 Confirm that the md5sum is correct.

See the VMware Web site topic *Using MD5 Checksums* at <http://www.vmware.com/download/md5.html>.

- 3 Mount or extract the ISO image to the client machine from which you want to deploy, upgrade, migrate, or restore the appliance.

---

**Note** ISO mounting or extracting software that does not allow more than eight directory levels, for example, MagicISO Maker on Windows, is unsupported.

For Linux OS and Mac OS, Archive Manager is unsupported.

---

For Mac OS, you can use DiskImageMounter.

For Ubuntu 14.04, you can use Disk Image Mounter.

For SUSE 12 OS, you can use the terminal.

```
$ sudo mkdir mount_dir
$ sudo mount -o loop VMware-VCSA-all-version_number-build_number.iso mount_dir
```

**What to do next**

Open the `readme.txt` file and review the information about the other files and directories in the vCenter Server Appliance ISO image.

**Synchronizing Clocks on the vSphere Network**

Verify that all components on the vSphere network have their clocks synchronized. If the clocks on the machines in your vSphere network are not synchronized, SSL certificates, which are time-sensitive, might not be recognized as valid in communications between network machines.

Unsynchronized clocks can result in authentication problems, which can cause the installation to fail or prevent the vCenter Server Appliance vpxd service from starting.

Verify that any Windows host machine on which vCenter Server runs is synchronized with the Network Time Server (NTP) server. See the Knowledge Base article <http://kb.vmware.com/kb/1318>.

To synchronize ESXi clocks with an NTP server, you can use the VMware Host Client. For information about editing the time configuration of an ESXi host, see *vSphere Single Host Management*.

## System Clock Synchronization Between the Client and Server

To establish a secure TLS connection to a Platform Services Controller or vCenter Server (the server), the system where you are running the CLI installer (the client) must not have its system clock slower or faster than the server's system clock by an acceptable limit (tolerance).

See [Table 2-6](#) for specific values for each deployment scenario.

**Note** The client clock values are applicable only for vCenter Server 6.7.

**Table 2-6. Client Clock Tolerance**

Deployment Scenario	Clock Tolerance	Connection Notes
Linking one Platform Services Controller with another Platform Services Controller	Clock tolerance for the client and the external Platform Services Controller must not exceed 10 minutes	The CLI installer must make a secure connection to a Platform Services Controller.
Linking a vCenter Server with an external Platform Services Controller	Clock tolerance for the client and external Platform Services Controller must not exceed 10 minutes.	The CLI installer must make a secure connection to a Platform Services Controller.
Linking one vCenter Server with an embedded Platform Services Controller with another vCenter Server with an embedded Platform Services Controller	When deploying the second vCenter Server with embedded Platform Services Controller, the clock tolerance for the client and the first vCenter Server with embedded Platform Services Controller must not exceed 10 minutes.	
Installing a vCenter Server Appliance using a container vCenter Server vCenter Server with a *. _on_vc. json template.	The maximum clock tolerance between the client and the container vCenter Server is 8 hours 20 minutes.	

## Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance

To ensure successful deployment of the vCenter Server Appliance or Platform Services Controller appliance, you must perform some required tasks and pre-checks before running the installer.

### General Prerequisites

- [Download and Mount the vCenter Server Appliance Installer.](#)
- For topologies with external Platform Services Controller instances, verify that you deploy the different nodes with time synchronization between each other. All vCenter Server instances, Platform Services Controller instances, and third-party load balancers in the vCenter Single Sign-On domain must be time synchronized. See [Synchronizing Clocks on the vSphere Network.](#)

## Target System Prerequisites

- Verify that your system meets the minimum software and hardware requirements. See [System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance](#).
- If you want to deploy the appliance on an ESXi host, verify that the ESXi host is not in lockdown or maintenance mode and not part of a fully automated DRS cluster.
- If you want to deploy the appliance on a DRS cluster of the inventory of a vCenter Server instance, verify that the cluster contains at least one ESXi host that is not in lockdown or maintenance mode.
- If you plan to use NTP servers for time synchronization, verify that the NTP servers are running and that the time between the NTP servers and the target server on which you want to deploy the appliance is synchronized.

## Network Prerequisites

If you plan to assign a static IP address and an FQDN as a system name in the network settings of the appliance, verify that you have configured the forward and reverse DNS records for the IP address.

## GUI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance

You can use the GUI installer to perform an interactive deployment of a vCenter Server Appliance with an embedded Platform Services Controller, a Platform Services Controller appliance, or a vCenter Server Appliance with an external Platform Services Controller.

When you perform the GUI deployment, you download the vCenter Server Appliance installer on a network client machine, run the deployment wizard from the client machine, and provide the inputs that are required for the appliance deployment and setup.

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**Important** For topologies with external Platform Services Controller instances, you must deploy the replicating Platform Services Controller instances in a sequence. After the successful deployment of all Platform Services Controller instances in the domain, you can perform concurrent deployments of multiple vCenter Server appliances that point to a common external Platform Services Controller instance.

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The GUI deployment process includes a series of two stages.

### Figure 2-1. Stage 1 - OVA Deployment



The first stage walks you through the deployment wizard to choose the deployment type and appliance settings. This stage completes the deployment of the OVA file on the target server with the deployment type and appliance settings that you provide.

As an alternative to performing the first stage of the deployment with the GUI installer, you can deploy the OVA file of the vCenter Server Appliance or Platform Services Controller appliance by using the vSphere Web Client or VMware Host Client. To deploy the OVA file on an ESXi host or vCenter Server instance of 6.0, you can also use the vSphere Client. After the OVA deployment, you must log in to the appliance management interface of the newly deployed appliance to proceed with the second stage of the deployment process.

**Figure 2-2. Stage 2 - Appliance Setup**



The second stage walks you through the setup wizard to configure the appliance time synchronization and vCenter Single Sign-On. This stage completes the initial setup and starts the services of the newly deployed appliance.

As an alternative to performing the second stage of the deployment with the GUI installer, you can log in to the Appliance Management Interface of the newly deployed appliance, [https://FQDN\\_or\\_IP\\_address:5480](https://FQDN_or_IP_address:5480).

## Required Information for Deploying a vCenter Server Appliance or Platform Services Controller Appliance

When you use the GUI method to deploy a vCenter Server Appliance with an embedded Platform Services Controller, a Platform Services Controller appliance, or a vCenter Server Appliance with an external Platform Services Controller, the wizard prompts you for deployment and setup information. It is a best practice to keep a record of the values that you enter in case you must reinstall the product.

You can use this worksheet to record the information that you need for deploying a vCenter Server Appliance with an embedded Platform Services Controller, a Platform Services Controller appliance, or a vCenter Server Appliance with an external Platform Services Controller.

**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process**

Required for Deployment of	Required Information	Default	Your Entry
All deployment types	FQDN or IP address of the target server on which you want to deploy the appliance.  The target server can be either an ESXi host or a vCenter Server instance.	-	
	HTTPS port of the target server	443	

**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process (Continued)**

Required for Deployment of	Required Information	Default	Your Entry
	User name with administrative privileges on the target server <ul style="list-style-type: none"> <li>■ If your target server is an ESXi host, use root.</li> <li>■ If your target server is a vCenter Server instance, use <i>user_name@your_domain_name</i>, for example, <i>administrator@vsphere.local</i>.</li> </ul>	-	
	Password of the user with administrative privileges on the target server	-	
All deployment types Only if your target server is a vCenter Server instance	Data center from the vCenter Server inventory on which you want to deploy the appliance  Optionally you can provide a data center folder.	-	
	ESXi host or DRS cluster from the data center inventory on which you want to deploy the appliance	-	
All deployment types	VM name for the appliance <ul style="list-style-type: none"> <li>■ Must not contain a percent sign (%), backslash (\), or forward slash (/)</li> <li>■ Must be no more than 80 characters in length</li> </ul>	VMware vCenter Server Appliance	
All deployment types	Password for the root user of the appliance operating system <ul style="list-style-type: none"> <li>■ Must contain only lower ASCII characters without spaces.</li> <li>■ Must be at least 8 characters, but no more than 20 characters in length</li> <li>■ Must contain at least one uppercase letter</li> <li>■ Must contain at least one lowercase letter</li> <li>■ Must contain at least one number</li> <li>■ Must contain at least one special character, for example, a dollar sign (\$), hash key (#), at sign (@), period (.), or exclamation mark (!)</li> </ul>	-	

**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process (Continued)**

Required for Deployment of	Required Information	Default	Your Entry
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an embedded Platform Services Controller</li> </ul>	<p>Deployment size of the vCenter Server Appliance for your vSphere environment</p>	Tiny	
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an external Platform Services Controller</li> </ul>	<ul style="list-style-type: none"> <li>■ Tiny           <p>Deploys an appliance with 2 CPUs and 10 GB of memory.</p> <p>Suitable for environments with up to 10 hosts or 100 virtual machines.</p> </li> <li>■ Small           <p>Deploys an appliance with 4 CPUs and 16 GB of memory.</p> <p>Suitable for environments with up to 100 hosts or 1,000 virtual machines.</p> </li> <li>■ Medium           <p>Deploys an appliance with 8 CPUs and 24 GB of memory.</p> <p>Suitable for environments with up to 400 hosts or 4,000 virtual machines.</p> </li> <li>■ Large           <p>Deploys an appliance with 16 CPUs and 32 GB of memory.</p> <p>Suitable for environments with up to 1,000 hosts or 10,000 virtual machines.</p> </li> <li>■ X-Large           <p>Deploys an appliance with 24 CPUs and 48 GB of memory.</p> <p>Suitable for environments with up to 2,000 hosts or 35,000 virtual machines.</p> </li> </ul>		

**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process (Continued)**

Required for Deployment of	Required Information	Default	Your Entry
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an embedded Platform Services Controller</li> </ul>	Storage size of the vCenter Server Appliance for your vSphere environment	Default	
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an external Platform Services Controller</li> </ul>	Increase the default storage size if you want larger volume for SEAT data (stats, events, alarms, and tasks).		
	<ul style="list-style-type: none"> <li>■ Default</li> </ul>		
	For tiny deployment size, deploys the appliance with 300 GB of storage.		
	For small deployment size, deploys the appliance with 340 GB of storage.		
	For medium deployment size, deploys the appliance with 525 GB of storage.		
	For large deployment size, deploys the appliance with 740 GB of storage.		
	For x-large deployment size, deploys the appliance with 1180 GB of storage.		
	<ul style="list-style-type: none"> <li>■ Large</li> </ul>		
	For tiny deployment size, deploys the appliance with 825 GB of storage.		
	For small deployment size, deploys the appliance with 870 GB of storage.		
	For medium deployment size, deploys the appliance with 1025 GB of storage.		
	For large deployment size, deploys the appliance with 1090 GB of storage.		
	For x-large deployment size, deploys the appliance with 1230 GB of storage.		
	<ul style="list-style-type: none"> <li>■ X-Large</li> </ul>		
	For tiny deployment size, deploys the appliance with 1700 GB of storage.		
	For small deployment size, deploys the appliance with 1750 GB of storage.		



**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process (Continued)**

Required for Deployment of	Required Information	Default	Your Entry
	<p>For medium deployment size, deploys the appliance with 1905 GB of storage.</p> <p>For large deployment size, deploys the appliance with 1970 GB of storage.</p> <p>For x-large deployment size, deploys the appliance with 2110 GB of storage.</p>		
All deployment types	<p>Name of the datastore on which you want to store the configuration files and virtual disks of the appliance</p> <hr/> <p><b>Note</b> The installer displays a list of datastores that are accessible from your target server.</p>	-	
	Enable or disable Thin Disk Mode	Disabled	
All deployment types	<p>Name of the network to which to connect the appliance</p> <hr/> <p><b>Note</b> The installer displays a drop-down menu with networks that depend on the network settings of your target server. If you are deploying the appliance directly on an ESXi host, non-ephemeral distributed virtual port groups are not supported and are not displayed in the drop-down menu.</p> <hr/> <p>The network must be accessible from the client machine from which you perform the deployment.</p>	-	
	IP version for the appliance address	IPv4	
	Can be either IPv4 or IPv6.		
	IP assignment for the appliance address	static	
	Can be either static or DHCP.		
All deployment types	FQDN	-	
Only if you use a static assignment	vCenter Server uses FQDN or IP address as the system name.		
	IP address	-	

**Table 2-7. Required Information During Stage 1 of the GUI Deployment Process (Continued)**

Required for Deployment of	Required Information	Default	Your Entry
	For IPv4 networks, you can use either a subnet mask or a network prefix. Subnet mask uses a dot decimal notation (for example, 255.255.255.0). An IPv4 network prefix is an integer between 0 and 32.  For IPv6 networks, you must use a network prefix. An IPv6 network prefix is an integer between 0 and 128 .	-	
	Default gateway	-	
	DNS servers separated by commas	-	
All deployment types Only if you use a DHCP assignment with IPv4 version and a DDNS server is available in your environment.	System name (FQDN)	-	

**Table 2-8. Required Information During Stage 2 of the GUI Deployment Process**

Required for	Required Information	Default	Your Entry
All deployment types	Time synchronization settings You can synchronize the time of the appliance either with the time of the ESXi host or with one or more NTP servers.  If you want to use more than one NTP servers, you must provide the IP addresses or FQDNs of the NTP servers as a comma-separated list.	Synchronize time with NTP servers	
	Enable or disable SSH access	Disabled	
	<b>Note</b> vCenter Server Appliance high availability requires remote SSH access to the appliance.		
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an embedded Platform Services Controller</li> <li>■ Platform Services Controller appliance as the first instance in a new domain</li> </ul>	Name for the new vCenter Single Sign-On domain For example, vsphere.local.	-	

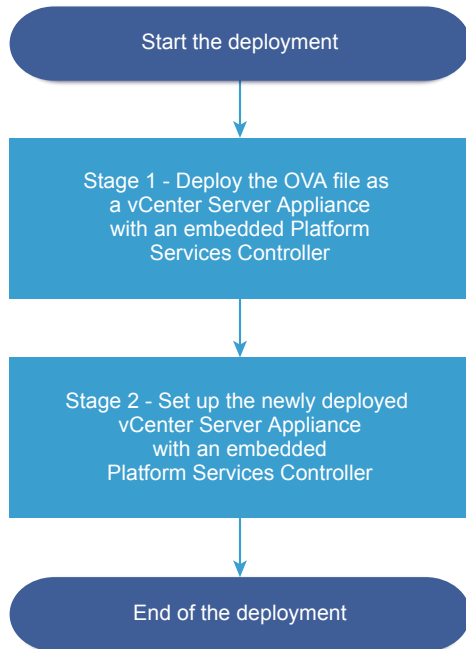
**Table 2-8. Required Information During Stage 2 of the GUI Deployment Process (Continued)**

Required for	Required Information	Default	Your Entry
	Password for the administrator account, <i>administrator@your_domain_name</i> <ul style="list-style-type: none"> <li>■ Must be at least 8 characters, but no more than 20 characters in length</li> <li>■ Must contain at least one uppercase letter</li> <li>■ Must contain at least one lowercase letter</li> <li>■ Must contain at least one number</li> <li>■ Must contain at least one special character, such as ampersand (&amp;), hash key (#), and percent sign (%)</li> </ul>	-	
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an external Platform Services Controller</li> <li>■ Platform Services Controller appliance as a subsequent instance in an existing domain</li> </ul>	FQDN or IP address of the Platform Services Controller instance that you want to join  You must join a Platform Services Controller instance of the same version.	-	
	HTTPS port of the Platform Services Controller instance	443	
	vCenter Single Sign On domain name of the Platform Services Controller instance  For example, vsphere.local.	-	
	Password of the vCenter Single Sign On administrator user for the domain	-	
	vCenter Single Sign-On site name  You can join an existing site or create a new site.	-	
<ul style="list-style-type: none"> <li>■ vCenter Server Appliance with an embedded Platform Services Controller</li> <li>■ Platform Services Controller appliance</li> </ul>	Join or do not participate in the VMware Customer Experience Improvement Program (CEIP)  For information about the CEIP, see the Configuring Customer Experience Improvement Program section in <i>vCenter Server and Host Management</i> .	Join the CEIP	

## Deploy the vCenter Server Appliance with an Embedded Platform Services Controller by Using the GUI

You can use the GUI installer to perform an interactive deployment of a vCenter Server Appliance with an embedded Platform Services Controller. You must run the GUI deployment from a Windows, Linux, or Mac machine that is in the network on which you want to deploy the appliance.

**Figure 2-3. Deployment Workflow of a vCenter Server Appliance with an Embedded Platform Services Controller**



### Prerequisites

- See [Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance](#).
- See [Required Information for Deploying a vCenter Server Appliance or Platform Services Controller Appliance](#).

### Procedure

#### 1 [Stage 1 - Deploy the OVA File as a vCenter Server Appliance with an Embedded Platform Services Controller](#)

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a vCenter Server Appliance with an embedded Platform Services Controller.

## 2 Stage 2 - Set up the Newly Deployed vCenter Server Appliance with an Embedded Platform Services Controller

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed vCenter Server Appliance with an embedded Platform Services Controller.

### Stage 1 - Deploy the OVA File as a vCenter Server Appliance with an Embedded Platform Services Controller

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a vCenter Server Appliance with an embedded Platform Services Controller.

#### Procedure

- 1 In the vCenter Server Appliance installer, navigate to the `vcasa-ui-installer` directory, go to the subdirectory for your operating system, and run the installer executable file.
  - For Windows OS, go to the `win32` subdirectory, and run the `installer.exe` file.
  - For Linux OS, go to the `lin64` subdirectory, and run the `installer` file.
  - For Mac OS, go to the `mac` subdirectory, and run the `Installer.app` file.
- 2 On the Home page, click **Install** to start the deployment wizard.
- 3 Review the Introduction page to understand the deployment process and click **Next**.
- 4 Read and accept the license agreement, and click **Next**.
- 5 On the Select deployment type page, select **vCenter Server with an Embedded Platform Services Controller** and click **Next**.

This option deploys an appliance in which both the Platform Services Controller and vCenter Server are installed.

## 6 Connect to the target server on which you want to deploy the vCenter Server Appliance.

Option	Steps
You can connect to an ESXi host on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the ESXi host.</li> <li>2 Enter the HTTPS port of the ESXi host.</li> <li>3 Enter the user name and password of a user with administrative privileges on the ESXi host, for example, the root user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target ESXi host, and click <b>Yes</b> to accept the certificate thumbprint.</li> </ol>
You can connect to a vCenter Server instance and browse the inventory to select an ESXi host or DRS cluster on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the vCenter Server instance.</li> <li>2 Enter the HTTPS port of the vCenter Server instance.</li> <li>3 Enter the user name and password of user with vCenter Single Sign-On administrative privileges on the vCenter Server instance, for example, the administrator@<i>your_domain_name</i> user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target vCenter Server instance, and click <b>Yes</b> to accept the certificate thumbprint.</li> <li>6 Select the data center or data center folder that contains the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b></li> </ol> <p><b>Note</b> You must select a data center or data center folder that contains at least one ESXi host that is not in lockdown or maintenance mode.</p> <ol style="list-style-type: none"> <li>7 Select the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b>.</li> </ol>

## 7 On the Set up appliance VM page, enter a name for the vCenter Server Appliance, set the password for the root user, and click **Next**.

The appliance name must not contain a percent sign (%), backslash (\), or forward slash (/) and must be no more than 80 characters in length.

The password must contain only lower ASCII characters without spaces, at least eight characters, a number, uppercase and lowercase letters, and a special character, for example, an exclamation mark (!), hash key (#), at sign (@), or brackets (()).

## 8 Select the deployment size for the vCenter Server Appliance for your vSphere inventory.

Deployment Size Option	Description
<b>Tiny</b>	Deploys an appliance with 2 CPUs and 10 GB of memory. Suitable for environments with up to 10 hosts or 100 virtual machines
<b>Small</b>	Deploys an appliance with 4 CPUs and 16 GB of memory. Suitable for environments with up to 100 hosts or 1,000 virtual machines
<b>Medium</b>	Deploys an appliance with 8 CPUs and 24 GB of memory. Suitable for environments with up to 400 hosts or 4,000 virtual machines
<b>Large</b>	Deploys an appliance with 16 CPUs and 32 GB of memory. Suitable for environments with up to 1,000 hosts or 10,000 virtual machines
<b>X-Large</b>	Deploys an appliance with 24 CPUs and 48 GB of memory. Suitable for environments with up to 2,000 hosts or 35,000 virtual machines

9 Select the storage size for the vCenter Server Appliance, and click **Next**.

Storage Size Option	Description for Tiny Deployment Size	Description for Small Deployment Size	Description for Medium Deployment Size	Description for Large Deployment Size	Description for X-Large Deployment Size
<b>Default</b>	Deploys an appliance with 300 GB of storage.	Deploys an appliance with 340 GB of storage.	Deploys an appliance with 525 GB of storage.	Deploys an appliance with 740 GB of storage.	Deploys an appliance with 1180 GB of storage.
<b>Large</b>	Deploys an appliance with 825 GB of storage.	Deploys an appliance with 870 GB of storage.	Deploys an appliance with 1025 GB of storage.	Deploys an appliance with 1090 GB of storage.	Deploys an appliance with 1230 GB of storage.
<b>X-Large</b>	Deploys an appliance with 1700 GB of storage.	Deploys an appliance with 1750 GB of storage.	Deploys an appliance with 1905 GB of storage.	Deploys an appliance with 1970 GB of storage.	Deploys an appliance with 2110 GB of storage.

10 From the list of available datastores, select the location where all the virtual machine configuration files and virtual disks will be stored and, optionally, enable thin provisioning by selecting **Enable Thin Disk Mode**. NFS datastores are thin provisioned by default.

11 On the Configure network settings page, set up the network settings.

The IP address or the FQDN of the appliance is used as a system name. It is recommended to use an FQDN. However, if you want to use an IP address, use static IP address allocation for the appliance, because IP addresses allocated by DHCP might change.

Option	Action
<b>Network</b>	<p>Select the network to which to connect the appliance.</p> <p>The networks displayed in the drop-down menu depend on the network settings of the target server. If you are deploying the appliance directly on an ESXi host, non-ephemeral distributed virtual port groups are not supported and are not displayed in the drop-down menu.</p>
<b>IP version</b>	<p>Select the version for the appliance IP address.</p> <p>You can select either IPv4 or IPv6.</p>
<b>IP assignment</b>	<p>Select how to allocate the IP address of the appliance.</p> <ul style="list-style-type: none"> <li>■ <b>static</b> <p>The wizard prompts you to enter the IP address and network settings.</p> <p><b>Note</b> Avoid using an IP address as a system name. If you use an IP address as a system name, you cannot change the IP address and update the DNS settings after deployment.</p> </li> <li>■ <b>DHCP</b> <p>A DHCP server is used to allocate the IP address. Select this option only if a DHCP server is available in your environment.</p> <p>If there is an enabled DDNS in your environment, you can enter a preferred fully qualified domain name (FQDN) for the appliance.</p> </li> </ul>
<b>Common Ports</b>	<p>You can customize the HTTP and HTTPS ports (optional).</p> <p>If specifying a custom HTTP and HTTPS port number, ensure that you do not use a port number already in use by vCenter Server, or the default HTTP and HTTPS ports of 80 and 443.</p>

- 12 On the Ready to complete stage 1 page, review the deployment settings for the vCenter Server Appliance and click **Finish** to start the OVA deployment process.
- 13 Wait for the OVA deployment to finish, and click **Continue** to proceed with stage 2 of the deployment process to set up and start the services of the newly deployed appliance.

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**Note** If you exit the wizard by clicking **Close**, you must log in to the vCenter Server Appliance Management Interface to set up and start the services.

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The newly deployed vCenter Server Appliance with an embedded Platform Services Controller is running on the target server but the services are not started.

## Stage 2 - Set up the Newly Deployed vCenter Server Appliance with an Embedded Platform Services Controller

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed vCenter Server Appliance with an embedded Platform Services Controller.

### Procedure

- 1 Review the introduction to stage 2 of the deployment process and click **Next**.
- 2 Configure the time settings in the appliance, optionally enable remote SSH access to the appliance, and click **Next**.

Option	Description
<b>Synchronize time with the ESXi host</b>	Enables periodic time synchronization, and VMware Tools sets the time of the guest operating system to be the same as the time of the ESXi host.
<b>Synchronize time with NTP servers</b>	Uses a Network Time Protocol server for synchronizing the time. If you select this option, you must enter the names or IP addresses of the NTP servers separated by commas.



### 3 Create a new vCenter Single Sign-On domain or join an existing domain.

Option	Description
<b>Create a new Single Sign-On domain</b>	<p>Creates a new vCenter Single Sign-On domain.</p> <ul style="list-style-type: none"> <li>a Enter the domain name, for example <b>vsphere.local</b>.</li> <li>b Set the password for the vCenter Single Sign-On administrator account.  This is the password for the user administrator@your_domain_name.</li> <li>c Confirm the administrator password, and click <b>Next</b>.</li> </ul>
<b>Join an existing vCenter Single Sign-On domain</b>	<p>Joins a new vCenter Single Sign-On server to a vCenter Single Sign-On domain in an existing Platform Services Controller. You must provide the information about the vCenter Single Sign-On server to which you join the new vCenter Single Sign-On server.</p> <ul style="list-style-type: none"> <li>a Enter the fully qualified domain name (FQDN) or IP address of the Platform Services Controller that contains the vCenter Single Sign-On server to join.</li> <li>b Enter the HTTPS port to use for communication with the Platform Services Controller.</li> <li>c Enter the domain name for the vCenter Single Sign-On you are joining, for example <b>vsphere.local</b>.</li> <li>d Enter the password of the vCenter Single Sign-On administrator account.</li> <li>e Click <b>Next</b>.</li> </ul>

### 4 Review the VMware Customer Experience Improvement Program (CEIP) page and choose if you want to join the program.

For information about the CEIP, see the Configuring Customer Experience Improvement Program section in *vCenter Server and Host Management*.

### 5 On the Ready to complete page, review the configuration settings for the vCenter Server Appliance, click **Finish**, and click **OK** to complete stage 2 of the deployment process and set up the appliance.

### 6 (Optional) After the initial setup finishes, enter the URL from the browser with **https://vcenter\_server\_appliance\_fqdn/ui** or **https://vcenter\_server\_appliance\_fqdn/vsphere-client** to go to the vSphere Web Client and log in to the vCenter Server instance in the vCenter Server Appliance, or click the **https://vcenter\_server\_appliance\_fqdn:443** to go the vCenter Server Appliance Getting Started page.

### 7 Click **Close** to exit the wizard.

You are redirected to the vCenter Server Appliance Getting Started page.

#### What to do next

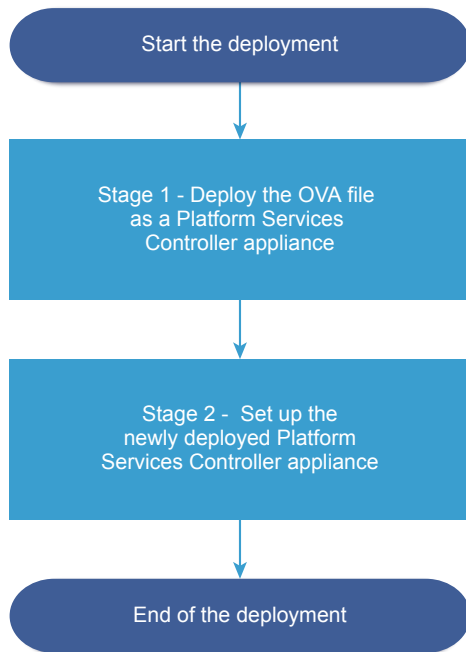
You can configure high availability for the vCenter Server Appliance. For information about providing vCenter Server Appliance high availability, see *vSphere Availability*.

## Deploy a Platform Services Controller Appliance by Using the GUI

You can use the GUI installer to perform an interactive deployment of a Platform Services Controller appliance as the first instance in a new vCenter Single Sign-On domain or as a replication partner in an existing vCenter Single Sign-On domain. You must run the GUI deployment from a Windows, Linux, or Mac machine that is in the network on which you want to deploy the appliance.

**Important** You must deploy the replicating Platform Services Controller instances in a sequence.

**Figure 2-4. Deployment Workflow of a Platform Services Controller Appliance**



### Prerequisites

- See [Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance](#).
- See [Required Information for Deploying a vCenter Server Appliance or Platform Services Controller Appliance](#).

### Procedure

#### 1 [Stage 1 - Deploy the OVA File as a Platform Services Controller Appliance](#)

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a Platform Services Controller appliance.

#### 2 [Stage 2 - Set up the Newly Deployed Platform Services Controller Appliance](#)

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed Platform Services Controller appliance.

## Stage 1 - Deploy the OVA File as a Platform Services Controller Appliance

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a Platform Services Controller appliance.

### Procedure

- 1 In the vCenter Server Appliance installer, navigate to the `vcasa-ui-installer` directory, go to the subdirectory for your operating system, and run the installer executable file.
  - For Windows OS, go to the `win32` subdirectory, and run the `installer.exe` file.
  - For Linux OS, go to the `lin64` subdirectory, and run the `installer` file.
  - For Mac OS, go to the `mac` subdirectory, and run the `Installer.app` file.
- 2 On the Home page, click **Install** to start the deployment wizard.
- 3 Review the Introduction page to understand the deployment process and click **Next**.
- 4 Read and accept the license agreement, and click **Next**.
- 5 On the Select a deployment type page, select **Platform Services Controller** and click **Next**.
- 6 Connect to the target server on which you want to deploy the Platform Services Controller appliance and click **Next**.

Option	Steps
You can connect to an ESXi host on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the ESXi host.</li> <li>2 Enter the HTTPS port of the ESXi host.</li> <li>3 Enter the user name and password of a user with administrative privileges on the ESXi host, for example, the root user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target ESXi host, and click <b>Yes</b> to accept the certificate thumbprint.</li> </ol>
You can connect to a vCenter Server instance and browse the inventory to select an ESXi host or DRS cluster on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the vCenter Server instance.</li> <li>2 Enter the HTTPS port of the vCenter Server instance.</li> <li>3 Enter the user name and password of user with vCenter Single Sign-On administrative privileges on the vCenter Server instance, for example, the <code>administrator@your_domain_name</code> user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target vCenter Server instance, and click <b>Yes</b> to accept the certificate thumbprint.</li> <li>6 Select the data center or data center folder that contains the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b></li> </ol> <p><b>Note</b> You must select a data center or data center folder that contains at least one ESXi host that is not in lockdown or maintenance mode.</p> <ol style="list-style-type: none"> <li>7 Select the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b>.</li> </ol>

- 7 On the Set up appliance VM page, enter a name for the Platform Services Controller appliance, set the password for the root user, and click **Next**.

The appliance name must not contain a percent sign (%), backslash (\), or forward slash (/) and must be no more than 80 characters in length.

The password must contain only lower ASCII characters without spaces, at least eight characters, a number, uppercase and lowercase letters, and a special character, for example, an exclamation mark (!), hash key (#), at sign (@), or brackets (()).

- 8 From the list of available datastores, select the location where all the virtual machine configuration files and virtual disks will be stored and, optionally, enable thin provisioning by selecting **Enable Thin Disk Mode**. NFS datastores are thin provisioned by default.
- 9 On the Configure network settings page, set up the network settings.

The IP address or the FQDN of the appliance is used as a system name. It is recommended to use an FQDN. However, if you want to use an IP address, use static IP address allocation for the appliance, because IP addresses allocated by DHCP might change.

Option	Action
<b>Network</b>	Select the network to which to connect the appliance. The networks displayed in the drop-down menu depend on the network settings of the target server. If you are deploying the appliance directly on an ESXi host, non-ephemeral distributed virtual port groups are not supported and are not displayed in the drop-down menu.
<b>IP version</b>	Select the version for the appliance IP address. You can select either IPv4 or IPv6.
<b>IP assignment</b>	Select how to allocate the IP address of the appliance. <ul style="list-style-type: none"> <li>■ <b>static</b> The wizard prompts you to enter the IP address and network settings. <b>Note</b> Avoid using an IP address as a system name. If you use an IP address as a system name, you cannot change the IP address and update the DNS settings after deployment.</li> <li>■ <b>DHCP</b> A DHCP server is used to allocate the IP address. Select this option only if a DHCP server is available in your environment. If there is an enabled DDNS in your environment, you can enter a preferred fully qualified domain name (FQDN) for the appliance.</li> </ul>
<b>Common Ports</b>	You can customize the HTTP and HTTPS ports (optional). If specifying a custom HTTP and HTTPS port number, ensure that you do not use a port number already in use by vCenter Server, or the default HTTP and HTTPS ports of 80 and 443.

- 10 On the Ready to complete stage 1 page, review the deployment settings for the Platform Services Controller appliance and click **Finish** to start the OVA deployment process.

- 11 Wait for the OVA deployment to finish, and click **Continue** to proceed with stage 2 of the deployment process to set up and start the services of the newly deployed appliance.

---

**Note** If you exit the wizard by clicking **Close**, you must log in to the Platform Services Controller Appliance Management Interface to set up and start the services.

---

The newly deployed Platform Services Controller appliance is running on the target server but the services are not started.

## Stage 2 - Set up the Newly Deployed Platform Services Controller Appliance

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed Platform Services Controller appliance.

### Procedure

- 1 Review the introduction to stage 2 of the deployment process and click **Next**.
- 2 Configure the time settings in the appliance, optionally enable remote SSH access to the appliance, and click **Next**.

Option	Description
<b>Synchronize time with the ESXi host</b>	Enables periodic time synchronization, and VMware Tools sets the time of the guest operating system to be the same as the time of the ESXi host.
<b>Synchronize time with NTP servers</b>	Uses a Network Time Protocol server for synchronizing the time. If you select this option, you must enter the names or IP addresses of the NTP servers separated by commas.

### 3 Create a new vCenter Single Sign-On domain or join an existing domain.

Option	Description
<b>Create a new Single Sign-On domain</b>	<p>Creates a vCenter Single Sign-On domain.</p> <ol style="list-style-type: none"> <li>Enter the domain name, for example <b>vsphere.local</b>.</li> <li>Set the password for the vCenter Single Sign-On administrator account.  This is the password for the user <code>administrator@your_domain_name</code>.</li> <li>Enter the site name for vCenter Single Sign-On.  The site name is important if you are using vCenter Single Sign-On in multiple locations. The site name must contain alphanumeric characters. Choose your own name for the vCenter Single Sign-On site. You cannot change the name after installation.  Extended ASCII and non-ASCII characters are unsupported in site names. Your site name must include alphanumeric characters and a comma (,), period (.), question mark (?), dash (-), underscore (_), plus sign (+) or equals sign (=).</li> <li>Click <b>Next</b>.</li> </ol>
<b>Join an existing vCenter Single Sign-On domain</b>	<p>Joins the Platform Services Controller appliance to an existing vCenter Single Sign-On domain as a replication partner of an existing Platform Services Controller instance. You must provide the information about the partner Platform Services Controller instance that you want to join.</p> <ol style="list-style-type: none"> <li>Enter the fully qualified domain name (FQDN) or IP address of the partner Platform Services Controller instance.</li> <li>Enter the HTTPS port of the partner Platform Services Controller instance.</li> <li>Enter the vCenter Single Sign-On domain name of the partner Platform Services Controller instance.</li> <li>Enter the password of the vCenter Single Sign-On administrator user.</li> <li>Click <b>Next</b>.</li> <li>Select whether to create or join an existing vCenter Single Sign-On site.</li> </ol>

### 4 Review the VMware Customer Experience Improvement Program (CEIP) page and choose if you want to join the program.

For information about the CEIP, see the Configuring Customer Experience Improvement Program section in *vCenter Server and Host Management*.

### 5 On the Ready to complete page, review the configuration settings for the Platform Services Controller appliance, click **Finish**, and click **OK** to complete stage 2 of the deployment process and set up the appliance.

### 6 (Optional) After the initial setup finishes, click the [https://platform\\_services\\_controller\\_fqdn/psc](https://platform_services_controller_fqdn/psc) to go to the Platform Services Controller Web interface, or click the [https://platform\\_services\\_controller\\_fqdn:443](https://platform_services_controller_fqdn:443) to go the Platform Services Controller Getting Started page.

### 7 Click **Close** to exit the wizard.

You are redirected to the Platform Services Controller Getting Started page.

If you joined the new Platform Services Controller appliance to an existing vCenter Single Sign-On domain, the appliance replicates infrastructure data with the other Platform Services Controller instances within the domain.

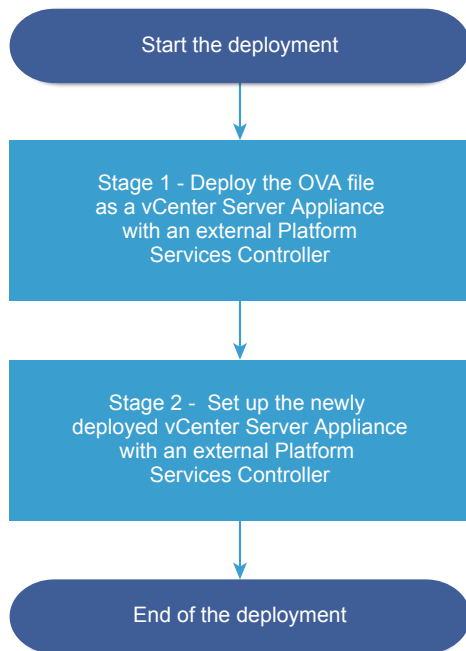
#### What to do next

- You can deploy a vCenter Server Appliance with an external Platform Services Controller and register it with the newly deployed Platform Services Controller appliance.
- You can deploy one or more Platform Services Controller instances joining the same vCenter Single Sign-On domain to replicate infrastructure data and distribute the load.

## Deploy the vCenter Server Appliance with an External Platform Services Controller by Using the GUI

You can use the GUI installer to perform an interactive deployment of a vCenter Server Appliance and register it with an existing external Platform Services Controller instance. You must run the GUI deployment from a Windows, Linux, or Mac machine that is in the network on which you want to deploy the appliance.

**Figure 2-5. Deployment Workflow of a vCenter Server Appliance with an External Platform Services Controller**



#### Prerequisites

- See [Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance](#).
- See [Required Information for Deploying a vCenter Server Appliance or Platform Services Controller Appliance](#).

- Verify that you have installed or deployed the Platform Services Controller instance with which you plan to register the vCenter Server Appliance.

## Procedure

### 1 [Stage 1 - Deploy the OVA File as a vCenter Server Appliance With an External Platform Services Controller](#)

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a vCenter Server Appliance with an external Platform Services Controller.

### 2 [Stage 2 - Set up the Newly Deployed vCenter Server Appliance With an External Platform Services Controller](#)

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed vCenter Server Appliance with an external Platform Services Controller.

## Stage 1 - Deploy the OVA File as a vCenter Server Appliance With an External Platform Services Controller

With stage 1 of the deployment process, you deploy the OVA file, which is included in the vCenter Server Appliance installer, as a vCenter Server Appliance with an external Platform Services Controller.

## Procedure

- 1 In the vCenter Server Appliance installer, navigate to the `vcasa-ui-installer` directory, go to the subdirectory for your operating system, and run the installer executable file.
  - For Windows OS, go to the `win32` subdirectory, and run the `installer.exe` file.
  - For Linux OS, go to the `lin64` subdirectory, and run the `installer` file.
  - For Mac OS, go to the `mac` subdirectory, and run the `Installer.app` file.
- 2 On the Home page, click **Install** to start the deployment wizard.
- 3 Review the Introduction page to understand the deployment process and click **Next**.
- 4 Read and accept the license agreement, and click **Next**.
- 5 On the Select deployment type page, select **vCenter Server (Requires External Platform Services Controller)** and click **Next**.



## 6 Connect to the target server on which you want to deploy the vCenter Server Appliance.

Option	Steps
You can connect to an ESXi host on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the ESXi host.</li> <li>2 Enter the HTTPS port of the ESXi host.</li> <li>3 Enter the user name and password of a user with administrative privileges on the ESXi host, for example, the root user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target ESXi host, and click <b>Yes</b> to accept the certificate thumbprint.</li> </ol>
You can connect to a vCenter Server instance and browse the inventory to select an ESXi host or DRS cluster on which to deploy the appliance.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the vCenter Server instance.</li> <li>2 Enter the HTTPS port of the vCenter Server instance.</li> <li>3 Enter the user name and password of user with vCenter Single Sign-On administrative privileges on the vCenter Server instance, for example, the administrator@<i>your_domain_name</i> user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target vCenter Server instance, and click <b>Yes</b> to accept the certificate thumbprint.</li> <li>6 Select the data center or data center folder that contains the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b></li> </ol> <p><b>Note</b> You must select a data center or data center folder that contains at least one ESXi host that is not in lockdown or maintenance mode.</p> <ol style="list-style-type: none"> <li>7 Select the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b>.</li> </ol>

## 7 On the Set up appliance VM page, enter a name for the vCenter Server Appliance, set the password for the root user, and click **Next**.

The appliance name must not contain a percent sign (%), backslash (\), or forward slash (/) and must be no more than 80 characters in length.

The password must contain only lower ASCII characters without spaces, at least eight characters, a number, uppercase and lowercase letters, and a special character, for example, an exclamation mark (!), hash key (#), at sign (@), or brackets (()).

## 8 Select the deployment size for the vCenter Server Appliance for your vSphere inventory.

Deployment Size Option	Description
<b>Tiny</b>	Deploys an appliance with 2 CPUs and 10 GB of memory. Suitable for environments with up to 10 hosts or 100 virtual machines
<b>Small</b>	Deploys an appliance with 4 CPUs and 16 GB of memory. Suitable for environments with up to 100 hosts or 1,000 virtual machines
<b>Medium</b>	Deploys an appliance with 8 CPUs and 24 GB of memory. Suitable for environments with up to 400 hosts or 4,000 virtual machines
<b>Large</b>	Deploys an appliance with 16 CPUs and 32 GB of memory. Suitable for environments with up to 1,000 hosts or 10,000 virtual machines
<b>X-Large</b>	Deploys an appliance with 24 CPUs and 48 GB of memory. Suitable for environments with up to 2,000 hosts or 35,000 virtual machines

9 Select the storage size for the vCenter Server Appliance, and click **Next**.

Storage Size Option	Description for Tiny Deployment Size	Description for Small Deployment Size	Description for Medium Deployment Size	Description for Large Deployment Size	Description for X-Large Deployment Size
<b>Default</b>	Deploys an appliance with 300 GB of storage.	Deploys an appliance with 340 GB of storage.	Deploys an appliance with 525 GB of storage.	Deploys an appliance with 740 GB of storage.	Deploys an appliance with 1180 GB of storage.
<b>Large</b>	Deploys an appliance with 825 GB of storage.	Deploys an appliance with 870 GB of storage.	Deploys an appliance with 1025 GB of storage.	Deploys an appliance with 1090 GB of storage.	Deploys an appliance with 1230 GB of storage.
<b>X-Large</b>	Deploys an appliance with 1700 GB of storage.	Deploys an appliance with 1750 GB of storage.	Deploys an appliance with 1905 GB of storage.	Deploys an appliance with 1970 GB of storage.	Deploys an appliance with 2110 GB of storage.

10 From the list of available datastores, select the location where all the virtual machine configuration files and virtual disks will be stored and, optionally, enable thin provisioning by selecting **Enable Thin Disk Mode**. NFS datastores are thin provisioned by default.

11 On the Configure network settings page, set up the network settings.

The IP address or the FQDN of the appliance is used as a system name. It is recommended to use an FQDN. However, if you want to use an IP address, use static IP address allocation for the appliance, because IP addresses allocated by DHCP might change.

Option	Action
<b>Network</b>	<p>Select the network to which to connect the appliance.</p> <p>The networks displayed in the drop-down menu depend on the network settings of the target server. If you are deploying the appliance directly on an ESXi host, non-ephemeral distributed virtual port groups are not supported and are not displayed in the drop-down menu.</p>
<b>IP version</b>	<p>Select the version for the appliance IP address.</p> <p>You can select either IPv4 or IPv6.</p>
<b>IP assignment</b>	<p>Select how to allocate the IP address of the appliance.</p> <ul style="list-style-type: none"> <li>■ <b>static</b> <p>The wizard prompts you to enter the IP address and network settings.</p> <p><b>Note</b> Avoid using an IP address as a system name. If you use an IP address as a system name, you cannot change the IP address and update the DNS settings after deployment.</p> </li> <li>■ <b>DHCP</b> <p>A DHCP server is used to allocate the IP address. Select this option only if a DHCP server is available in your environment.</p> <p>If there is an enabled DDNS in your environment, you can enter a preferred fully qualified domain name (FQDN) for the appliance.</p> </li> </ul>
<b>Common Ports</b>	<p>You can customize the HTTP and HTTPS ports (optional).</p> <p>If specifying a custom HTTP and HTTPS port number, ensure that you do not use a port number already in use by vCenter Server, or the default HTTP and HTTPS ports of 80 and 443.</p>

- 12 On the Ready to complete stage 1 page, review the deployment settings for the vCenter Server Appliance and click **Finish** to start the OVA deployment process.
- 13 Wait for the OVA deployment to finish, and click **Continue** to proceed with stage 2 of the deployment process to set up and start the services of the newly deployed appliance.

---

**Note** If you exit the wizard by clicking **Close**, you must log in to the vCenter Server Appliance Management Interface to set up and start the services.

---

The newly deployed vCenter Server Appliance with an external Platform Services Controller is running on the target server but the services are not started.

## Stage 2 - Set up the Newly Deployed vCenter Server Appliance With an External Platform Services Controller

When the OVA deployment finishes, you are redirected to stage 2 of the deployment process to set up and start the services of the newly deployed vCenter Server Appliance with an external Platform Services Controller.

### Procedure

- 1 Review the introduction to stage 2 of the deployment process and click **Next**.
- 2 Configure the time settings in the appliance, optionally enable remote SSH access to the appliance, and click **Next**.

Option	Description
<b>Synchronize time with the ESXi host</b>	Enables periodic time synchronization, and VMware Tools sets the time of the guest operating system to be the same as the time of the ESXi host.
<b>Synchronize time with NTP servers</b>	Uses a Network Time Protocol server for synchronizing the time. If you select this option, you must enter the names or IP addresses of the NTP servers separated by commas.

- 3 Provide the FQDN or IP address of the Platform Services Controller instance with which you want to register the vCenter Server Appliance, enter the vCenter Single Sign-On HTTPS port, domain name, and administrator password, and click **Next**.

If the Platform Services Controller instance is a Windows installation, provide the system name of the host machine on which the Platform Services Controller is running.

- 4 On the Ready to complete page, review the configuration settings for the vCenter Server Appliance, click **Finish**, and click **OK** to complete stage 2 of the deployment process and set up the appliance.
- 5 (Optional) After the initial setup finishes, enter the URL from the browser with **[https://vcenter\\_server\\_appliance\\_fqdn/ui](https://vcenter_server_appliance_fqdn/ui)** or **[https://vcenter\\_server\\_appliance\\_fqdn/vsphere-client](https://vcenter_server_appliance_fqdn/vsphere-client)** to go to the vSphere Web Client and log in to the vCenter Server instance in the vCenter Server Appliance, or click the **[https://vcenter\\_server\\_appliance\\_fqdn:443](https://vcenter_server_appliance_fqdn:443)** to go the vCenter Server Appliance Getting Started page.

## 6 Click **Close** to exit the wizard.

You are redirected to the vCenter Server Appliance Getting Started page.

The newly deployed vCenter Server Appliance joined the vCenter Single Sign-On domain and site of the Platform Services Controller instance with which you registered the appliance.

### What to do next

You can configure high availability for the vCenter Server Appliance. For information about providing vCenter Server Appliance high availability, see *vSphere Availability*.

## CLI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance

You can use the CLI installer to perform a silent deployment of a vCenter Server Appliance or Platform Services Controller appliance on an ESXi host or vCenter Server instance.

The CLI deployment process includes downloading the vCenter Server Appliance installer on a network virtual machine or physical server from which you want to perform the deployment, preparing a JSON configuration file with the deployment information, and running the deployment command.

---

**Important** The user name that you use to log in to the machine from which you want to run the CLI installer, the path to the vCenter Server Appliance installer, the path to your JSON configuration file, and the string values in your JSON configuration file, including the passwords, must contain only ASCII characters. Extended ASCII and non-ASCII characters are unsupported.

---

The vCenter Server Appliance ISO file contains templates of JSON files that contain the minimum configuration parameters that are required for deploying the vCenter Server Appliance or Platform Services Controller appliance.

The vCenter Server Appliance ISO file contains templates of JSON files that contain the minimum configuration parameters that are required for deploying the vCenter Server Appliance or Platform Services Controller appliance. For information about preparing JSON templates for CLI deployment, see [Prepare Your JSON Configuration File for CLI Deployment](#).

---

**Important** For topologies with external Platform Services Controller instances, you must deploy the replicating Platform Services Controller instances in a sequence. After the successful deployment of all Platform Services Controller instances in the domain, you can perform concurrent deployments of multiple vCenter Server appliances that point to a common external Platform Services Controller instance.

---

## Prepare Your JSON Configuration File for CLI Deployment

Before you run the CLI installer to deploy a vCenter Server Appliance or Platform Services Controller appliance, you must prepare a JSON file with configuration parameters and their values for your deployment specification.

The vCenter Server Appliance installer contains JSON templates for all deployment types. For information about the templates, see [JSON Templates for CLI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance](#).

You can deploy an appliance with minimum configurations by setting values to the configuration parameters in the JSON template for your specification. You can edit the preset values, remove configuration parameters, and add configuration parameters for custom configurations.

For a complete list of the configuration parameters and their descriptions, navigate to the installer subdirectory for your operating system and run the `vcsa-deploy install --template-help` command or see [Deployment Configuration Parameters](#).

### Prerequisites

- You must be familiar with the JSON syntax.
- [Download and Mount the vCenter Server Appliance Installer](#).

### Procedure

- 1 In the vCenter Server Appliance installer, navigate to the `vcsa-cli-installer` directory, and open the `templates` subfolder.
- 2 Copy the deployment templates from the `install` subfolder to your workspace.

---

**Important** The path to the JSON configuration files must contain only ASCII characters. Extended ASCII and non-ASCII characters are unsupported.

---

- 3 In a text editor, open the template file for your specification.

To ensure the correct syntax of your JSON configuration file, use a JSON editor.

- 4 Fill in the values for the required configuration parameters and, optionally, enter additional parameters and their values.

For example, if you want to use an IPv4 DHCP assignment for the network of the appliance, in the network subsection of the template, change the value of the mode parameter to dhcp and remove the default configuration parameters that are for a static assignment.

```
"network": {
  "ip_family": "ipv4",
  "mode": "dhcp"
},
```

---

**Important** The string values, including the passwords, must contain only ASCII characters. Extended ASCII and non-ASCII characters are unsupported.

To set a value that contains a backslash (\) or quotation mark (") character, you must precede the character with the backslash (\) character. For example, "password": "my\"password" sets the password my"password, "image": "G:\\vcsa\\VMware-vCenter-Server-Appliance-6.7.0.XXXX-YYYYYYY\_OVF10.ova" sets the path G:\vcsa\VMware-vCenter-Server-Appliance-6.7.0.XXXX-YYYYYYY\_OVF10.ova.

The Boolean values must contain only lowercase characters, that is, a value can be either true or false. For example, "ssh\_enable": false.

---

- 5 (Optional) Use a JSON editor of your choice to validate the JSON file.
- 6 Save in UTF-8 format and close the file.

### What to do next

You can create and save additional templates if needed for your deployment specification.

## JSON Templates for CLI Deployment of the vCenter Server Appliance and Platform Services Controller Appliance

The vCenter Server Appliance installer contains JSON templates that are located in the `vcsa-cli-installer/templates` directory. In the `install` subfolder, you can find eight JSON templates with the minimum configuration parameters for all deployment types.

For each deployment type, there is one template for deploying the appliance on an ESXi host and another template for deploying the appliance on a vCenter Server instance.

**Table 2-9. Deployment JSON Templates Included in the vCenter Server Appliance Installer**

Location	Template	Description
vcsa-cli- installer\templates\install	embedded_vCSA_on_ESXi.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an embedded Platform Services Controller on an ESXi host.
	embedded_vCSA_on_VC.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an embedded Platform Services Controller on a vCenter Server instance.
	embedded_vCSA_replication_on_ESXi.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an embedded Platform Services Controller joining an existing Single Sign-On domain on an ESXi host.
	embedded_vCSA_replication_on_VC.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an embedded Platform Services Controller joining an existing Single Sign-On domain on a vCenter Server instance.
	PSC_first_instance_on_ESXi.json	Contains the minimum configuration parameters that are required for deployment of a Platform Services Controller appliance as the first instance in a new vCenter Single Sign-On domain on an ESXi host.
	PSC_first_instance_on_VC.json	Contains the minimum configuration parameters that are required for deployment of a Platform Services Controller appliance as the first instance in a new vCenter Single Sign-On domain on a vCenter Server instance.
	PSC_replication_on_ESXi.json	Contains the minimum configuration parameters that are required for deployment of a Platform Services Controller appliance joining an existing vCenter Single Sign-On domain on an ESXi host.

**Table 2-9. Deployment JSON Templates Included in the vCenter Server Appliance Installer (Continued)**

Location	Template	Description
	PSC_replication_on_VC.json	Contains the minimum configuration parameters that are required for deployment of a Platform Services Controller appliance joining an existing vCenter Single Sign-On domain on a vCenter Server instance.
	vCSA_on_ESXi.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an external Platform Services Controller on an ESXi host.
	vCSA_on_VC.json	Contains the minimum configuration parameters that are required for deployment of a vCenter Server Appliance with an external Platform Services Controller on a vCenter Server instance.

## Deployment Configuration Parameters

When you prepare your JSON configuration files for CLI deployment, you must set parameters and values to provide input data for the deployment of a vCenter Server Appliance or Platform Services Controller appliance.

### Sections and Subsections of Configuration Parameters in the JSON Deployment Files

The configuration parameters in the JSON configuration files for CLI upgrade are organized in sections and subsections.

**Table 2-10. Sections and Subsections of Configuration Parameters in the JSON Deployment Files**

Section	Subsection	Description
new_vcsa - describes the appliance that you want to deploy	esxi	Use only if you want to deploy the appliance directly on an ESXi host. Contains the configuration parameters that describe the target ESXi host. See <a href="#">Table 2-11</a> .  <b>Note</b> You must fill in either the esxi or the vc subsection.
	vc	Use only if you want to deploy the appliance on the inventory of a vCenter Server instance. Contains the configuration parameters that describe the target ESXi host or DRS cluster from the vCenter Server inventory. See <a href="#">Table 2-12</a> .  <b>Note</b> You must fill in either the vc or the esxi subsection.



**Table 2-10. Sections and Subsections of Configuration Parameters in the JSON Deployment Files (Continued)**

Section	Subsection	Description
	appliance	Contains the configuration parameters that describe the appliance. See <a href="#">Table 2-13</a> .
	network	Contains the configuration parameters that describe the network settings for the appliance. See <a href="#">Table 2-14</a> .
	os	Contains the configuration parameters that describe the operating system settings for the appliance. See <a href="#">Table 2-15</a> .
	sso	Contains the configuration parameters that describe the vCenter Single Sign-On settings for the appliance. See <a href="#">Table 2-16</a> .
	ovftool_arguments	Optional subsection for adding arbitrary arguments and their values to the OVF Tool command that the installer generates.  <b>Important</b> The vCenter Server Appliance installer does not validate the configuration parameters in the <code>ovftool_arguments</code> subsection. If you set arguments that the OVF Tool does not recognize, the deployment might fail.
ceip - describes joining the VMware Customer Experience Improvement Program (CEIP)	settings	Contains only the <code>ceip_enabled</code> configuration parameter to join or not to join the VMware Customer Experience Improvement Program (CEIP). See <a href="#">Table 2-17</a> .  Required only if you are deploying a vCenter Server Appliance with an embedded Platform Services Controller or a Platform Services Controller appliance.  <b>Note</b> If set to <code>true</code> , you must run the CLI deployment command with the <code>--acknowledge-ceip</code> argument.  For information about the CEIP, see the Configuring Customer Experience Improvement Program section in <i>vCenter Server and Host Management</i> .

**Important** The string values, including the passwords, must contain only ASCII characters. Extended ASCII and non-ASCII characters are unsupported.

To set a value that contains a backslash (\) or quotation mark (") character, you must precede the character with the backslash (\) character. For example, `"password": "my\"password"` sets the password `my"password`, `"image": "G:\vcsa\VMware-vCenter-Server-Appliance-6.7.0.XXX-YYYYYYY_OVF10.ova"` sets the path `G:\vcsa\VMware-vCenter-Server-Appliance-6.7.0.XXX-YYYYYYY_OVF10.ova`.

The Boolean values must contain only lowercase characters. Can be either `true` or `false`. For example, `"ssh_enable": false`.

### Configuration Parameters in the `new_vcsa` Section

**Table 2-11. Configuration Parameters in the `new_vcsa` Section, `esxi` Subsection**

Name	Type	Description
hostname	string	The IP address or FQDN of the target ESXi host on which you want to deploy the appliance.
username	string	A user name with administrative privileges on the target ESXi host, for example, <code>root</code> .

**Table 2-11. Configuration Parameters in the new\_vcsc Section, esxi Subsection (Continued)**

Name	Type	Description
password	string	The password of the user with administrative privileges on the target ESXi host.
deployment_network	string	The name of the network to which to connect the appliance.  <b>Note</b> The network must be accessible from the target ESXi host.  Ignored if the target ESXi host has only one network.
datastore	string	The name of the datastore that you want to store all virtual machine configuration files and virtual disks of the appliance.  <b>Note</b> The datastore must be accessible from the ESXi host. The datastore must have enough free space.
port	integer	The HTTPS reverse proxy port of the target ESXi host. The default port is 443. Use only if the target ESXi host uses a custom HTTPS reverse proxy port.

**Table 2-12. Configuration Parameters in the new\_vcsc Section, vc Subsection**

Name	Type	Description
hostname	string	The IP address or FQDN of the target vCenter Server instance on which you want to deploy the appliance.
username	string	vCenter Single Sign-On administrator user name on the target vCenter Server instance, for example, administrator@vsphere.local.
password	string	The password of the vCenter Single Sign-On administrator user on the target vCenter Server instance.
deployment_network	string	The name of the network to which to connect the appliance.  <b>Note</b> The network must be accessible from the target ESXi host or DRS cluster on which you want to deploy the appliance.  Ignored if the target ESXi host or DRS cluster has only one network.
datacenter	string or array	The vCenter Server datacenter that contains the target ESXi host or DRS cluster on which you want to deploy the appliance. If the datacenter is located in a folder or a structure of folders, the value must be either a comma-separated list of strings or a comma-separated list as a single string. For example,  <pre>["parent_folder", "child_folder", "datacenter_name"]</pre> or  <pre>"parent_folder, child_folder, datacenter_name"</pre> <b>Note</b> The value is case-sensitive.
datastore	string	The name of the datastore that you want to store all virtual machine configuration files and virtual disks of the appliance.  <b>Note</b> The datastore must be accessible from the target ESXi host or DRS cluster. The datastore must have at least 15 GB of free space.

**Table 2-12. Configuration Parameters in the new\_vcsa Section, vc Subsection (Continued)**

Name	Type	Description
port	integer	<p>The HTTPS reverse proxy port of the target vCenter Server instance. The default port is 443. Use only if the target vCenter Server instance uses a custom HTTPS reverse proxy port.</p>
target	string or array	<p>The target ESXi host or DRS cluster on which you want to deploy the appliance.</p> <p><b>Important</b> You must provide the name that is displayed in the vCenter Server inventory. For example, if the name of the target ESXi host is an IP address in the vCenter Server inventory, you cannot provide an FQDN.</p> <p>If the target ESXi host or DRS cluster is located in a folder or a structure of folders, the value must be a comma-separated list of strings or a comma-separated list as a single string. For example,</p> <pre data-bbox="590 659 1426 722">["parent_folder", "child_folder", "esxi-host.domain.com"]</pre> <p>or</p> <pre data-bbox="590 785 1426 848">"parent_folder, child_folder, esxi-host.domain.com"</pre> <p>If the target ESXi host is part of a cluster, use a comma-separated list of strings or a comma-separated list as a single string to provide the path. For example,</p> <pre data-bbox="590 932 1426 995">["cluster_name", "esxi-host.domain.com"]</pre> <p>or</p> <pre data-bbox="590 1079 1426 1142">"cluster_name, esxi-host.domain.com"</pre> <p><b>Note</b> The value is case-sensitive.</p>
vm_folder	string	Optional. The name of the VM folder to which to add the appliance.

**Table 2-13. Configuration Parameters in the new\_vcsa Section, appliance Subsection**

Name	Type	Description
thin_disk_mode	Boolean	Set to true to deploy the appliance with thin virtual disks.
deployment_option	string	<p>The size of the appliance.</p> <ul style="list-style-type: none"> <li>■ Set to <code>tiny</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 10 hosts and 100 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 250 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>tiny-lstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 10 hosts and 100 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 775 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>tiny-xlstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 10 hosts and 100 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 1650 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>small</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 290 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>small-lstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 820 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>small-xlstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 1700 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>medium</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 425 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>medium-lstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 925 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>medium-xlstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 1805 GB of storage.</p> <ul style="list-style-type: none"> <li>■ Set to <code>large</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 640 GB of storage.</p>

**Table 2-13. Configuration Parameters in the new\_vcsa Section, appliance Subsection (Continued)**

Name	Type	Description
		<ul style="list-style-type: none"> <li>■ Set to <code>large-lstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 990 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>large-xlstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 1870 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>xlarge</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 980 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>xlarge-lstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 1030 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>xlarge-xlstorage</code> if you want to deploy a vCenter Server Appliance with an embedded Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 1910 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-tiny</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 10 hosts and 100 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 250 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-tiny-lstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 10 hosts and 100 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 775 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-tiny-xlstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 10 hosts and 100 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 2 CPUs, 10 GB of memory, and 1650 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-small</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 290 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-small-lstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 820 GB of storage.</p>

**Table 2-13. Configuration Parameters in the new\_vcsa Section, appliance Subsection (Continued)**

Name	Type	Description
		<ul style="list-style-type: none"> <li>■ Set to <code>management-small-xlstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 100 hosts and 1,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 4 CPUs, 16 GB of memory, and 1700 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-medium</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 425 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-medium-lstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 925 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-medium-xlstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 400 hosts and 4,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 8 CPUs, 24 GB of memory, and 1805 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-large</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 640 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-large-lstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 990 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-large-xlstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 1,000 hosts and 10,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 16 CPUs, 32 GB of memory, and 1870 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-xlarge</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the default storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 980 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-xlarge-lstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the large storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 1030 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>management-xlarge-xlstorage</code> if you want to deploy a vCenter Server Appliance with an external Platform Services Controller for up to 2,000 hosts and 35,000 virtual machines with the x-large storage size.</li> </ul> <p>Deploys an appliance with 24 CPUs, 48 GB of memory, and 1910 GB of storage.</p>
		<ul style="list-style-type: none"> <li>■ Set to <code>infrastructure</code> if you want to deploy a Platform Services Controller appliance.</li> </ul> <p>Deploys an appliance with 2 CPUs, 4 GB of memory, and 60 GB of storage.</p>

**Table 2-13. Configuration Parameters in the new\_vcsa Section, appliance Subsection (Continued)**

Name	Type	Description
image	string	Optional. A local file path or URL to the vCenter Server Appliance installation package. By default the installer uses the installation package that is included in the ISO file, in the vcsa folder.
name	string	The VM name for the appliance. Must contain only ASCII characters except a percent sign (%), backslash (\), or forward slash (/) and must be no more than 80 characters in length.
ovftool_path	string	Optional. A local file path to the OVF Tool executable file. By default the installer uses the OVF Tool instance that is included in the ISO file, in the vcsa/ovftool folder.

**Table 2-14. Configuration Parameters in the new\_vcsa Section, network Subsection**

Name	Type	Description
ip_family	string	IP version for the network of the appliance. Set to <code>ipv4</code> or <code>ipv6</code> .
mode	string	IP assignment for the network of the appliance. Set to <code>static</code> or <code>dhcp</code> .
ip	string	IP address for the appliance. Required only if you use static assignment, that is, if you set the <code>mode</code> parameter to <code>static</code> . You must set an IPv4 or IPv6 address that corresponds to the network IP version, that is, to the value of the <code>ip_family</code> parameter. An IPv4 address must comply with the RFC 790 guidelines. An IPv6 address must comply with the RFC 2373 guidelines.
dns_servers	string or array	IP addresses of one or more DNS servers. To set more than one DNS server, use a comma-separated list of strings or a comma-separated list as a single string to provide the path. For example, <pre>["x.y.z.a", "x.y.z.b"]</pre> or <pre>"x.y.z.a, x.y.z.b"</pre> Required only if you use static assignment, that is, if you set the <code>mode</code> parameter to <code>static</code> .
prefix	string	Network prefix length. Use only if the <code>mode</code> parameter is set to <code>static</code> . Remove if the <code>mode</code> parameter is set to <code>dhcp</code> . The network prefix length is the number of bits that are set in the subnet mask. For example, if the subnet mask is 255.255.255.0, there are 24 bits in the binary version of the prefix length, so the network prefix length is 24. For IPv4 version, the value must be between 0 and 32. For IPv6 version, the value must be between 0 and 128.

**Table 2-14. Configuration Parameters in the new\_vcsa Section, network Subsection (Continued)**

Name	Type	Description
gateway	string	IP address of the default gateway. For IPv6 version, the value can be default.
system_name	string	Primary network identity. Can be an IP address or FQDN, preferably FQDN. You cannot change the value of this parameter after the deployment. The FQDN and dotted-decimal numbers must comply with the RFC 1123 guidelines.

**Table 2-15. Configuration Parameters in the new\_vcsa Section, os Subsection**

Name	Type	Description
password	string	The password for the root user of the appliance operating system. The password must contain between 8 and 20 characters, at least one uppercase letter, at least one lowercase letter, at least one number, and at least one special character, for example, a dollar sign (\$), hash key (#), at sign (@), period (.), or exclamation mark (!). All characters must be lower ASCII characters without spaces.
ntp_servers	string or array	Optional. Host names or IP addresses of one or more NTP servers for time synchronization. To set more than one NTP server, use a comma-separated list of strings or a comma-separated list as a single string to provide the path. For example, <pre>["x.y.z.a", "x.y.z.b"]</pre> or <pre>"x.y.z.a, x.y.z.b"</pre>
ssh_enable	Boolean	Set to true to enable SSH administrator login to the appliance. <b>Note</b> vCenter Server Appliance high availability requires remote SSH access to the appliance.
time_tools-sync	Boolean	Optional. Set to true to deploy the appliance with the VMware Tools time synchronization. VMware Tools synchronizes the time of the appliance with the time of the ESXi host. Ignored if you set NTP servers for time synchronization, that is, if you set the ntp_servers parameter.



**Table 2-16. Configuration Parameters in the new\_vcsa Section, sso Subsection**

Name	Type	Description
password	string	<p>Password of the vCenter Single Sign-On administrator user, administrator@your_domain_name.</p> <ul style="list-style-type: none"> <li>■ If you are deploying a vCenter Server Appliance with an embedded Platform Services Controller or a Platform Services Controller appliance as the first instance in a new vCenter Single Sign-On domain, you must set the password for the vCenter Single Sign-On administrator user.</li> </ul> <p>The password must contain between 8 and 20 characters, at least one uppercase letter, at least one lowercase letter, at least one number, and at least one special character, for example, a dollar sign (\$), hash key (#), at sign (@), period (.), or exclamation mark (!). All characters must be ASCII characters.</p> <ul style="list-style-type: none"> <li>■ If you are deploying a Platform Services Controller appliance as a replication partner in an existing vCenter Single Sign-On domain, you must provide the password of the vCenter Single Sign-On administrator user of the partner Platform Services Controller.</li> <li>■ If you are deploying a vCenter Server Appliance with an external Platform Services Controller, you must provide the password of the vCenter Single Sign-On administrator user of the external Platform Services Controller.</li> </ul>
domain_name	string	<p>vCenter Single Sign-On domain name, for example, vsphere.local.</p> <ul style="list-style-type: none"> <li>■ If you are deploying a vCenter Server Appliance with an embedded Platform Services Controller or a Platform Services Controller appliance as the first instance in a new vCenter Single Sign-On domain, you must set the name for the new vCenter Single Sign-On domain.</li> <li>■ If you are deploying a vCenter Server Appliance with an external Platform Services Controller or a Platform Services Controller appliance as a replication partner in an existing vCenter Single Sign-On domain, you must provide the name of the existing vCenter Single Sign-On domain.</li> </ul>
first_instance	Boolean	<p>Required only if you are deploying a Platform Services Controller appliance.</p> <p>The default value is true.</p> <p>Set to false if you want to join the Platform Services Controller appliance to an existing vCenter Single Sign-On domain.</p> <p>Joined Platform Services Controller instances replicate their infrastructure data and enable Enhanced Linked Mode. For information about managing the Platform Services Controller services, see <i>Platform Services Controller Administration</i>.</p>
platform_services_controller	string	<p>The system name of the external Platform Services Controller.</p> <p>Required only if you are deploying a vCenter Server Appliance with an external Platform Services Controller.</p>
replication_partner_hostname	string	<p>The system name of the partner Platform Services Controller.</p> <p>Required only if you are deploying a Platform Services Controller appliance as a replication partner in an existing vCenter Single Sign-On domain.</p>
sso_port	integer	<p>The HTTPS reverse proxy port of the partner Platform Services Controller.</p> <p>The default port is 443. Use only if you the partner Platform Services Controller uses a custom HTTPS reverse proxy port.</p>
site_name	string	<p>vCenter Single Sign-On name.</p> <p>Required only if you are deploying an embedded Platform Services Controller appliance.</p>

## Configuration Parameters in the `ceip` Section

**Table 2-17. Configuration Parameters in the `ceip` Section, `settings` Subsection**

Name	Type	Description
<code>ceip_enabled</code>	Boolean	Set to <code>true</code> to join the CEIP for this appliance.

## Deploy a vCenter Server Appliance or Platform Services Controller Appliance by Using the CLI

You can use the CLI installer to perform an unattended deployment of a vCenter Server Appliance or Platform Services Controller appliance. You must run the CLI deployment from a Windows, Linux, or Mac machine that is in the network on which you want to deploy the appliance.

### Prerequisites

- See [Prerequisites for Deploying the vCenter Server Appliance or Platform Services Controller Appliance](#).
- [Prepare Your JSON Configuration File for CLI Deployment](#).
- Review [Syntax of the CLI Deployment Command](#).
- Verify that the user name with which you are logged in to your client machine, the path to the vCenter Server Appliance installer, the path to your JSON configuration file, and the string values in your JSON configuration file contain only ASCII characters. Extended ASCII and non-ASCII characters are unsupported.

### Procedure

- 1 Navigate to the `vcasa-cli-installer` subdirectory for your operating system.
  - If you are running the deployment on Windows OS, navigate to the `vcasa-cli-installer\win32` directory.
  - If you are running the deployment on Linux OS, navigate to the `vcasa-cli-installer/lin64` directory.
  - If you are running the deployment on Mac OS, navigate to the `vcasa-cli-installer/mac` directory.
- 2 (Optional) Run a pre-deployment check without deploying the appliance to verify that you prepared the deployment template correctly.

```
vcasa-deploy install --verify-only path_to_the_json_file
```

### 3 Run the deployment command.

```
vcsa-deploy install --accept-eula --acknowledge-ceip optional_arguments path_to_the_json_file
```

Use *optional\_arguments* to enter space-separated arguments to set additional execution parameters of the deployment command.

For example, you can set the location of the log and other output files that the installer generates.

```
vcsa-deploy install --accept-eula --acknowledge-ceip --log-dir=path_to_the_location
path_to_the_json_file
```

## Syntax of the CLI Deployment Command

You can use command arguments to set the execution parameters of the deployment command.

You can add a space-separated list of arguments to the CLI deployment command.

```
vcsa-deploy install path_to_the_json_file list_of_arguments
```

Argument	Description
--accept-eula	Accepts the end-user license agreement. Required for executing the deployment command.
--acknowledge-ceip	Confirms your acknowledgement of your VMware Customer Experience Improvement Program (CEIP) participation. Required if the <code>ceip.enabled</code> parameter is set to <code>true</code> in the JSON deployment template.
-v, --verbose	Adds debug information to the console output.
-t, --terse	Hides the console output. Displays only warning and error messages.
--log-dir <i>LOG_DIR</i>	Sets the location of the log and other output files.
--skip-ovftool-verification	Performs basic verification of the configuration parameters in the JSON file and deploys the appliance. Does not perform verification of the OVF Tool parameters.
--no-esx-ssl-certificate-verification	Skips the SSL verification for ESXi connections. <b>Important</b> Avoid using this option because it might cause problems during deployment or after deployment because of not validated identity of the target ESXi host.
--pause-on-warnings	Pauses and waits for acknowledgment of warnings.
--verify-only	Performs basic verification of the configuration parameters in the JSON file and verification of the OVF Tool parameters. Does not deploy the appliance.
--sso-ssl-thumbprint <i>SSL-SHA1-THUMBPRINT</i>	Validates server certificate against the supplied SHA1 thumbprint.

Argument	Description
-h, --help	Displays the help message for the <code>vcsa-deploy install</code> command.
--template-help	Displays the help message for the use of configuration parameters in the JSON deployment file.

After the execution finishes, you can get the exit code of the command.

Exit Code	Description
0	Command ran successfully
1	Runtime error
2	Validation error
3	Template error

## Deploy Multiple vCenter Server Appliances or Platform Services Controller Appliances Using the CLI

You can deploy multiple instances of the vCenter Server Appliance or the Platform Services Controller concurrently (in batch mode) using the CLI installer.

To deploy multiple instances concurrently, create JSON templates for all the vCenter Server Appliance and Platform Services Controller instances in your deployment. The CLI installer assesses the topology of the deployment using the JSON templates, and determines the order. For this reason, the JSON templates must use static IP addresses for all vCenter Server and Platform Services Controller instances in the deployment that are dependant upon one another. For example, you can install two vCenter Server instances which share a common external Platform Services Controller instance.

**Important** The JSON templates you create for each appliance must use a static IP address to resolve the network addresses of other appliances in the deployment upon which they have a dependency.

To perform the batch deployment, place the JSON templates defining your deployment in a single directory. When invoked, the CLI installer deploys your existing deployment using the topology defined in the JSON templates.

### Procedure

- 1 In your workspace, create a folder to contain the JSON files for batch deployment. For example, `MyWorkspace/BatchDeploy`.
- 2 Prepare each JSON configuration file and copy the file to your batch deployment folder. See [Prepare Your JSON Configuration File for CLI Deployment](#) for instructions on configuring the JSON files.
- 3 Navigate to the `vcsa-cli-installer` subdirectory for your operating system.
  - If you are running the deployment on Windows OS, navigate to the `vcsa-cli-installer\win32` directory.

- If you are running the deployment on Linux OS, navigate to the `vcsa-cli-installer/lin64` directory.
  - If you are running the deployment on Mac OS, navigate to the `vcsa-cli-installer/mac` directory.
- 4 (Optional) Run a pre-deployment check without deploying the appliance to verify that you prepared the deployment template correctly. For example:

```
vcsa-deploy install --verify-only MyWorkspace/BatchDeploy
```

- 5 Run the deployment command. For example,

```
vcsa-deploy install --accept-eula --acknowledge-ceip optional_arguments MyWorkspace/BatchDeploy
```

Use *optional\_arguments* to enter space-separated arguments to set additional execution parameters of the deployment command.

For example, you can set the location of the log and other output files that the installer generates.

```
vcsa-deploy install --accept-eula --acknowledge-ceip --log-dir=path_to_the_location  
MyWorkspace/BatchDeploy
```

# Installing vCenter Server and Platform Services Controller on Windows

# 3

You can install vCenter Server with an embedded or external Platform Services Controller on a Microsoft Windows virtual machine or physical server to manage your vSphere environment.

Before you install vCenter Server, download the installer ISO file and mount it to the Windows host machine on which you want to perform the installation, and then start the installation wizard.

Windows installations of vCenter Server can use either the embedded PostgreSQL database or an external database. Before installing vCenter Server that uses an external database, you must prepare your database. See [Preparing vCenter Server Databases for Install](#).

For information about the vCenter Server requirements, see [vCenter Server for Windows Requirements](#).

For information about the inputs that are required during the installation of vCenter Server, see [Required Information for Installing vCenter Server or Platform Services Controller on Windows](#).

---

**Important** For topologies with external Platform Services Controller instances, you must install the replicating Platform Services Controller instances in a sequence. After the successful deployment of all Platform Services Controller instances in the domain, you can perform concurrent installations of multiple vCenter Server instances that point to a common external Platform Services Controller instance.

---

After you install vCenter Server, only the user `administrator@your_domain_name` has the privileges to log in to the vCenter Server system.

The `administrator@your_domain_name` user can perform the following tasks:

- Add an identity source in which additional users and groups are defined in vCenter Single Sign-On.
- Assign roles to users and groups to give them privileges.

For information about adding identity sources and giving permissions to the users and groups, see *Platform Services Controller Administration*.

Starting with vSphere 6.5, vCenter Server supports mixed IPv4 and IPv6 environment. If you want to set up the vCenter Server instance to use an IPv6 address version, use the fully qualified domain name (FQDN) or host name of the host machine. To set up an IPv4 address, the best practice is to use the FQDN or host name of the host machine, because the IP address can change if assigned by DHCP.

This chapter includes the following topics:

- [vCenter Server for Windows Requirements](#)
- [Preparing for Installing vCenter Server and Platform Services Controller on Windows](#)
- [Required Information for Installing vCenter Server or Platform Services Controller on Windows](#)
- [Installing vCenter Server and Platform Services Controller on Windows](#)

## vCenter Server for Windows Requirements

To install vCenter Server on a Windows virtual machine or physical server, your system must meet specific hardware and software requirements.

- Synchronize the clocks of the virtual machines on which you plan to install vCenter Server and the Platform Services Controller. See [Synchronizing Clocks on the vSphere Network](#).
- Verify that the DNS name of the virtual machine or physical server matches the actual full computer name.
- Verify that the host name of the virtual machine or physical server on which you are installing vCenter Server complies with RFC 1123 guidelines.
- Verify that the system on which you are installing vCenter Server is not an Active Directory domain controller.
- If you plan to use a user account other than the Local System account in which to run your vCenter Server service, verify that the user account has the following permissions:
  - **Member of the Administrators group**
  - **Log on as a service**
  - **Act as part of the operating system (if the user is a domain user)**

---

**Note** Starting with vSphere 6.5, the vCenter Server services run as child processes of the VMware Service Lifecycle Manager service.

---

- Verify that the local policy of the virtual machine or physical server on which you are installing vCenter Server allows assigning **Log on as a batch job** rights to new local users.

---

**Note** Starting with vSphere 6.5, some vCenter Server processes use separate local users that are automatically created and added to the local security policy **Log on as a batch job**. Such new local users are cm, content-library, eam, imagebuilder, mbc, netdumper, perfcharts, rbd, vapiEndpoint, vmware-vpostgres, vsan-health, vsm, vsphere-client, and vsphere-ui.

---

- If the system that you use for your vCenter Server installation belongs to a workgroup rather than a domain, not all functionality is available to vCenter Server. If assigned to a workgroup, the vCenter Server system is not able to discover all domains and systems available on the network when using some features. Your host machine must be connected to a domain if you want to add Active Directory identity sources after the installation.

- Verify that the LOCAL SERVICE account has read permission on the folder in which vCenter Server is installed and on the HKLM registry.
- Verify that the connection between the virtual machine or physical server and the domain controller is working.

## Pre-Install Checks for vCenter Server and Platform Services Controller on Windows

When you install or upgrade vCenter Server and Platform Services Controller on Windows, the installer does a pre-check, for example, to verify that enough space is available on the virtual machine or physical server where you are installing or upgrading vCenter Server, and verifies that the external database, if any, can be successfully accessed.

When you install Platform Services Controller as an embedded or external instance, vCenter Single Sign-On is installed as part of Platform Services Controller. During the installation of an external Platform Services Controller, the installer provides you with the option to join an existing vCenter Single Sign-On server domain. During the installation of vCenter Server with an external Platform Services Controller, the installer prompts you to join an existing vCenter Single Sign-On server domain. When you provide the information about the vCenter Single Sign-On service, the installer uses the administrator account to check the host name and password, to verify that the details of the vCenter Single Sign-On server you provided can be authenticated before proceeding with the installation process.

The pre-install checker performs checks for the following aspects of the environment:

- Windows version
- Minimum processor requirements
- Minimum memory requirements
- Minimum disk space requirements
- Permissions on the selected install and data directory
- Internal and external port availability
- External database version
- External database connectivity
- Administrator privileges on the Windows machine
- Any credentials that you enter

Additionally, the pre-install checker verifies if Universal C Runtime is installed. This is a Microsoft Windows operating system component that enables CRT functionality on the Windows OS. If Universal C Runtime is not installed, you receive an error message.

For information about the minimum storage requirements, see [Storage Requirements for vCenter Server and Platform Services Controller on Windows](#). For information about the minimum hardware requirements, see [Hardware Requirements for vCenter Server and Platform Services Controller on Windows](#).



## Hardware Requirements for vCenter Server and Platform Services Controller on Windows

When you install vCenter Server or Platform Services Controller on a virtual machine or physical server running Microsoft Windows, your system must meet specific hardware requirements.

You can install vCenter Server and the Platform Services Controller on the same virtual machine or physical server or on different virtual machines or physical servers. When you install vCenter Server with an embedded Platform Services Controller, you install vCenter Server and the Platform Services Controller on the same virtual machine or physical server. When you install the vCenter Server with an external Platform Services Controller, first install the Platform Services Controller that contains all of the required services on one virtual machine or physical server, and then install vCenter Server and the vCenter Server components on another virtual machine or physical server.

**Note** Installing vCenter Server on a network drive or USB flash drive is not supported.

**Table 3-1. Minimum Recommended Hardware Requirements for Installing vCenter Server and Platform Services Controller on Windows**

		vCenter Server with an Embedded or External Platform Services Controller for a Tiny Environment (up to 10 Hosts, 100 Virtual Machines)	vCenter Server with an Embedded or External Platform Services Controller for a Small Environment (up to 100 Hosts, 1000 Virtual Machines)	vCenter Server with an Embedded or External Platform Services Controller for a Medium Environment (up to 400 Hosts, 4,000 Virtual Machines)	vCenter Server with an Embedded or External Platform Services Controller for a Large Environment (up to 1,000 Hosts, 10,000 Virtual Machines)	vCenter Server with an Embedded or External Platform Services Controller for an X-Large Environment (up to 2,000 Hosts, 35,000 Virtual Machines)
Number of CPUs	2	2	4	8	16	24
Memory	4 GB RAM	10 GB RAM	16 GB RAM	24 GB RAM	32 GB RAM	48 GB RAM

**Note** If you want to add an ESXi host with more than 512 LUNs and 2,048 paths to the vCenter Server inventory, your vCenter Server instance must be suitable for a large or x-large environment.

For the hardware requirements of your database, see the database documentation. The database requirements are in addition to the vCenter Server requirements if the database and vCenter Server run on the same machine.

## Storage Requirements for vCenter Server and Platform Services Controller on Windows

When you install vCenter Server, your system must meet minimum storage requirements.

The storage requirements per folder depend on the deployment model that you decide to install. During installation, you can select a folder other than the default C:\Program Files\VMware folder to install vCenter Server and the Platform Services Controller. You can also select a folder other than the default C:\ProgramData\VMware\vCenterServer\ in which to store data.

**Table 3-2. vCenter Server Minimum Storage Requirements Depending On the Deployment Model**

Default Folder	vCenter Server with an Embedded Platform Services Controller	vCenter Server with an External Platform Services Controller	External Platform Services Controller
Program Files	6 GB	6 GB	1 GB
ProgramData	8 GB	8 GB	2 GB
System folder (to cache the MSI installer)	3 GB	3 GB	1 GB

## Software Requirements for vCenter Server and Platform Services Controller on Windows

Verify that your operating system supports vCenter Server.

vCenter Server requires a 64-bit operating system, and the 64-bit system DSN is required for vCenter Server to connect to the external database.

The earliest Windows Server version that vCenter Server supports is Windows Server 2008 SP2. Your Windows Server must have the latest updates and patches installed. For a full list of supported operating systems, see <http://kb.vmware.com/kb/2091273>.

## Database Requirements for vCenter Server on Windows

vCenter Server requires a database to store and organize server data.

Each vCenter Server instance must have its own database. For environments with up to 20 hosts and 200 virtual machines, you can use the bundled PostgreSQL database that the vCenter Server installer can install and set up for you during the vCenter Server installation. A larger installation requires a supported external database for the size of the environment.

During vCenter Server installation you must select to install the embedded database or point the vCenter Server system to any existing supported database. vCenter Server supports Oracle and Microsoft SQL Server databases.

For information about supported database server versions, see the VMware Product Interoperability Matrix at [http://www.vmware.com/resources/compatibility/sim/interop\\_matrix.php](http://www.vmware.com/resources/compatibility/sim/interop_matrix.php).

## Required Ports for vCenter Server and Platform Services Controller

The vCenter Server system, both on Windows and in the appliance, must be able to send data to every managed host and receive data from the vSphere Web Client and the Platform Services Controller services. To enable migration and provisioning activities between managed hosts, the source and destination hosts must be able to receive data from each other.

If a port is in use or is blacklisted, the vCenter Server installer displays an error message. You must use another port number to proceed with the installation. There are internal ports that are used only for inter-process communication.

VMware uses designated ports for communication. Additionally, the managed hosts monitor designated ports for data from vCenter Server. If a built-in firewall exists between any of these elements, the installer opens the ports during the installation or upgrade process. For custom firewalls, you must manually open the required ports. If you have a firewall between two managed hosts and you want to perform source or target activities, such as migration or cloning, you must configure a means for the managed hosts to receive data.

---

**Note** In Microsoft Windows Server 2008 and later, firewall is enabled by default.

---

**Table 3-3. Ports Required for Communication Between Components**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
22	TCP	System port for SSHD.	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
53		DNS service	Windows installations and appliance deployments of Platform Services Controller	No

---

**Table 3-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
80	TCP	<p>vCenter Server requires port 80 for direct HTTP connections. Port 80 redirects requests to HTTPS port 443. This redirection is useful if you accidentally use http://server instead of https://server. WS-Management (also requires port 443 to be open).</p> <p>If you use a Microsoft SQL database that is stored on the same virtual machine or physical server as the vCenter Server, port 80 is used by the SQL Reporting Service. When you install or upgrade vCenter Server, the installer prompts you to change the HTTP port for vCenter Server. Change the vCenter Server HTTP port to a custom value to ensure a successful installation or upgrade.</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
88	TCP	<p>Active Directory server. This port must be open for host to join Active Directory. If you use native Active Directory, the port must be open on both vCenter Server and Platform Services Controller.</p>	<p>Windows installations and appliance deployments of Platform Services Controller</p>	No
389	TCP/UDP	<p>This port must be open on the local and all remote instances of vCenter Server. This is the LDAP port number for the Directory Services for the vCenter Server group. If another service is running on this port, it might be preferable to remove it or change its port to a different port. You can run the LDAP service on any port from 1025 through 65535.</p> <p>If this instance is serving as the Microsoft Windows Active Directory, change the port number from 389 to an available port from 1025 through 65535.</p>	<p>Windows installations and appliance deployments of Platform Services Controller</p>	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to Platform Services Controller</li> </ul>

**Table 3-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
443	TCP	<p>The default port that the vCenter Server system uses to listen for connections from the vSphere Web Client. To enable the vCenter Server system to receive data from the vSphere Web Client, open port 443 in the firewall.</p> <p>The vCenter Server system also uses port 443 to monitor data transfer from SDK clients.</p> <p>This port is also used for the following services:</p> <ul style="list-style-type: none"> <li>■ WS-Management (also requires port 80 to be open)</li> <li>■ Third-party network management client connections to vCenter Server</li> <li>■ Third-party network management clients access to hosts</li> </ul> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	<ul style="list-style-type: none"> <li>■ vCenter Server to vCenter Server</li> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
514	TCP/UDP	<p>vSphere Syslog Collector port for vCenter Server on Windows and vSphere Syslog Service port for vCenter Server Appliance</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
636	TCP	<p>vCenter Single Sign-On LDAPS</p> <p>For backward compatibility with vSphere 6.0 only.</p>	<p>Windows installations and appliance deployments of Platform Services Controller</p>	<p>During upgrade from vSphere 6.0 only. vCenter Server 6.0 to Platform Services Controller 6.5</p>

**Table 3-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
902	TCP/UDP	<p>The default port that the vCenter Server system uses to send data to managed hosts. Managed hosts also send a regular heartbeat over UDP port 902 to the vCenter Server system. This port must not be blocked by firewalls between the server and the hosts or between hosts.</p> <p>Port 902 must not be blocked between the VMware Host Client and the hosts. The VMware Host Client uses this port to display virtual machine consoles</p> <p><b>Important</b> You can change this port number during the vCenter Server installations on Windows.</p>	Windows installations and appliance deployments of vCenter Server	No
1514	TCP	<p>vSphere Syslog Collector TLS port for vCenter Server on Windows and vSphere Syslog Service TLS port for vCenter Server Appliance</p> <p><b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.</p>	<p>Windows installations and appliance deployments of</p> <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
2012	TCP	Control interface RPC for vCenter Single Sign-On	Windows installations and appliance deployments of Platform Services Controller	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> <li>■ Platform Services Controller to Platform Services Controller</li> </ul>
2014	TCP	<p>RPC port for all VMCA (VMware Certificate Authority) APIs</p> <p><b>Important</b> You can change this port number during the Platform Services Controller installations on Windows.</p>	Windows installations and appliance deployments of Platform Services Controller	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
2015	TCP	DNS management	Windows installations and appliance deployments of Platform Services Controller	Platform Services Controller to Platform Services Controller

**Table 3-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
2020	TCP/UDP	Authentication framework management  <b>Important</b> You can change this port number during the vCenter Server and Platform Services Controller installations on Windows.	Windows installations and appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	<ul style="list-style-type: none"> <li>■ vCenter Server to Platform Services Controller</li> <li>■ Platform Services Controller to vCenter Server</li> </ul>
5480	TCP	Appliance Management Interface Open endpoint serving all HTTPS, XMLRPC and JSON-RPC requests over HTTPS.	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
6500	TCP/UDP	ESXi Dump Collector port  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
6501	TCP	Auto Deploy service  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
6502	TCP	Auto Deploy management  <b>Important</b> You can change this port number during the vCenter Server installations on Windows.	Windows installations and appliance deployments of vCenter Server	No
7080, 12721	TCP	Secure Token Service  <b>Note</b> Internal ports	Windows installations and appliance deployments of Platform Services Controller	No
7081	TCP	VMware Platform Services Controller Web Client  <b>Note</b> Internal port	Windows installations and appliance deployments of Platform Services Controller	No
8200, 8201, 8300, 8301	TCP	Appliance management  <b>Note</b> Internal ports	Appliance deployments of <ul style="list-style-type: none"> <li>■ vCenter Server</li> <li>■ Platform Services Controller</li> </ul>	No
8084	TCP	vSphere Update Manager SOAP port The port used by vSphere Update Manager client plug-in to connect to the vSphere Update Manager SOAP server.	Appliance deployments of vCenter Server	No

**Table 3-3. Ports Required for Communication Between Components (Continued)**

Port	Protocol	Description	Required for	Used for Node-to-Node Communication
9084	TCP	vSphere Update Manager Web Server Port The HTTP port used by ESXi hosts to access host patch files from vSphere Update Manager server.	Appliance deployments of vCenter Server	No
9087	TCP	vSphere Update Manager Web SSL Port The HTTPS port used by vSphere Update Manager client plug-in to upload host upgrade files to vSphere Update Manager server.	Appliance deployments of vCenter Server	No
9443	TCP	vSphere Web Client HTTPS	Windows installations and appliance deployments of vCenter Server	No

To configure the vCenter Server system to use a different port to receive vSphere Web Client data, see the *vCenter Server and Host Management* documentation.

For more information about firewall configuration, see the *vSphere Security* documentation.

## DNS Requirements for vCenter Server and Platform Services Controller on Windows

You install or upgrade vCenter Server, like any other network server, on a host machine with a fixed IP address and well-known DNS name, so that clients can reliably access the service.

Assign a static IP address and host name to the Windows server that will host the vCenter Server system. This IP address must have a valid (internal) domain name system (DNS) registration. When you install vCenter Server and the Platform Services Controller, you must provide the fully qualified domain name (FQDN) or the static IP of the host machine on which you are performing the install or upgrade. The recommendation is to use the FQDN.

Ensure that DNS reverse lookup returns an FQDN when queried with the IP address of the host machine on which vCenter Server is installed. When you install or upgrade vCenter Server, the installation or upgrade of the Web server component that supports the vSphere Web Client fails if the installer cannot look up the fully qualified domain name of the vCenter Server host machine from its IP address. Reverse lookup is implemented using PTR records.

If you plan to use an FQDN for the virtual machine or physical server, you must verify that the FQDN is resolvable.

You can use the `nslookup` command to verify that the DNS reverse lookup service returns an FQDN when queried with the IP address and to verify that the FQDN is resolvable.

```
nslookup -nosearch -nodefname FQDN_or_IP_address
```



If you use DHCP instead of a static IP address for vCenter Server, make sure that the vCenter Server computer name is updated in the domain name service (DNS). If you can ping the computer name, the name is updated in DNS.

Ensure that the ESXi host management interface has a valid DNS resolution from the vCenter Server and all vSphere Web Client instances. Ensure that the vCenter Server has a valid DNS resolution from all ESXi hosts and all vSphere Web Clients.

## vSphere Web Client Software Requirements

Make sure that your browser supports the vSphere Web Client.

The vSphere Web Client 6.7 requires Adobe Flash Player v. 16 to 23. For best performance and the most recent security updates, use Adobe Flash Player 23.

VMware has tested and supports the following guest operating systems and browser versions for the vSphere Web Client. For best performance, use Google Chrome.

**Table 3-4. Supported Guest Operating Systems and Minimum Browser Versions for the vSphere Web Client**

Operating system	Browser
Windows	Microsoft Internet Explorer v. 10.0.19 and later.
	Mozilla Firefox v. 39 and later.
	Google Chrome v. 34 and later.
Mac OS	Mozilla Firefox v. 39 and later.
	Google Chrome v. 34 and later.

## Preparing for Installing vCenter Server and Platform Services Controller on Windows

Before you install vCenter Server or Platform Services Controller, you must download the vCenter Server installer ISO file and mount it to the Windows virtual machine or physical server on which you want to install vCenter Server or Platform Services Controller.

If you plan to use an external vCenter Server database, before you install vCenter Server, you must set up the database.

### Download the vCenter Server Installer for Windows

Download the .iso installer for vCenter Server for Windows and the associated vCenter Server components and support tools.

#### Prerequisites

Create a My VMware account at <https://my.vmware.com/web/vmware/>.

## Procedure

- 1 Download the vCenter Server installer from the VMware Web site at <https://my.vmware.com/web/vmware/downloads>.

vCenter Server is part of VMware vCloud Suite and VMware vSphere, listed under Datacenter & Cloud Infrastructure.

- 2 VMware provides a sha-1 hash, a sha-256 hash, or an MD5 message digest for software downloads. To confirm file integrity, use a sha-1, sha-256, and/or a MD5 utility on your computer to calculate your own hash for files downloaded from the VMware web site.

See the VMware Web site topic Using Cryptographic Hashes at <http://www.vmware.com/download/md5.html>.

- 3 Mount the ISO image to the Windows virtual machine or physical server on which you want to install vCenter Server for Windows.

## Preparing vCenter Server Databases for Install

vCenter Server requires a database to store and organize server data. For vCenter Server on Windows, you can either use the bundled PostgreSQL database that can be installed and configured together with vCenter Server, or you can set up an external database prior to installing vCenter Server.

vCenter Server for Windows supports Oracle and Microsoft SQL Server as external databases.

You can configure an external database manually or by using a script. In addition, the data source name user must have a specific list of permissions.

The database passwords are stored in clear text on the Windows virtual machine or physical host on which you install vCenter Server and in the vCenter Server Appliance. The files containing the passwords are protected by using the operating system protection, that is, you must be a Windows local administrator or a Linux root user to access and read these files.

vCenter Server instances cannot share the same database schema. Multiple vCenter Server databases can reside on the same database server, or they can be separated across multiple database servers. For Oracle databases, which have the concept of schema objects, you can run multiple vCenter Server instances in a single database server if you have a different schema owner for each vCenter Server instance. You can also use a dedicated Oracle database server for each vCenter Server instance.

You cannot install vCenter Server and point to an older external vCenter Server database. You can upgrade the old vCenter Server database to the latest version only by upgrading the vCenter Server instance connected to that database. For information about upgrading vCenter Server, see *vSphere Upgrade*.

## vCenter Server Database Configuration Notes

After you select a supported database type, make sure you understand any special configuration requirements.

Table 3-5 is not a complete list of databases supported with vCenter Server for Windows. For information about specific database versions and service pack configurations supported with vCenter Server, see the [VMware Product Interoperability Matrixes](#). Only special database configuration notes not listed in the Product Interoperability Matrixes are provided in Table 3-5.

vCenter Server databases require a UTF code set.

Contact your DBA for the appropriate database credentials.

**Table 3-5. Configuration Notes for Databases Supported with vCenter Server**

Database Type	Configuration Notes
Embedded PostgreSQL	For vCenter Server 6.7, the bundled PostgreSQL database is suitable for environments with up to 20 hosts and 200 virtual machines.  <b>Important</b> If you use the embedded PostgreSQL database, uninstalling vCenter Server on Windows, uninstalls the embedded database, and all data is lost.
Microsoft SQL Server 2012 SP3	Ensure that the machine has a valid ODBC DSN entry.
Microsoft SQL Server 2014 SP2	Ensure that the machine has a valid ODBC DSN entry.
Oracle 11g and Oracle 12c	Ensure that the machine has a valid ODBC DSN entry. After you complete the vCenter Server installation, apply the latest patch to the Oracle client and server.

## Configure Microsoft SQL Server Databases

To use a Microsoft SQL database for your vCenter Server repository, configure your database to work with vCenter Server.

You can install and configure the Microsoft SQL Server database on the same machine on which you plan to install vCenter Server. You can install and configure the Microsoft SQL Server database on a separate machine.

### Procedure

#### 1 Prepare the vCenter Server SQL Server Database

You first create a database and user for vCenter Server. Then you assign permissions to the vCenter Server database user either by using the existing dbo schema and dbo\_owner role or by creating custom database schema and roles.

#### 2 (Optional) Use a Script to Create Microsoft SQL Server Database Objects Manually

This topic describes how to create database objects manually instead of letting the vCenter Server installer create the data objects automatically.

#### 3 Configure a SQL Server ODBC Connection

After you create and configure a SQL Server database and user for vCenter Server, you must create a 64-bit DSN on the machine on which you plan to install vCenter Server. During the vCenter Server installation, you use the DSN to establish a connection between vCenter Server and the database.

#### 4 Configure Microsoft SQL Server TCP/IP for JDBC

If the Microsoft SQL Server database has TCP/IP disabled and the dynamic ports are not set, the JDBC connection remains closed. The closed connection causes the vCenter Server statistics to malfunction. You can configure the server TCP/IP for JDBC.

#### Prepare the vCenter Server SQL Server Database

You first create a database and user for vCenter Server. Then you assign permissions to the vCenter Server database user either by using the existing dbo schema and dbo\_owner role or by creating custom database schema and roles.

#### Prerequisites

Log in to the Microsoft SQL Server Management Studio as the sysadmin (SA) or a user account with sysadmin privileges.

#### Prepare the vCenter Server Database by Using the dbo Schema and the db\_owner Database Role

The simplest way to assign permissions for a vCenter Server database user is through the database role db\_owner.

You must first create a database and user for vCenter Server. Then you can use the existing db\_owner database role and let the vCenter Server installer create the default dbo schema that assigns database user permissions to that role. You must also enable database monitoring for the user before you install vCenter Server. See [Database Permission Requirements for vCenter Server](#).

To perform the following procedure, you can either use the graphical user interface or run scripts. The vCenter Server installer package contains example scripts in the vCenter-Server\dbschema\DB\_and\_schema\_creation\_scripts\_PostgreSQL.txt file.

#### Procedure

- 1 Create a database and user for vCenter Server.
  - a In the master database, create a database for vCenter Server.
  - b Create a database user for vCenter Server and map it to the vCenter Server and msdb databases.

For example, to create the database VCDB and user vpxuser, you can run the following script:

```
use master
go
CREATE DATABASE VCDB ON PRIMARY
(NAME = N'vcdb', FILENAME = N'C:\database_path\VCDB.mdf', SIZE = 10MB, FILEGROWTH = 10% )
LOG ON
(NAME = N'vcdb_log', FILENAME = N'C:\database_path\VCDB.ldf', SIZE = 1000KB, FILEGROWTH = 10%)
COLLATE SQL_Latin1_General_CP1_CI_AS
go
use VCDB
go
CREATE LOGIN vpxuser WITH PASSWORD=N'vpxuser!0', DEFAULT_DATABASE=VCDB,
DEFAULT_LANGUAGE=us_english, CHECK_POLICY=OFF
```

```

go
CREATE USER vpxuser for LOGIN vpxuser
go
use MSDB
go
CREATE USER vpxuser for LOGIN vpxuser
go

```

You now have a Microsoft SQL Server database that you can use with vCenter Server.

- 2 Assign the db\_owner role to the vCenter Server database user on both the vCenter Server and msdb databases.

For example, to assign the db\_owner role to the vpxuser user, you can run the following script:

```

use VCDB
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
go
use MSDB
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
go

```

- 3 Enable database monitoring for the vCenter Server database user.

For example, to grant database disk size monitoring permissions to the vpxuser user, you can run the following script:

```

use master
go
grant VIEW SERVER STATE to vpxuser
go
GRANT VIEW ANY DEFINITION TO vpxuser
go

```

When you install vCenter Server, the installer uses the default dbo schema to assign permissions to the db\_owner role.

### Prepare the vCenter Server Database by Creating Custom Database Schema and Roles

As an alternative to using the db\_owner database role, experienced database administrators can set permissions by creating database schema and roles manually, which ensures greater control over database permissions.

You must first create a database and user for vCenter Server. Then you can create a custom schema and new database roles for the database user. You must also enable database monitoring for the user before you install vCenter Server. See [Database Permission Requirements for vCenter Server](#).

To perform the following procedure, you can either use the graphical user interface or run scripts. The vCenter Server installer package contains example scripts in the vCenter-Server\dbschema\DB\_and\_schema\_creation\_scripts\_PostgreSQL.txt file.

## Procedure

- 1 Create a database and user for vCenter Server.
  - a In the master database, create a database for vCenter Server.
  - b Create a database user for vCenter Server and map it to the vCenter Server and msdb databases.

For example, to create the database VCDB and user vpxuser, you can run the following script:

```
use master
go
CREATE DATABASE VCDB ON PRIMARY
(NAME = N'vcdb', FILENAME = N'C:\database_path\VCDB.mdf', SIZE = 10MB, FILEGROWTH = 10% )
LOG ON
(NAME = N'vcdb_log', FILENAME = N'C:\database_path\VCDB.ldf', SIZE = 1000KB, FILEGROWTH = 10%)
COLLATE SQL_Latin1_General_CP1_CI_AS
go
use VCDB
go
CREATE LOGIN vpxuser WITH PASSWORD=N'vpxuser!0', DEFAULT_DATABASE=VCDB,
DEFAULT_LANGUAGE=us_english, CHECK_POLICY=OFF
go
CREATE USER vpxuser for LOGIN vpxuser
go
use MSDB
go
CREATE USER vpxuser for LOGIN vpxuser
go
```

You now have a Microsoft SQL Server database that you can use with vCenter Server.

- 2 In the vCenter Server database, create a database schema and assign it to the vCenter Server database user.

For example, to create the schema VMW in VCDB and assign it to the vpxuser user, you can run the following script:

```
use VCDB
CREATE SCHEMA VMW
go
ALTER USER vpxuser WITH DEFAULT_SCHEMA =VMW
```

- 3 In the vCenter Server database, create and grant privileges to the VC\_ADMIN\_ROLE and VC\_USER\_ROLE database roles and assign them to the vCenter Server database user.

For example, to create the roles in VCDB and assign them to the vpxuser user, you can run the following script:

```
use VCDB
go
if not exists (SELECT name FROM sysusers WHERE issqlrole=1 AND name = 'VC_ADMIN_ROLE')
CREATE ROLE VC_ADMIN_ROLE;
```

```

GRANT ALTER ON SCHEMA :: VMW to VC_ADMIN_ROLE;
GRANT REFERENCES ON SCHEMA :: VMW to VC_ADMIN_ROLE;
GRANT INSERT ON SCHEMA :: VMW to VC_ADMIN_ROLE;

GRANT CREATE TABLE to VC_ADMIN_ROLE;
GRANT CREATE VIEW to VC_ADMIN_ROLE;
GRANT CREATE Procedure to VC_ADMIN_ROLE;

if not exists (SELECT name FROM sysusers WHERE issqlrole=1 AND name = 'VC_USER_ROLE')
CREATE ROLE VC_USER_ROLE
go
GRANT SELECT ON SCHEMA :: VMW to VC_USER_ROLE
go
GRANT INSERT ON SCHEMA :: VMW to VC_USER_ROLE
go
GRANT DELETE ON SCHEMA :: VMW to VC_USER_ROLE
go
GRANT UPDATE ON SCHEMA :: VMW to VC_USER_ROLE
go
GRANT EXECUTE ON SCHEMA :: VMW to VC_USER_ROLE
go
sp_addrolemember VC_USER_ROLE , vpxuser
go
sp_addrolemember VC_ADMIN_ROLE , vpxuser
go

```

- 4 In the msdb database, create and grant privileges to the VC\_ADMIN\_ROLE database role and assign it to the vCenter Server database user.

For example, to create the roles and assign them to the vpxuser user, you can run the following script:

```

use MSDB
go
if not exists (SELECT name FROM sysusers WHERE issqlrole=1 AND name = 'VC_ADMIN_ROLE')
CREATE ROLE VC_ADMIN_ROLE;
go
GRANT SELECT on msdb.dbo.syscategories to VC_ADMIN_ROLE
go
GRANT SELECT on msdb.dbo.sysjobsteps to VC_ADMIN_ROLE
go
GRANT SELECT ON msdb.dbo.sysjobs to VC_ADMIN_ROLE
go
GRANT SELECT ON msdb.dbo.sysjobs_view to VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_add_job TO VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_delete_job TO VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_add_jobstep TO VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_update_job TO VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_add_jobserver TO VC_ADMIN_ROLE

```

```

go
GRANT EXECUTE ON msdb.dbo.sp_add_jobschedule TO VC_ADMIN_ROLE
go
GRANT EXECUTE ON msdb.dbo.sp_add_category TO VC_ADMIN_ROLE
go
sp_addrolemember VC_ADMIN_ROLE , vpxuser
go

```

---

**Note** The VC\_ADMIN\_ROLE role in the msdb database is required only during installation and upgrade of vCenter Server. After the installation or upgrade, you can revoke the role and leave it as inactive for future upgrades, or you can remove it for increased security.

---

## 5 Enable database monitoring for the vCenter Server database user.

For example, to grant database disk size monitoring permissions to the vpxuser user, you can run the following script:

```

use master
go
grant VIEW SERVER STATE to vpxuser
go
GRANT VIEW ANY DEFINITION TO vpxuser
go

```

### (Optional) Use a Script to Create Microsoft SQL Server Database Objects Manually

This topic describes how to create database objects manually instead of letting the vCenter Server installer create the data objects automatically.

#### Procedure

- 1 Log in to a Microsoft SQL Server Management Studio session with the vCenter Server database user account that you created on the vCenter Server and msdb databases.
- 2 In the vCenter Server installation package, locate the dbschema scripts in the vCenter-Server/dbschema directory.
- 3 Open the VCDB\_mssql.SQL and the TopN\_DB\_mssql.sql files by using Microsoft SQL Server Management Studio and replace all occurrences of \$schema with your schema name.
- 4 Open the VCDB\_views\_mssql.sql file by using Microsoft SQL Server Management Studio and after each occurrence of ;, insert a new line and write go.
- 5 Run the scripts in a sequence on the database.

The DBO user must own the objects created by these scripts. Open the scripts one at a time in Microsoft SQL Server Management Studio and press F5 to execute each script in the following order:

- a VCDB\_mssql.SQL
- b insert\_stats\_proc\_mssql.sql
- c load\_stats\_proc\_mssql.sql



- d purge\_stat2\_proc\_mssql.sql
- e purge\_stat3\_proc\_mssql.sql
- f purge\_usage\_stats\_proc\_mssql.sql
- g stats\_rollup1\_proc\_mssql.sql
- h stats\_rollup2\_proc\_mssql.sql
- i stats\_rollup3\_proc\_mssql.sql
- j cleanup\_events\_mssql.sql
- k delete\_stats\_proc\_mssql.sql
- l upsert\_last\_event\_proc\_mssql.sql
- m load\_usage\_stats\_proc\_mssql.sql
- n TopN\_DB\_mssql.sql
- o calc\_topn1\_proc\_mssql.sql
- p calc\_topn2\_proc\_mssql.sql
- q calc\_topn3\_proc\_mssql.sql
- r calc\_topn4\_proc\_mssql.sql
- s clear\_topn1\_proc\_mssql.sql
- t clear\_topn2\_proc\_mssql.sql
- u clear\_topn3\_proc\_mssql.sql
- v clear\_topn4\_proc\_mssql.sql
- w rule\_topn1\_proc\_mssql.sql
- x rule\_topn2\_proc\_mssql.sql
- y rule\_topn3\_proc\_mssql.sql
- z rule\_topn4\_proc\_mssql.sql
- aa process\_license\_snapshot\_mssql.sql
- ab l\_stats\_rollup3\_proc\_mssql.sql
- ac l\_purge\_stat2\_proc\_mssql.sql
- ad l\_purge\_stat3\_proc\_mssql.sql
- ae l\_stats\_rollup1\_proc\_mssql.sql
- af l\_stats\_rollup2\_proc\_mssql.sql
- ag VCDB\_views\_mssql.sql

**6** (Optional) Run the scripts to enable database health monitoring.

- a job\_dbm\_performance\_data\_mssql.sql

b process\_performance\_data\_mssql.sql

- 7 For all supported editions of Microsoft SQL Server except Microsoft SQL Server Express, run the scripts to set up scheduled jobs on the database.

These scripts ensure that the SQL Server Agent service is running.

a job\_schedule1\_mssql.sql

b job\_schedule2\_mssql.sql

c job\_schedule3\_mssql.sql

d job\_cleanup\_events\_mssql.sql

e job\_topn\_past\_day\_mssql.sql

f job\_topn\_past\_week\_mssql.sql

g job\_topn\_past\_month\_mssql.sql

h job\_topn\_past\_year\_mssql.sql

- 8 For all the procedures you created in [Step 5](#), grant the execute privilege to the vCenter Server database user in the vCenter Server database.

For example, to grant execute privilege for the procedures to the vpxuser user, you can run the following script.

```
grant execute on insert_stats_proc to vpxuser
grant execute on purge_stat2_proc to vpxuser
grant execute on purge_stat3_proc to vpxuser
grant execute on purge_usage_stat_proc to vpxuser
grant execute on stats_rollup1_proc to vpxuser
grant execute on stats_rollup2_proc to vpxuser
grant execute on stats_rollup3_proc to vpxuser
grant execute on cleanup_events_tasks_proc to vpxuser
grant execute on delete_stats_proc to vpxuser
grant execute on upsert_last_event_proc to vpxuser
grant execute on load_usage_stats_proc to vpxuser
grant execute on load_stats_proc to vpxuser
grant execute on calc_topn1_proc to v
grant execute on calc_topn2_proc to vpxuser
grant execute on calc_topn3_proc to vpxuser
grant execute on calc_topn4_proc to vpxuser
grant execute on clear_topn1_proc to vpxuser
grant execute on clear_topn2_proc to vpxuser
grant execute on clear_topn3_proc to vpxuser
grant execute on clear_topn4_proc to vpxuser
grant execute on rule_topn1_proc to vpxuser
grant execute on rule_topn2_proc to vpxuser
grant execute on rule_topn3_proc to vpxuser
grant execute on rule_topn4_proc to vpxuser
grant execute on process_license_snapshot_proc to vpxuser
grant execute on l_stats_rollup3_proc to vpxuser
```

```
grant execute on l_purge_stat2_proc to vpxuser
grant execute on l_purge_stat3_proc to vpxuser
grant execute on l_stats_rollup1_proc to vpxuser
grant execute on l_stats_rollup2_proc to vpxuser
```

If you ran the script `process_performance_data_mssql.sql` in [Step 5](#), grant the following execute privilege to the vCenter Server database.

```
grant execute on process_performance_data_proc to vpxuser
```

You created the vCenter Server tables manually.

---

**Note** During the vCenter Server installation, when a database reinitialization warning message appears, select **Do not overwrite, leave my existing database in place** and continue the installation.

---

### Configure a SQL Server ODBC Connection

After you create and configure a SQL Server database and user for vCenter Server, you must create a 64-bit DSN on the machine on which you plan to install vCenter Server. During the vCenter Server installation, you use the DSN to establish a connection between vCenter Server and the database.

If you use SQL Server for vCenter Server, do not use the master or any other system database.

See your Microsoft SQL ODBC documentation for specific instructions for configuring the SQL Server ODBC connection.

#### Prerequisites

Deploy SQL Native Client version 10 or 11.

#### Procedure

- 1 On the machine on which you plan to install vCenter Server, select **Start > Administrative Tools > Data Sources (ODBC)**.
- 2 On the **System DSN** tab, modify an existing or create a new SQL Server ODBC connection.
  - To modify an existing SQL Server ODBC connection, select the connection from the System Data Source list and click **Configure**.

---

**Important** The existing DSN must use SQL Native Client version 10 or 11.

---

- To create a new SQL Server ODBC connection, click **Add**, select **SQL Native Client**, and click **Finish**.
- 3 In the **Name** text box, enter an ODBC data source name (DSN).  
For example, **VMware vCenter Server**.
  - 4 (Optional) In the **Description** text box, enter an ODBC DSN description.

- 5 In the **Server** text box, enter the IP address or FQDN of the SQL Server and, if you want to use a non-default port to access the SQL Server, enter a custom port separated by a comma.

For example, if the IP address of your SQL Server is 10.160.10.160 and you want to access the server by using custom port 8347, enter **10.160.10.160,8347**.

---

**Note** You cannot use a database server alias to create a DSN.

---

- 6 Select an authentication method.

- **Integrate Windows authentication.**

Additionally, you can also enter the Service Principal Name (SPN).

---

**Important** You cannot use this option if the vCenter Server service is running under the Microsoft Windows built-in system account.

---

- **SQL Server authentication.**

Enter your SQL Server login name and password.

- 7 Select the database created for the vCenter Server system from the **Change the default database to** menu.
- 8 Click **Finish**.
- 9 Test the data source by selecting **Test Data Source** and clicking **OK** from the **ODBC Microsoft SQL Server Setup** menu.
- 10 Verify that the SQL Agent is running on your database server.

### Configure Microsoft SQL Server TCP/IP for JDBC

If the Microsoft SQL Server database has TCP/IP disabled and the dynamic ports are not set, the JDBC connection remains closed. The closed connection causes the vCenter Server statistics to malfunction. You can configure the server TCP/IP for JDBC.

This task applies to remote Microsoft SQL Server database servers. You can skip this task if your database is located on the same machine as vCenter Server.

#### Procedure

- 1 Select **Start > All Programs > Microsoft SQL Server > Configuration Tool > SQL Server Configuration Manager**.
- 2 Select **SQL Server Network Configuration > Protocols for *Instance name***.
- 3 Enable TCP/IP.
- 4 Open TCP/IP Properties.

- 5 On the **Protocol** tab, make the following entries.

Enabled	<b>Yes</b>
Listen All	<b>Yes</b>
Keep Alive	<b>30000</b>

- 6 On the **IP Addresses** tab, make the following selections.

Active	<b>Yes</b>
TCP Dynamic Ports	<b>0</b>

- 7 Restart the SQL Server service from **SQL Server Configuration Manager > SQL Server Services**.
- 8 Start the SQL Server Browser service from **SQL Server Configuration Manager > SQL Server Services**.

## Configure Oracle Databases

To use an Oracle database for your vCenter Server repository, configure your database to work with vCenter Server.

You can install and configure the Oracle database on the same machine on which you plan to install vCenter Server. You can install and configure the Oracle database on a separate machine.

### Procedure

#### 1 [Prepare the vCenter Server Oracle Database](#)

To use an Oracle database with vCenter Server, you must create the database with certain tablespaces and privileges, and the database user with certain permissions.

#### 2 [\(Optional\) Use a Script to Create the Oracle Database Schema](#)

The vCenter Server installer creates the schema during installation. For experienced database administrators who need more control over schema creation because of environmental constraints, you can optionally use a script to create your database schema.

#### 3 [Create a Net Service Name](#)

To configure an Oracle ODBC DSN, you must have a net service name for your database. On the machine on which your Oracle database is running, you must create a net service name for the vCenter Server tablespace.

#### 4 [Configure an Oracle ODBC Connection](#)

After you create and configure an Oracle database and user for vCenter Server, you must create a 64-bit DSN on the machine on which you plan to install vCenter Server. During the vCenter Server installation, you use the DSN to establish a connection between vCenter Server and the database.

### Prepare the vCenter Server Oracle Database

To use an Oracle database with vCenter Server, you must create the database with certain tablespaces and privileges, and the database user with certain permissions.

You must first create a tablespace and user for vCenter Server. Then you grant permissions to the database user. You must also enable database monitoring for the user before you install vCenter Server. See [Database Permission Requirements for vCenter Server](#).

To perform the following procedure, you can either use the graphical user interface or run scripts. The vCenter Server installer package contains example scripts in the vCenter-Server\dbschema\DB\_and\_schema\_creation\_scripts\_PostgreSQL.txt file.

### Prerequisites

Log in to a SQL\*Plus session with the system account.

### Procedure

- 1 Create a tablespace for vCenter Server.

For example, to create the tablespace VPX, you can run the following script:

```
CREATE SMALLFILE TABLESPACE "VPX" DATAFILE 'C:\database_path\vpx01.dbf'
SIZE 1G AUTOEXTEND ON NEXT 10M MAXSIZE UNLIMITED LOGGING EXTENT MANAGEMENT LOCAL SEGMENT
SPACE MANAGEMENT AUTO;
```

- 2 Create a database user with the correct permissions for vCenter Server.

For example, to create the VPXADMIN user, you can run the following script:

```
CREATE USER "VPXADMIN" PROFILE "DEFAULT" IDENTIFIED BY "oracle" DEFAULT TABLESPACE "VPX" ACCOUNT
UNLOCK;
grant connect to VPXADMIN;
grant resource to VPXADMIN;
grant create view to VPXADMIN;
grant create sequence to VPXADMIN;
grant create table to VPXADMIN;
grant create materialized view to VPXADMIN;
grant execute on dbms_lock to VPXADMIN;
grant execute on dbms_job to VPXADMIN;
grant select on dba_lock to VPXADMIN;
grant select on dba_tablespaces to VPXADMIN;
```

```
grant select on dba_temp_files to VPXADMIN;
grant select on dba_data_files to VPXADMIN;
grant select on v_$session to VPXADMIN;
grant unlimited tablespace to VPXADMIN;
```

By default, the RESOURCE role has the **CREATE PROCEDURE**, **CREATE TABLE**, and **CREATE SEQUENCE** privileges assigned. If the RESOURCE role lacks these privileges, grant them to the vCenter Server database user.

**Note** Instead of granting unlimited tablespace, you can set a specific tablespace quota. The recommended quota is unlimited with a minimum of at least 500MB. To set an unlimited quota, use the following command.

```
alter user "VPXADMIN" quota unlimited on "VPX";
```

If you set a limited quota, monitor the remaining available tablespace to avoid the following error.

```
ORA-01536: space quota exceeded for tablespace 'tablespace'
```

You now have an Oracle database user for vCenter Server.

### 3 Enable database monitoring for the vCenter Server database user.

For example, to grant database disk size monitoring permissions to the VPXADMIN user, you can run the following script:

```
grant select on v_$system_event to VPXADMIN;
grant select on v_$sysmetric_history to VPXADMIN;
grant select on v_$sysstat to VPXADMIN;
grant select on dba_data_files to VPXADMIN;
grant select on v_$loghist to VPXADMIN;
```

### (Optional) Use a Script to Create the Oracle Database Schema

The vCenter Server installer creates the schema during installation. For experienced database administrators who need more control over schema creation because of environmental constraints, you can optionally use a script to create your database schema.

#### Procedure

- 1 Open a SQL\*Plus window with a user that has schema owner rights on the vCenter Server database.
- 2 Locate the dbschema scripts in the vCenter Server installation package */installation directory/vCenter-Server/dbschema* directory.
- 3 In SQL\*Plus, run the scripts in a sequence on the database.
  - a VCDB\_oracle.SQL
  - b VCDB\_views\_oracle.SQL
  - c insert\_stats\_proc\_oracle.sql

- d load\_stats\_proc\_oracle.sql
- e purge\_stat2\_proc\_oracle.sql
- f purge\_stat3\_proc\_oracle.sql
- g purge\_usage\_stats\_proc\_oracle.sql
- h stats\_rollup1\_proc\_oracle.sql
- i stats\_rollup2\_proc\_oracle.sql
- j stats\_rollup3\_proc\_oracle.sql
- k cleanup\_events\_oracle.sql
- l delete\_stats\_proc\_oracle.sql
- m load\_usage\_stats\_proc\_oracle.sql
- n TopN\_DB\_oracle.sql
- o calc\_topn1\_proc\_oracle.sql
- p calc\_topn2\_proc\_oracle.sql
- q calc\_topn3\_proc\_oracle.sql
- r calc\_topn4\_proc\_oracle.sql
- s clear\_topn1\_proc\_oracle.sql
- t clear\_topn2\_proc\_oracle.sql
- u clear\_topn3\_proc\_oracle.sql
- v clear\_topn4\_proc\_oracle.sql
- w rule\_topn1\_proc\_oracle.sql
- x rule\_topn2\_proc\_oracle.sql
- y rule\_topn3\_proc\_oracle.sql
- z rule\_topn4\_proc\_oracle.sql
- aa process\_license\_snapshot\_oracle.sql
- ab l\_purge\_stat2\_proc\_oracle.sql
- ac l\_purge\_stat3\_proc\_oracle.sql
- ad l\_stats\_rollup1\_proc\_oracle.sql
- ae l\_stats\_rollup2\_proc\_oracle.sql
- af l\_stats\_rollup3\_proc\_oracle.sql

**4** (Optional) You can also run the following scripts to enable database health monitoring.

- a job\_dbm\_performance\_data\_oracle.sql
- b process\_performance\_data\_oracle.sql



- 5 For all supported editions of Oracle Server, run the scripts to set up scheduled jobs on the database.
  - a job\_schedule1\_oracle.sql
  - b job\_schedule2\_oracle.sql
  - c job\_schedule3\_oracle.sql
  - d job\_cleanup\_events\_oracle.sql
  - e job\_topn\_past\_day\_oracle.sql
  - f job\_topn\_past\_week\_oracle.sql
  - g job\_topn\_past\_month\_oracle.sql
  - h job\_topn\_past\_year\_oracle.sql

You created the vCenter Server tables manually.

---

**Note** During the vCenter Server installation, when a database reinitialization warning message appears, select **Do not overwrite, leave my existing database in place** and continue the installation.

---

### Create a Net Service Name

To configure an Oracle ODBC DSN, you must have a net service name for your database. On the machine on which your Oracle database is running, you must create a net service name for the vCenter Server tablespace.

#### Procedure

- 1 Use a text editor or the Net8 Configuration Assistant to open the `tnsnames.ora` file located in the directory `C:\Oracle\Oraxx\NETWORK\ADMIN`, where `xx` is either **10g** or **11g**.
- 2 Add the following entry, where `HOST` is the managed host to which the client must connect.

```
VPX_TNS =
(DESCRIPTION =
(AADDRESS_LIST =
(AADDRESS=(PROTOCOL=TCP)(HOST=vpxd-Oracle)(PORT=1521))
)
(CONNECT_DATA =
(SERVICE_NAME = ORCL)
)
)
```

### Configure an Oracle ODBC Connection

After you create and configure an Oracle database and user for vCenter Server, you must create a 64-bit DSN on the machine on which you plan to install vCenter Server. During the vCenter Server installation, you use the DSN to establish a connection between vCenter Server and the database.

#### Prerequisites

Install the Oracle Client 11.2.0.3 p16656151 (Patch 19) or later, 11.2.0.4, 12.1.0.1.12 or later, or 12.1.0.2.

## Procedure

- 1 On the machine on which you plan to install vCenter Server, select **Start > Administrative Tools > Data Sources (ODBC)**.
- 2 On the **System DSN** tab, modify an existing or create a new Oracle ODBC connection.
  - To modify an existing Oracle ODBC connection, select the connection from the System Data Source list and click **Configure**.
  - To create an Oracle ODBC connection, click **Add**, select the Oracle client, and click **Finish**.
- 3 In the **Data Source Name** text box, enter an ODBC data source name (DSN).  
For example, **VMware vCenter Server**.
- 4 (Optional) In the **Description** text box, enter an ODBC DSN description.
- 5 In the **TNS Service Name** text box, enter the net service name for the database to which you want to connect.  
For example, **VPX\_TNS**.  
  
This is the net service name that you previously configured in the `tnsnames.ora` file that is located in the `NETWORK\ADMIN` folder in the Oracle database installation location.
- 6 In the **User ID** text box, enter the database user name for vCenter Server.  
For example, **VPXADMIN**.
- 7 Click **Test Connection**.
- 8 In the **Password** text box, enter the password of the database user and click **OK**.  
If you configured the DNS correctly, the `Connection successful` message appears.
- 9 Click **OK**.

## Database Permission Requirements for vCenter Server

vCenter Server requires a database. If you decide to use an external Oracle or Microsoft SQL Server database, when you create the database, you must grant certain permissions to the database user.

**Table 3-6. Microsoft SQL Database Permissions for vCenter Server**

Permission	Description
<code>GRANT ALTER ON SCHEMA :: [VMW] TO VC_ADMIN_ROLE</code>	Mandatory when you work with SQL Server custom schema.
<code>GRANT REFERENCES ON SCHEMA :: [VMW] TO VC_ADMIN_ROLE</code>	Mandatory when you work with SQL Server custom schema.
<code>GRANT INSERT ON SCHEMA :: [VMW] TO VC_ADMIN_ROLE</code>	Mandatory when you work with SQL Server custom schema.
<code>GRANT CREATE TABLE TO VC_ADMIN_ROLE</code>	Necessary for creating a table.
<code>GRANT CREATE VIEW TO VC_ADMIN_ROLE</code>	Necessary for creating a view.
<code>GRANT CREATE PROCEDURE TO VC_ADMIN_ROLE</code>	Necessary for creating a stored procedure.

**Table 3-6. Microsoft SQL Database Permissions for vCenter Server (Continued)**

Permission	Description
GRANT SELECT ON SCHEMA :: [VMW] TO VC_USER_ROLE	Permissions that let you run SELECT, INSERT, DELETE, UPDATE operations on tables which are part of the VMW schema.
GRANT INSERT ON SCHEMA :: [VMW] TO VC_USER_ROLE	
GRANT DELETE ON SCHEMA :: [VMW] TO VC_USER_ROLE	
GRANT UPDATE ON SCHEMA :: [VMW] TO VC_USER_ROLE	
GRANT EXECUTE ON SCHEMA :: [VMW] TO VC_USER_ROLE	Necessary for running a stored procedure in the db schema.
GRANT SELECT ON msdb.dbo.syscategories TO VC_ADMIN_ROLE	Necessary for deploying SQL Server jobs. These permissions are mandatory only during installation and upgrade and not required after deployment.
GRANT SELECT ON msdb.dbo.sysjobsteps TO VC_ADMIN_ROLE	
GRANT SELECT ON msdb.dbo.sysjobs TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_add_job TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_delete_job TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_add_jobstep TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_update_job TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_add_jobserver TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_add_jobschedule TO VC_ADMIN_ROLE	
GRANT EXECUTE ON msdb.dbo.sp_add_category TO VC_ADMIN_ROLE	
GRANT VIEW SERVER STATE TO [vpxuser]	Provides access to SQL Server DMV views and sp_lock execution.
GRANT VIEW ANY DEFINITION TO [vpxuser]	Necessary for providing the user with the privileges to see metadata for SQL Server objects.

**Table 3-7. Oracle Database Permissions for vCenter Server**

Permission	Description
GRANT CONNECT TO VPXADMIN	Necessary for connecting to the Oracle database.
GRANT RESOURCE TO VPXADMIN	Necessary for creating a trigger, sequence, type, procedure, and so on. By default, the RESOURCE role has the CREATE PROCEDURE, CREATE TABLE, and CREATE SEQUENCE privileges assigned. If the RESOURCE role lacks these privileges, grant them to the vCenter Server database user.
GRANT CREATE VIEW TO VPXADMIN	Necessary for creating a view.

**Table 3-7. Oracle Database Permissions for vCenter Server (Continued)**

Permission	Description
GRANT CREATE SEQUENCE TO VPXADMIN	Necessary for creating a sequence.
GRANT CREATE TABLE TO VPXADMIN	Necessary for creating a table.
GRANT CREATE MATERIALIZED VIEW TO VPXADMIN	Necessary for creating a materialized view.
GRANT EXECUTE ON dbms_lock TO VPXADMIN	Necessary for guaranteeing that the vCenter Server database is used by a single vCenter Server instance.
GRANT EXECUTE ON dbms_job TO VPXADMIN	Necessary during installation or upgrade for scheduling and managing the SQL jobs. This permission is not required after deployment.
GRANT SELECT ON dba_lock TO VPXADMIN	Necessary for determining existing locks on the vCenter Server database.
GRANT SELECT ON dba_tablespaces TO VPXADMIN	Necessary during upgrade for determining the required disk space. This permission is not required after deployment.
GRANT SELECT ON dba_temp_files TO VPXADMIN	Necessary during upgrade for determining the required disk space. This permission is not required after deployment.
GRANT SELECT ON dba_data_files TO VPXADMIN	Necessary for monitoring the free space while vCenter Server is working.
GRANT SELECT ON v_\$session TO VPXADMIN	View used to determine existing locks on the vCenter Server database.
GRANT UNLIMITED TABLESPACE TO VPXADMIN	Necessary for granting unlimited tablespace permissions to the vCenter Server database user.
GRANT SELECT ON v_\$system_event TO VPXADMIN	Necessary for checking log file switches.
GRANT SELECT ON v_\$sysmetric_history TO VPXADMIN	Necessary for checking the CPU utilization.
GRANT SELECT ON v_\$sysstat TO VPXADMIN	Necessary for determining the Buffer Cache Hit Ratio.
GRANT SELECT ON dba_data_files TO VPXADMIN	Necessary for determining the tablespace utilization.
GRANT SELECT ON v_\$loghist TO VPXADMIN	Necessary for checking the checkpoint frequency.

The privileges on the master database are used to monitor the vCenter Server database. so that, for example, if a certain threshold is reached, you can see an alert.

## Verify That vCenter Server Can Communicate with the Local Database

If your database is on the same machine on which vCenter Server is to be installed, and you changed the machine name, verify the configuration. Make sure that the vCenter Server DSN is configured to communicate with the new name of the machine.

Changing the vCenter Server computer name impacts database communication if the database server is on the same computer with vCenter Server. If you changed the machine name, you can verify that communication remains intact.

If your database is remote, you can skip this procedure. The name change has no effect on communication with remote databases.

After you rename the server, verify with your database administrator or the database vendor that all components of the database are working.

### Prerequisites

- Make sure that the database server is running.
- Make sure that the vCenter Server computer name is updated in the domain name service (DNS).

### Procedure

- 1 Update the data source information, as needed.
- 2 To test this condition, ping the computer name.

For example, if the computer name is `host-1.company.com`, run the following command at the Windows command prompt:

```
ping host-1.company.com
```

If you can ping the computer name, the name is updated in DNS.

vCenter Server communication is confirmed. You can continue to prepare other components of your environment.

## Maintaining a vCenter Server Database

After your vCenter Server database instance and vCenter Server are installed and operational, perform standard database maintenance processes.

The standard database maintenance processes include the following:

- Monitoring the growth of the log file and compacting the database log file, as needed.
- Scheduling regular backups of the database.
- Backing up the database before any vCenter Server upgrade.

See your database vendor's documentation for specific maintenance procedures and support.

## Synchronizing Clocks on the vSphere Network

Verify that all components on the vSphere network have their clocks synchronized. If the clocks on the machines in your vSphere network are not synchronized, SSL certificates, which are time-sensitive, might not be recognized as valid in communications between network machines.

Unsynchronized clocks can result in authentication problems, which can cause the installation to fail or prevent the vCenter Server Appliance vpxd service from starting.

Verify that any Windows host machine on which vCenter Server runs is synchronized with the Network Time Server (NTP) server. See the Knowledge Base article <http://kb.vmware.com/kb/1318>.

To synchronize ESXi clocks with an NTP server, you can use the VMware Host Client. For information about editing the time configuration of an ESXi host, see *vSphere Single Host Management*.

## Using a User Account for Running vCenter Server

You can use the Microsoft Windows built-in system account or a user account to run vCenter Server. With a user account, you can enable Windows authentication for SQL Server, and it provides more security.

The user account must be an administrator on the local machine. In the installation wizard, you specify the account name as *DomainName\Username*. You must configure the SQL Server database to allow the domain account access to SQL Server.

The Microsoft Windows built-in system account has more permissions and rights on the server than the vCenter Server system needs, which can contribute to security problems.

---

**Important** If the vCenter Server service is running under the Microsoft Windows built-in system account, when using Microsoft SQL Server, vCenter Server supports only DSNs with SQL Server authentication.

---

For SQL Server DSNs configured with Windows authentication, use the same user account for the VMware VirtualCenter Management Webservices service and the DSN user.

If you do not plan to use Microsoft Windows authentication for SQL Server or you are using an Oracle database, you might still want to set up a local user account for the vCenter Server system. The only requirement is that the user account is an administrator on the local machine and the account must be granted the **Log on as a service** privilege.

---

**Note** Starting with vSphere 6.5, the vCenter Server services are not standalone services under Windows SCM, instead they run as child processes of the VMware Service Lifecycle Manager service.

---

## Installing vCenter Server on IPv6 Machines

Starting with vSphere 6.5, vCenter Server supports mixed IPv4 and IPv6 environments.

You can connect vCenter Server with an IPv4 address to vCenter Server with an IPv6 address. When you install vCenter Server with an IPv6 address, use the fully qualified domain name (FQDN) or host name of the machine on which you install vCenter Server. When you install vCenter Server with an IPv4 address, the best practice is to use the fully qualified domain name (FQDN) or host name of the machine on which you install vCenter Server, because the IP address can change if assigned by DHCP.

## Running the vCenter Server Installer from a Network Drive

You can run the vCenter Server installer from a network drive, but you cannot install the software on a network drive.

In Windows, you can run the installers from the network drive and install the software on the local machine.

## Required Information for Installing vCenter Server or Platform Services Controller on Windows

When you install vCenter Server with an embedded Platform Services Controller, Platform Services Controller, or vCenter Server with an external Platform Services Controller, the wizard prompts you for the installation information. It is a best practice to keep a record of the values that you entered in case you must reinstall the product.

You can use this worksheet to record the information that you need for the installation of vCenter Server with an embedded Platform Services Controller, Platform Services Controller, or vCenter Server with an external Platform Services Controller.

**Table 3-8. Required Information for Installing vCenter Server or Platform Services Controller on Windows**

Required for	Required Information	Default	Your Entry
All deployment types	System name of the local system  A system name to use for managing the local system. The system name must be an FQDN. If a DNS is not available, provide a static IP address.	-	
<ul style="list-style-type: none"> <li>■ vCenter Server with an embedded Platform Services Controller</li> <li>■ Platform Services Controller as the first instance in a new domain</li> </ul>	Name for the new vCenter Single Sign-On domain  User name  Password for the vCenter Single Sign-On administrator account  The password must be at least 8 characters, but no more than 20 characters in length.  The password must conform to the following requirements: <ul style="list-style-type: none"> <li>■ Must contain at least one uppercase letter.</li> <li>■ Must contain at least one lowercase letter.</li> <li>■ Must contain at least one number.</li> <li>■ Must contain at least one special character, such as ampersand (&amp;), hash key (#), and percent sign (%).</li> </ul> Site name A name for the vCenter Single Sign-On site.	vsphere.local  administrator  -  Default-First-Site	  You cannot change the default user name during installation.
<ul style="list-style-type: none"> <li>■ vCenter Server with an external Platform Services Controller</li> <li>■ Platform Services Controller as a subsequent instance in an existing domain</li> </ul>	FQDN or IP address of the Platform Services Controller instance that you want to join  You must join a Platform Services Controller instance of the same version.  HTTPS port of the Platform Services Controller instance  Password of the vCenter Single Sign On administrator user for the domain  vCenter Single Sign-On site name  You can join an existing site or create a new site.	-  443  -  -	

**Table 3-8. Required Information for Installing vCenter Server or Platform Services Controller on Windows (Continued)**

Required for	Required Information	Default	Your Entry
■ vCenter Server with an embedded Platform Services Controller	vCenter Server service account information Can be the Windows local system account or a user service account.	Windows local system account	
	<b>Note</b> Starting with vSphere 6.5, the vCenter Server services run as child processes of the VMware Service Lifecycle Manager service.		
■ vCenter Server with an external Platform Services Controller	Account user name Only if you use a user service account	-	
	Account password Only if you use a user service account	-	
■ vCenter Server with an embedded Platform Services Controller	vCenter Server database Can be the embedded VMware Postgres database or an existing external database	embedded Postgres database	
	Data source name (DSN) Only if you use an existing external database. Leading and trailing spaces are not supported. Remove spaces from the beginning or end of the DSN.	-	
■ vCenter Server with an external Platform Services Controller	Database user name Only if you use an existing external database. Non-ASCII characters are not supported.	-	
	Database password Only if you use an existing external database.	-	
All deployment types	HTTP port	80	
	HTTPS port	443	
	Syslog Service port	514	
	Syslog Service TLS port	1514	
■ vCenter Server with an embedded Platform Services Controller	Secure Token Service port	7444	
■ Platform Services Controller			
■ vCenter Server with an embedded Platform Services Controller	Auto Deploy Management port	6502	
	Auto Deploy Service port	6501	
	ESXi Dump Collector port	6500	
■ vCenter Server with an external Platform Services Controller	ESXi Heartbeat port	902	
	vSphere Web Client port	9443	



**Table 3-8. Required Information for Installing vCenter Server or Platform Services Controller on Windows (Continued)**

Required for	Required Information	Default	Your Entry
All deployment types	Destination folder <ul style="list-style-type: none"> <li>■ The folder in which to install vCenter Server or Platform Services Controller</li> <li>■ The folder in which to store data for vCenter Server or Platform Services Controller</li> </ul> The installation paths cannot contain non-ASCII characters, commas (,), periods (.), exclamation points (!), pound signs (#), at signs (@), or percentage signs (%).	<ul style="list-style-type: none"> <li>■ The default installation folder is C:\Program Files\VMware.</li> <li>■ The default folder for data storage is C:\ProgramData\VMware.</li> </ul>	
<ul style="list-style-type: none"> <li>■ vCenter Server with an embedded Platform Services Controller</li> <li>■ Platform Services Controller</li> </ul>	Join or do not participate in the VMware Customer Experience Improvement Program (CEIP) For information about the CEIP, see the Configuring Customer Experience Improvement Program section in <i>vCenter Server and Host Management</i> .	Join the CEIP	

## Installing vCenter Server and Platform Services Controller on Windows

You can install vCenter Server with an embedded Platform Services Controller, Platform Services Controller, or vCenter Server with an external Platform Services Controller on a Windows virtual or physical machine.

You download the vCenter Server installer ISO file, mount it to the Windows host machine on which you want to perform the installation, start the installation wizard, and provide the inputs that required for the installation and setup.

Before installing vCenter Server that uses an external database, you must prepare your database. See [Preparing vCenter Server Databases for Install](#).

---

**Important** For topologies with external Platform Services Controller instances, you must install the replicating Platform Services Controller instances in a sequence. After the successful deployment of all Platform Services Controller instances in the domain, you can perform concurrent installations of multiple vCenter Server instances that point to a common external Platform Services Controller instance.

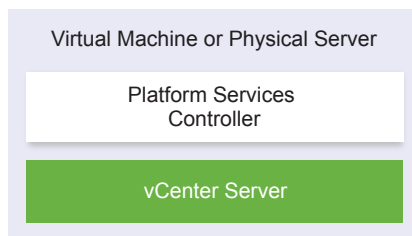
---

## Install vCenter Server with an Embedded Platform Services Controller

You can deploy vCenter Server, the vCenter Server components, and the Platform Services Controller on one virtual machine or physical server.

After you deploy vCenter Server with an embedded Platform Services Controller, you can reconfigure your topology and switch to vCenter Server with an external Platform Services Controller. This is a one-way process after which you cannot switch back to vCenter Server with an embedded Platform Services Controller. You can repoint the vCenter Server instance only to an external Platform Services Controller that is configured to replicate the infrastructure data within the same domain.

**Figure 3-1. vCenter Server with an Embedded Platform Services Controller**



### Prerequisites

- Verify that your system meets the minimum software and hardware requirements. See [vCenter Server for Windows Requirements](#).
- [Download the vCenter Server Installer for Windows](#).
- If you want to use the vSphere Web Client on the host machine on which you install vCenter Server, verify that Adobe Flash Player version 11.9 or later is installed on the system.

### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file to start the installer.
- 2 Select **vCenter Server for Windows** and click **Install**.
- 3 Follow the prompts of the installation wizard to review the welcome page and accept the license agreement.
- 4 Select **vCenter Server and Embedded Platform Services Controller**, and click **Next**.
- 5 Enter the system network name, preferably an FQDN, and click **Next**.

You can also enter an IP address. If you enter an IP address, provide a static IP address.

---

**Important** Make sure the FQDN or IP address that you provide does not change. The system name cannot be changed after deployment. If the system name changes, you must uninstall vCenter Server and install it again.

---

- 6 Set up the new vCenter Single Sign-On domain and click **Next**.
  - a Enter the domain name, for example **vsphere.local**.
  - b Set the password for the vCenter Single Sign-On administrator account.

This is the password for the user `administrator@your_domain_name`. After installation, you can log in to vCenter Single Sign-On and to vCenter Server as `administrator@your_domain_name`.

- 7 Select the vCenter Server service account and click **Next**.

---

**Note** Starting with vSphere 6.5, the vCenter Server services are not standalone services under Windows SCM, instead they run as child processes of the VMware Service Lifecycle Manager service.

---

Option	Description
<b>Use Windows Local System Account</b>	The vCenter Server service runs in the Windows Local System account. This option prevents you from connecting to an external database by using Windows integrated authentication.
<b>Specify a user service account</b>	The vCenter Server service runs in an administrative user account with a user name and password that you provide.  <b>Important</b> The user credentials that you provide must be of a user who is in the local administrator group and who has the <b>Log on as a service</b> privilege.

---

- 8 Select the type of database that you want to use and click **Next**.

Option	Description
<b>Use an embedded database (PostgreSQL)</b>	vCenter Server uses the embedded PostgreSQL database. This database is suitable for small scale deployments.
<b>Use an external database</b>	vCenter Server uses an existing external database. <ol style="list-style-type: none"> <li>a Select your database from the list of available DSNs.</li> <li>b Type the user name and the password for the DSN.</li> </ol> If your database uses Windows NT authentication, the user name and password text boxes are disabled.

---

- 9 For each component, accept the default port numbers, or if another service is using the defaults, enter alternative ports, and click **Next**.

Make sure that ports 80 and 443 are free and dedicated, so that vCenter Single Sign-On can use these ports. Otherwise, use custom ports during installation.

- 10 (Optional) Change the default destination folders and click **Next**.

---

**Important** Do not use folders that end with an exclamation mark (!).

---

- 11 Review the VMware Customer Experience Improvement Program (CEIP) page and choose if you want to join the program.

For information about the CEIP, see the Configuring Customer Experience Improvement Program section in *vCenter Server and Host Management*.

- 12 Click **Next**.
- 13 Review the summary of the installation settings and click **Install** to start the installation.
- 14 (Optional) After the installation finishes, click **Launch vSphere Web Client** to start the vSphere Web Client and log in to vCenter Server.
- 15 Click **Finish** to close the installer.

vCenter Server, the vCenter Server components, and the Platform Services Controller are installed.

## Install a Platform Services Controller on Windows

Before installing vCenter Server with an external Platform Services Controller, you install a Platform Services Controller. The Platform Services Controller contains the common services, such as vCenter Single Sign-On and the License service, which can be shared across several vCenter Server instances.

You can install many Platform Services Controllers of the same version and join them as replicating partners in the same vCenter Single Sign-On domain. Concurrent installations of replicating Platform Services Controllers are not supported. You must install the Platform Services Controllers in the domain in a sequence.

---

**Important** If you want to replace the VMCA-signed certificate with a CA-signed certificate, install the Platform Services Controller first, and then include VMCA in the certificate chain and generate new certificates from VMCA that are signed by the whole chain. You can then install vCenter Server. For information about managing vCenter Server certificates, see *Platform Services Controller Administration*.

---

### Prerequisites

- Verify that your system meets the minimum software and hardware requirements. See [vCenter Server for Windows Requirements](#).
- [Download the vCenter Server Installer for Windows](#).

### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file to start the installer.
- 2 Select **vCenter Server for Windows** and click **Install**.
- 3 Follow the prompts of the installation wizard to review the welcome page and accept the license agreement.
- 4 Select **Platform Services Controller** and click **Next**.

- 5 Enter the system name, preferably an FQDN, and click **Next**.

You can also enter an IP address. If you enter an IP address, provide a static IP address.

---

**Important** When you provide an FQDN or an IP address as the system name of the Platform Services Controller, make sure that the FQDN or IP address does not change. If the FQDN or IP address of the host machine changes, you have to reinstall the Platform Services Controller and the vCenter Server instances registered with it. The FQDN or IP address of the Platform Services Controller is used to generate an SSL certificate for the Platform Services Controller host machine.

---

- 6 Create a new vCenter Single Sign-On domain or join an existing domain.

Option	Description
<b>Create a new Single Sign-On domain</b>	<p>Creates a new vCenter Single Sign-On domain.</p> <ul style="list-style-type: none"> <li>a Enter the domain name, for example <b>vsphere.local</b>.</li> <li>b Set the password for the vCenter Single Sign-On administrator account.  This is the password for the user <code>administrator@your_domain_name</code>.</li> <li>c Enter the site name for vCenter Single Sign-On.  The site name is important if you are using vCenter Single Sign-On in multiple locations. Choose your own name for the vCenter Single Sign-On site. You cannot change the name after installation.  The supported characters are alphanumeric characters and dash (-).</li> <li>d Confirm the administrator password, and click <b>Next</b>.</li> </ul>
<b>Join an existing vCenter Single Sign-On domain</b>	<p>Joins a new vCenter Single Sign-On server to a vCenter Single Sign-On domain in an existing Platform Services Controller. You must provide the information about the vCenter Single Sign-On server to which you join the new vCenter Single Sign-On server.</p> <ul style="list-style-type: none"> <li>a Enter the fully qualified domain name (FQDN) or IP address of the Platform Services Controller that contains the vCenter Single Sign-On server to join.</li> <li>b Enter the HTTPS port to use for communication with the Platform Services Controller.</li> <li>c Enter the domain name for the vCenter Single Sign-On you are joining, for example <b>vsphere.local</b>.</li> <li>d Enter the password of the vCenter Single Sign-On administrator account.</li> <li>e Click <b>Next</b>.</li> </ul>

- 7 Click **Next**.
- 8 For each component, accept the default port numbers, or if another service is using the defaults, enter alternative ports, and click **Next**.

Make sure that ports 80 and 443 are free and dedicated, so that vCenter Single Sign-On can use these ports. Otherwise, use custom ports during installation.

- 9 (Optional) Change the default destination folders and click **Next**.

---

**Important** Do not use folders that end with an exclamation mark (!).

---

- 10 Review the VMware Customer Experience Improvement Program (CEIP) page and choose if you want to join the program.

For information about the CEIP, see the *Configuring Customer Experience Improvement Program* section in *vCenter Server and Host Management*.

- 11 Review the summary of the installation settings and click **Install** to start the installation.
- 12 After the installation completes, click **Finish** to close the installer.

The Platform Services Controller is installed.

#### What to do next

Install vCenter Server on another Windows virtual machine or physical server and register vCenter Server and the vCenter Server components to the Platform Services Controller.

## Install vCenter Server with an External Platform Services Controller on Windows

After you install a Platform Services Controller on a Windows host machine, or deploy a Platform Services Controller appliance, you can install vCenter Server and the vCenter Server components and connect the vCenter Server instance to the deployed Platform Services Controller.

#### Prerequisites

- Verify that your system meets the minimum software and hardware requirements. See [vCenter Server for Windows Requirements](#).
- [Download the vCenter Server Installer for Windows](#).
- If you want to use the vSphere Web Client on the host machine on which you install vCenter Server, verify that Adobe Flash Player version 11.9 or later is installed on the system.

#### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file to start the installer.
- 2 Select **vCenter Server for Windows** and click **Install**.
- 3 Follow the prompts of the installation wizard to review the welcome page and accept the license agreement.
- 4 Select **vCenter Server** and click **Next**.
- 5 Enter the system network name, preferably a static IP address, and click **Next**.

---

**Important** The name that you type is encoded in the SSL certificate of the system. The components communicate with each other by using this name. The system name must be either a static IP address or a fully qualified domain name (FQDN). Make sure that the system name does not change. You cannot change the system name after the installation completes.

---

- 6 Provide the system name of the Platform Services Controller that you already installed or deployed, the HTTPS port to use for communication with the vCenter Single Sign-On server, as well as the vCenter Single Sign-On password, and click **Next**.

---

**Important** Make sure that you use either the IP address or the FQDN that you provided during the installation of the Platform Services Controller. If you provided the FQDN as a system name of the Platform Services Controller, you cannot use an IP address, and the reverse. When a service from vCenter Server connects to a service running in the Platform Services Controller, the certificate is verified. If the IP address or FQDN changes, the verification fails and vCenter Server cannot connect to the Platform Services Controller.

---

- 7 Approve the certificate provided by the remote machine.
- 8 Select the vCenter Server service account and click **Next**.

---

**Note** Starting with vSphere 6.5, the vCenter Server services are not standalone services under Windows SCM, instead they run as child processes of the VMware Service Lifecycle Manager service.

---

Option	Description
<b>Use Windows Local System Account</b>	The vCenter Server service runs in the Windows Local System account. This option prevents you from connecting to an external database by using Windows integrated authentication.
<b>Specify a user service account</b>	The vCenter Server service runs in an administrative user account with a user name and password that you provide.  <b>Important</b> The user credentials that you provide must be of a user who is in the local administrator group and who has the <b>Log on as a service</b> privilege.

---

- 9 Select the type of database that you want to use and click **Next**.

Option	Description
<b>Use an embedded database (PostgreSQL)</b>	vCenter Server uses the embedded PostgreSQL database. This database is suitable for small scale deployments.
<b>Use an external database</b>	vCenter Server uses an existing external database. a Select your database from the list of available DSNs. b Type the user name and the password for the DSN. If your database uses Windows NT authentication, the user name and password text boxes are disabled.

---

- 10 For each component, accept the default port numbers, or if another service is using the defaults, enter alternative ports, and click **Next**.
- 11 (Optional) Change the default destination folders and click **Next**.

---

**Important** Do not use folders that end with an exclamation mark (!).

---

- 12 Review the summary of the installation settings and click **Install** to start the installation.

- 13 (Optional) After the installation finishes, click **Launch vSphere Web Client** to start the vSphere Web Client and log in to vCenter Server.
- 14 Click **Finish** to close the installer.

vCenter Server is installed in evaluation mode. You can activate vCenter Server by using the vSphere Web Client. For information about activating vCenter Server, see *vCenter Server and Host Management*.

## Installing vCenter Server in an Environment with Multiple NICs

If you want to install vCenter Server with an external Platform Services Controller in an environment with multiple NICs, you must keep a record of the IP addresses or FQDNs that you use as system network names.

For example, if you want to install a Platform Services Controller on one virtual machine and vCenter Server on another virtual machine and each virtual machine has two NICs, you can use the following workflow:

- 1 Install a Platform Services Controller on one of the virtual machines and use one of its IP addresses or FQDNs as a system network name.
- 2 On the other virtual machine, start the installation of vCenter Server and use one of its IP addresses or FQDNs as a system network name.
- 3 When prompted to provide the system network name of the Platform Services Controller, enter the IP address or FQDN that you entered during the installation of the Platform Services Controller.  
If you enter the other IP address or FQDN of the Platform Services Controller, you receive an error message.
- 4 After the installation completes, you can log in to the vSphere Web Client by using either of the NIC IP addresses or FQDNs of vCenter Server.



# File-Based Backup and Restore of vCenter Server Appliance

# 4

The vCenter Server Appliance supports a file-based backup and restore mechanism that helps you to recover your environment after failures.

In vSphere 6.7, you can use the vCenter Server Appliance Management Interface to create a file-based backup of the vCenter Server Appliance and Platform Services Controller appliance. After you create the backup, you can restore it by using the GUI installer of the appliance.

You use the vCenter Server Appliance Management Interface to perform a file-based backup of the vCenter Server core configuration, inventory, and historical data of your choice. The backed-up data is streamed over FTP, FTPS, HTTP, HTTPS, or SCP to a remote system. The backup is not stored on the vCenter Server Appliance.

You can perform a file-based restore only for a vCenter Server Appliance that you have previously backed up by using the vCenter Server Appliance Management Interface. You can perform such restore operation by using the GUI installer of the vCenter Server Appliance. The process consists of deploying a new vCenter Server Appliance and copying the data from the file-based backup to the new appliance.

You can also perform a restore operation by deploying a new vCenter Server Appliance and using the vCenter Server Appliance management interface to copy the data from the file-based backup to the new appliance.

---

**Important** If you back up a vCenter Server Appliance High Availability cluster, the backup operation only backs up the primary vCenter Server instance. Before restoring a vCenter Server Appliance High Availability cluster, you must power off the active, passive, and witness nodes. The restore operation restores the vCenter Server in non-vCenter Server High Availability mode. You must reconstruct the cluster after the restore operation completes successfully.

---

This chapter includes the following topics:

- [Considerations and Limitations for File-Based Backup and Restore](#)
- [Schedule a File-Based Backup](#)
- [Manually Back up a vCenter Server Appliance by Using the vCenter Server Appliance Management Interface](#)
- [Restore a vCenter Server Appliance from a File-Based Backup](#)

## Considerations and Limitations for File-Based Backup and Restore

When you backup or restore a vCenter Server environment, take into account these considerations and limitation.

### Protocols

The following considerations apply to file-based backup and restore protocols:

- FTP and HTTP are not secure protocols
- Backup servers must support minimum of 10 simultaneous connections for each vCenter Server Appliance
- You must have write permissions for upload and read permissions for download
- Only explicit mode is supported for FTPS
- If you use HTTP or HTTPS, you must enable WebDAV on the backup Web server
- You can use only FTP, FTPS, HTTP, or HTTPS to transmit data through an HTTP proxy server
- You can use IPv4 and IPv6 URLs in file-based backup and restore of a vCenter Server Appliance. Mixed mode of IP versions between the backup server and the vCenter Server Appliance is unsupported.
- If you use SCP protocol, you must use the Linux backup server

### Configuration

After a restore, the following configurations revert to the state when the backup was taken.

- Virtual machine resource settings
- Resource pool hierarchy and setting
- Cluster-host membership
- DRS configuration and rules

### Storage DRS

If the configuration changes, the following might change after a restore.

- Datastore Cluster configuration
- Datastore Cluster membership
- Datastore I/O Resource Management (Storage I/O Control) settings
- Datastore-Datacenter membership
- Host-Datastore membership

## Distributed Power Management

If you put a host into standby mode after a backup, the vCenter Server might force the host to exit standby mode when you restore to the backup.

## Distributed Virtual Switch

If you use a distributed virtual switch, you are advised to export separately the distributed virtual switch configuration before you restore to a backup. You can import the configuration after the restore. If you omit this consideration, you may lose the changes made to a distributed virtual switch after the backup. For detailed steps, see the VMware knowledge base article at <http://kb.vmware.com/kb/2034602>.

## Content Libraries

If you delete libraries or items after a backup, you cannot access or use these libraries or items after the restore. You can only delete such libraries or items. A warning message notifies you that there are missing files or folders in the storage backup.

If you create new items or item files after the backup, the Content Library Service has no record of the new items or files after the restore operation. A warning notifies you that extra folders or files were found on the storage backup.

If you create new libraries after the backup, the Content Library Service has no record of the new libraries after restore. The library content exists on the storage backing, but no warning is displayed. You must manually clean the new libraries.

## Virtual Machine Life Cycle Operations

- Restoring vCenter Server from a backup that was taken during in-flight relocation operations in the vCenter Server instance.

After you restore vCenter Server, the vCenter Server view of the virtual machines might be out of sync with the ESXi view of the virtual machines. This is also true if you performed the backup during in-flight operations on vCenter Server. If virtual machines disappear after you restore vCenter Server, you can refer to the following cases.

- a The missing virtual machine is located on the destination ESXi host and is registered with the destination ESXi host, but it is either an orphan or not in the vCenter Server inventory. You must manually add the virtual machine to the vCenter Server inventory.
- b The missing virtual machine is located on the destination ESXi host, but it is not registered with the destination ESXi host and it is not in the vCenter Server inventory. You must manually register the virtual machine to the ESXi host and add the virtual machine back to the vCenter Server inventory.

- c The missing virtual machine is located on the destination ESXi host, but it is not registered with the destination ESXi host. In the vCenter Server instance, the missing virtual machine is marked as orphaned. You must remove the virtual machine from the vCenter Server inventory and add it again.
- Restoring vCenter Server from a backup that has an out-of-date linked clone virtual machine layout.
 

If you create a linked clone virtual machine after the backup and you restore vCenter Server from the old backup, then after the restore, the vCenter Server does not know about the new linked clone virtual machine until vCenter Server discovers the new linked clone virtual machine. If you remove all existing virtual machines before the new linked clone virtual machine is discovered, then the removal of existing virtual machines corrupts the new linked clone due to missing disks. In order to avoid this, you must wait until all linked clone virtual machines are discovered by the vCenter Server before you remove virtual machines.
- Restoring vCenter Server from a backup that was taken during virtual machine registration.
 

If you are registering a virtual machine during the backup and you restore vCenter Server from the old backup, then after the restore, the virtual machine is marked as orphaned in the vCenter Server instance. You must manually add the virtual machine to the vCenter Server inventory.

## vSphere High Availability

Restoring vCenter Server from a backup might cause it to rollback to older version for the vSphere HA cluster state (HostList, ClusterConfiguration, VM protection state) while the hosts in the cluster have the latest version for the cluster state. You need to make sure the vSphere HA cluster state stays the same during restore and backup operations. Otherwise, the following problems might occur.

- If hosts are added or removed to or from the vSphere HA cluster after backup and before vCenter Server restore, virtual machines could potentially failover to hosts not being managed by the vCenter Server but are still part of the HA cluster.
- Protection state for new virtual machines is not updated on the vSphere HA agents on the hosts that are part of the vSphere HA cluster. As a result, virtual machines are not protected or unprotected.
- New cluster configuration state is not updated on the vSphere HA agents on the hosts that are part of the vSphere HA cluster.

## vCenter High Availability

Restoring vCenter Server requires vCenter HA to be reconfigured.

## Storage Policy Based Management

Restoring vCenter Server from a backup can lead to the following inconsistencies related to storage policies, storage providers, and virtual machines.

- Registered storage providers after backup are lost.
- Unregistered storage providers after backup re-appear and might show different provider status.

- Changes, such as create, delete, or update, performed on storage policies after backup are lost.
- Changes, such as create, delete, or update, performed on storage policy components after backup are lost.
- Default policy configuration changes for datastores performed after backup are lost.
- Changes in the storage policy association of the virtual machine and its disks, and in their policy compliance might occur.

## Virtual Storage Area Network

Restoring vCenter Server from a backup might cause inconsistencies in the vSAN. For information on how to check vSAN health, see *Administering VMware vSAN*.

## Patching

Restoring vCenter Server from a backup might result in missing security patches. You must apply them again after the restore is complete. For information on patching the vCenter Server Appliance, see *vSphere Upgrade*.

## Schedule a File-Based Backup

You can schedule file-based backups in vSphere 6.7. You can set up a schedule that is used to perform periodic backups.

The schedule can be set up with information about the backup location, recurrence, and retention for the backups.

You can only set up one schedule at a time.

### Prerequisites

- You must have an FTP, FTPS, HTTP, HTTPS, or SCP server up and running with sufficient disk space to store the backup.

### Procedure

- 1 In a Web browser, go to the vCenter Server Appliance Management Interface, <https://appliance-IP-address-or-FQDN:5480>.
- 2 Log in as root.
- 3 In the vCenter Server Appliance Management Interface, click **Backup**.
- 4 Click **Configure** to set up a backup schedule.

## 5 Enter the backup location details.

Option	Description
<b>Backup location</b>	Enter the backup location, including the protocol to use to connect to your backup server, the port, the server address, and backup folder to store the backup files. Use one of the following protocols: FTP, FTPS, HTTP, HTTPS, or SCP. For FTP, FTPS, HTTP, or HTTPS the path is relative to the home directory configured for the service. For SCP, the path is absolute to the remote systems root directory.
<b>Backup server credentials</b>	Enter a user name and password of a user with <b>write</b> privileges on the backup server.

## 6 Set the schedule recurrence and time for the backup.

The recurrence can be set daily, weekly, or you can customize the schedule to run the backup on a specific day or days of the week. You can specify the time of day to run the backup. The default time is 11:59pm.

## 7 (Optional) Enter an Encryption Password if you want to encrypt your backup file.

If you select to encrypt the backup data, you must use the encryption password for the restore procedure.

## 8 Select **Retain all backups** or enter the number of backups to retain.

The retention information provides the number of backups to retain for a given vCenter Server.

## 9 (Optional) Select **Stats, Events, and Tasks** to back up additional historical data from the database.

## 10 Click **Create**.

The backup schedule information is populated in the Backup page.

The complete and in progress backups are listed under Activity.

### What to do next

You can perform an immediate backup with the existing schedule information by selecting **Use backup location and user name from backup schedule** from the backup schedule on the Backup Now dialog box.

## Manually Back up a vCenter Server Appliance by Using the vCenter Server Appliance Management Interface

You can use the vCenter Server Appliance Management Interface to back up the vCenter Server instance. You can select whether to include historical data, such as stats, events, and tasks, in the backup file.

---

**Note** The backup operation for a vCenter High Availability cluster, backs up only the active node.

---

## Prerequisites

- You must have an FTP, FTPS, HTTP, HTTPS, or SCP server up and running with sufficient disk space to store the backup.

## Procedure

- 1 In a Web browser, go to the vCenter Server Appliance Management Interface, <https://appliance-IP-address-or-FQDN:5480>.
- 2 Log in as root.
- 3 In the vCenter Server Appliance Management Interface, click **Backup**.
- 4 Click **Backup Now**.

The **Backup Appliance** wizard opens.

- 5 (Optional) Select **Use backup location and user name from backup schedule** to use the information from a scheduled backup.
- 6 Enter the backup location details.

Option	Description
<b>Backup location</b>	Enter the backup location, including the protocol to use to connect to your backup server, the port, the server address, and backup folder to store the backup files. Use one of the following protocols: FTP, FTPS, HTTP, HTTPS, or SCP. For FTP, FTPS, HTTP, or HTTPS the path is relative to the home directory configured for the service. For SCP, the path is absolute to the remote systems root directory.
<b>Backup server credentials</b>	Enter a user name and password of a user with <b>write</b> privileges on the backup server.
	<b>Note</b> Username and password should only contain ASCII characters.

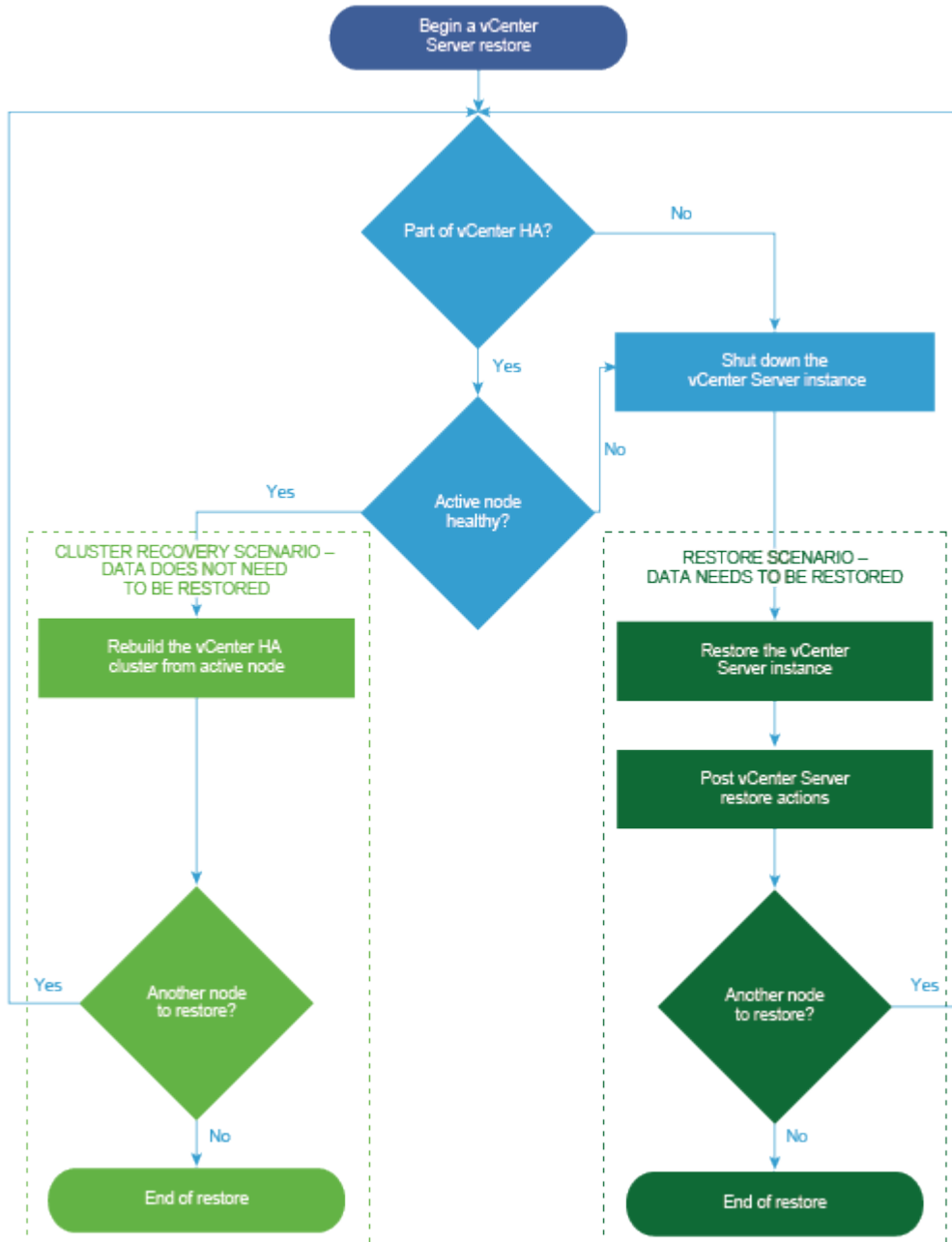
- 7 (Optional) Enter an Encryption Password if you want to encrypt your backup file.  
If you select to encrypt the backup data, you must use the encryption password for the restore procedure.
- 8 (Optional) Select **Stats, Events, and Tasks** to back up additional historical data from the database.
- 9 (Optional) In the **Description** text box, enter a description of the backup.
- 10 Click **Start** to begin the backup process.

The complete and in progress backups are listed under Activity.

## Restore a vCenter Server Appliance from a File-Based Backup

You can use the vCenter Server Appliance GUI installer to restore a vCenter Server Appliance to an ESXi host or a vCenter Server instance. The restore procedure has two stages. The first stage deploys a new vCenter Server Appliance. The second stage populates the newly deployed vCenter Server Appliance with the data stored in the file-based backup.

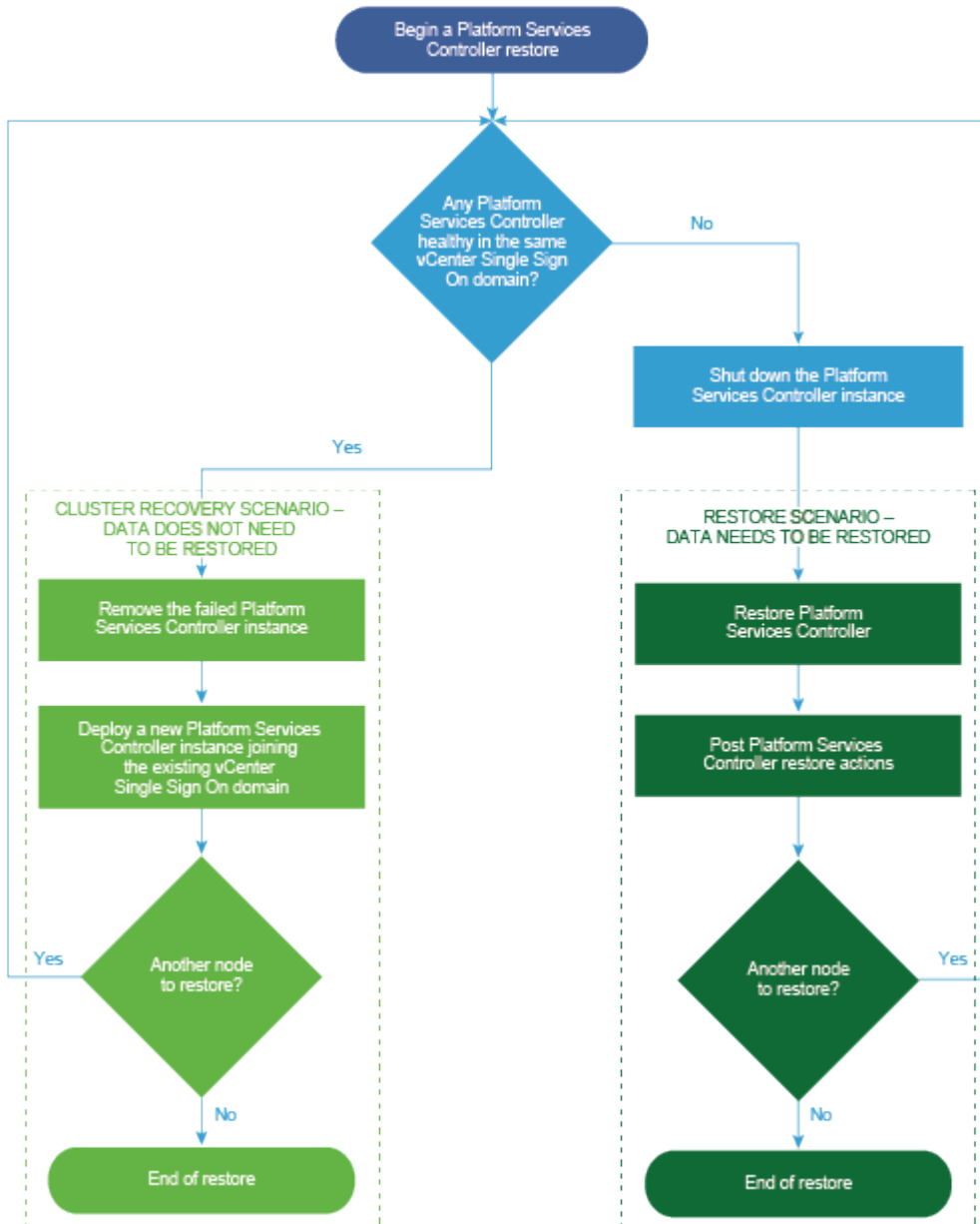
**Figure 4-1. vCenter Server Appliance Restore Workflow**





Perform a file-based restore of a Platform Services Controller only when the last Platform Services Controller in the domain fails. If there are other Platform Services Controller instances in the same vCenter Single Sign-On domain, deploy a new Platform Services Controller instance and join it to the existing Single Sign-On domain.

**Figure 4-2. Platform Services Controller Appliance Restore Workflow**



### Prerequisites

- Verify that your system meets the minimum software and hardware requirements. See [System Requirements for the vCenter Server Appliance and Platform Services Controller Appliance](#).
- [Download and Mount the vCenter Server Appliance Installer](#).

- If the vCenter Server instance is part of a vCenter High Availability cluster, you must power off the active, passive, and witness nodes of the cluster before restoring the vCenter Server.

## Procedure

### 1 Stage 1 - Deploy a New Appliance

In stage 1 of the restore process, you deploy the OVA file, which is included in the vCenter Server Appliance GUI installer.

### 2 Stage 2 - Transfer Data to the Newly Deployed Appliance

After the OVA deployment finishes, you are redirected to stage 2 of the restore process in which the data from the backup location is copied to the newly deployed vCenter Server Appliance.

## Stage 1 - Deploy a New Appliance

In stage 1 of the restore process, you deploy the OVA file, which is included in the vCenter Server Appliance GUI installer.

As an alternative to performing the first stage of the restore with the GUI installer, you can deploy the OVA file of the new vCenter Server Appliance or Platform Services Controller appliance by using the vSphere Web Client or the vSphere Client. After the OVA deployment, you must log in to the appliance management interface of the newly deployed appliance to proceed with the second stage of the restore process.

### Prerequisites

- Download and mount the vCenter Server Appliance installer. See [Download and Mount the vCenter Server Appliance Installer](#).
- If you plan to restore the vCenter Server Appliance on an ESXi host, verify that the target ESXi host is not in lockdown or maintenance mode.
- If you plan to restore the vCenter Server Appliance on a DRS cluster of a vCenter Server inventory, verify that the cluster contains at least one ESXi host that is not in lockdown or maintenance mode.
- If you plan to assign a static IP address to the appliance, verify that you have configured the forward and reverse DNS records for the IP address.
- If you are attempting to restore a vCenter Server instance that is still running, power off the backed up vCenter Server before you start the restore operation.

### Procedure

- 1 In the vCenter Server Appliance installer, navigate to the `vcasa-ui-installer` directory, go to the subdirectory for your operating system, and run the installer executable file.
  - For Windows OS, go to the `win32` subdirectory, and run the `installer.exe` file.
  - For Linux OS, go to the `lin64` subdirectory, and run the `installer` file.
  - For Mac OS, go to the `mac` subdirectory, and run the `Installer.app` file.
- 2 On the Home page, click **Restore**.

- 3 Review the Introduction page to understand the restore process and click **Next**.
- 4 Read and accept the license agreement, and click **Next**.
- 5 On the Enter backup details page, enter the details of the backup file that you want to restore, and click **Next**.

Option	Description
<b>Backup location</b>	Enter the server address and backup folder where the backup files are stored. Specify the protocol to use to retrieve the backup from your backup server. You can select HTTPS, HTTP, SCP, FTPS, or FTP.  You can also enter the IP address or hostname of the backup server and browse for the location of the backup folder.
<b>User name</b>	Enter the user name of a user with <b>read</b> privileges on the backup server.
<b>Password</b>	Enter the password of the user with <b>read</b> privileges on the backup server.

- 6 Review the backup information, and click **Next**.
- 7 Connect to the ESXi host or vCenter Server on which you want to deploy the vCenter Server Appliance to use for the restore operation.

Option	Steps
You can connect to an ESXi host on which to deploy the appliance to use for the restore operation.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the ESXi host.</li> <li>2 Enter the HTTPS port of the ESXi host.</li> <li>3 Enter the user name and password of a user with administrative privileges on the ESXi host, for example, the root user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target ESXi host, and click <b>Yes</b> to accept the certificate thumbprint.</li> </ol>
You can connect to a vCenter Server instance and browse the inventory to select an ESXi host or DRS cluster on which to deploy the appliance to use for the restore operation.	<ol style="list-style-type: none"> <li>1 Enter the FQDN or IP address of the vCenter Server instance.</li> <li>2 Enter the HTTPS port of the vCenter Server instance.</li> <li>3 Enter the user name and password of user with vCenter Single Sign-On administrative privileges on the vCenter Server instance, for example, the administrator@your_domain_name user.</li> <li>4 Click <b>Next</b>.</li> <li>5 Verify that the certificate warning displays the SHA1 thumbprint of the SSL certificate that is installed on the target vCenter Server instance, and click <b>Yes</b> to accept the certificate thumbprint.</li> <li>6 Select the data center or data center folder that contains the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b>.</li> </ol> <p><b>Note</b> You must select a data center or data center folder that contains at least one ESXi host that is not in lockdown or maintenance mode.</p> <ol style="list-style-type: none"> <li>7 Select the ESXi host or DRS cluster on which you want to deploy the appliance, and click <b>Next</b>.</li> </ol>

- 8 Accept the certificate warning.
- 9 Enter a name for the vCenter Server Appliance, set up the password for the root user, and click **Next**.

- 10 Select the deployment size for the new vCenter Server Appliance depending on the size of your vSphere inventory.

Deployment Size Option	Description
<b>Tiny</b>	Deploys an appliance with 2 CPUs and 10 GB of memory. Suitable for environments with up to 10 hosts or 100 virtual machines
<b>Small</b>	Deploys an appliance with 4 CPUs and 16 GB of memory. Suitable for environments with up to 100 hosts or 1,000 virtual machines
<b>Medium</b>	Deploys an appliance with 8 CPUs and 24 GB of memory. Suitable for environments with up to 400 hosts or 4,000 virtual machines
<b>Large</b>	Deploys an appliance with 16 CPUs and 32 GB of memory. Suitable for environments with up to 1,000 hosts or 10,000 virtual machines
<b>X-Large</b>	Deploys an appliance with 24 CPUs and 48 GB of memory. Suitable for environments with up to 2,000 hosts or 35,000 virtual machines

- 11 Select the storage size for the new vCenter Server Appliance, and click **Next**.

**Important** You must consider the storage size of the appliance that you are restoring.

Storage Size Option	Description for Tiny Deployment Size	Description for Small Deployment Size	Description for Medium Deployment Size	Description for Large Deployment Size	Description for X-Large Deployment Size
<b>Default</b>	Deploys an appliance with 300 GB of storage.	Deploys an appliance with 340 GB of storage.	Deploys an appliance with 525 GB of storage.	Deploys an appliance with 740 GB of storage.	Deploys an appliance with 1180 GB of storage.
<b>Large</b>	Deploys an appliance with 825 GB of storage.	Deploys an appliance with 870 GB of storage.	Deploys an appliance with 1025 GB of storage.	Deploys an appliance with 1090 GB of storage.	Deploys an appliance with 1230 GB of storage.
<b>X-Large</b>	Deploys an appliance with 1700 GB of storage.	Deploys an appliance with 1750 GB of storage.	Deploys an appliance with 1905 GB of storage.	Deploys an appliance with 1970 GB of storage.	Deploys an appliance with 2110 GB of storage.

- 12 From the list of available datastores, select the location where all the virtual machine configuration files and virtual disks will be stored and, optionally, enable thin provisioning by selecting **Enable Thin Disk Mode**.
- 13 On the Configure network settings page review the settings populated from the backup file of the vCenter Server Appliance.
- 14 (Optional) Edit the network configuration to match the current network environment where the vCenter Server Appliance is restored.
- 15 On the Ready to complete stage 1 page, review the deployment settings for the restored vCenter Server Appliance and click **Finish** to start the OVA deployment process.

- 16 Wait for the OVA deployment to finish, and click **Continue** to proceed with stage 2 of the restore process to transfer the data to the newly deployed appliance.

---

**Note** If you exit the wizard by clicking **Close**, you must log in to the vCenter Server Appliance Management Interface to transfer the data.

---

The newly deployed vCenter Server Appliance is running on the target server but the data is not copied from the backup location.

## Stage 2 - Transfer Data to the Newly Deployed Appliance

After the OVA deployment finishes, you are redirected to stage 2 of the restore process in which the data from the backup location is copied to the newly deployed vCenter Server Appliance.

### Procedure

- 1 Review the introduction to stage 2 of the restore process and click **Next**.
- 2 Review the backup details and click **Next**.
- 3 If you are restoring a vCenter Server Appliance that is a vCenter Embedded Linked Mode, you are asked to provide the Single Sign-On credentials. Enter the Single Sign-On user name and password, then click **Validate and Recover**.
- 4 On the Ready to complete page, review the details, click **Finish**, and click **OK** to complete stage 2 of the restore process.

The restore process restarts the vCenter Server Appliance Management Service. You cannot access the vCenter Server Appliance Management API during the restart.

---

**Important** If a restore operation of a vCenter Server Appliance or a Platform Services Controller appliance VM results with a failure, you must power off and delete the partially restored VM. After that you can try to restore the VM again.

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- 5 (Optional) After the restore process finishes, click the **[https://vcenter\\_server\\_appliance\\_fqdn/vsphere-client](https://vcenter_server_appliance_fqdn/vsphere-client)** to go to the vSphere Web Client and log in to the vCenter Server instance in the vCenter Server Appliance, or click the **[https://vcenter\\_server\\_appliance\\_fqdn:443](https://vcenter_server_appliance_fqdn:443)** to go to the vCenter Server Appliance Getting Started page.
- 6 Click **Close** to exit the wizard.  
You are redirected to the vCenter Server Appliance Getting Started page.
- 7 If the backed up vCenter node is part of a vCenter High Availability cluster, the last needs to be reconfigured after the restore operation completes successfully.

For information about how to perform backup and restore operations, see *vSphere Availability*.

# Image-Based Backup and Restore of a vCenter Server Environment

# 5

You can use a third-party product that is integrated with VMware vSphere Storage APIs - Data Protection to back up and restore a virtual machine that contains vCenter Server, a vCenter Server Appliance, or a Platform Services Controller.

You can perform a full image backup of a virtual machine that contains vCenter Server, a vCenter Server Appliance, or a Platform Services Controller. The virtual machine must use a fully qualified domain name (FQDN) with correct DNS resolution, or the hostname must be configured to be an IP address. If the hostname is configured as an IP address, the IP address cannot be changed.

The following backups and recoveries are not supported:

- Incremental backups
- Differential backups
- Individual disk backups
- Virtual machines that have snapshots
- Virtual machines configured with Fault Tolerance

VMware vSphere Storage APIs - Data Protection is a data protection framework that enables backup products to perform centralized, efficient, off-host LAN free backup of vSphere virtual machines. For information about VMware vSphere Storage APIs - Data Protection, see the VMware Web site. For information about the integration of backup products with VMware vSphere Storage APIs - Data Protection, contact your backup vendor.

This chapter includes the following topics:

- [Considerations and Limitations for Image-Based Backup and Restore](#)
- [Restore a vCenter Server Image-based Environment](#)

## Considerations and Limitations for Image-Based Backup and Restore

When you restore a vCenter Server environment, take into account these considerations and limitations.

---

**Note** Restoring a vCenter Server or Platform Services Controller instance with DHCP network configuration results in changing its IP address. The changed IP address prevents some vCenter Server services from starting properly. To start all vCenter Server services successfully, after the restore, you must reconfigure the IP address of the restored vCenter Server or Platform Services Controller instance to the IP address that the instance was set to when you performed the backup.

---

### Configuration

After a restore, the following configurations revert to the state when the backup was taken.

- Virtual machine resource settings
- Resource pool hierarchy and setting
- Cluster-host membership
- DRS configuration and rules

### Storage DRS

If the configuration changes, the following might change after a restore.

- Datastore Cluster configuration
- Datastore Cluster membership
- Datastore I/O Resource Management (Storage I/O Control) settings
- Datastore-Datacenter membership
- Host-Datastore membership

### Distributed Power Management

If you put a host into standby mode after a backup, the vCenter Server might force the host to exit standby mode when you restore to the backup.

### Distributed Virtual Switch

If you use a distributed virtual switch, you are advised to export separately the distributed virtual switch configuration before you restore to a backup. You can import the configuration after the restore. If you omit this consideration, you may lose the changes made to a distributed virtual switch after the backup. For detailed steps, see the VMware knowledge base article at <http://kb.vmware.com/kb/2034602>.

## Content Libraries

If you delete libraries or items after a backup, you cannot access or use these libraries or items after the restore. You can only delete such libraries or items. A warning message notifies you that there are missing files or folders in the storage backup.

If you create new items or item files after the backup, the Content Library Service has no record of the new items or files after the restore operation. A warning notifies you that extra folders or files were found on the storage backup.

If you create new libraries after the backup, the Content Library Service has no record of the new libraries after restore. The library content exists on the storage backing, but no warning is displayed. You must manually clean the new libraries.

## Virtual Machine Life Cycle Operations

- Restoring vCenter Server from a backup that was taken while there are in-flight relocation operations within the vCenter Server instance.

After you restore vCenter Server, the vCenter Server view of the virtual machines may be out of sync with the ESXi view of the virtual machines. This is also true if you performed the backup while there were in-flight operations on vCenter Server. If virtual machines disappear after you restore vCenter Server, you can refer to the following cases.

- a The missing virtual machine is located on the destination ESXi host and is registered with the destination ESXi host, but it is not in the vCenter Server inventory. You must manually add the virtual machine to the vCenter Server inventory.
  - b The missing virtual machine is located on the destination ESXi host, but it is not registered with the destination ESXi host and it is not in the vCenter Server inventory. You must manually register the virtual machine to the ESXi and add the virtual machine back to the vCenter Server inventory.
  - c The missing virtual machine is located on the destination ESXi host, but it is not registered with the destination ESXi host. Within the vCenter Server instance, the missing virtual machine is marked as orphaned. You must remove the virtual machine from the vCenter Server inventory and add it again.
- Restoring vCenter Server from a backup that has an out of date linked clone virtual machine layout.  
If you create a linked clone virtual machine after the backup and you restore vCenter Server from the old backup, then after the restore, vCenter Server does not know about the new linked clone virtual machine until vCenter Server discovers the new linked clone virtual machine. If you remove all existing virtual machines before the new linked clone virtual machine is discovered, then the removal of existing virtual machines corrupts the new linked clone due to missing disks. To avoid this corruption, you must wait until all linked clone virtual machines get discovered by the vCenter Server before you remove virtual machines.



## vSphere High Availability

Restoring vCenter Server from a backup may cause it to roll back to older version for the vSphere HA cluster state (HostList, ClusterConfiguration, VM protection state) while the hosts in the cluster have the latest version for the cluster state. Ensure that the vSphere HA cluster state stays the same during restore and backup operations. Otherwise, the following potential problems are present.

- If hosts are added or removed to/from the vSphere HA cluster after backup and before vCenter Server restore, virtual machines could potentially fail over to hosts not managed by the vCenter Server but are still part of the HA cluster.
- Protection states for new virtual machines are not updated on the vSphere HA agents on the hosts which are part of the vSphere HA cluster. As a result, virtual machines are not protected/unprotected.
- New cluster configuration state is not updated on the vSphere HA agents on the hosts which are part of the vSphere HA cluster.

## vCenter High Availability

Restoring vCenter Server requires vCenter HA to be reconfigured.

## Storage Policy Based Management

Restoring vCenter Server from a backup can lead to the following inconsistencies related to storage policies, storage providers, and virtual machines.

- Registered storage providers after backup are lost.
- Unregistered storage providers after backup reappear and might show different provider status.
- Changes, such as create, delete, or update, performed on storage policies after backup are lost.
- Changes, such as create, delete, or update, performed on storage policy components after backup are lost.
- Default policy configuration changes for datastores performed after backup are lost.
- Changes in the storage policy association of the virtual machine and its disks, and in their policy compliance might occur.

## Virtual Storage Area Network

Restoring vCenter Server from a backup may cause inconsistencies in the vSAN. For information how to check vSAN health, see *Administering VMware vSAN*.

## Patching

Restoring vCenter Server from a backup might result in missing security patches. You must apply them again after the restore is complete. For information on patching the vCenter Server Appliance, see *vSphere Upgrade*.

## Restore a vCenter Server Image-based Environment

You can use a third-party product that is integrated with VMware vSphere Storage APIs - Data Protection to restore a virtual machine that contains vCenter Server, vCenter Server Appliance, or Platform Services Controller.

You can perform an image-based restore of a virtual machine that contains vCenter Server, a vCenter Server Appliance, or a Platform Services Controller. The virtual machine must use a fully qualified domain name (FQDN) with correct DNS resolution, or the host name of the machine must be configured to be an IP address. If the host name is configured as an IP address, the IP address cannot be changed.

You can restore a virtual machine to the original location by either overwriting the backed up virtual machine or by creating a new virtual machine that contains the restored vCenter Server, vCenter Server Appliance, or Platform Services Controller on the same ESXi host. You can also restore the virtual machine on a new ESXi host.

You can restore a virtual machine that contains vCenter Server or a Platform Services Controller instance directly on the ESXi host that is running the third-party appliance when the vCenter Server service becomes unavailable or when you cannot access the third-party user interface by using the vSphere Web Client.

---

**Important** Restoring virtual machines that have snapshots or that are configured with Fault Tolerance is unsupported.

---

Figure 5-1. vCenter Server Restore Workflow

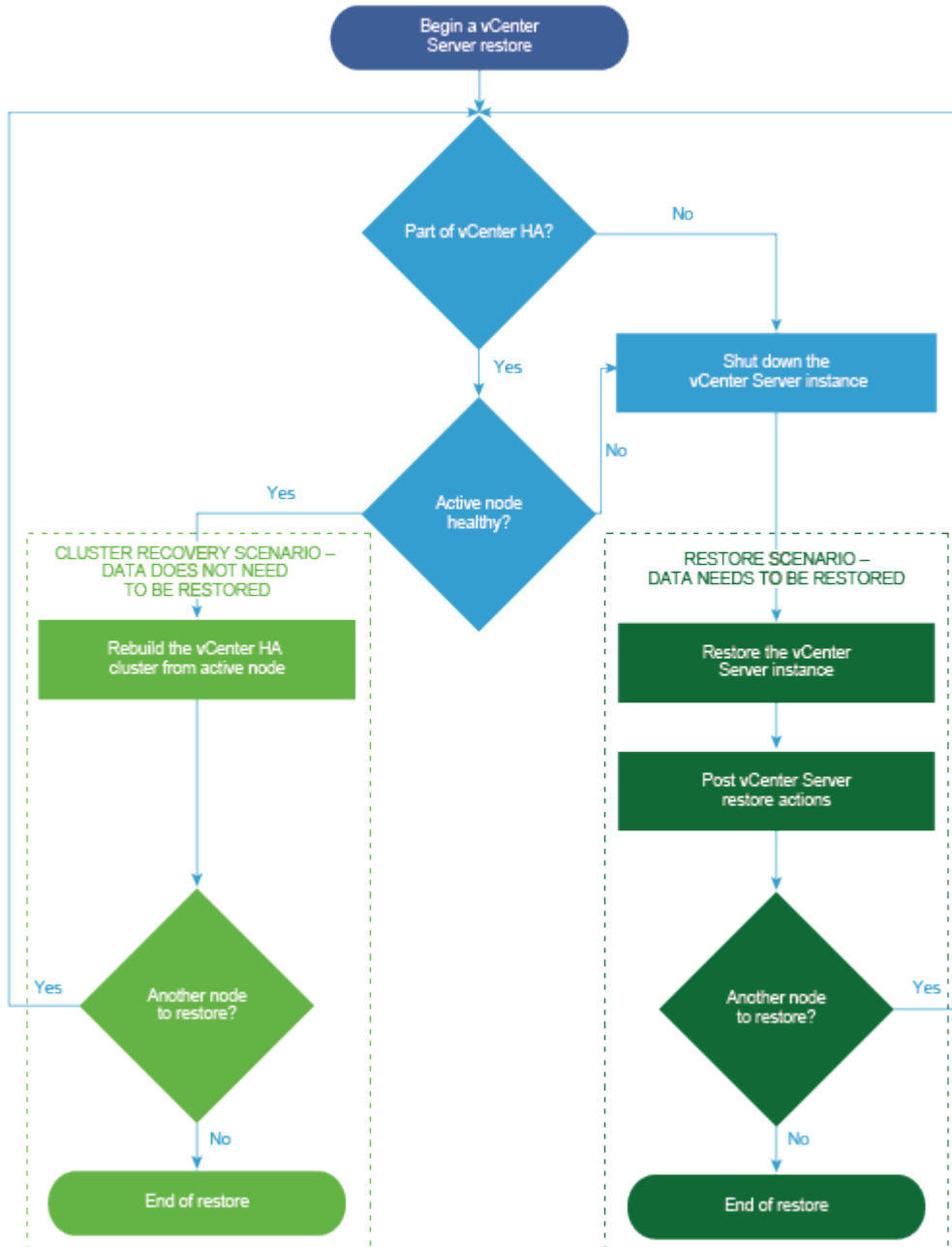
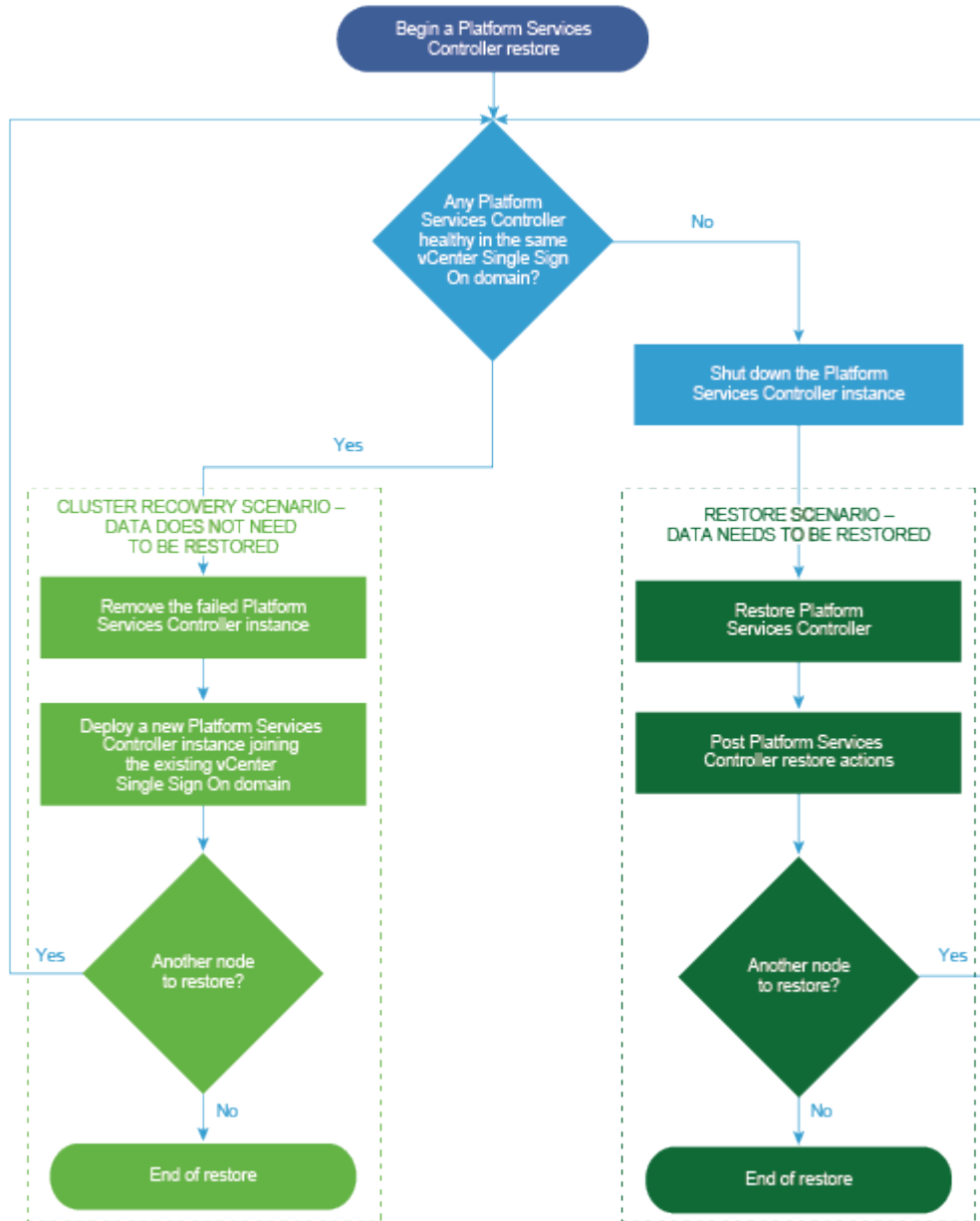


Figure 5-2. Platform Services Controller Restore Workflow



## Restore a vCenter Server Instance with an Embedded Platform Services Controller

Your environment might consist of vCenter Server or a vCenter Server Appliance with an embedded Platform Services Controller. You can use a third-party product to restore a vCenter Server environment with an embedded Platform Services Controller.

**Important** You can back up and restore only virtual machines that contain vCenter Server, vCenter Server Appliance, and Platform Services Controller. You cannot back up and restore physical machines that are running vCenter Server by using a third-party product.

### Procedure

- 1 Restore the vCenter Server virtual machine onto the ESXi host using a third-party solution.
- 2 Log into the vCenter Server Appliance Management Interface, <https://appliance-IP-address-or-FQDN:5480>.
- 3 Run the reconciliation operation and provide the Single Sign-On credentials.
- 4 If you are restoring the last embedded node in the embedded linked mode deployment, run the reconciliation operation with the `ignore_warnings` flag selected.

### What to do next

Power on the restored virtual machine that contains the restored vCenter Server instance.

## Restoring a vCenter Server Environment with a Single Embedded Platform Services Controller

Your environment might consist of many vCenter Server instances that are registered with a single Platform Services Controller. You can use a third party solution to restore a virtual machine that contains a Platform Services Controller. You can also use the third party solution to restore either virtual machines that contain vCenter Server instances or vCenter Server Appliance instances that are registered with a single external Platform Services Controller.

---

**Note** If vCenter Server and Platform Services Controller instances fail at the same time, you must first restore the Platform Services Controller and then the vCenter Server instances.

---

## Restoring a vCenter Server Environment with Multiple Platform Services Controller Instances

You can use a third party solution to restore an environment in which the vCenter Server instances are registered with different Platform Services Controller instances, and the infrastructure data is replicated between the Platform Services Controller instances.

---

**Important** You can back up and restore only virtual machines that contain vCenter Server, vCenter Server Appliance, and Platform Services Controller. You cannot back up and restore physical machines that are running vCenter Server by using a third-party product.

---

For a vCenter Server with an external Platform Services Controller, restore is only allowed if it is the last node in the cluster. If it is not the last node in the cluster, deploy a new Platform Services Controller node and join the cluster.

For the last Platform Services Controller in the cluster, use the third party solution to restore the vCenter Server virtual machine onto the ESXi host. You do not need to perform reconciliation. After the restore succeeds, in the node associated with that Platform Services Controller, run the following commands:

```
service-control --stop --all  
service-control --start --all
```

# After You Install vCenter Server or Deploy the vCenter Server Appliance

# 6

After you install vCenter Server or deploy the vCenter Server Appliance, consider these postinstallation options before adding inventory for the vCenter Server to manage.

For information about configuring the vSphere Authentication Proxy service, see *vSphere Security*.

This chapter includes the following topics:

- [Log in to vCenter Server by Using the vSphere Web Client](#)
- [Install the VMware Enhanced Authentication Plug-in](#)
- [Collect vCenter Server Log Files](#)
- [Repoint vCenter Server to Another External Platform Services Controller in the Same Domain](#)
- [Repoint vCenter Server to External Platform Services Controller in a Different Domain](#)
- [Reconfigure a Standalone vCenter Server with an Embedded Platform Services Controller to a vCenter Server with an External Platform Services Controller](#)

## Log in to vCenter Server by Using the vSphere Web Client

Log in to vCenter Server by using the vSphere Web Client to manage your vSphere inventory.

In vSphere 6.0 and later, the vSphere Web Client is installed as part of the vCenter Server on Windows or the vCenter Server Appliance deployment. This way, the vSphere Web Client always points to the same vCenter Single Sign-On instance.

### Procedure

- 1 Open a Web browser and enter the URL for the vSphere Web Client:  
`https://vcenter_server_ip_address_or_fqdn/vsphere-client.`
- 2 Enter the credentials of a user who has permissions on vCenter Server, and click **Login**.

- 3 If a warning message about an untrusted SSL certificate appears, select the appropriate action based on your security policy.

Option	Action
Ignore the security warning for this login session only.	Click <b>Ignore</b> .
Ignore the security warning for this login session, and install the default certificate so that the warning does not appear again.	Select <b>Install this certificate and do not display any security warnings for this server</b> and click <b>Ignore</b> . Select this option only if using the default certificate does not present a security problem in your environment.
Cancel and install a signed certificate before proceeding.	Click <b>Cancel</b> and ensure that a signed certificate is installed on the vCenter Server system before you attempt to connect again.

The vSphere Web Client connects to all the vCenter Server systems on which the specified user has permissions, allowing you to view and manage your inventory.

## Install the VMware Enhanced Authentication Plug-in

The VMware Enhanced Authentication Plug-in provides Integrated Windows Authentication and Windows-based smart card functionality.

In the vSphere 6.5 release, the VMware Enhanced Authentication Plug-in replaced the Client Integration Plug-in from vSphere 6.0 releases and earlier. The Enhanced Authentication Plug-in provides Integrated Windows Authentication and Windows-based smart card functionality. These are the only two features carried over from the previous Client Integration Plug-in. The Enhanced Authentication Plug-in can function seamlessly if you already have the Client Integration Plug-in installed on your system from vSphere 6.0 or earlier. There are no conflicts if both plug-ins are installed.

Watch the video "vSphere Web Client after the Client Integration Plug-in Removal" for more information about the workflow changes to the vSphere Client:



vSphere Web Client after the Client Integration Plug-in Removal  
([http://link.brightcove.com/services/player/bcpid2296383276001?bctid=ref:video\\_web\\_client\\_after\\_cip\\_removal](http://link.brightcove.com/services/player/bcpid2296383276001?bctid=ref:video_web_client_after_cip_removal))

Install the plug-in only once to enable all the functionality the plug-in delivers.

If you install the plug-in from an Internet Explorer browser, you must first disable Protected Mode and enable pop-up windows on your Web browser. Internet Explorer identifies the plug-in as being on the Internet instead of on the local intranet. In such cases, the plug-in is not installed correctly because Protected Mode is enabled for the Internet.

For information about supported browsers and operating systems, see the *vCenter Server Installation and Setup* documentation.

### Prerequisites

If you use Microsoft Internet Explorer, disable Protected Mode.



### Procedure

- 1 Open a Web browser and type the URL for the vSphere Web Client.
- 2 At the bottom of the vSphere Web Client login page, click **Download Enhanced Authentication Plug-in**.
- 3 If the browser blocks the installation either by issuing certificate errors or by running a pop-up blocker, follow the Help instructions for your browser to resolve the problem.
- 4 Save the plug-in to your computer, and run the executable.
- 5 Step through the installation wizard for both the VMware Enhanced Authentication Plug-in and the VMware Plug-in Service which are run in succession.
- 6 When the installations are complete, refresh your browser.
- 7 On the External Protocol Request dialog box, click **Launch Application** to run the Enhanced Authentication Plug-in.

The link to download the plug-in disappears from the login page.

## Collect vCenter Server Log Files

After you install vCenter Server, you can collect the vCenter Server log files for diagnosing and troubleshooting purposes.

---

**Note** This procedure provides information about how to collect the log files for a Windows installation of vCenter Server. For information about exporting a support bundle and browsing the log files in the vCenter Server Appliance, see *vCenter Server Appliance Configuration*.

---

### Procedure

- 1 Log in as an administrator on the Windows machine where vCenter Server is installed.
- 2 Navigate to **Start > Programs > VMware > Generate vCenter Server log bundle** to generate the log bundle.

You can generate vCenter Server log bundles even if you are unable to connect to the vCenter Server by using the vSphere Web Client

The log files for the vCenter Server system are generated and saved in a .tgz archive on your desktop.

## Repoint vCenter Server to Another External Platform Services Controller in the Same Domain

Joining external Platform Services Controller instances in the same vCenter Single Sign-On domain, ensures high availability of your system.

If an external Platform Services Controller stops responding or if you want to distribute the load of an external Platform Services Controller, you can repoint the vCenter Server instances to another Platform Services Controller in the same domain and site.

- You can repoint the vCenter Server instance to an existing functional Platform Services Controller instance with free load capacity in the same domain and site.
- You can install or deploy a new Platform Services Controller instance in the same domain and site to which to repoint the vCenter Server instance.

### Prerequisites

- If the old Platform Services Controller instance has stopped responding, remove the node and clean up the stale vmdir data by running the `cmsso-util unregister` command. For information about decommissioning a Platform Services Controller instance, see <https://kb.vmware.com/kb/2106736>.
- Verify that the old and the new Platform Services Controller instances are in the same vCenter Single Sign-On domain and site by running the `vdcrepadmin -f showservers` command. For information about using the command, see <https://kb.vmware.com/kb/2127057>.
- If you want to repoint a vCenter Server Appliance that is configured in a vCenter HA cluster, remove the vCenter HA configuration. For information about removing a vCenter HA configuration, see *vSphere Availability*.

### Procedure

- 1 Log in to the vCenter Server instance.
  - For a vCenter Server Appliance, log in to the vCenter Server Appliance shell as root.
  - For a vCenter Server instance on Windows, log in as an administrator to the vCenter Server virtual machine or physical server.
- 2 If the vCenter Server instance runs on Windows, in the Windows command prompt, navigate to `C:\Program Files\VMware\vCenter Server\bin`.
- 3 Run the `cmsso-util repoint` command.

```
cmsso-util repoint --repoint-psc psc_fqdn_or_static_ip [--dc-port port_number]
```

where the square brackets [ ] enclose the command options.

Here, *psc\_fqdn\_or\_static\_ip* is the system name used to identify the Platform Services Controller. This system name must be an FQDN or a static IP address.

---

**Note** The FQDN value is case-sensitive.

---

Use the `--dc-port port_number` option if the Platform Services Controller runs on a custom HTTPS port. The default value of the HTTPS port is 443.

- 4 Log in to the vCenter Server instance by using the vSphere Web Client to verify that the vCenter Server instance is running and can be managed.

The vCenter Server instance is registered with the new Platform Services Controller.

#### What to do next

If you repointed a vCenter Server Appliance that was configured in a vCenter HA cluster, you can reconfigure the vCenter HA cluster. For information about configuring vCenter HA, see *vSphere Availability*.

## Repoint vCenter Server to External Platform Services Controller in a Different Domain

You can move one vCenter Server to a Platform Services Controller in another vSphere domain. You can also move all vCenter Servers in one vSphere domain one at a time to another domain, which provides a way to perform domain consolidation. Services such as tagging, and licensing, are migrated to the new Platform Services Controller.

In addition to consolidating vSphere domains, you can also split an existing domain. The following use cases are supported:

- You can move one or more vCenter Server instances that point to separate external Platform Services Controller to point to a new Platform Services Controller in a different domain.
- You can move one or more vCenter Server instances that point to one external Platform Services Controller to point to different Platform Services Controller in a different domain.
- You can move a vCenter Server that is part of an embedded Platform Services Controller to an external Platform Services Controller in a different domain. You must first reconfigure the node to an external Platform Services Controller node before repointing to a Platform Services Controller in a different domain.

#### Prerequisites

- Cross domain repointing is only supported with Platform Services Controller 6.7 and vCenter Server 6.7.
- Each vCenter Server and vCenter Server node must be in a healthy state.
- To ensure no loss of data, take a snapshot or backup each node before proceeding with repointing the vCenter Server or Platform Services Controller.

## Procedure

- 1 (Optional) Run the pre-check mode command. The pre-check mode fetches the tagging (tags and categories) and authorization (roles and privileges) data from the Platform Services Controller. Conflicts can be checked for tagging and authorization data. Pre-check does not migrate any data, but checks the conflicts and writes them to a JSON file. For example, run the pre-check with the following CLI:

```
cmsso-util domain-repoint --mode pre-check --src-psc-admin source_PSC_admin_userid --dest-psc-fqdn target_PSC_FQDN --dest-psc-admin target_PSC_admin_userid --dest-domain-name target_FQDN --dest-vc-fqdn target_vCenter_server
```

You are prompted for the administrator password.

The pre-check writes the conflict details to a JSON file with the location provided after pre-check.

- 2 (Optional) Edit the conflict file and apply resolutions for all conflicts or apply a separate resolution for each conflict.

The conflict resolutions are:

- Copy: Create a duplicate copy of the data in the target Platform Services Controller.
- Skip: Skips copying the data in the target Platform Services Controller.
- Merge: Merges the conflict without creating duplicates.

To check conflicts of tag authZ data, you must provide a vCenter Server part of the target Platform Services Controller or the conflicts are not checked.

- 3 Run the execute mode command. In the execute mode, the data generated during the pre-check mode is read from the JSON file and imported to the target Platform Services Controller. Licensing data is exported from the original Platform Services Controller. Then, the vCenter Server is repointed to the target Platform Services Controller. For example, run the execute command with the following:

```
cmsso-util domain-repoint --mode execute --src-psc-admin Source_PSC_admin_userid --dest-psc-fqdn target_PSC_FQDN --dest-psc-admin target_PSC_admin_userid --dest-domain-name target_FQDN --dest-vc-fqdn target_vCenter_server
```

You are prompted for the administrator password.

---

**Note** If you do not run the pre-check command, the data is exported first and then imported to the target Platform Services Controller. You cannot edit the conflicts during the execute mode. The pre-check command give you the opportunity to look at the conflicts in detail and edit the conflicts file to provide detailed input on how to handle various conflicts. To avoid any conflicts, run the pre-check mode first to understand the conflicts and then run in execute mode.

---

Check that the tags and categories are migrated and all the required services are up and running.

---

**Note** If the repointing fails, collect the support bundle and revert to the snapshot taken before this process.

---

After vCenter Server is repointed to the target Platform Services Controller, the Customer Experience Improvement Program (CEIP) participation preference is updated to the target domain preference.

### What to do next

If you repointed a vCenter Server Appliance that is configured in a vSphere High Availability cluster, you can reconfigure the vSphere HA cluster. See *vSphere Availability* for information about configuring vSphere HA.

Solutions or plugins registered with vCenter Server must be registered again after a successful replot.

Identity sources must be manually migrated. SSO configuration is not migrated. Users and policies require manual intervention.

## Syntax of the Domain Repoint Command

You can use command arguments to set the execution parameters of the domain replot command.

The `cmsso-util domain-repoint` CLI replots vCenter Server to External Platform Services Controller in a different Domain.

You can add a space-separated list of arguments to the CLI replot command

```
cmsso-util domain replot --mode mode --src-psc-admin source_PSC_admin_userid
--dest-psc-fqdn target_PSC_FQDN --dest-psc-admin target_PSC_admin_userid
--dest-domain-name domain_name_to_replot --dest-vc-fqdn target_vCenter_server
```

Argument	Description
-m, --mode	<i>mode</i> can be <i>pre-check</i> or <i>execute</i> . The <i>pre-check</i> argument runs the command in <i>pre-check</i> mode. The <i>execute</i> argument runs the command in <i>execute</i> mode.
-spa, --src-psc-admin	SSO administrator user name for the source Platform Services Controller. Do not append the <i>@domain</i> .
-dpf, --dest-psc-fqdn	The FQDN of the Platform Services Controller to replot.
-dpa, --dest-psc-admin	SSO administrator user name for the destination Platform Services Controller. Do not append <i>@domain</i> .
-ddn, --dest-domain-name	SSO domain name of the destination Platform Services Controller.
-dpr, --dest-psc-rhttps	(Optional) HTTPS port for the destination Platform Services Controller. If not set, the default 443 is used.
-dvf, --dest-vc-fqdn	The FQDN of the vCenter Server pointing to a destination Platform Services Controller. The vCenter Server is used to check for component data conflicts in the <i>pre-check</i> mode. If not provided, conflict checks are skipped and the default resolution (COPY) is applied for any conflicts found during the import process.
	<b>Note</b> This argument is optional only if the destination domain does not have a vCenter Server. If a vCenter Server exists in the destination domain, this argument is mandatory.

Argument	Description
-dvr, --dest-vc-rhttps	(Optional) The HTTPS port for the vCenter Server pointing to the destination Platform Services Controller. If not set, the default 443 is used.
--ignore-snapshot	(Optional) Ignore snapshot warnings.
--no-check-certs	(Optional) Ignore certification validations.
--debug	(Optional) Retrieves command execution detail.
-h, --help	(Optional) Displays the help message for the cmsso-util domain repoint command.

## Understanding Tagging and Authorization Conflicts

When you run the domain repoint command in pre-check mode, data from the Platform Services Controller is exported, examined, and conflicts are written to a file.

The following data is exported to the /storage/domain-data/ or ProgramData/VMWare/vCenterServerdata/domain-data folder:

- All\_Privileges.json
- All\_Roles.json
- All\_TagCategories.json
- All\_Tags.json

These files contain the all the data (Authorization and Tagging) from the vCenter Server on which this command was run.

If a secondary vCenter Server is provided using the -dvf or --dest-vc-fqdn option, any conflicts are also exported to the same folder:

- Conflicts\_Roles.json
- Conflicts\_TagCategories.json
- Conflicts\_Tags.json

The following is a sample conflicts file:

```
<---- Sample Conflict file code block ---->
{
  "global" : {
    "resolution" : "MERGE|SKIP|COPY",
    "description" : "Default resolution option used to resolve Role Conflicts is COPY. The
conflicts list describes the differences between Role entities on source and target PSC. If
the source information represents an empty JSON array, it simply means that all the entity
attributes from source and target are identical. If the source lists few entries, it means
that only these entity attributes are missing from the target. If the target lists few entries,
it means that only these entity attributes are missing from the source. Though a global resolution
can be set, it can also be overridden at each conflict level by providing individual resolution
mode."
```

```

    },
    "conflicts-count" : 1,
    "conflicts-list" : {
      "NoCryptoAdmin" : {
        "source" : {
          "privileges" : "[]"
        },
        "target" : {
          "privileges" : "[Group-1.SamplePriv-1, Group-1.SamplePriv-4, Group-2.SamplePriv-10,
Group-2.SamplePriv-3, Group-2.SamplePriv-7, Group-3.SamplePriv-2, Group-3.SamplePriv-9]"
        },
        "resolution" : ""
      }
    }
  }
}
<----- End of code block ---->

```

The parts of the sample conflict files are:

- **description.** Provides the details on how the respective conflicts file is read and understood.
- **source and target.** JSON objects that list only the differences between the source and target Platform Services Controller objects.
- **resolution.** User supplies one valid resolution. Valid resolutions are MERGE, COPY, and SKIP.

To specify the resolution for handling conflicts, you can provide a default resolution option all conflicts in the "global": "resolution" = "MERGE|SKIP|COPY" section. If you do not provide a valid global resolution type for resolution or leave it unedited, the system uses COPY as the default resolution option.

You can also provide a valid resolution option for each of the conflicts by editing the resolution property at each conflict level which overrides the global resolution option.

The types of conflicts listed in [Table 6-1](#).

Table 6-1. Conflict Types

Conflict	Properties used to compare Category Objects	Conflict Types	Conflicting Properties	Conflict Resolution Options
Role conflict	<ul style="list-style-type: none"> <li>■ name: Name of the category.</li> <li>■ privilegeId: List of privileges for the role.</li> </ul>	<p>RoLeName conflict occurs while importing roles and a role with the same name exists in the target Platform Services Controller but with different privileges.</p>	<p>Properties that can be conflicting for RoLeName conflict type can be Privileges.</p>	<ul style="list-style-type: none"> <li>■ COPY. A copy of the conflicting role is created in the target Platform Services Controller, with --copy appended to the role name. The new role is created with a new role ID with the same set of privilege IDs. The new role ID is updated in the VPX_ACCESS table. The new role ID is applicable for both role name conflict and role ID conflict.</li> </ul> <hr/> <p><b>Note</b></p> <p>The default resolution option to resolve Role conflicts is COPY.</p> <ul style="list-style-type: none"> <li>■ MERGE. The MERGE option is resolved in the following sequence: <ul style="list-style-type: none"> <li>a If the source Platform Services Controller has a role with the same name and privilege list as a role in the target Platform Services Controller, but the role IDs are different, the role ID from the target Platform Services Controller is used and updated in the VPX_ACCESS table.</li> <li>b If the source Platform Services Controller has a role with the same name as a role in the target Platform Services</li> </ul> </li> </ul>



Table 6-1. Conflict Types (Continued)

Conflict	Properties used to compare Category Objects	Conflict Types	Conflicting Properties	Conflict Resolution Options
				<p>Controller, but with a different privilege list, then the privilege lists for both roles are merged.</p> <ul style="list-style-type: none"> <li>■ SKIP. Do nothing. The specific role is skipped.</li> </ul>
<p>Tag Category conflict: A category name must be unique in a Platform Services Controller.</p>	<ul style="list-style-type: none"> <li>■ <code>name</code>: Name of the category.</li> <li>■ <code>cardinality</code>: Cardinality of Category, either Single or Multiple.</li> <li>■ <code>associableEntityType</code>: List of vCenter Server object that can be associated with a tag from this category. A value of All indicates all vCenter Server objects.</li> </ul>	<p>Only one type of conflict can be seen while importing Tag Categories, <code>CategoryName</code> conflict. This conflict indicates that a category with the same name exists in the target Platform Services Controller but with different properties (<code>cardinality</code> or <code>associableEntityType</code>).</p>	<p>Properties that can be conflicting for conflict type <code>CategoryName</code> can be at least one of two types: <code>Cardinality</code> or <code>AssociableTypes</code>.</p>	<ul style="list-style-type: none"> <li>■ COPY. A copy of the conflicting category is created in the target Platform Services Controller, with <code>--copy</code> appended to the category name. The new category is created with the same property name as in the source Platform Services Controller. All the tags that were present under this category is imported under the newly created <code>CategoryCopy</code>.</li> </ul> <p><b>Note</b></p> <p>The default resolution option to resolve <code>CategoryName</code> conflicts is COPY.</p> <ul style="list-style-type: none"> <li>■ MERGE. Conflicting properties are merged with the category that is already present in the SSO. Properties are merged as follows: <ul style="list-style-type: none"> <li>a <code>Description</code>. The description that is already present is used.</li> <li>b <code>Cardinality</code>. Cardinality cannot shrink. If there is a cardinality conflict, the cardinality is set to <code>multiple</code>. It cannot be reduced to <code>single</code>.</li> </ul> </li> </ul>

**Table 6-1. Conflict Types (Continued)**

Conflict	Properties used to compare Category Objects	Conflict Types	Conflicting Properties	Conflict Resolution Options
				<ul style="list-style-type: none"> <li>c AssociableTypes.If either the associableEntityType values are null, it is set to null. Otherwise, Objects types are merged.</li> <li>■ SKIP. Do nothing. All tags are imported under the category that exists.</li> </ul>
Tags Conflict: A tag object always belongs to a category Object. A tag Name must be unique only inside a category.	<ul style="list-style-type: none"> <li>■ name</li> <li>■ description</li> </ul>	<p>Only one type of conflict can be seen while importing tags: TagName conflict. This conflict indicates that a Tag with the same name exists under the same category and in the target Platform Services Controller but with different properties.</p>	<p>Properties that can be conflicting for a conflict of type: TagName can be Description.</p>	<ul style="list-style-type: none"> <li>■ COPY. A copy of the conflicting tag is created in the target Platform Services Controller, with --copy appended to the tag name. Take the MoRef(Internal tag ID) of the newly created tag and update the tag association if necessary.</li> </ul> <p><b>Note</b></p> <p>The default resolution option to resolve CategoryName conflicts is COPY.</p> <ul style="list-style-type: none"> <li>■ MERGE.Keep the existing description. Take the MoRef(Internal Tag ID) and update one or more Tag Associations if necessary.</li> <li>■ SKIP. Do nothing. Do not create this tag. Clean up any Tag Associations.</li> </ul>

## vCenter Server Domain Repoint License Considerations

Domain repointing copies license keys to a new domain. Copying the license keys ensures that valid licensing of all assets is maintained after repointing.

vCenter Server tracks license usage on a per domain basis. If a key is used in more than one domain, you must ensure that the aggregate use of the key does not exceed its capacity. To simplify your license management, remove each license copied to a second domain and assign a new license to assets.

Consider the following two cases:

- License keys that are no longer in use (that is, assigned to assets) in the original domain post repointing.
- License keys that are in use (that is, assigned to assets) in multiple domains.

## License Keys Not in Use in a Domain

If after completing repointing, a license key appears in more than one domain, but is not in use in some of those domains, you can remove the license key from any domain in which it is not in use. See "Remove Licenses" in *vCenter Server and Host Management* for instructions on how to remove the licenses in vCenter Server.

## License Keys in Use in Multiple Domains

If after completing repointing, a license key is in use (that is, assigned to assets) in more than one domain, to remove the license key from all but one domain, first a different license key must be assigned to each asset in domains from which the license key will be removed. Two common approaches:

- If you have other license keys available with sufficient unused capacity, you might use these other keys in place of a license key to be removed. See "Assign a License to Multiple Assets" in *vCenter Server and Host Management* to assign licenses in vCenter Server.
- You might divide the license keys used in more than one domain into separate license keys, one for each domain. To divide the license keys, see the VMware knowledge base article at <http://kb.vmware.com/kb/2006972>. To determine the capacity to be included in each of the license keys into which the original is divided, see "Viewing Licensing Information" in *vCenter Server and Host Management* to view the usage of the license key in vCenter Server for each of the domains.

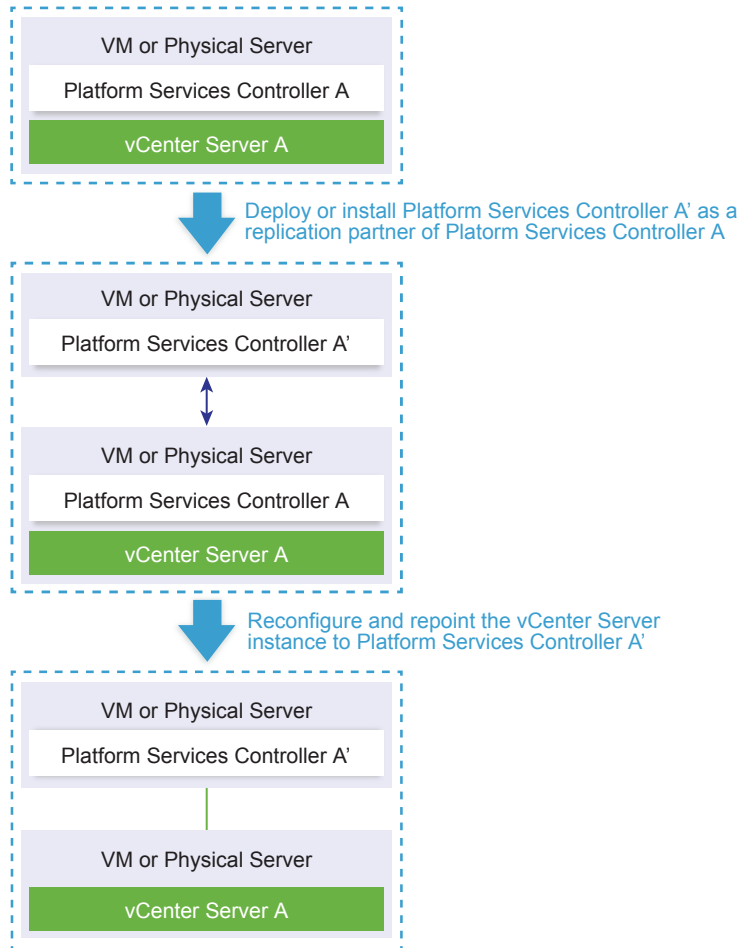
Each of the resulting license keys can then be added to a different domain and assigned in vCenter Server to assets previously licensed with the original license key. See "Create New Licenses" in *vCenter Server and Host Management* to create licenses and "Assign a License to Multiple Assets" in *vCenter Server and Host Management* to assign a license to multiple assets.

After different licenses are assigned to all assets, the original license key, which is no longer valid, can be removed from all the domains using vCenter Server. See "Remove Licenses" *vCenter Server and Host Management*.

## Reconfigure a Standalone vCenter Server with an Embedded Platform Services Controller to a vCenter Server with an External Platform Services Controller

If you have deployed or installed a standalone vCenter Server instance with an embedded Platform Services Controller and you want to extend your vCenter Single Sign-On domain with more vCenter Server instances, you can reconfigure and repoint the existing vCenter Server instance to an external Platform Services Controller.

**Figure 6-1. Reconfiguration of a Standalone vCenter Server Instance with an Embedded Platform Services Controller and Repeating it to an External Platform Services Controller**



**Table 6-2. Legend**

Arrow or line	Description
	Replication agreement between two Platform Services Controller instances
	vCenter Server registration with an external Platform Services Controller
	Transition step

**Note** The reconfiguration of a vCenter Server instance with an embedded Platform Services Controller and repeating it to an external Platform Services Controller instance is a one-way process after which you cannot switch back to vCenter Server with an embedded Platform Services Controller.

## Prerequisites

- Deploy or install the external Platform Services Controller instance as a replication partner of the existing embedded Platform Services Controller instance in the same vCenter Single Sign-On site.

**Note** You can determine the current vCenter Single Sign-On site by using the `vmfad-cli` command.

- For a vCenter Server Appliance with an embedded Platform Services Controller, log in to the appliance shell as root and run the command.

```
/usr/lib/vmware-vmafd/bin/vmafdd-cli get-site-name --server-name localhost
```

- For a Windows installation of vCenter Server instance with an embedded Platform Services Controller, log in to the Windows machine as an administrator, open the Windows command prompt, and run the command.

```
C:\Program Files\VMware\vCenter Server\vmafdd\vmafd-cli get-site-name --server-name localhost
```

- Create snapshots of the vCenter Server with an embedded Platform Services Controller and the external Platform Services Controller instance, so that you can revert to the snapshots if the reconfiguration fails.
- If you want to reconfigure a vCenter Server Appliance with an embedded Platform Services Controller that is configured in a vCenter HA cluster, remove the vCenter HA configuration. For information about removing a vCenter HA configuration, see *vSphere Availability*.

## Procedure

- Log in to the vCenter Server instance with an embedded Platform Services Controller.

Option	Steps
For a vCenter Server Appliance with an embedded Platform Services Controller	Log in to the appliance shell as root. <ul style="list-style-type: none"> <li>If you have direct access to the appliance console, press Alt+F1.</li> <li>If you want to connect remotely, use SSH or another remote console connection to start a session to the appliance.</li> </ul>
For a Windows installation of vCenter Server with an embedded Platform Services Controller	Log in to the Windows machine as an administrator, open the Windows command prompt, and navigate to <code>C:\Program Files\VMware\vCenter Server\bin</code> .

- Verify that all Platform Services Controller services are running.

Run the `service-control --status --all` command.

The Platform Services Controller services that must be running are VMware License Service, VMware Identity Management Service, VMware Security Token Service, VMware Certificate Service, and VMware Directory Service.

- Run the `cmsso-util reconfigure` command.

```
cmsso-util reconfigure --repoint-psc psc_fqdn_or_static_ip --username username --domain-name domain_name --passwd password [--dc-port port_number]
```

where the square brackets [ ] enclose optional items.

Here, *pvc\_fqdn\_or\_static\_ip* is the system name used to identify the external Platform Services Controller instance. This system name must be an FQDN or a static IP address.

---

**Note** The FQDN value is case-sensitive.

---

The options *username* and *password* are the administrator user name and password of the vCenter Single Sign-On *domain\_name*.

Use the `--dc-port` option if the external Platform Services Controller runs on a custom HTTPS port. The default value of the HTTPS port is 443.

For example, if the external Platform Services Controller runs on a custom HTTPS port 449, you must run:

```
cmsso-util reconfigure --repoint-psc pvc.acme.local --username administrator --
domain-name vsphere.local --passwd Password1! --dc-port 449
```

- 4 Log in to the vCenter Server instance by using the vSphere Web Client to verify that the vCenter Server instance is running and can be managed.

The vCenter Server with an embedded Platform Services Controller is demoted, and the vCenter Server is redirected to the external Platform Services Controller.

#### What to do next

- You can deploy or install additional vCenter Server and Platform Services Controller instances in the vCenter Single Sign-On domain.
- If you reconfigured a vCenter Server Appliance with an embedded Platform Services Controller that was configured in a vCenter HA cluster, you can reconfigure the vCenter HA cluster. For information about configuring vCenter HA, see *vSphere Availability*.

# Troubleshooting vCenter Server Installation or Deployment

# 7

The vCenter Server installation or deployment troubleshooting topics provide solutions to problems that you might encounter during the vCenter Server installation or vCenter Server Appliance deployment process.

This chapter includes the following topics:

- [Collecting Logs for Troubleshooting a vCenter Server Installation or Upgrade](#)
- [Attempt to Install a Platform Services Controller After a Prior Installation Failure](#)
- [Microsoft SQL Database Set to Unsupported Compatibility Mode Causes vCenter Server Installation or Upgrade to Fail](#)

## Collecting Logs for Troubleshooting a vCenter Server Installation or Upgrade

You can collect installation or upgrade log files for vCenter Server. If an installation or upgrade fails, checking the log files can help you identify the source of the failure.

You can choose the Installation Wizard method or the manual method for saving and recovering log files for a vCenter Server for Windows installation failure.

You can also collect deployment log files for vCenter Server Appliance.

- [Collect Installation Logs by Using the Installation Wizard](#)

You can use the Setup Interrupted page of the installation wizard to browse to the generated .zip file of the vCenter Server for Windows installation log files.
- [Retrieve Installation Logs Manually](#)

You can retrieve the installation log files manually for examination.
- [Collect Deployment Log Files for the vCenter Server Appliance](#)

If the vCenter Server Appliance deployment fails, you can retrieve the log files and examine them for the reason of the failure.
- [Export a vCenter Server Support Bundle for Troubleshooting](#)

You can export the support bundle of the vCenter Server instance in the vCenter Server Appliance for troubleshooting using the URL displayed on the DCUI home screen.

## Collect Installation Logs by Using the Installation Wizard

You can use the Setup Interrupted page of the installation wizard to browse to the generated .zip file of the vCenter Server for Windows installation log files.

If the installation fails, the Setup Interrupted page appears with the log collection check boxes selected by default.

### Procedure

- 1 Leave the check boxes selected and click **Finish**.

The installation files are collected in a .zip file on your desktop, for example, *VMware-VCS-logs-time-of-installation-attempt.zip*, where *time-of-installation-attempt* displays the year, month, date, hour, minutes, and seconds of the installation attempt.

- 2 Retrieve the log files from the .zip file on your desktop.

### What to do next

Examine the log files to determine the cause of failure.

## Retrieve Installation Logs Manually

You can retrieve the installation log files manually for examination.

### Procedure

- 1 Navigate to the installation log file locations.
  - %PROGRAMDATA%\VMware\vCenterServer\logs directory, usually  
C:\ProgramData\VMware\vCenterServer\logs
  - %TEMP% directory, usually C:\Users\username\AppData\Local\Temp

The files in the %TEMP% directory include *vc-install.txt*, *vminst.log*, *pkgmgr.log*, *pkgmgr-comp-msi.log*, and *vim-vcs-msi.log*.

- 2 Open the installation log files in a text editor for examination.

## Collect Deployment Log Files for the vCenter Server Appliance

If the vCenter Server Appliance deployment fails, you can retrieve the log files and examine them for the reason of the failure.

The full path to the log files is displayed in the vCenter Server Appliance deployment wizard.

In case of firstboot failure, you can download the support bundle on a Windows host machine and examine the log files to determine which firstboot script failed. See [Export a vCenter Server Support Bundle for Troubleshooting](#).



**Procedure**

- 1 On the Windows machine that you use for deploying the vCenter Server Appliance, navigate to the log files folder.

If you are logged in as an administrator, by default this is the  
C:\Users\Administrator\AppData\Local\VMware\CIP\vcsaInstaller folder.

- 2 Open the installation log files in a text editor for examination.

**Export a vCenter Server Support Bundle for Troubleshooting**

You can export the support bundle of the vCenter Server instance in the vCenter Server Appliance for troubleshooting using the URL displayed on the DCUI home screen.

You can also collect the support bundle from the vCenter Server Appliance Bash shell by running the `vc-support.sh` script.

The support bundle is exported in `.tgz` format.

**Procedure**

- 1 Log in to the Windows host machine on which you want to download the bundle.
- 2 Open a Web browser and enter the URL to the support bundle displayed in the DCUI.

`https://appliance-fully-qualified-domain-name:443/appliance/support-bundle`

- 3 Enter the user name and password of the root user.
- 4 Click **Enter**.

The support bundle is downloaded as `.tgz` file on your Windows machine.

- 5 (Optional) To determine which firstboot script failed, examine the `firstbootStatus.json` file.

If you ran the `vc-support.sh` script in the vCenter Server Appliance Bash shell, to examine the `firstbootStatus.json` file, run

```
cat /var/log/firstboot/firstbootStatus.json
```

**Attempt to Install a Platform Services Controller After a Prior Installation Failure**

When you want to replicate Platform Services Controller data, you might not be able to join a vCenter Single Sign-On domain in an existing Platform Services Controller.

**Problem**

When you try to install a Platform Services Controller, either embedded or external, and join the Platform Services Controller to a vCenter Single Sign-On domain or site, the installation might fail and the failure might leave incomplete data in the Platform Services Controller federation.

**Cause**

The Platform Services Controller data is not cleaned up when an installation of a Platform Services Controller fails. Consider the following scenario:

- 1 Install Platform Services Controller A.
- 2 When you try to install Platform Services Controller B and join it to the same domain as Platform Services Controller A, the installation fails.
- 3 Second attempt to install Platform Services Controller B and join it to the same domain as Platform Services Controller A fails, because Platform Services Controller A contains incomplete data.

**Solution**

- 1 Log in as an administrator to the machine on which you install Platform Services Controller A.
- 2 At the command prompt navigate to the `vdcleavefed` command.

The `vdcleavefed` command is located at `C:\Program Files\VMware\vCenter Server\vmkdir\` on Windows and `/usr/lib/vmware-vmkdir/bin/` on Linux.

- 3 Run the `vdcleavefed` command to delete the data.

```
vdcleavefed -h Platform-Services-Controller-B-System-Name -u Administrator
```

- 4 Install Platform Services Controller B.

## Microsoft SQL Database Set to Unsupported Compatibility Mode Causes vCenter Server Installation or Upgrade to Fail

vCenter Server installation with a Microsoft SQL database fails when the database is set to compatibility mode with an unsupported version.

**Problem**

The following error message appears: The DB User entered does not have the required permissions needed to install and configure vCenter Server with the selected DB. Please correct the following error(s): %s

**Cause**

The database version must be supported for vCenter Server. For SQL, even if the database is a supported version, if it is set to run in compatibility mode with an unsupported version, this error occurs. For example, if SQL 2008 is set to run in SQL 2000 compatibility mode, this error occurs.

**Solution**

- ◆ Make sure the vCenter Server database is a supported version and is not set to compatibility mode with an unsupported version. See the VMware Product Interoperability Matrixes at [http://partnerweb.vmware.com/comp\\_guide2/sim/interop\\_matrix.php?](http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php?)

# Uninstall vCenter Server

You must have administrator privileges to uninstall VMware vCenter Server.

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**Important** If you are using the embedded PostgreSQL database, uninstalling vCenter Server causes the embedded database to be uninstalled, and all data is lost.

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## Prerequisites

If you are uninstalling the vCenter Server system, remove the hosts from the Hosts and Clusters inventory.

## Procedure

- 1 As an administrator user on the Windows system, click **Start > Control Panel > Programs and Features**.
- 2 Select **VMware vCenter Server** from the list and click **Remove**.
- 3 Click **Remove** to confirm that you want to remove the program.
- 4 Click **Finish**.
- 5 Reboot the system.