VMware vCenter Server™ 6.0 Deployment Guide

TECHNICAL WHITE PAPER

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vmware®

Table of Contents

Introduction

The VMware vCenter Server™ 6.0 release introduces new, simplified deployment models. The components that make up a vCenter Server installation have been grouped into two types: *embedded* and *external*. Embedded refers to a deployment in which all components—this can but does not necessarily include the database—are installed on the same virtual machine. External refers to a deployment in which vCenter Server is installed on one virtual machine and the Platform Services Controller (PSC) is installed on another. The Platform Services Controller is new to vCenter Server 6.0 and comprises VMware vCenter™ Single Sign-On™, licensing, and the VMware Certificate Authority (VMCA).

Embedded installations are recommended for standalone environments in which there is only one vCenter Server system and replication to another Platform Services Controller is not required. If there is a need to replicate with other Platform Services Controllers or there is more than one vCenter Single Sign-On enabled solution, deploying the Platform Services Controller(s) on separate virtual machine(s)—via external deployment—from vCenter Server is required.

This paper defines the services installed as part of each deployment model, recommended deployment models (reference architectures), installation and upgrade instructions for each reference architecture, postdeployment steps, and certificate management in VMware vSphere 6.0.

VMware vCenter Server 6.0 Services

SERVICE	INSTALLED WITH
VMware AFD Service	vCenter Server and PSC
VMware Certificate Service	PSC
VMware Component Manager	vCenter Server and PSC
VMware Content Library Service	vCenter Server
VMware Directory Service	PSC
VMware ESX Agent Manager	vCenter Server
VMware HTTP Reverse Proxy	vCenter Server and PSC
VMware Identity Management Service	PSC
VMware vCenter Inventory Service	vCenter Server
VMware License Service	PSC
VMware Message Bus Configuration Service	vCenter Server
VMware Performance Charts	vCenter Server
VMware Postgres	vCenter Server (vCenter Server Appliance, Microsoft Windows if embedded database is chosen)
VMware Security Token Service	PSC
VMware Service Control Agent	vCenter Server and PSC
VMware Syslog Collector	vCenter Server
VMware System and Hardware Health Manager	vCenter Server
VMware vAPI Endpoint	vCenter Server

SERVICE	INSTALLED WITH
VMware vCenter Configuration Service	vCenter Server and PSC
VMware vCenter Workflow Manager	vCenter Server
VMware VirtualCenter Server	vCenter Server
VMware vService Manager	vCenter Server
VMware vSphere Auto Deploy Waiter	vCenter Server
VMware vSphere ESXi™ Dump Collector	vCenter Server
VMware vSphere ESXi Dump Collector Web Service	vCenter Server
VMware vSphere Profile-Driven Storage	vCenter Server
VMware vSphere Web Client	vCenter Server

Table 1. vCenter Server and Platform Services Controller Services

Requirements

General

A few requirements are common to both installing vCenter Server on Microsoft Windows and deploying VMware vCenter Server Appliance™. Ensure that all of these prerequisites are in place before proceeding with a new installation or an upgrade.

- DNS – Ensure that resolution is working for all system names via fully qualified domain name (FQDN), short name (host name), and IP address (reverse lookup).
- Time – Ensure that time is synchronized across the environment.
- Passwords – vCenter Single Sign-On passwords must contain only ASCII characters; non-ASCII and extended (or high) ASCII characters are not supported.

Windows Installation

Installing vCenter Server 6.0 on a Windows Server requires a Windows 2008 SP2 or higher 64-bit operating system (OS). Two options are presented: Use the local system account or use a Windows domain account. With a Windows domain account, ensure that it is a member of the local computer's administrator group and that it has been delegated the "Log on as a service" right and the "Act as part of the operating system" right. This option is not available when installing an external Platform Services Controller.

Windows installations can use either a supported external database or a local PostgreSQL database that is installed with vCenter Server and is limited to 20 hosts and 200 virtual machines. Supported external databases include Microsoft SQL Server 2008 R2, SQL Server 2012, SQL Server 2014, Oracle Database 11*g*, and Oracle Database 12*c*. When upgrading to vCenter Server 6.0, if SQL Server Express was used in the previous installation, it will be replaced with PostgreSQL. External databases require a 64-bit DSN. DSN aliases are not supported.

When upgrading vCenter Server to vCenter Server 6.0, only versions 5.0 and later are supported. If the vCenter Server system being upgraded is not version 5.0 or later, such an upgrade is required first.

Table 2 outlines minimum hardware requirements per deployment environment type and size when using an external database. If VMware vSphere Update Manager™ is installed on the same server, add 125GB of disk space and 4GB of RAM.

RESOURCES	TINY: UP TO 10 HOSTS/ 100 VIRTUAL MACHINES OR EXTERNAL PSC	SMALL: UP TO 100 HOSTS/ 1,000 VIRTUAL MACHINES	MEDIUM: UP TO 400 HOSTS/ 4,000 VIRTUAL MACHINES	LARGE: UP TO 1,000 HOSTS/ 10,000 VIRTUAL MACHINES
CPU	2	4	8	16
Memory	8GB	16GB	24GB	32GB
Disk Space	50GB 10GB (PSC)	100GB	100GB	100GB

Table 2. Minimum Hardware Requirements – Windows Installation

Appliance Deployment

vCenter Server Appliance can use either a local PostgreSQL database that is built in to the appliance, which is recommended, or an external database. Unlike Windows support for PostgreSQL, vCenter Server Appliance supports up to 1,000 hosts or 10,000 virtual machines at full vCenter Server scale. Supported external databases include Oracle Database 11*g* and Oracle Database 12*c*. External database support is being deprecated in this release; this is the last release that supports the use of an external database with vCenter Server Appliance.

When deploying vCenter Server Appliance, the target host must be ESXi 5.0 or later. In addition, prechecks such as connectivity to an external database, NTP server, DNS server, and so on, are performed on the client deploying the appliance rather than against the target host and destination port group. This does not ensure that all required connectivity is available from the ESXi host and the destination port group of vCenter Server Appliance. Users must ensure that the ESXi host and port group have the required connectivity.

Upgrading is possible only from versions 5.1 update 3 and later.

Table 3 outlines minimum hardware requirements per deployment environment type and size.

RESOURCES	TINY: UP TO 10 HOSTS/ 100 VIRTUAL MACHINES OR EXTERNAL PSC	SMALL: UP TO 100 HOSTS/ 1,000 VIRTUAL MACHINES	MEDIUM: UP TO 400 HOSTS/ 4,000 VIRTUAL MACHINES	LARGE: UP TO 1,000 HOSTS/ 10,000 VIRTUAL MACHINES
CPU	2	4	8	16
Memory	8GB	16GB	24GB	32GB
Disk Space (External PSC)	86GB (vCenter) 30GB (PSC)	106GB	245GB	295GB
Disk Space (Embedded PSC)	116GB	136GB	275GB	325GB

Table 3. Minimum Hardware Requirements – vCenter Server Appliance Deployment

Reference Architectures

We examine the following architectures in this deployment guide:

- Fresh embedded deployment
- Upgrade in which all vCenter Server components are installed on a single machine
- Fresh external deployments
- Upgrade with external vCenter Single Sign-On
- Fresh vCenter Single Sign-On high availability deployment
- Upgrade of vCenter Single Sign-On high availability

Fresh Embedded Deployment

A fresh, or new, embedded installation is the simplest of all the deployments. In this scenario, vCenter Server and the Platform Services Controller are deployed together onto a single virtual machine.

The vCenter Server database can be either local or remote. On the Windows platform, the local PostgreSQL database is limited to 20 hosts and 200 virtual machines.

Embedded installations are recommended for standalone environments in which there is only one vCenter Server and replication to another Platform Services Controller is not required. If there is a need to replicate with other Platform Services Controllers or there is more than one vCenter Single Sign-On enabled solution, deploying the Platform Services Controller(s) on separate virtual machine(s)—via external deployment—from vCenter Server is required.

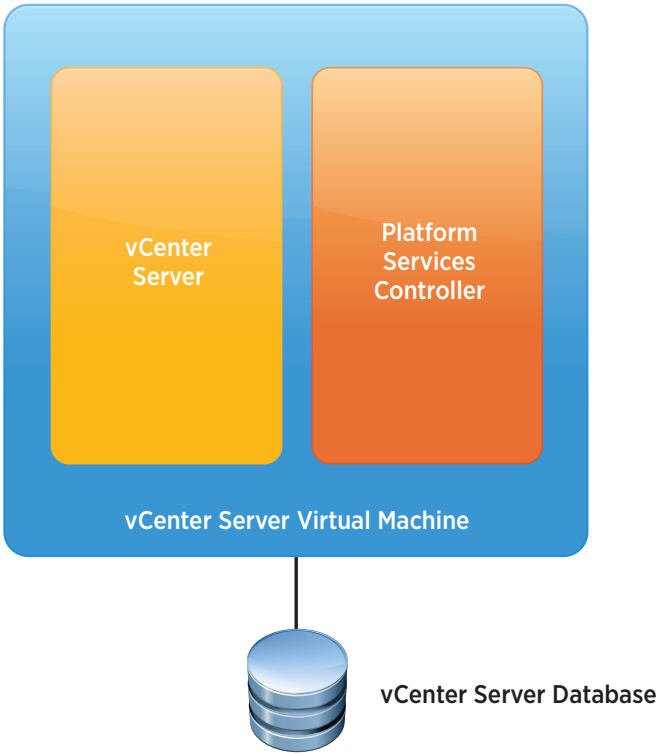


Figure 1. Embedded Architecture

Upgrade in Which All vCenter Server Components Are Installed on a Single Machine

Upgrading vCenter Server 5.0 or vCenter Server with vCenter Single Sign-On—that is, vCenter Server 5.1 or 5.5—installed on the same virtual machine can be accomplished using the embedded deployment method.

All vCenter Server components are upgraded. If upgrading from vCenter Server 5.0, an external Platform Services Controller can be installed or an embedded one can be used. vCenter Single Sign-On in vCenter Server 5.1 and 5.5 is upgraded to a Platform Services Controller. In all upgrade scenarios, all services listed in Table 1 are installed or upgraded.

The vCenter Server database is upgraded during vCenter Server upgrade. On Windows installations using the embedded SQL Server Express database, SQL Server Express is migrated to the PostgreSQL database during the upgrade.

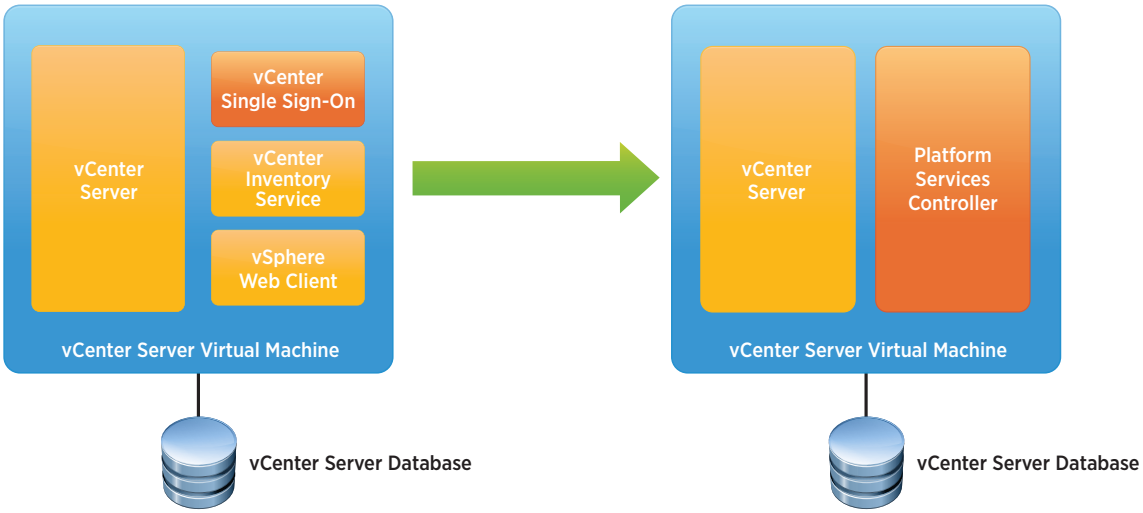


Figure 2. Upgraded Embedded Architecture

Fresh External Deployment

A fresh, or new, external deployment involves running the deployment wizard twice. The first time is to deploy the Platform Services Controller. After this successful deployment, vCenter Server is deployed.

The vCenter Server database can be either local or remote. On the Windows platform, the local PostgreSQL database is limited to 20 hosts and 200 virtual machines.

Deploying the Platform Services Controller externally is recommended for all but standalone vCenter Server systems.

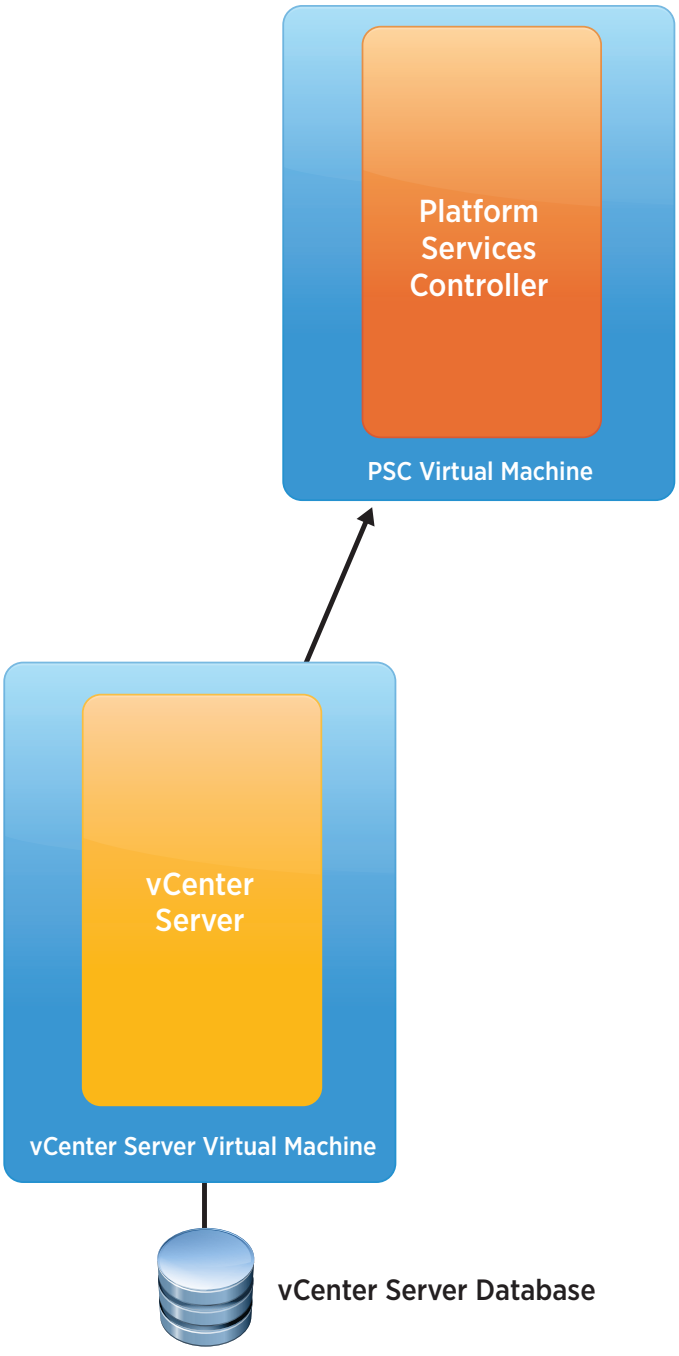


Figure 3. External Platform Services Controller Architecture

Upgrade External vCenter Single Sign-On

When upgrading from vCenter Server 5.1 or 5.5 and vCenter Single Sign-On is deployed externally from vCenter Server, vCenter Single Sign-On is first upgraded to a Platform Services Controller. After the Platform Services Controller has been deployed, the vCenter Server system can be upgraded.

The vCenter Server database is upgraded during the vCenter Server upgrade. In Windows installations using the embedded SQL Server Express database, SQL Server Express is migrated to the PostgreSQL database during the upgrade.

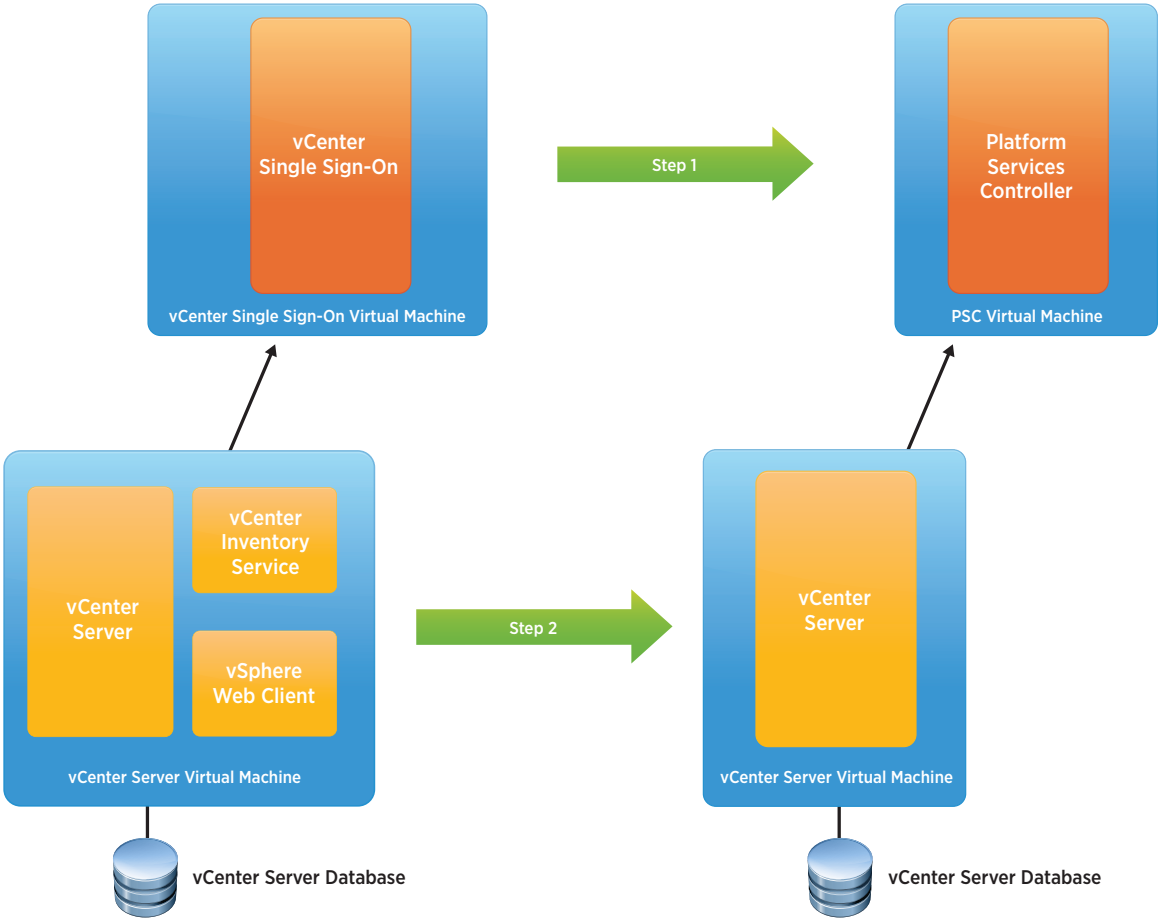


Figure 4. Upgraded External Platform Services Controller Architecture

Fresh vCenter Single Sign-On High Availability Deployment

A fresh, or new, vCenter Single Sign-On high availability deployment is recommended when there are multiple vCenter Server systems or vCenter Single Sign-On enabled solutions that require a high level of uptime.

When deploying the Platform Services Controller externally for multiple services, availability of the Platform Services Controller must be considered. In some cases, simply having the Platform Services Controller located in a vSphere cluster with VMware vSphere High Availability enabled is sufficient. In other cases, having more than one Platform Services Controller deployed in a highly available architecture is recommended. This requires a network load balancer. In Figure 5, we examine redundant Platform Services Controllers behind a network load balancer.

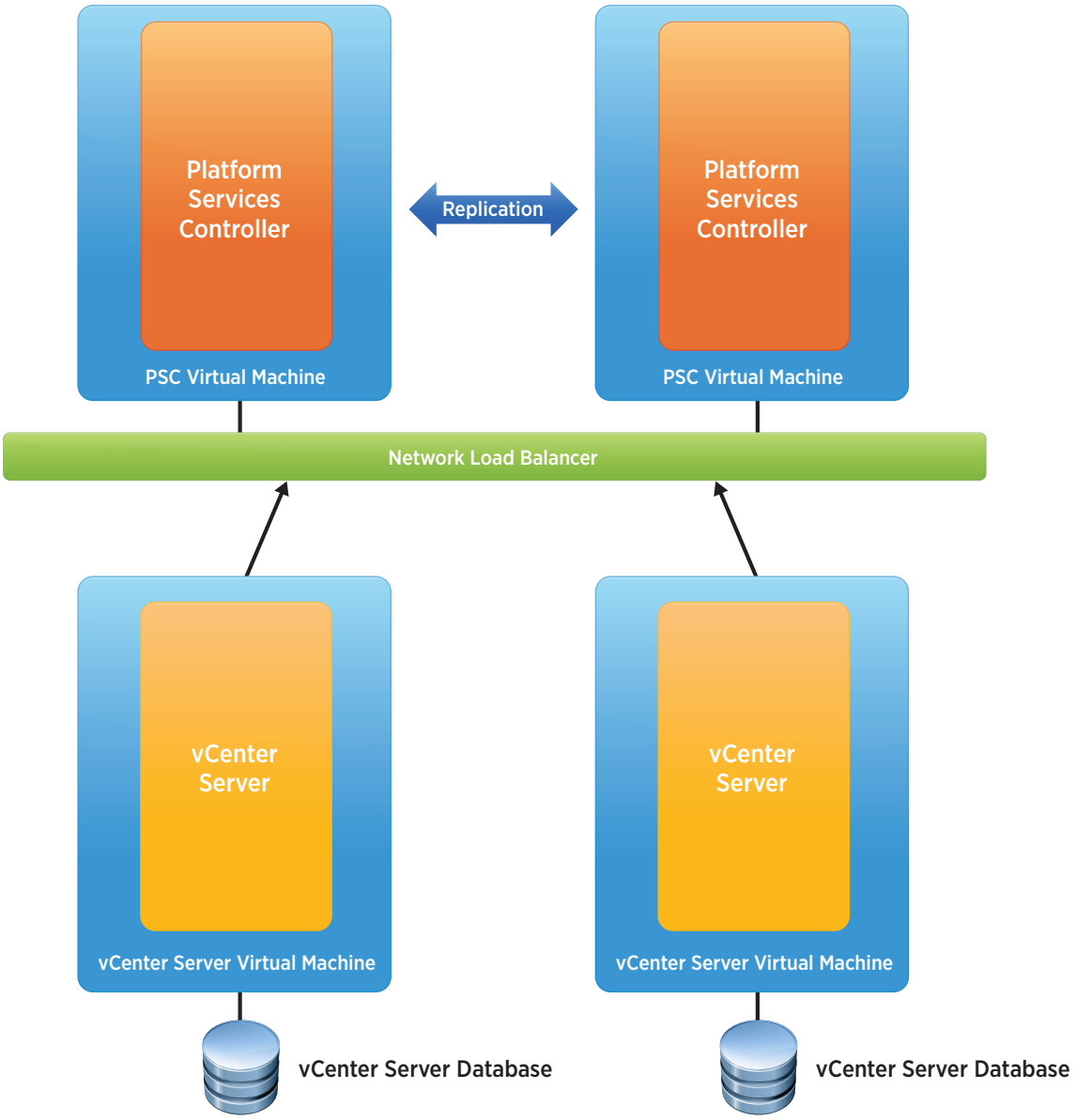


Figure 5. Highly Available Platform Services Controllers

Upgrade of vCenter Single Sign-On High Availability

Upgrading an existing vCenter Single Sign-On high availability deployment converts vCenter Single Sign-On servers to Platform Services Controllers. vCenter Single Sign-On 5.5 and previous versions do not work with vCenter Server 6.0, so upgrading vCenter Single Sign-On to Platform Services Controller is a prerequisite.

After the Platform Services Controllers are up and running, the load balancer rules must be adjusted to load-balance the Platform Services Controller ports before attempting to upgrade vCenter Server. Session affinity is required based on source address and must-span ports. If vCenter Server initiates communication to the Platform Services Controller on port 443 and is placed on the first Platform Services Controller, all subsequent requests must also go to the first Platform Services Controller.

Upgrading from vCenter Single Sign-On high availability has been tested and validated only when upgrading from vCenter Server 5.5 and when the vCenter Single Sign-On with network load balancer guide is followed to set up the vCenter Single Sign-On high availability environment.

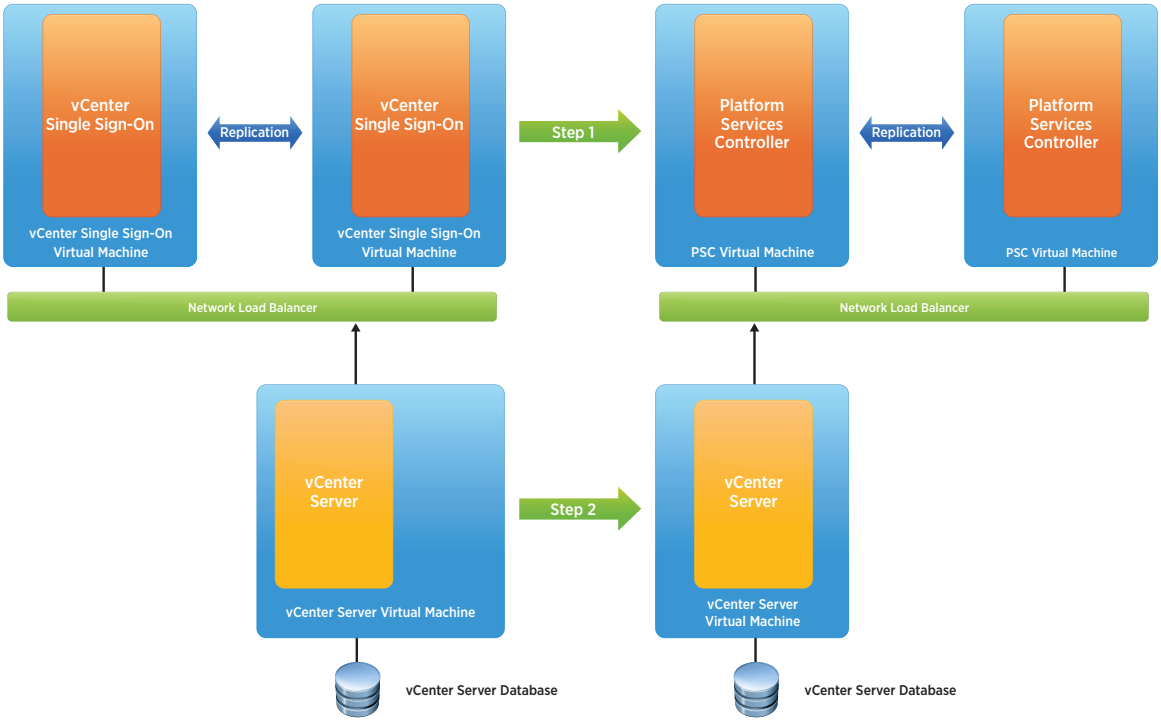


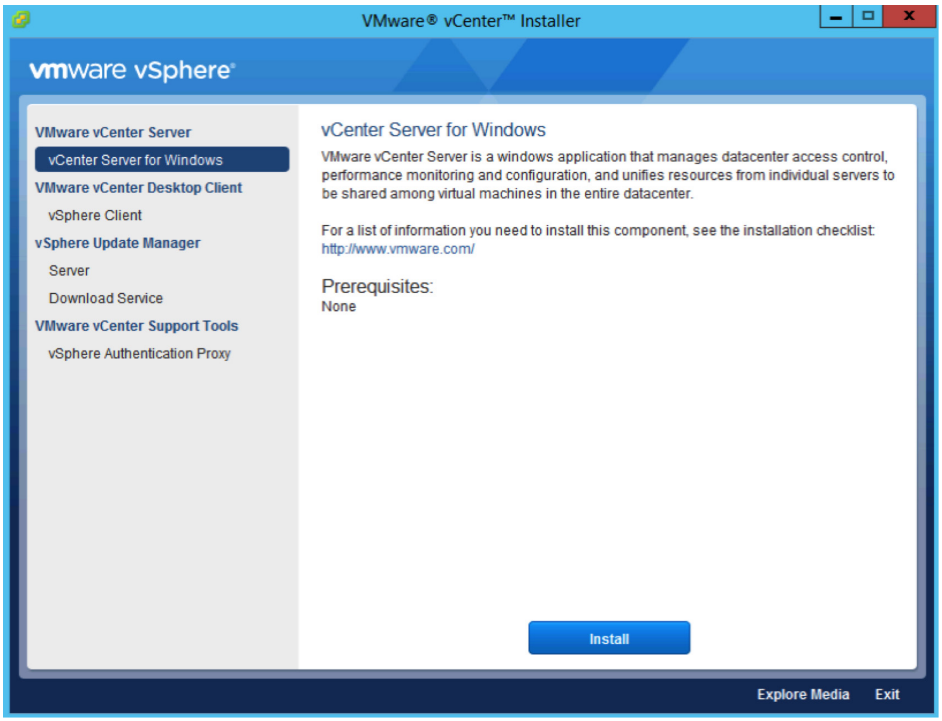
Figure 6. Upgrade of Highly Available Single Sign-On to Highly Available Platform Services Controller

Deploying vCenter Server 6.0

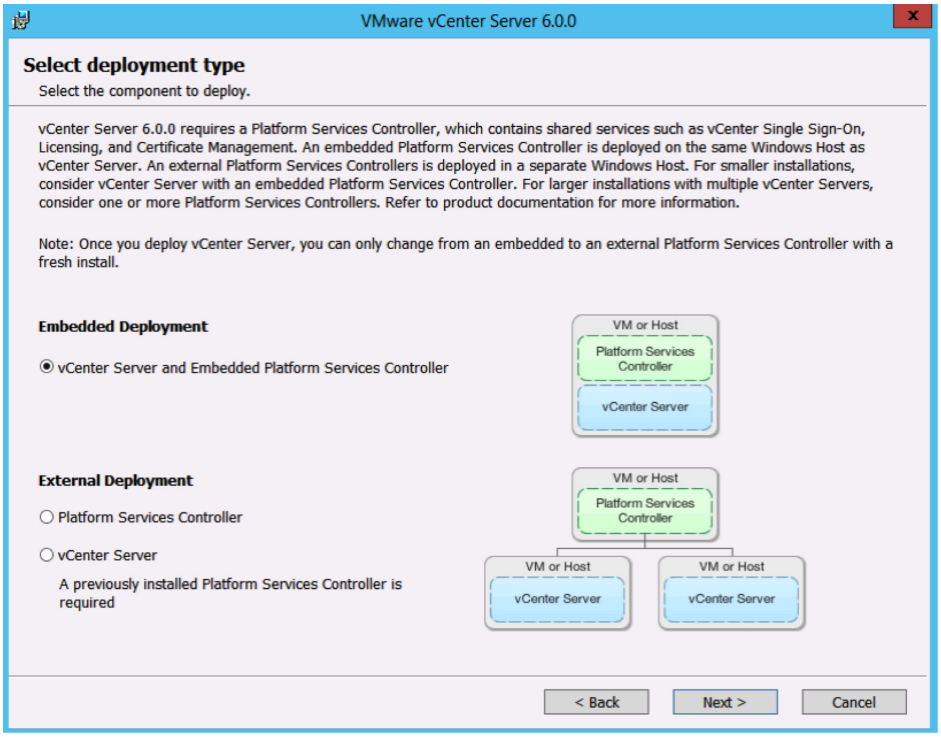
Fresh Embedded Deployment

Windows Deployment

1. Verify all prerequisites.
2. If using a remote database, ensure that a 64-bit DSN has been created. DSN aliases are not supported. This step is not necessary if using the local PostgreSQL database.
3. Mount the vCenter Server 6.0 ISO image.
4. If autorun does not start, execute autorun.exe.
5. Select **vCenter Server for Windows** and click **Install**.

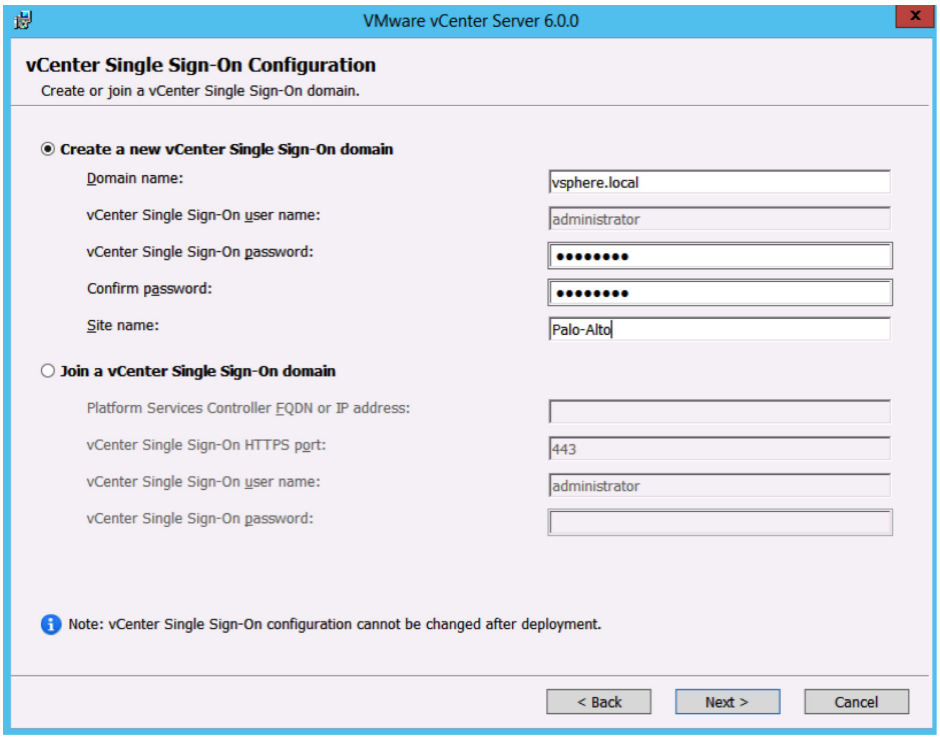


6. Click **Next**.
7. Accept the license agreements.
8. Select **Embedded Deployment** and click **Next**.

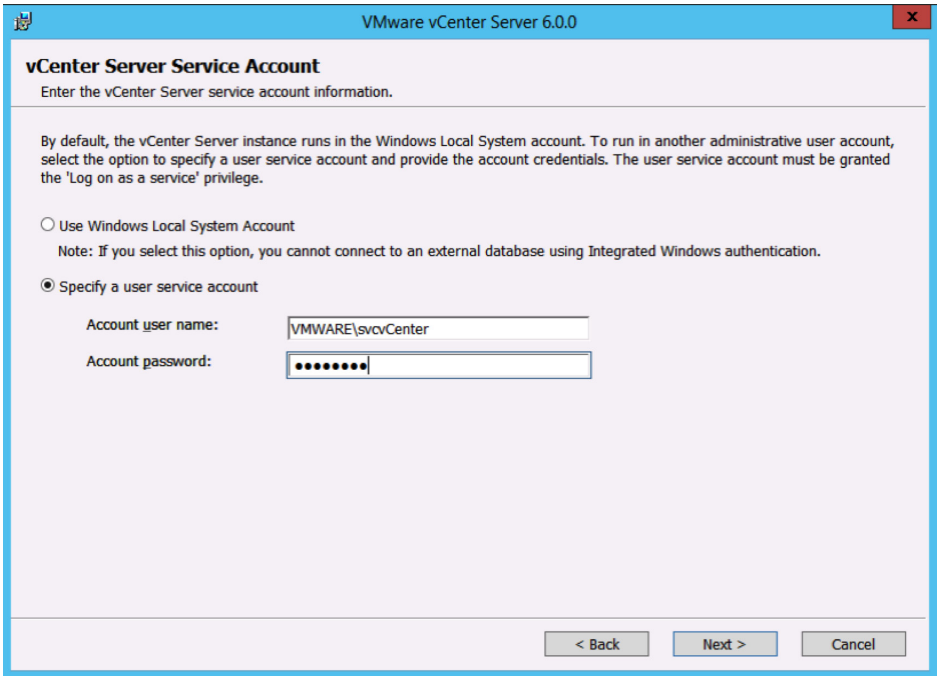


9. Verify that the FQDN is correct and click **Next**.

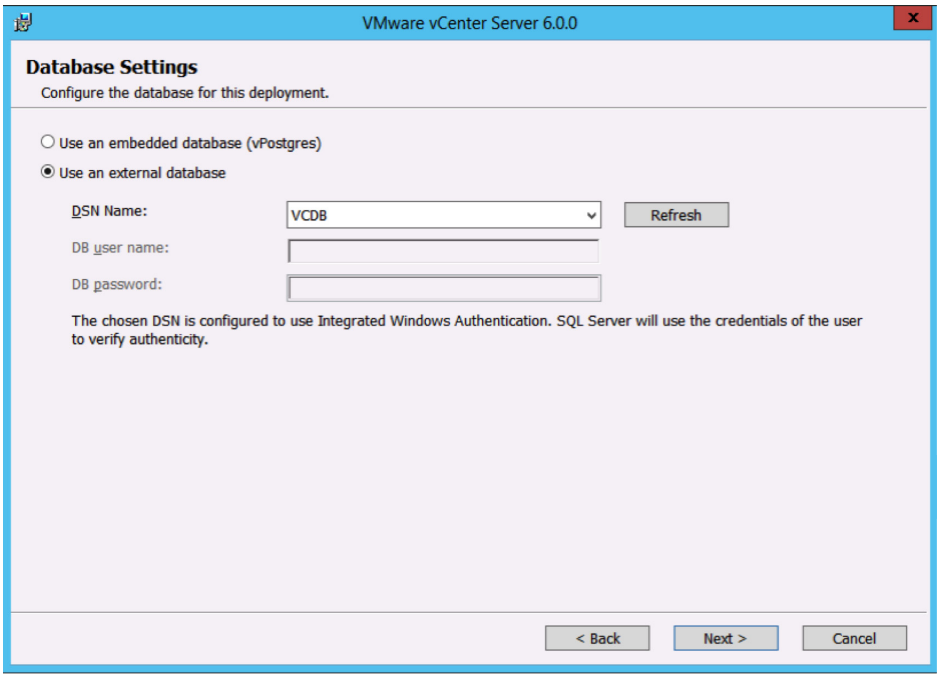
10. Enter a **password** and **Site name** for vCenter Single Sign-On and click **Next**.



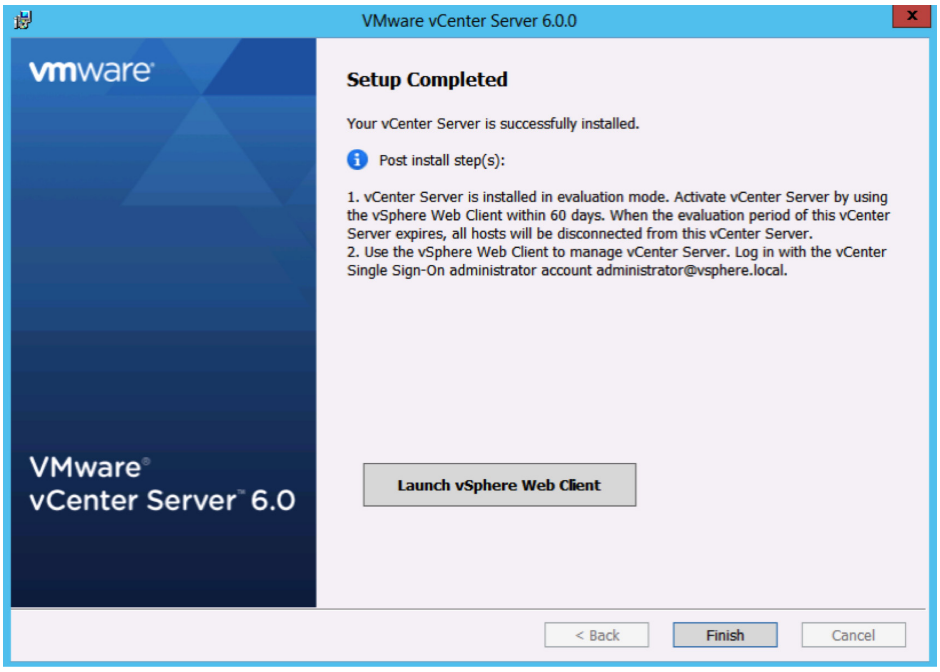
11. Select the local system account or enter the service account **user name** and **password**.



12. Select **Use an embedded database (vPostgres)** or **Use an external database** server's **DSN Name** and click **Next**.

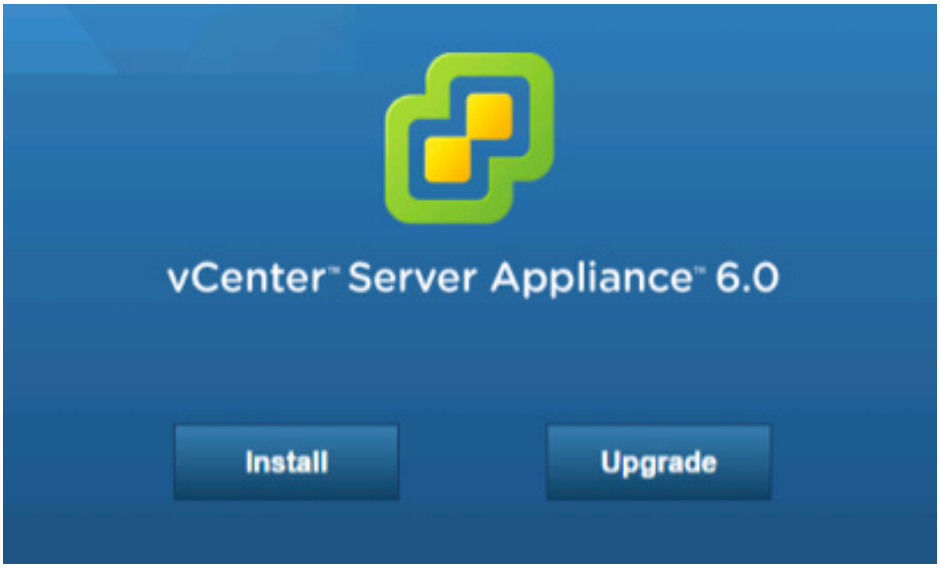


13. Unless required, leave all ports at their defaults and click **Next**.
14. Unless required, leave the default paths for installation and click **Next**.
15. Review and then click **Install**.

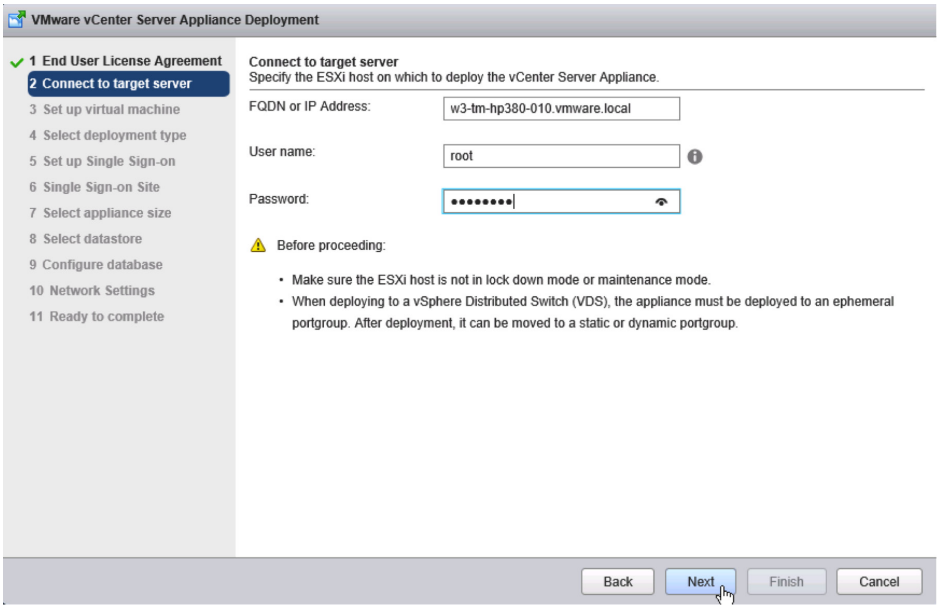


vCenter Server Appliance Deployment

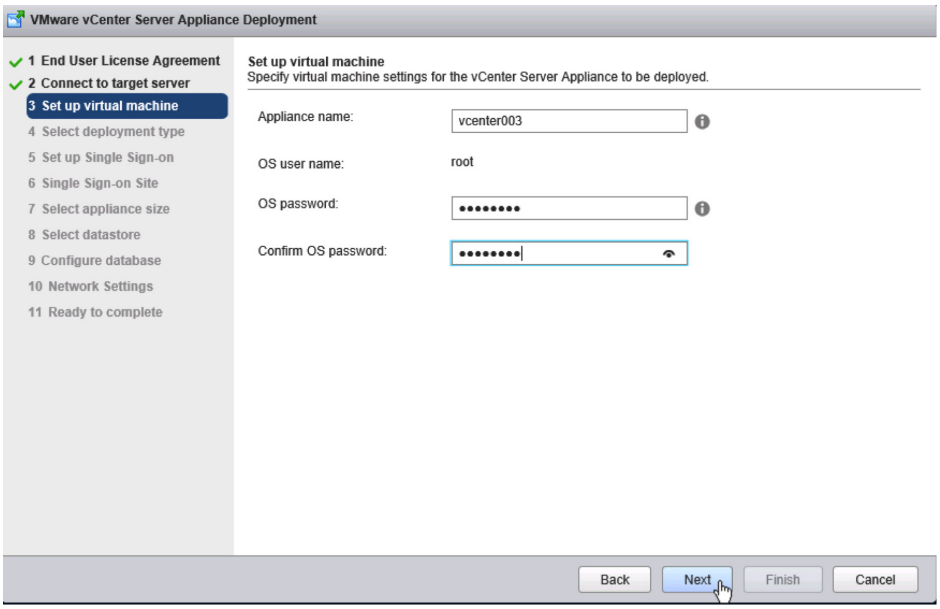
1. Mount the ISO image on PC.
2. Open the vcsa folder and install the plug-in.
3. In the root of the ISO image, double-click the vcsa-setup.html file.
4. Wait until you are prompted to enable the client integration plug-in to run. Click **Install**.



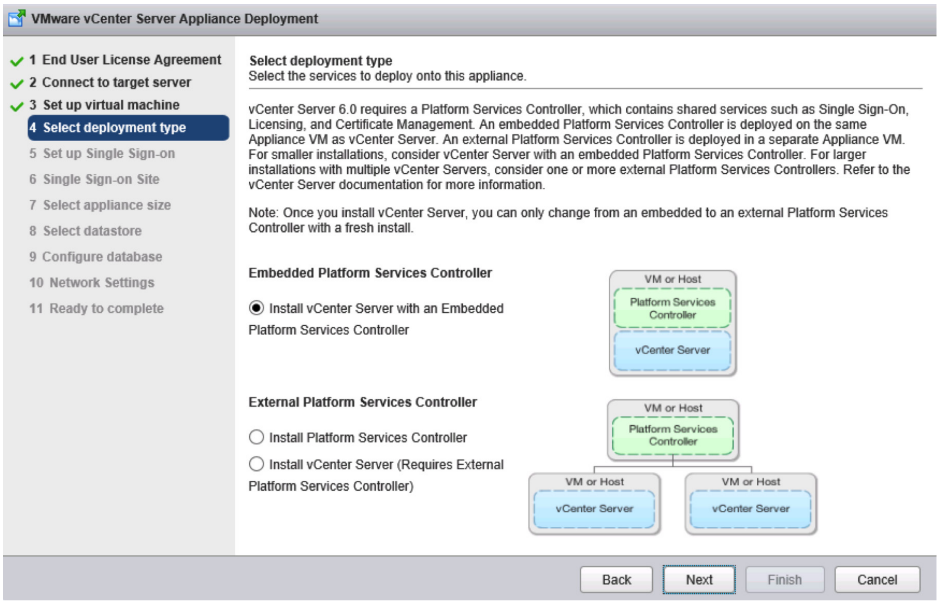
5. Accept the **License Agreement** and click **Next**.
6. Enter a target host and a **User name** and **Password** on the host with root access.



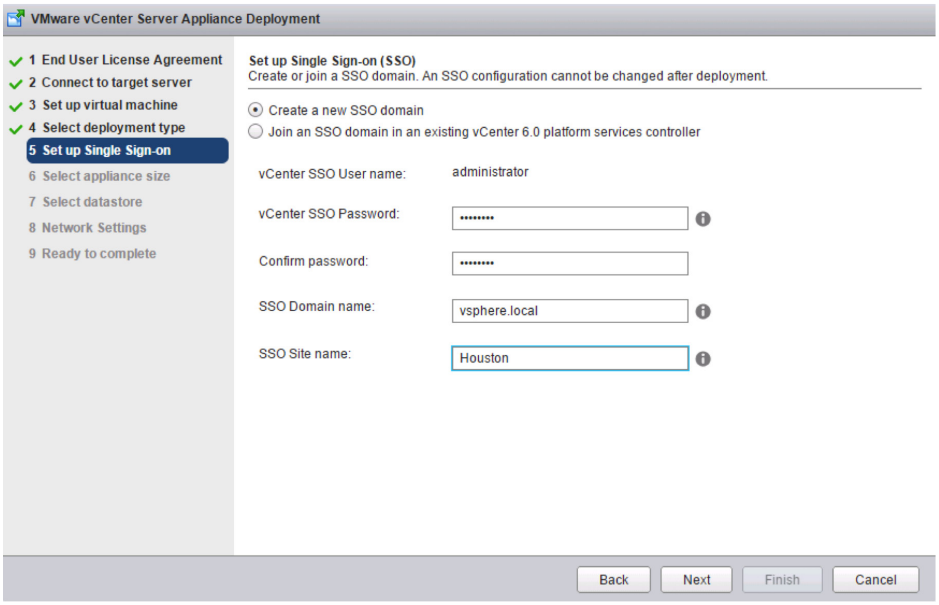
7. Click **Yes** to accept the host's certificate.
8. Enter an **Appliance name** and the root **OS password** you want to assign. Click **Next**.



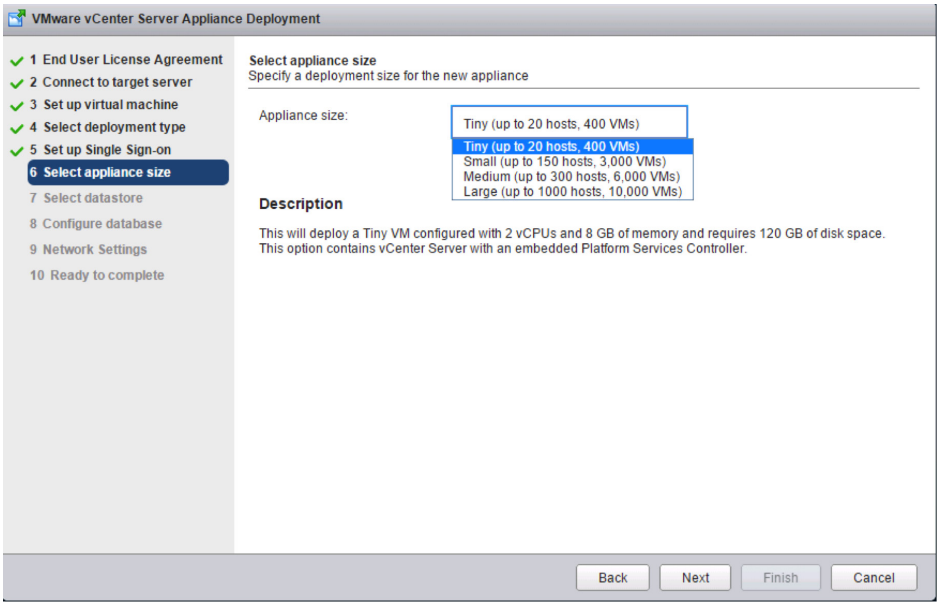
9. Select **Install vCenter Server with an Embedded Platform Services Controller** and click **Next**.



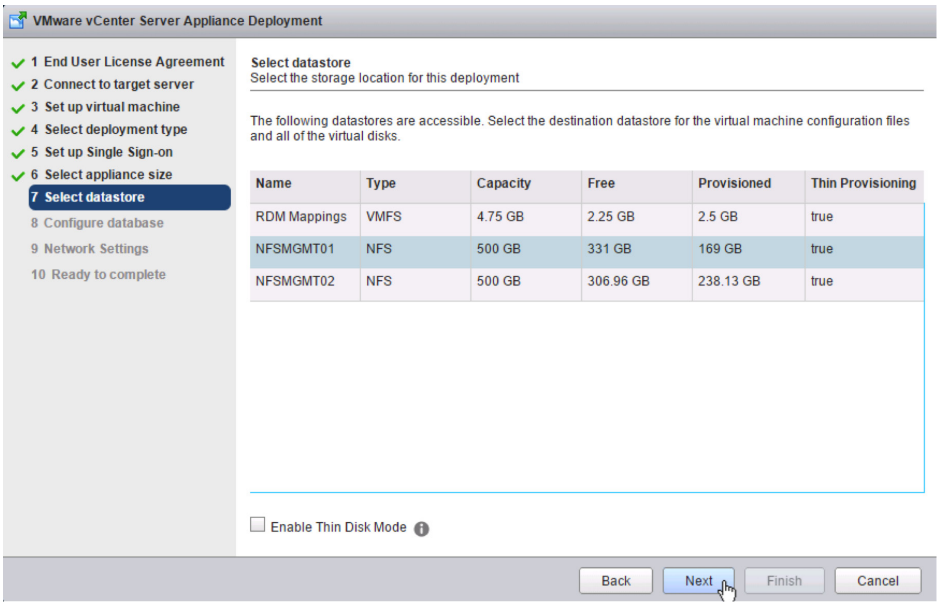
10. Select **Create a new SSO Domain** and enter an administrator **vCenter SSO Password**; enter an **SSO Domain name** such as vsphere.local and an **SSO Site name** such as a city or physical location name.



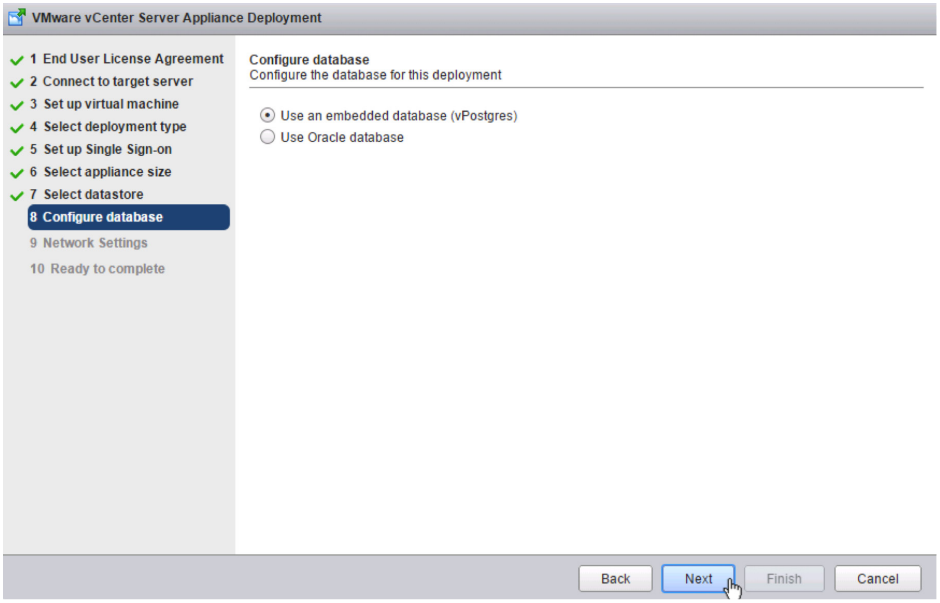
11. **Select appliance size** from the drop-down list and click **Next**.



12. **Select datastore** to deploy the appliance on and click **Next**.

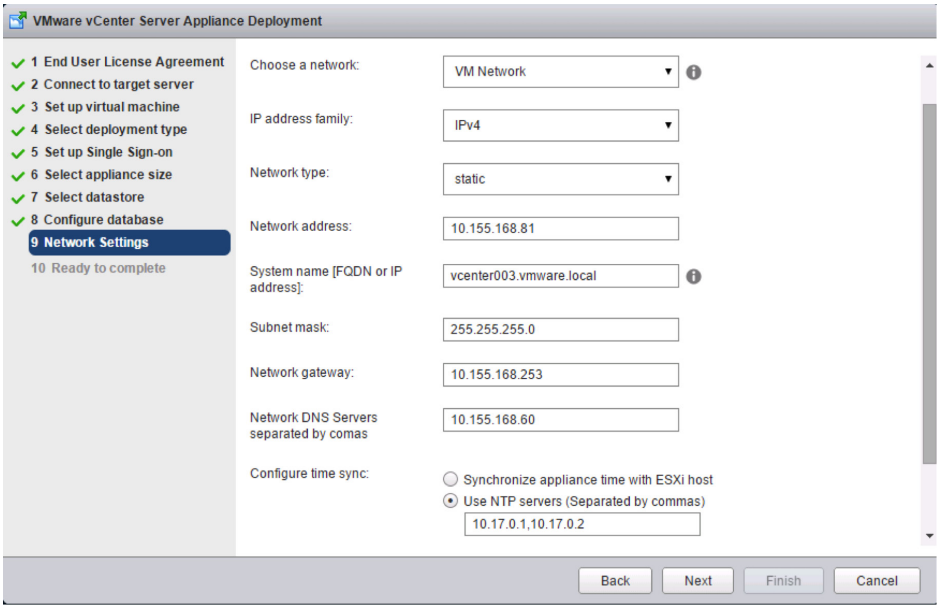


13. Select **Use an embedded database (vPostgres)**, which is recommended, or **Use Oracle database** and click **Next**.

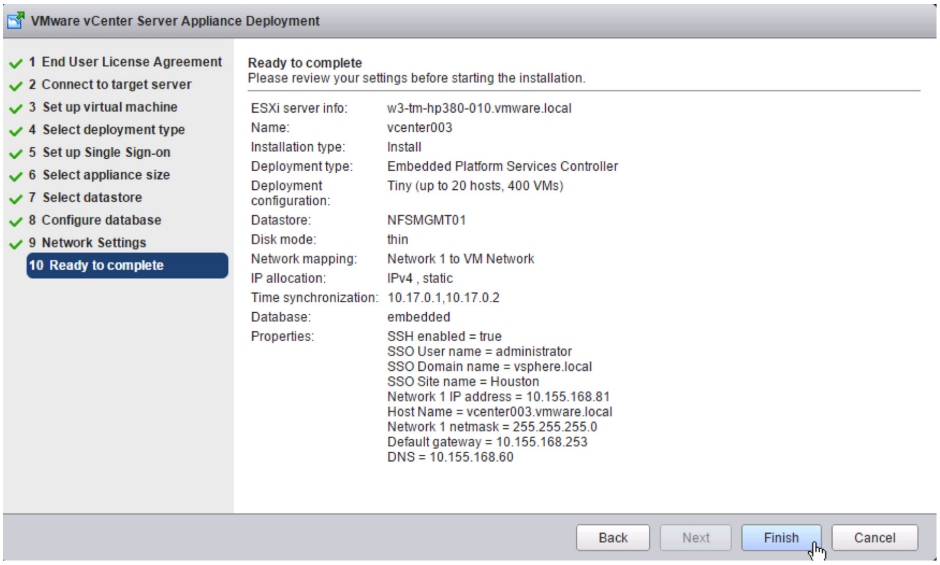


14. Enter **Network Settings** and click **Next**.

NOTE: The FQDN and IP addresses entered here must be resolvable by the DNS server specified or the deployment will fail.



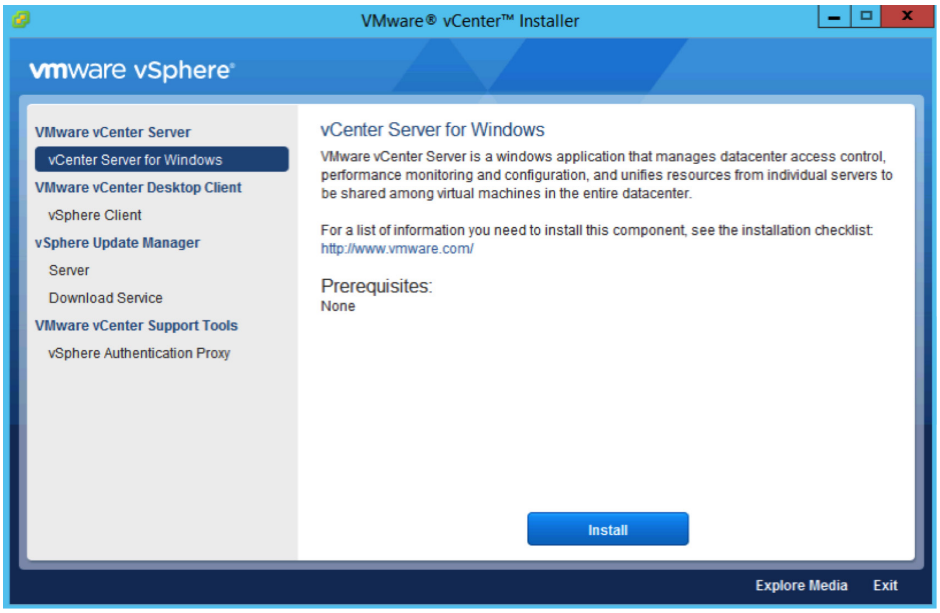
15. Review and click **Finish**.



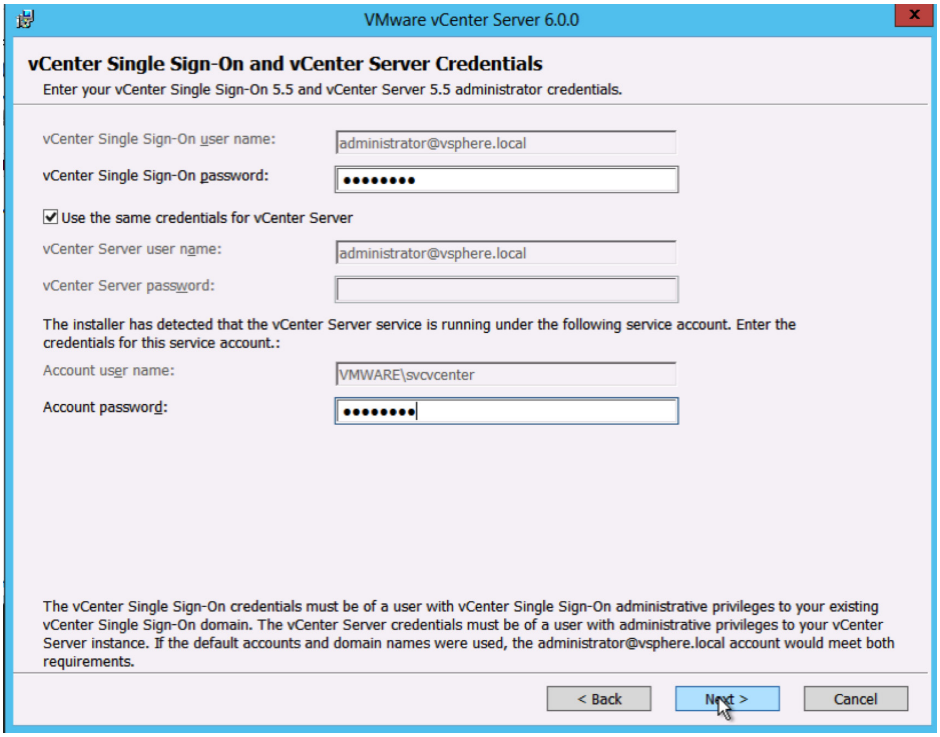
Upgrade in Which All vCenter Server Components Are Installed on a Single Machine

Windows Upgrade

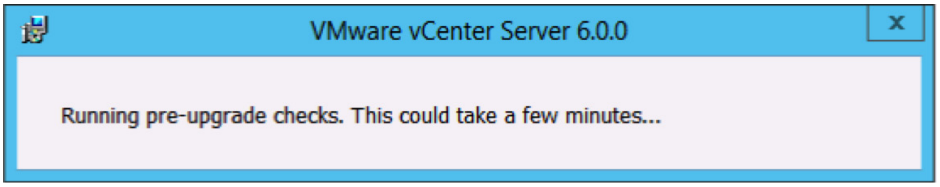
1. Verify all prerequisites.
2. Mount the vCenter Server 6.0 ISO image.
3. If autorun does not start, execute autorun.exe.
4. Select **vCenter Server for Windows** and click **Install**.



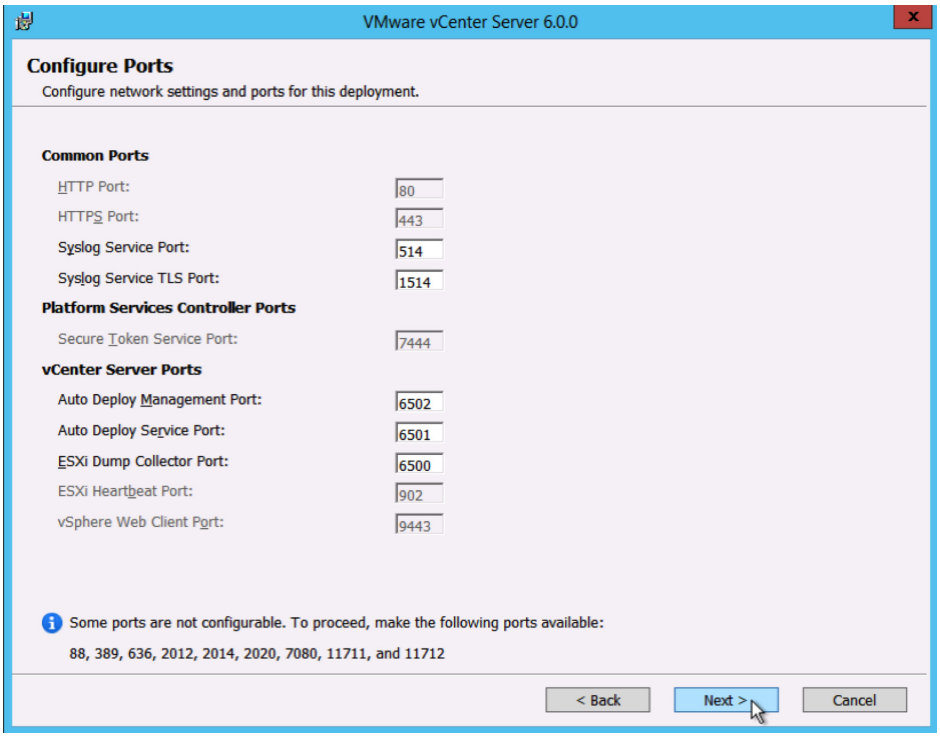
5. Click **Next**.
6. Accept the license agreements.
7. Enter the **vCenter Single Sign-On password** and the service account **password** if applicable. Click **Next**.



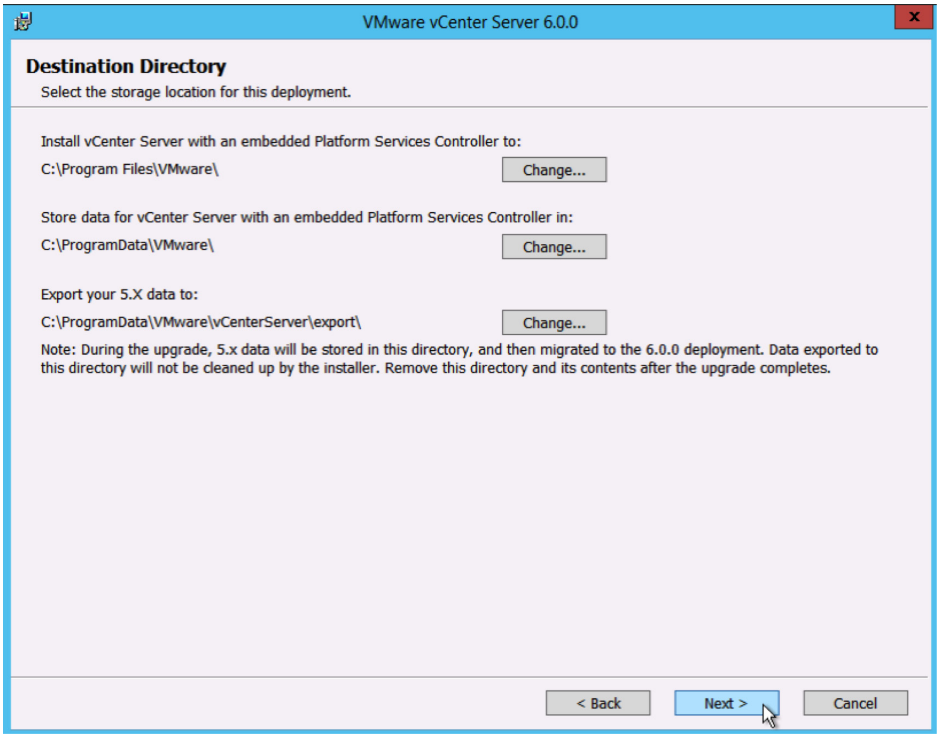
8. Wait for the **pre-upgrade checks** to complete.



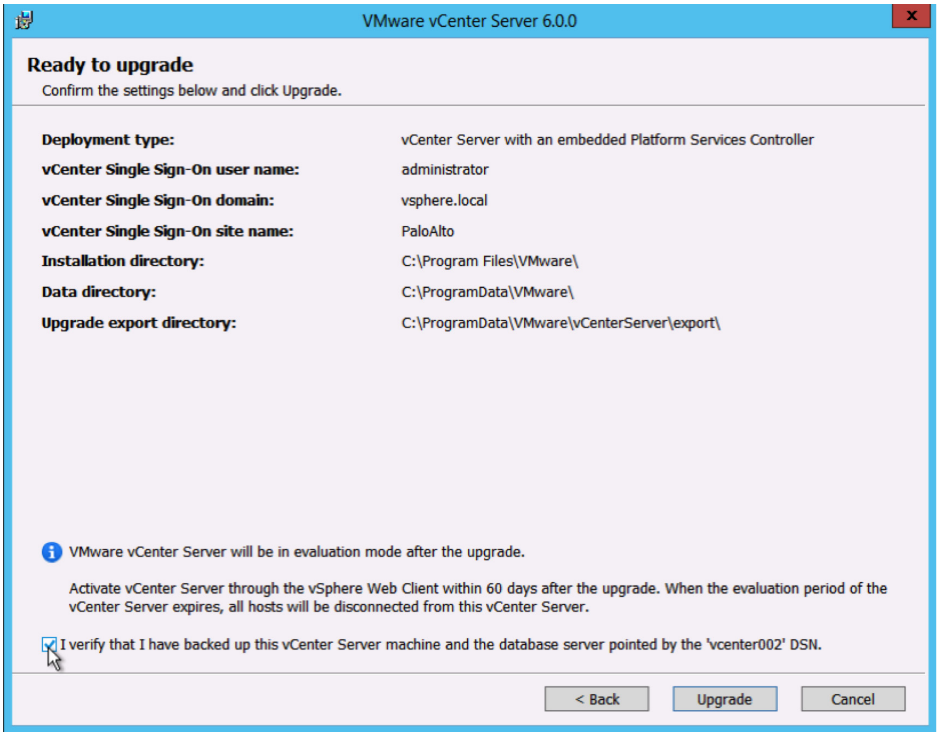
9. Accept the default ports and click **Next**.



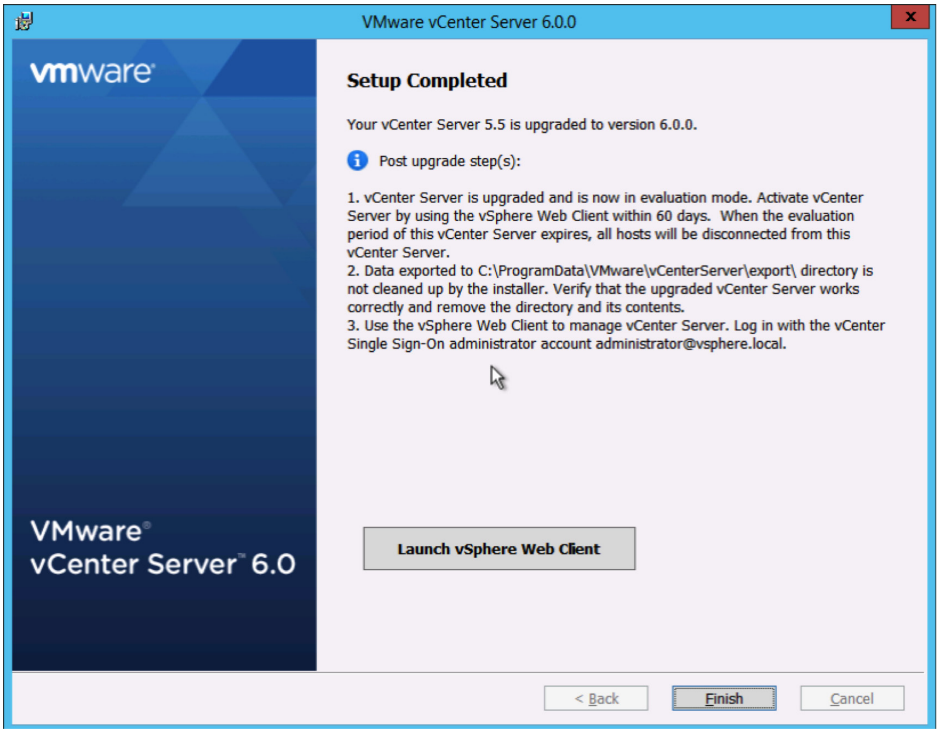
10. Accept or change the installation paths as necessary. Click **Next**.



11. Check the box to verify that you have backed up this vCenter Server and its database. Click **Upgrade**.

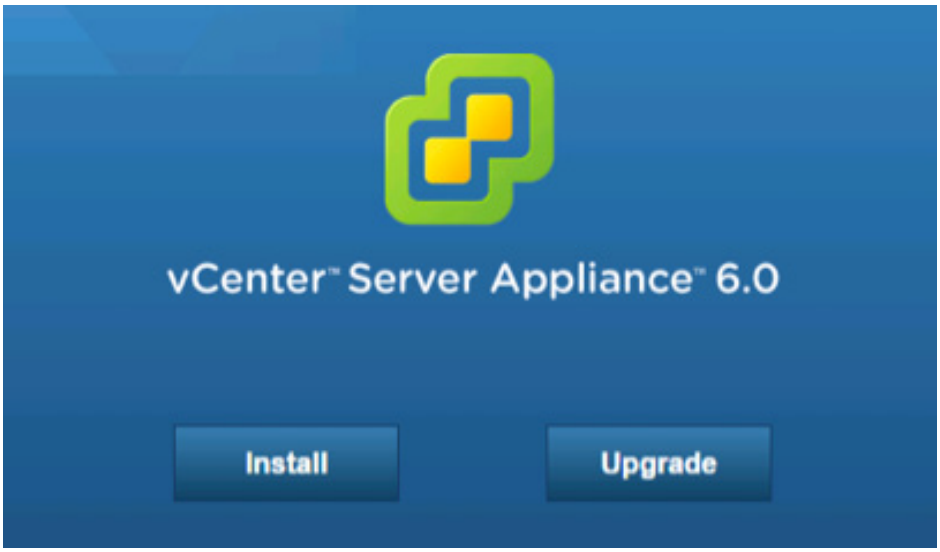


12. When completed, click **Finish**.

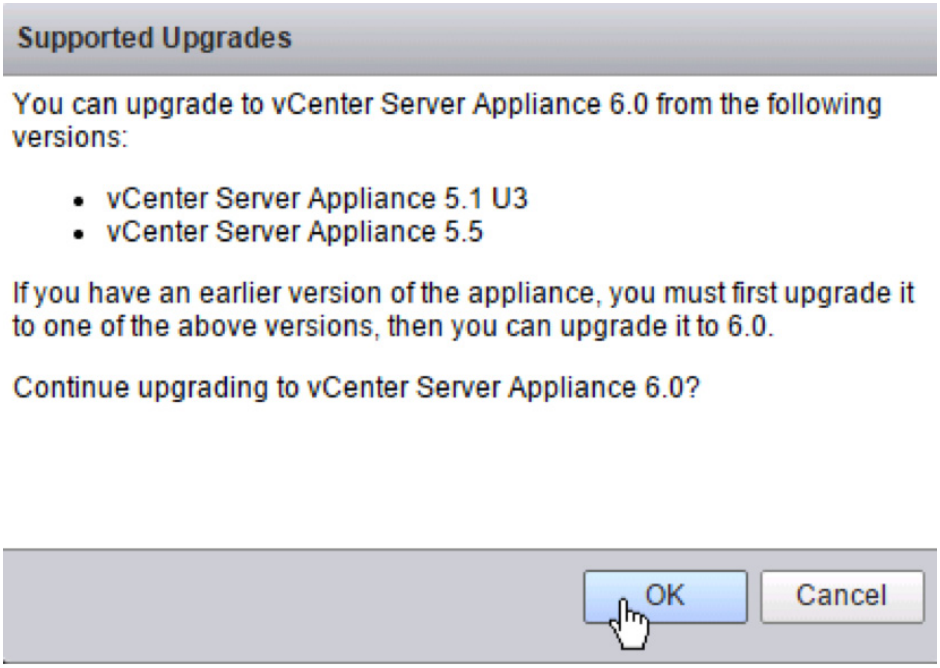


vCenter Server Appliance Upgrade

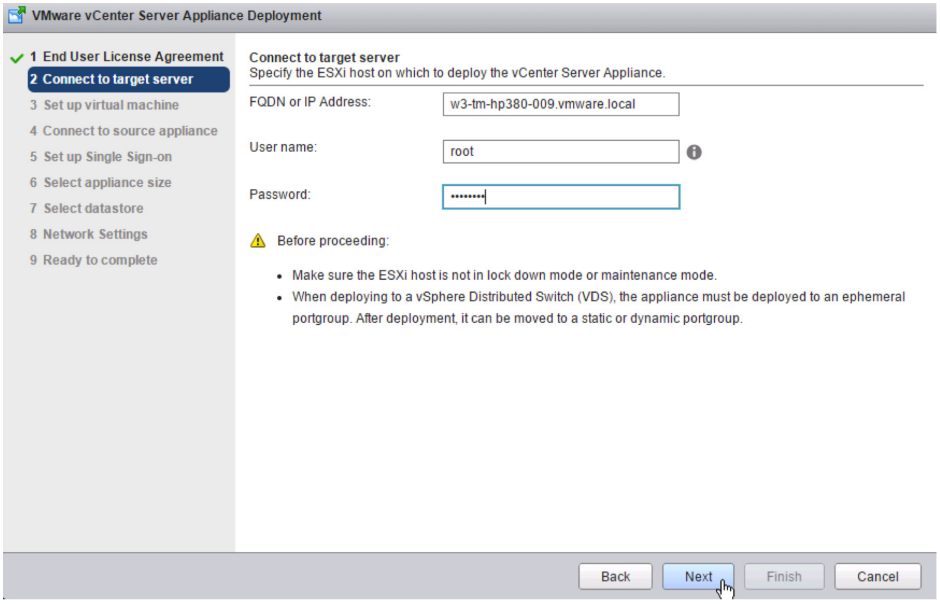
1. Mount the ISO image on PC.
2. Open the vcsa folder and install the plug-in.
3. In the root of the ISO image, double-click the vcsa-setup.html file.
4. Wait until you are prompted to enable the client integration plug-in to run. Click **Upgrade**.



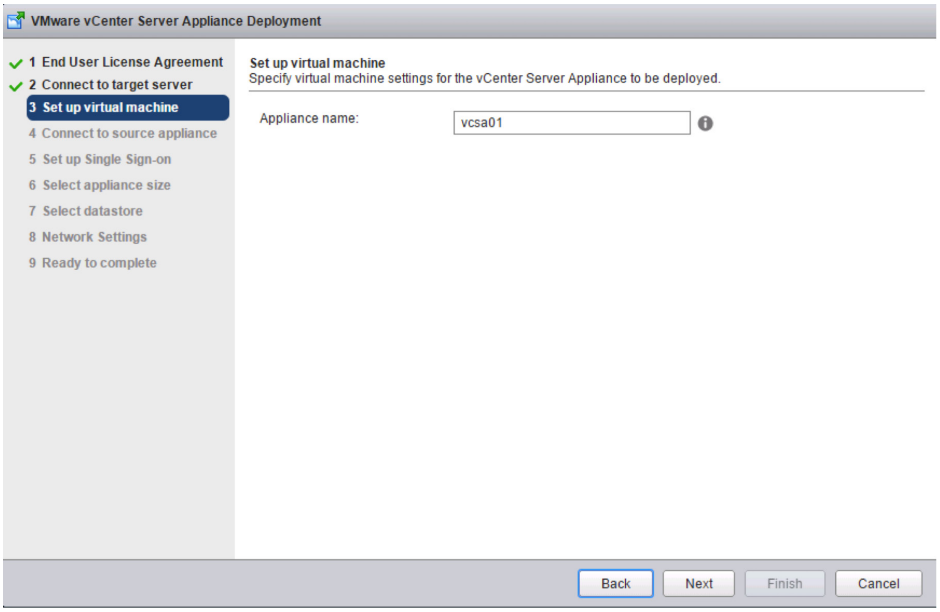
5. Click **OK** to the supported upgrades pop-up.



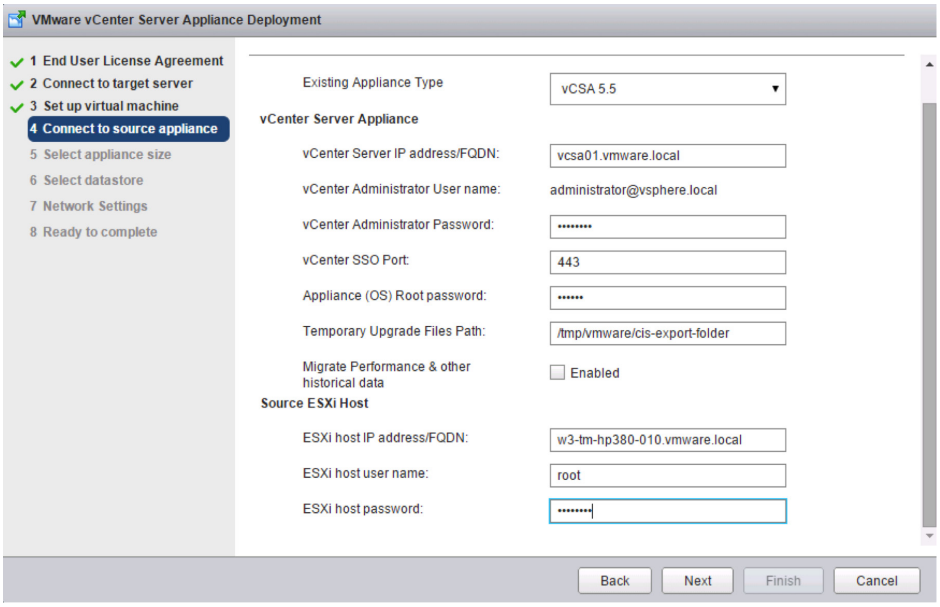
6. Accept the license agreement and click **Next**.
7. Enter a target host and a **User name** and **Password** on the host with root access.



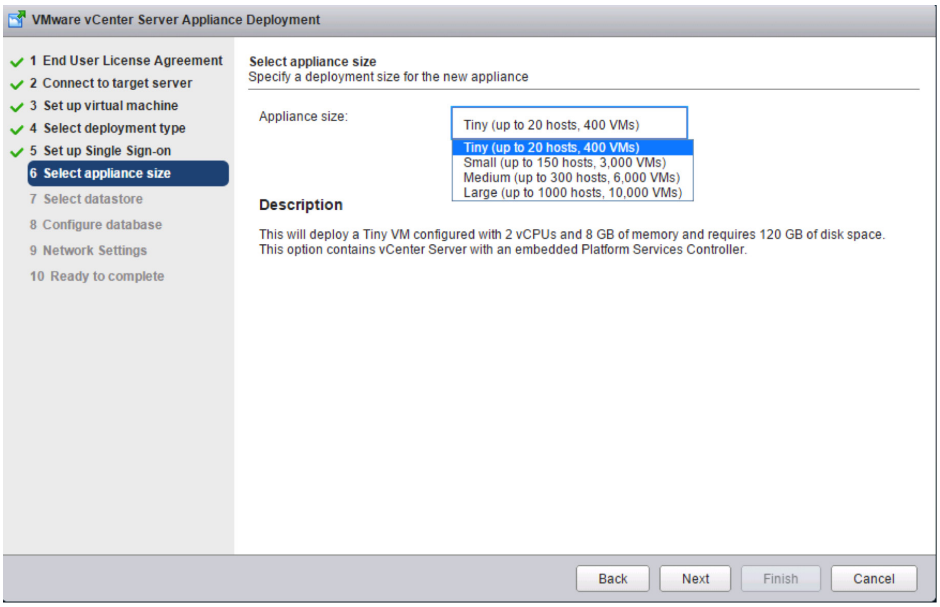
8. Click **Yes** to accept the host's certificate.
9. Enter an **Appliance name** and **Enable SSH** if required. Click **Next**.



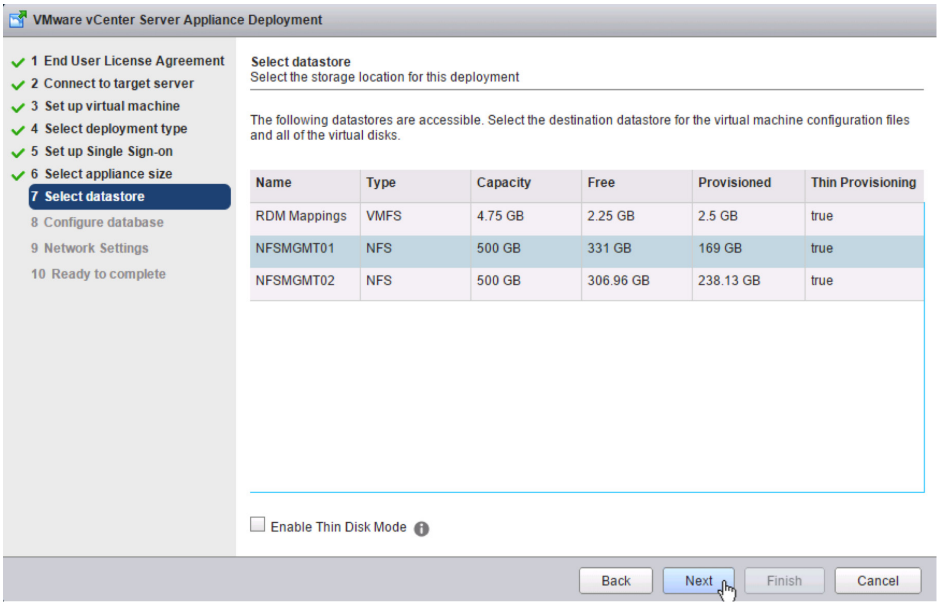
10. Enter the **vCenter Server** version, **FQDN**, **Password**, **vCenter SSO Port** (443), **ESXi host FQDN**, **user name**, and **password**. Click **Next**.



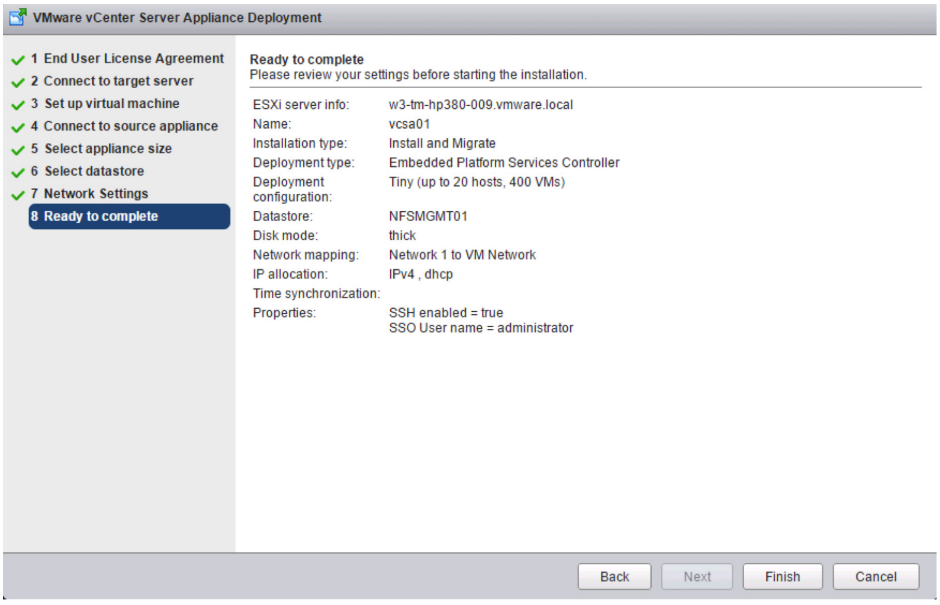
11. Select **Appliance size** from the drop-down list and click **Next**.



12. **Select datastore** to deploy the appliance on and click **Next**.



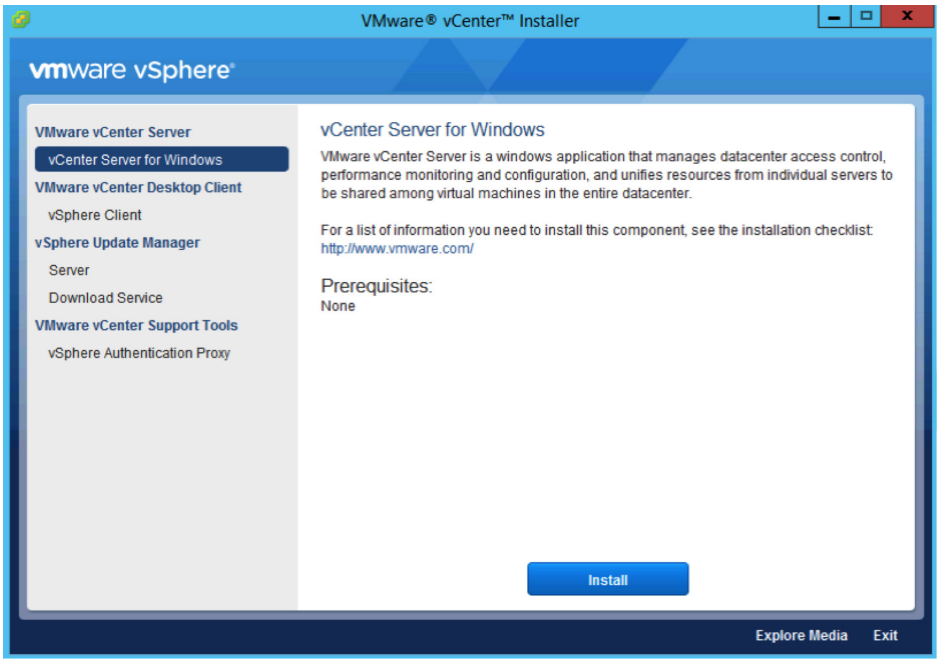
13. Review and click **Finish**.



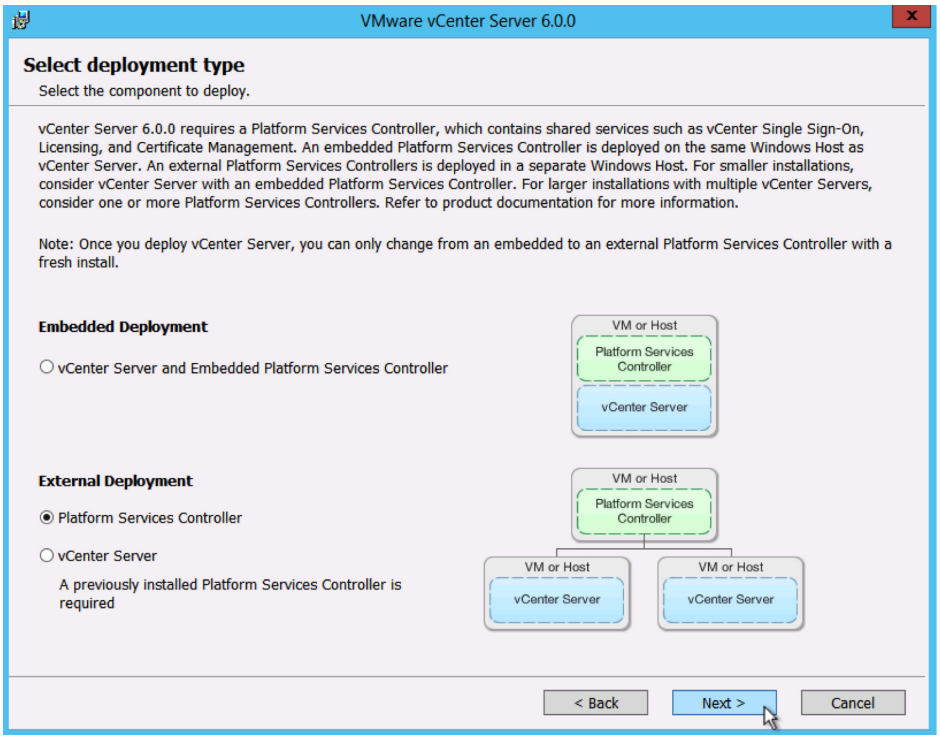
Fresh External Platform Services Controller Deployment

Windows Deployment

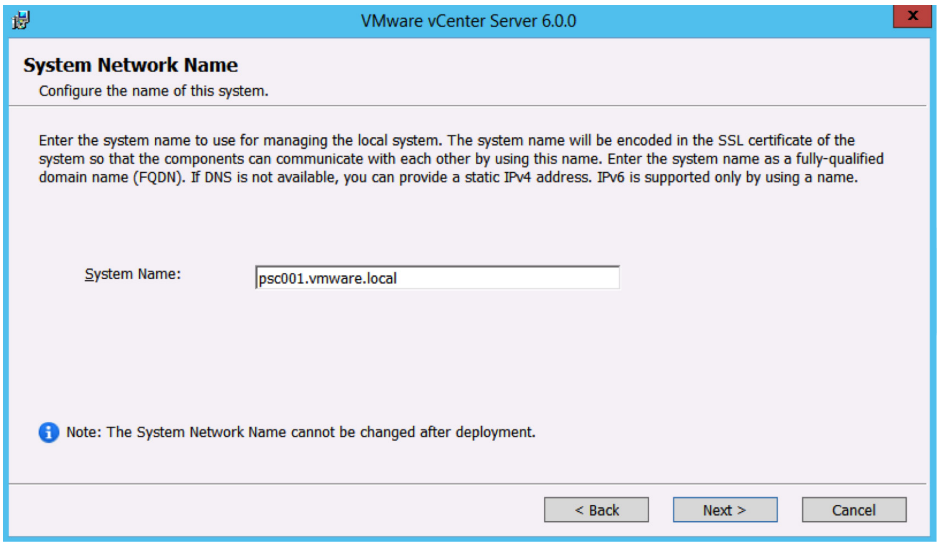
1. Verify all prerequisites.
2. Mount the vCenter Server 6.0 ISO image.
3. If autorun does not start, execute autorun.exe.
4. Select **vCenter Server for Windows** and click **Install**.



5. Click **Next**.
6. Accept the license agreements.
7. Select **External Deployment Platform Services Controller** and click **Next**.

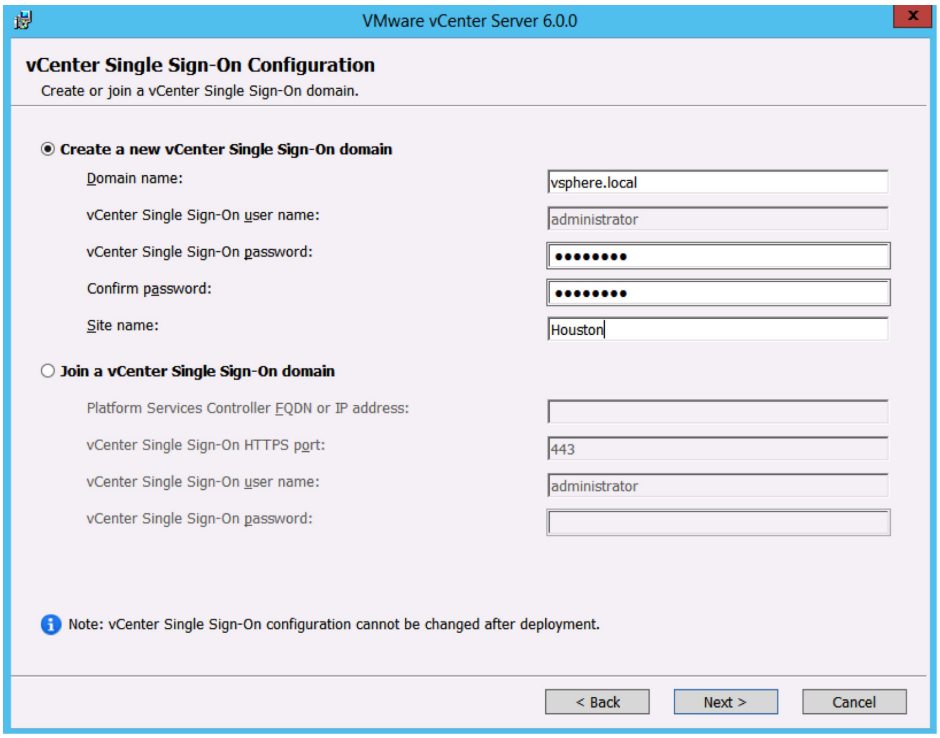


8. Verify the system name and click **Next**.

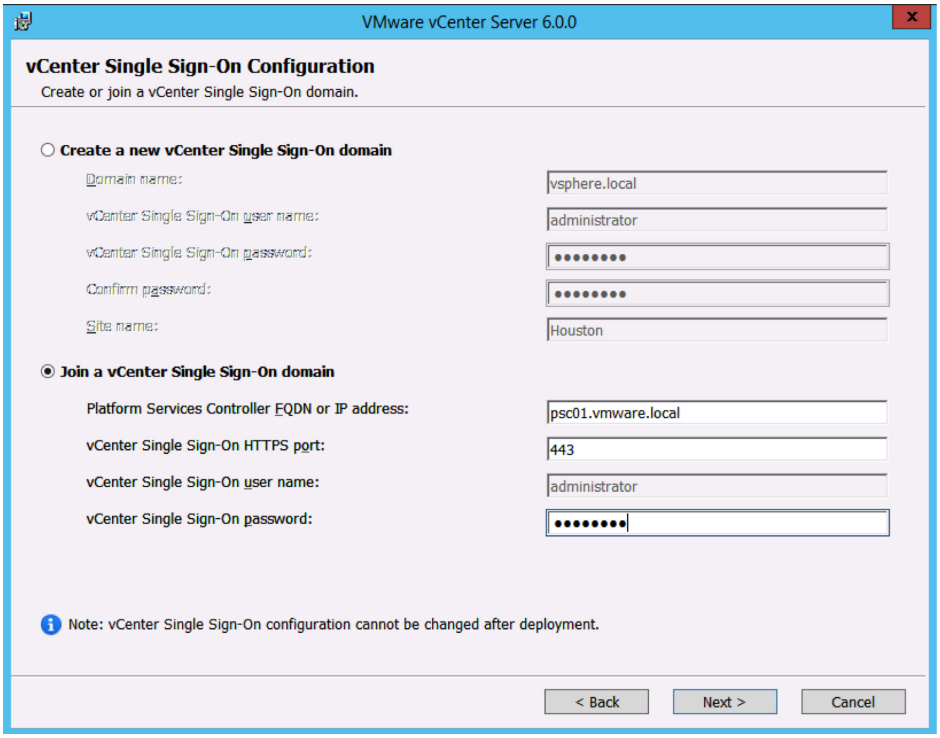


9. If this is the first Platform Services Controller, select **Create a new vCenter Single Sign-On domain**. If this is an additional Platform Services Controller, select **Join a vCenter Single Sign-On domain**.

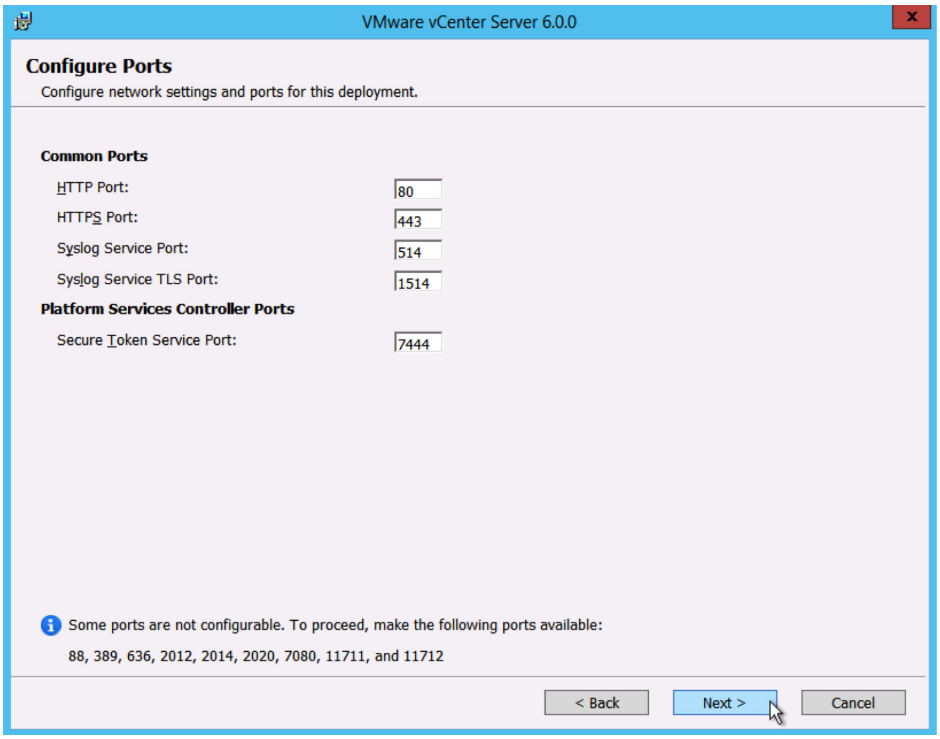
   a. For a new vCenter Single Sign-On domain, enter a **password** for the vCenter Single Sign-On administrator, a **Domain name** such as vsphere.local, and a **Site name** such as a city or physical building name.



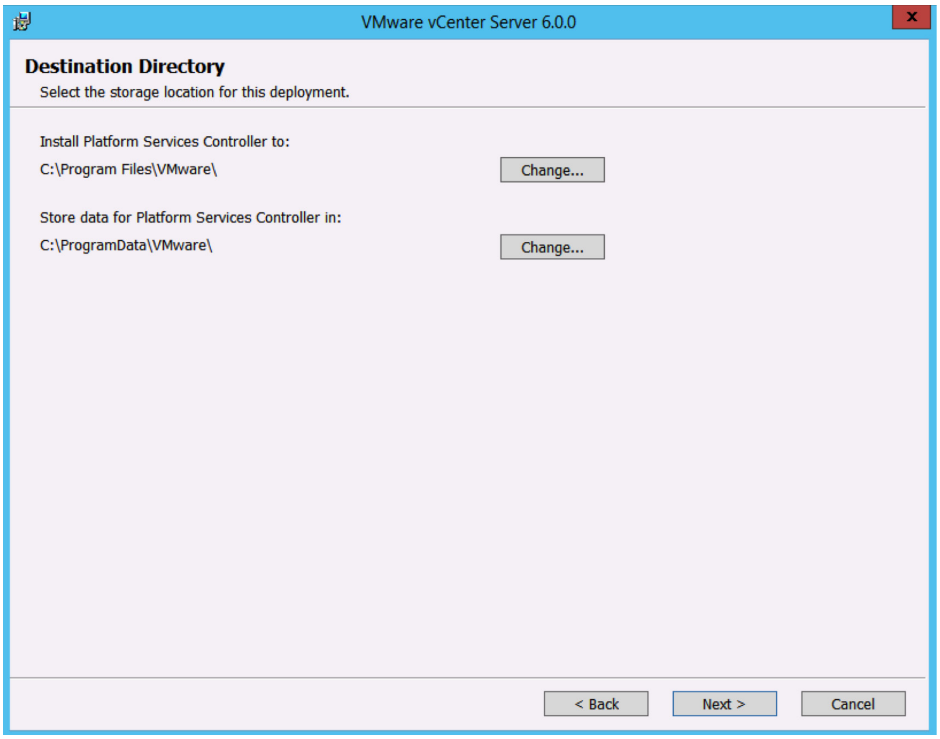
   b. To join an existing vCenter Single Sign-On domain, enter the FQDN of an existing Platform Services Controller and the vCenter Single Sign-On administrator's password. Click **Next**. Choose a site to join from the drop-down list. Click **Next**.



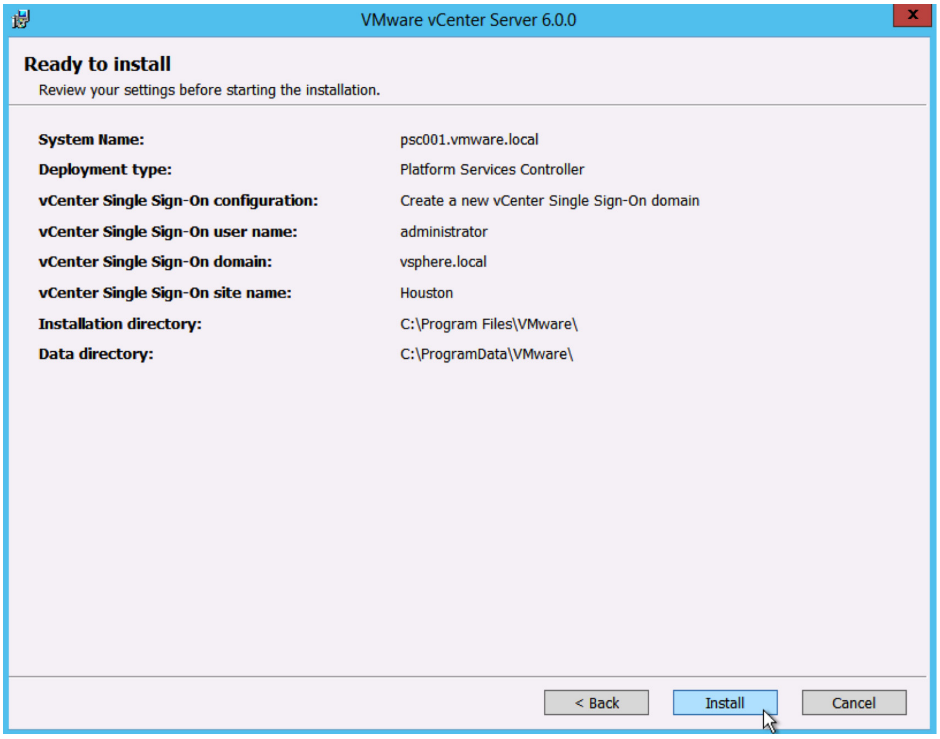
10. Accept the default ports and click **Next**.



11. Accept or change the installation paths as necessary. Click **Next**.

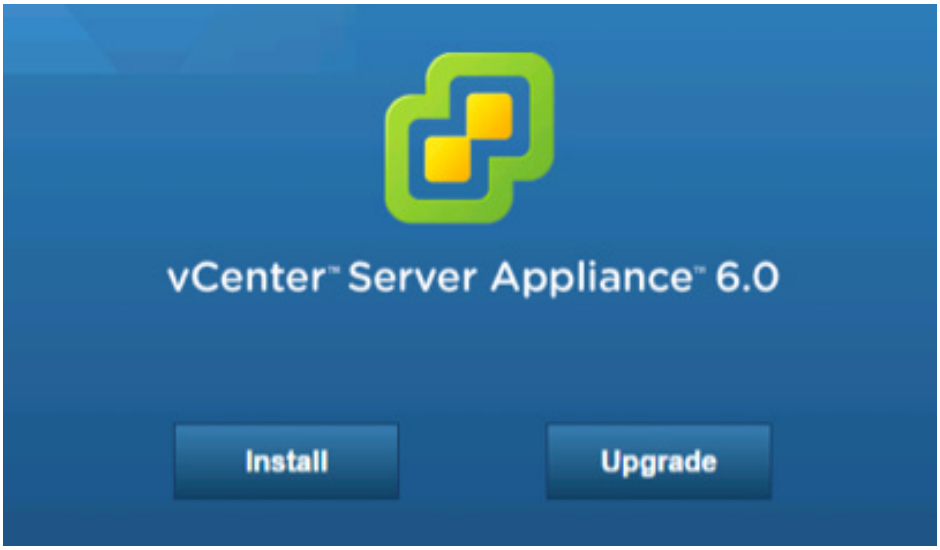


12. Review and click **Install**.

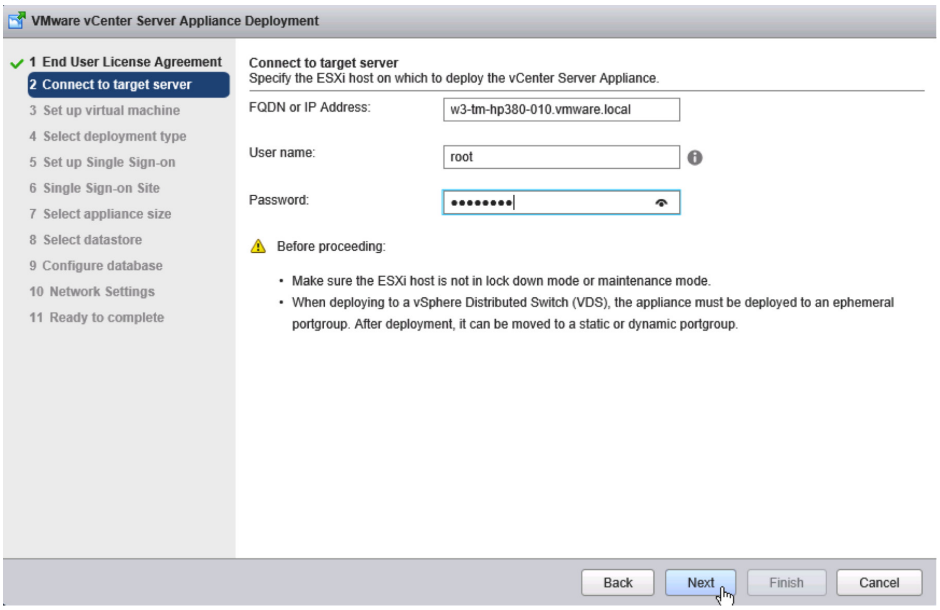


vCenter Server Appliance Deployment

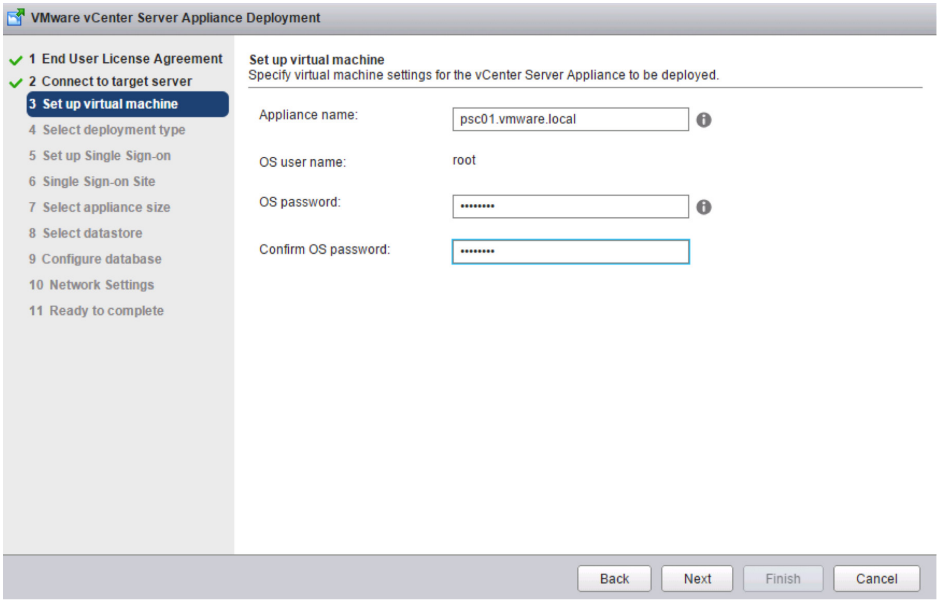
1. Mount the ISO image on a PC.
2. Open the vcsa folder and install the plug-in.
3. In the root of the ISO image, double-click the vcsa-setup.html file.
4. Wait until you are prompted to enable the client integration plug-in to run. Click **Install**.



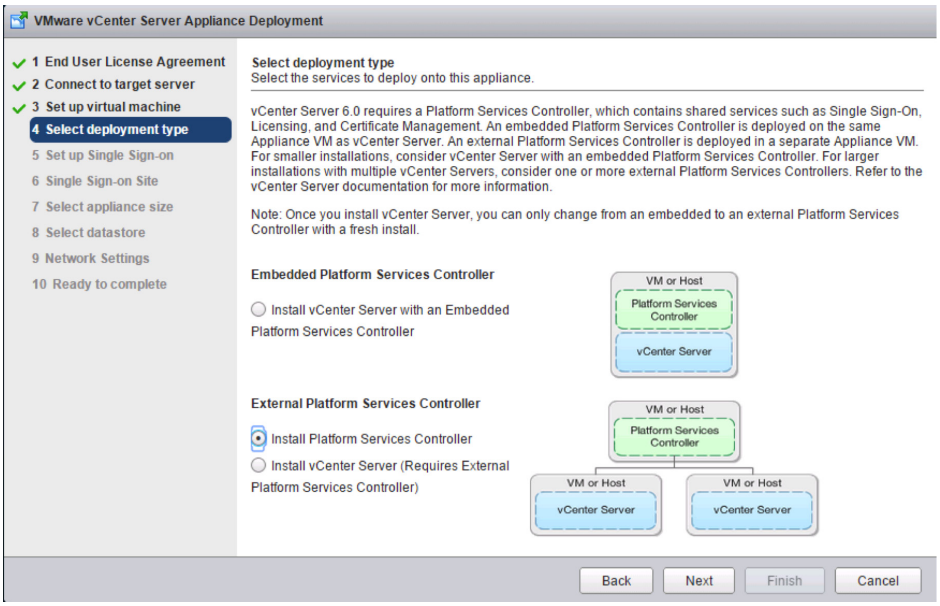
5. Accept the license agreement and click **Next.**
6. Enter a target host and a **User name** and **Password** on the host with root access.



7. Click **Yes** to accept the host's certificate.
8. Enter an **Appliance name** and the root **password** you want to assign. Click **Next**.

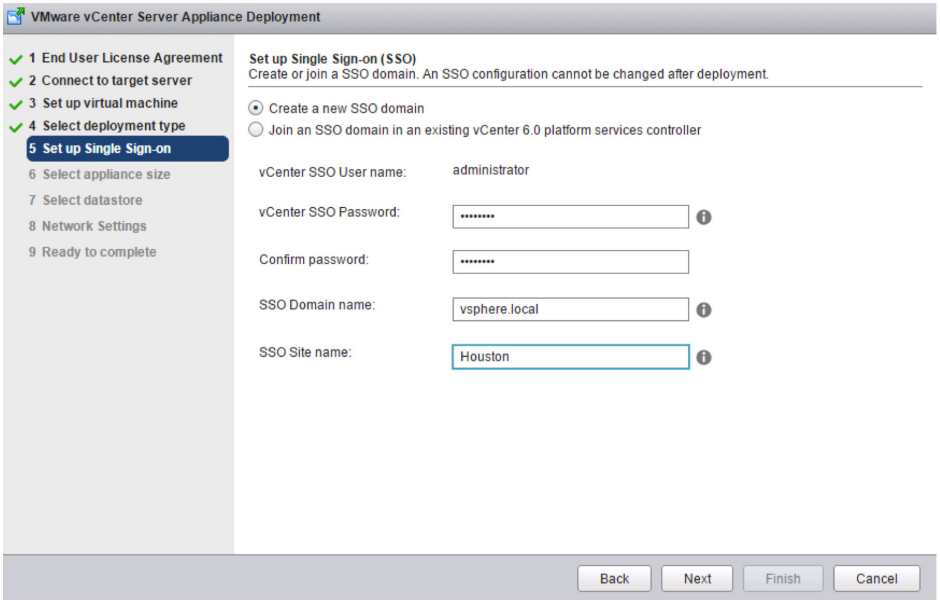


9. Under **External Platform Services Controller**, select **Install Platform Services Controller**. Click **Next**.

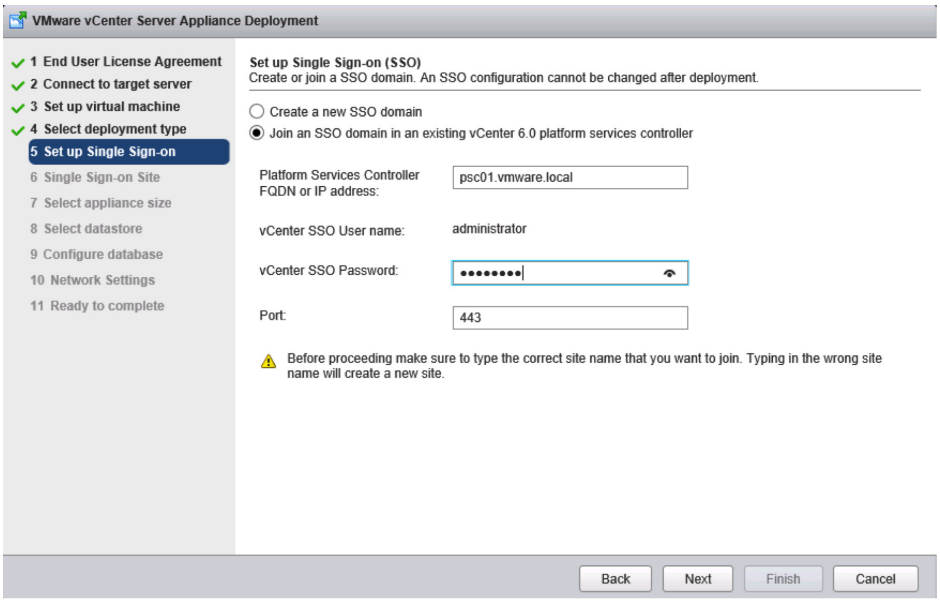


10. If this is the first Platform Services Controller, select **Create a new SSO domain**. If this is an additional Platform Services Controller, select **Join an SSO Domain**.

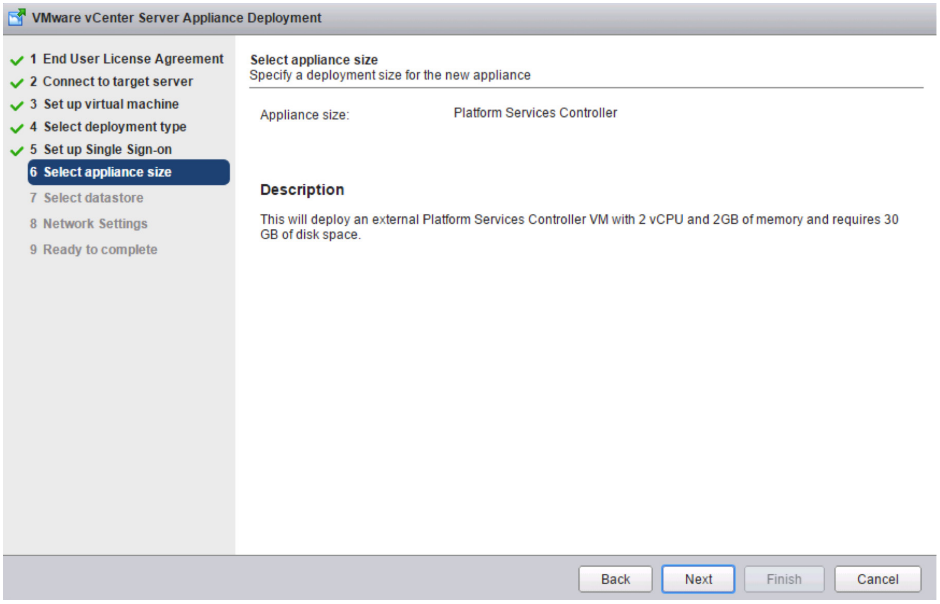
    a. For a new vCenter Single Sign-On domain, enter an administrator **vCenter SSO Password**, an **SSO Domain name** such as vsphere.local, and an **SSO Site name**.



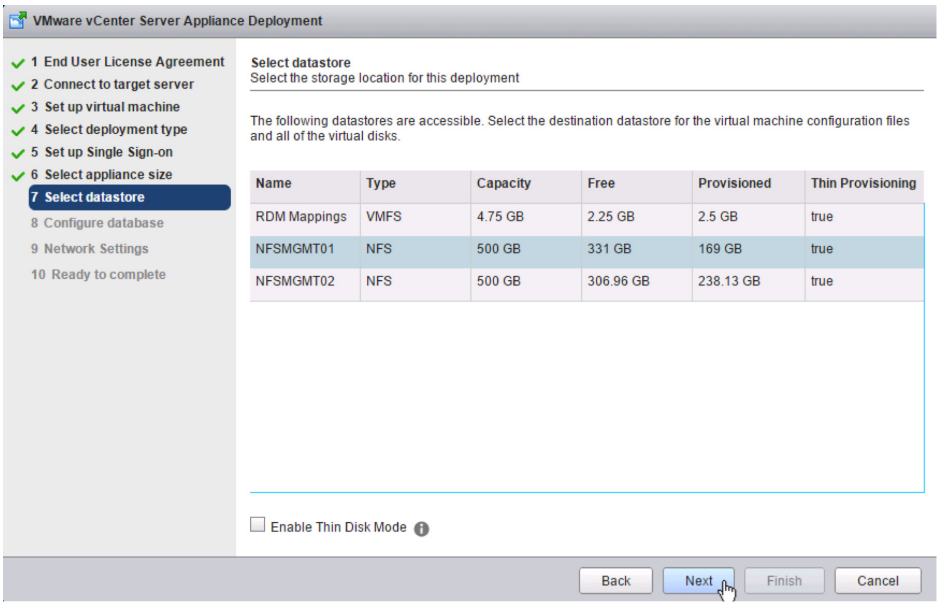
b. To join an existing vCenter Single Sign-On domain, enter the FQDN of an existing Platform Services Controller and the vCenter Single Sign-On administrator's password. Then click **Next**. Choose a site to join from the drop-down list. Click **Next**.



11. Click **Next**. There is only one appliance size for the Platform Services Controller.

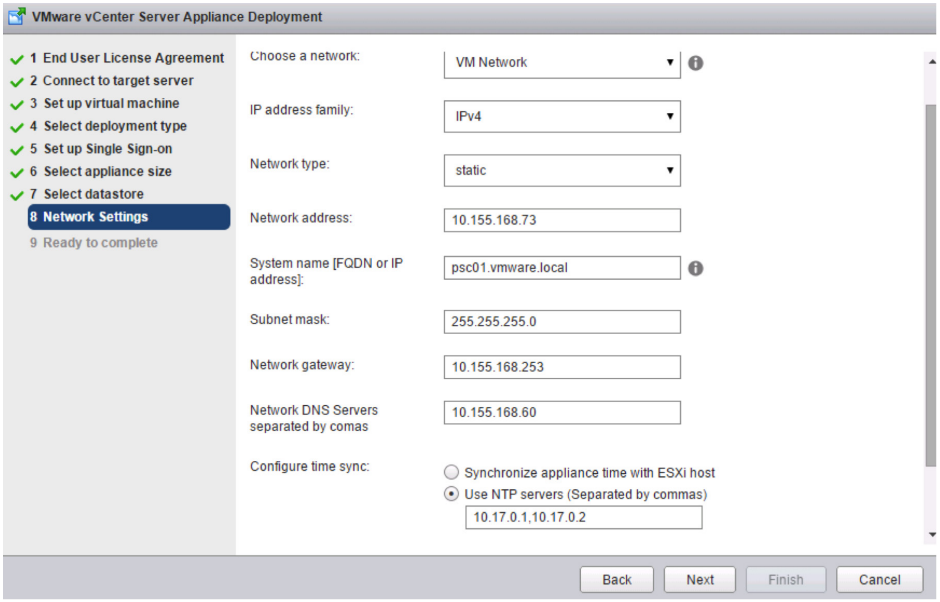


12. Select a datastore to deploy the appliance on and click **Next**.

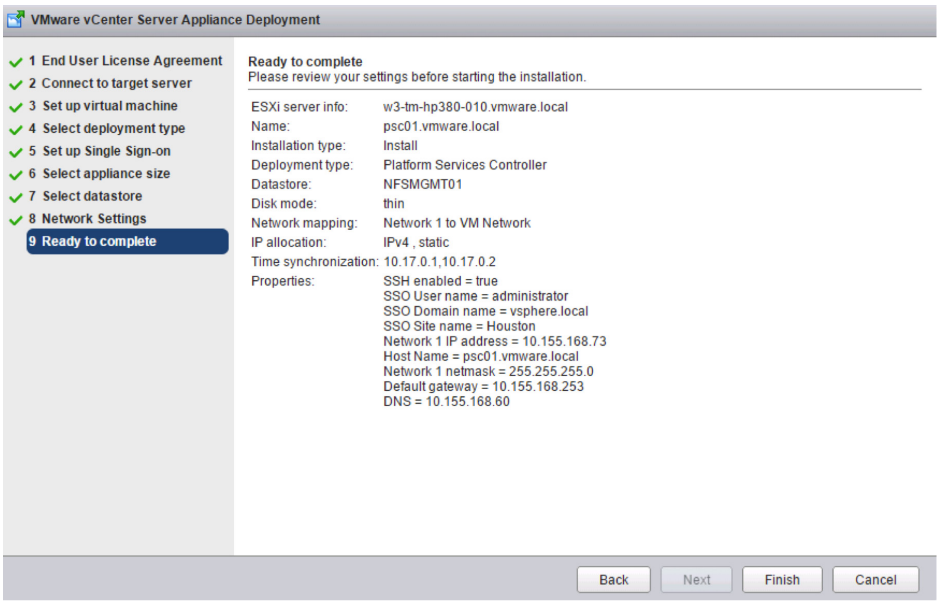


13. Enter **Network Settings** and click **Next**.

NOTE: The FQDN and IP addresses entered here must be resolvable by the DNS server specified or the deployment will fail.



14. Review and click **Finish**.

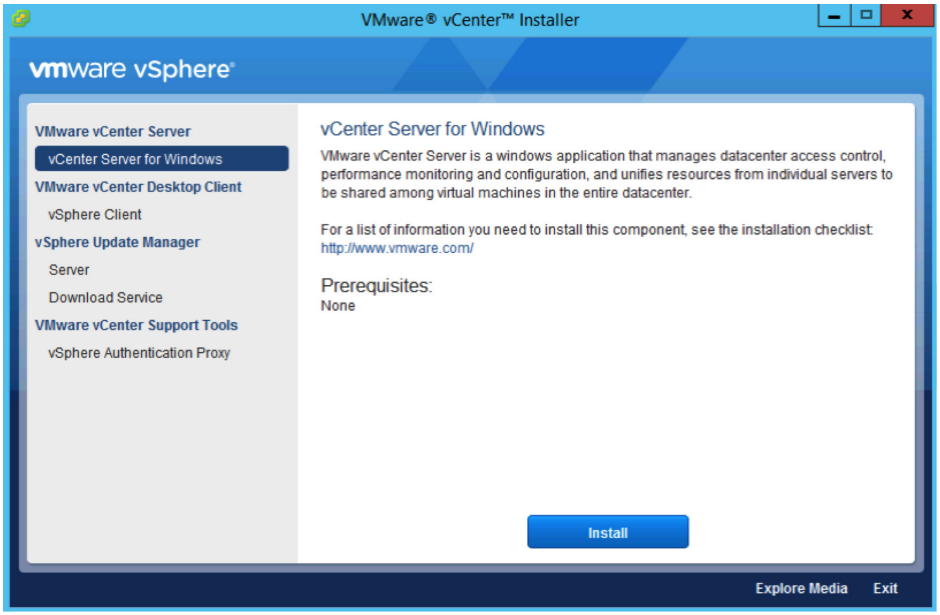


Fresh External vCenter Server Deployment

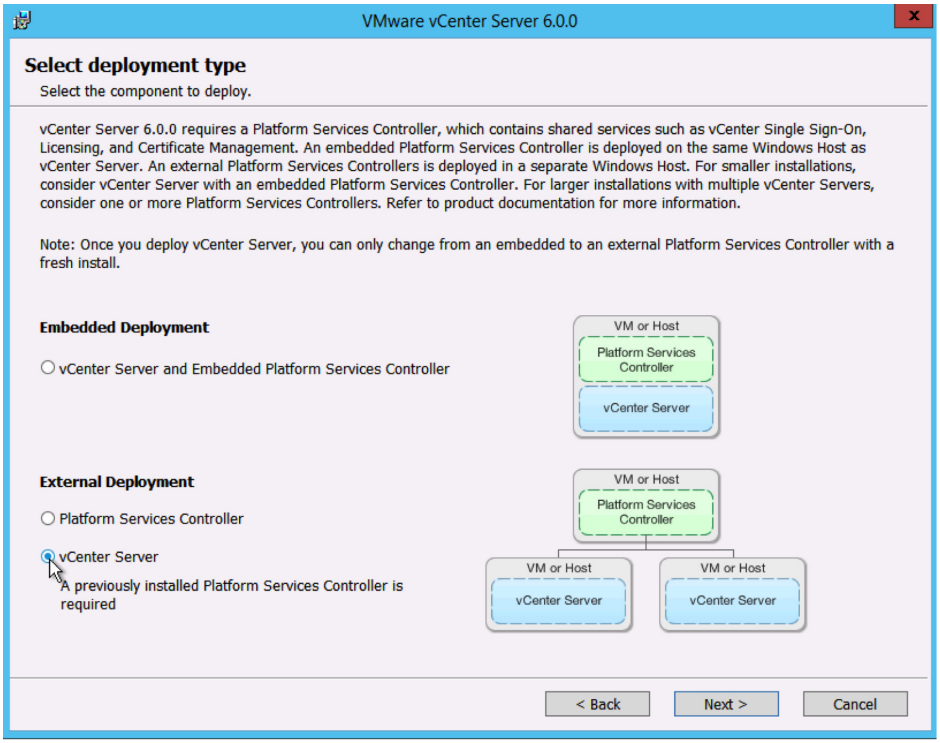
Windows Deployment

1. Verify all prerequisites.
2. If using a remote database, ensure that a 64-bit DSN has been created. This step is not necessary if using the local PostgreSQL database.
3. Mount the vCenter Server 6.0 ISO image.
4. If autorun does not start, execute autorun.exe.

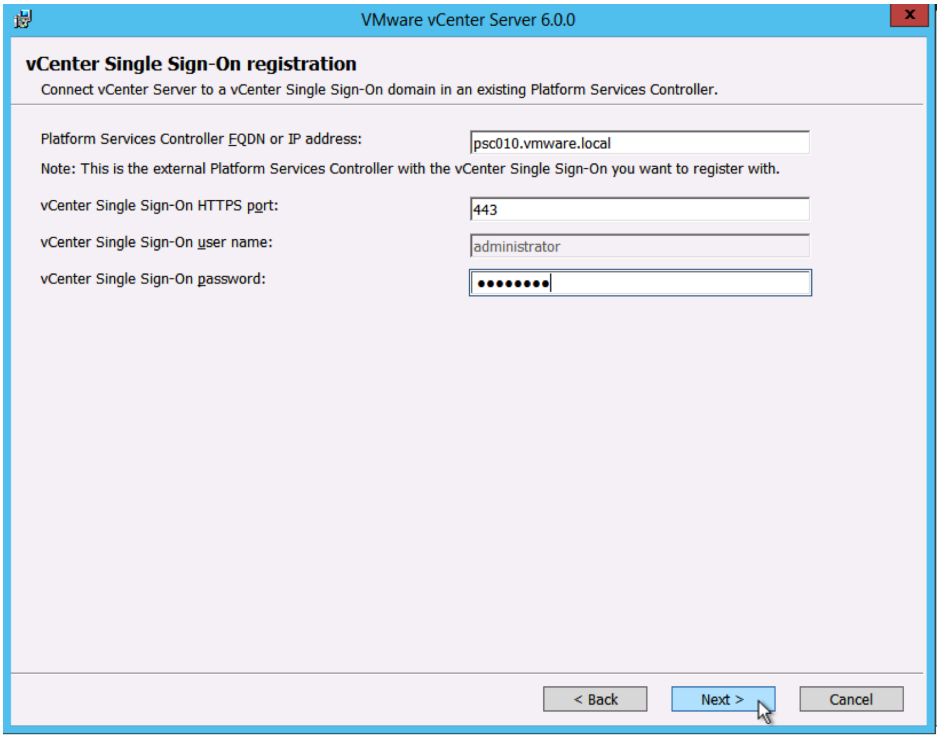
5. Select **vCenter Server for Windows** and click **Install**.



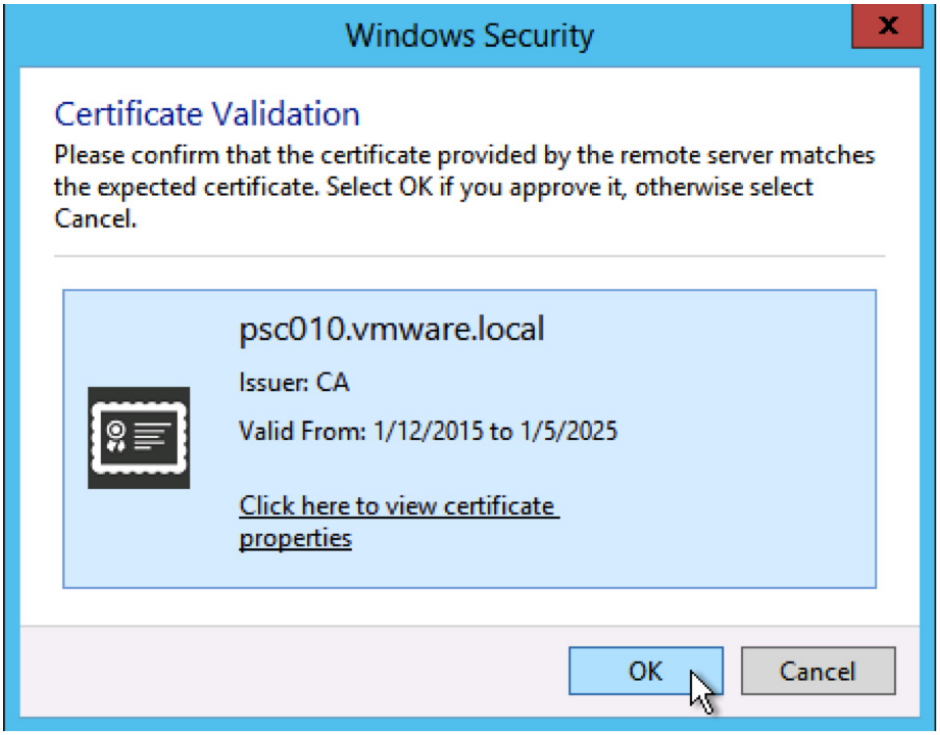
6. Click **Next**.
7. Accept the license agreements.
8. Under **External Deployment**, select **vCenter Server**. Click **Next**.



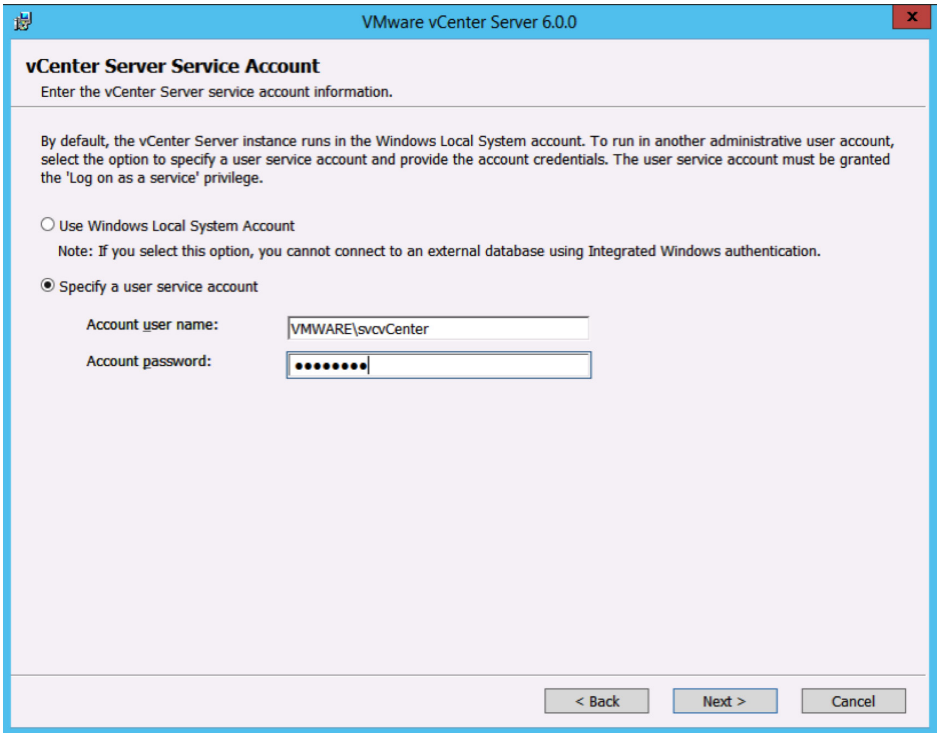
9. Verify that the FQDN is correct and click **Next**.
10. Enter the external **Platform Services Controller FQDN** and **vCenter Single Sign-On password**. Click **Enter**.



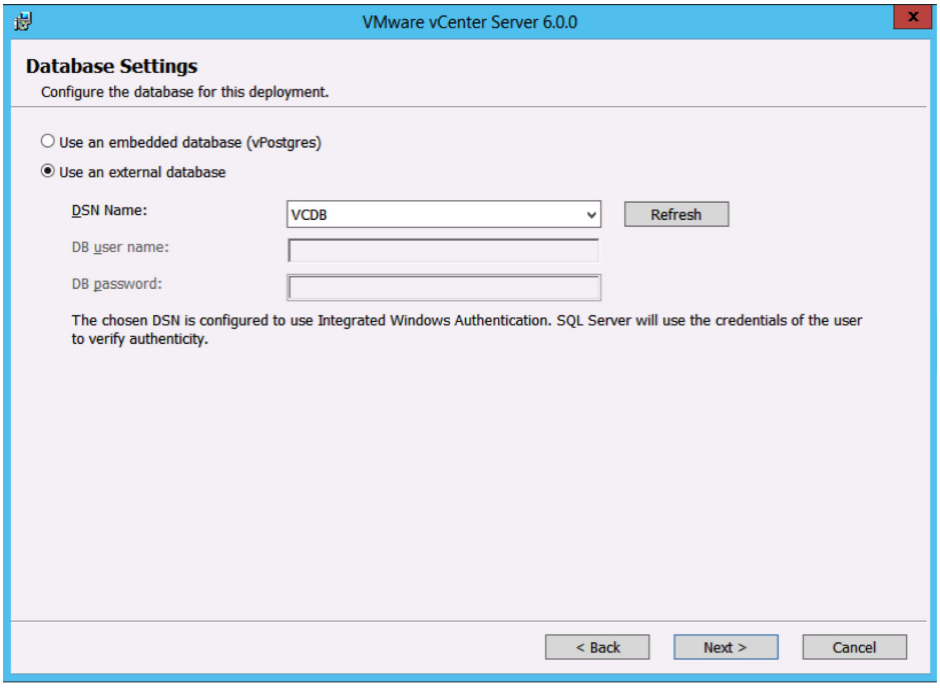
11. Click **OK** to accept the certificate.



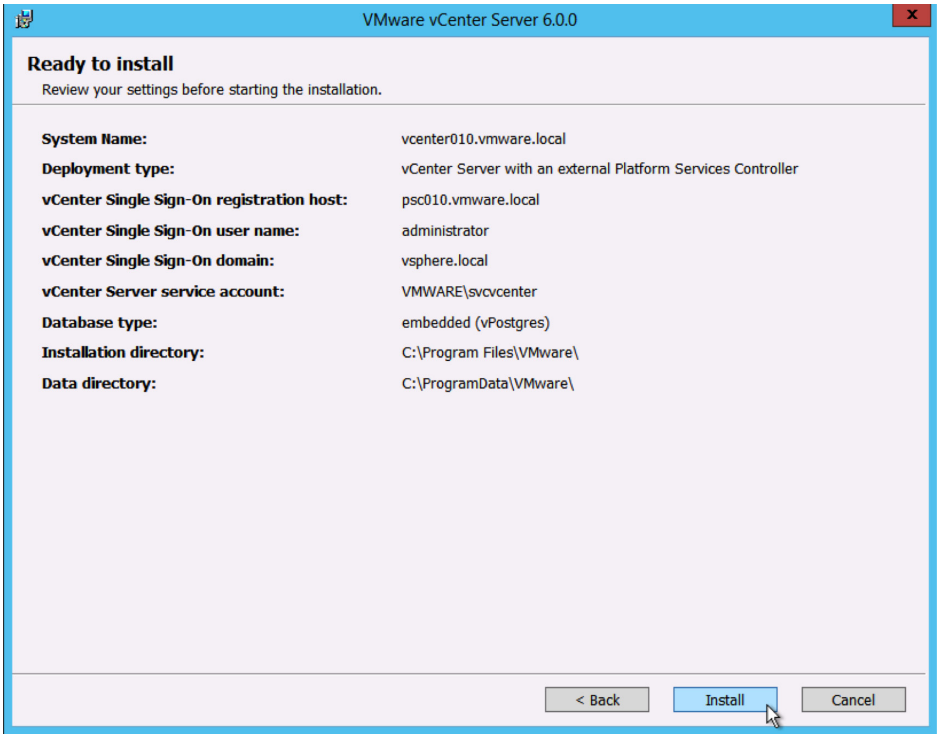
12. Select **Use Windows Local System Account** or enter the service account **user name** and **password**.



13. Select **Use an embedded database (vPostgres)** or **Use an external database** and enter the server's **DSN Name**. Click **Next**.

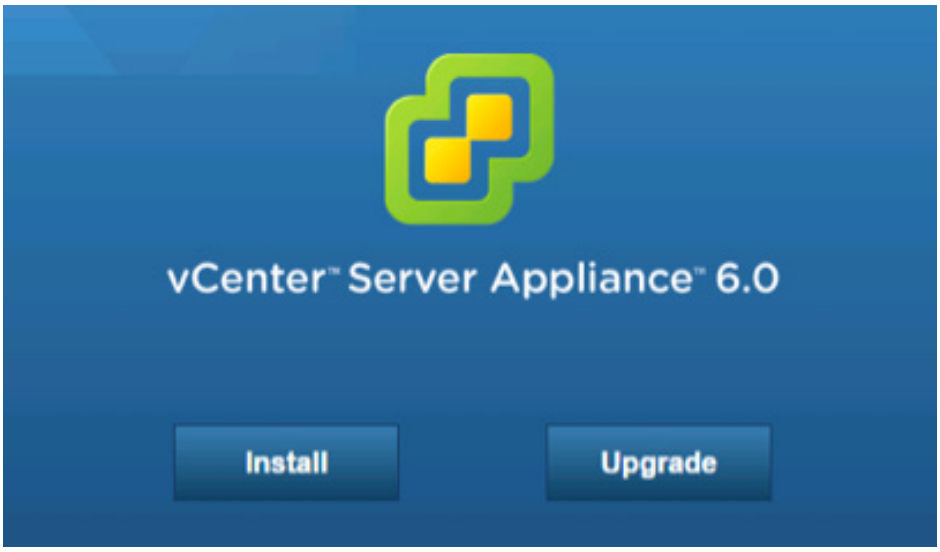


14. Unless required, leave all ports at their defaults and click **Next**.
15. Unless required, leave the default paths for installation and click **Next**.
16. Review and then click **Install**.

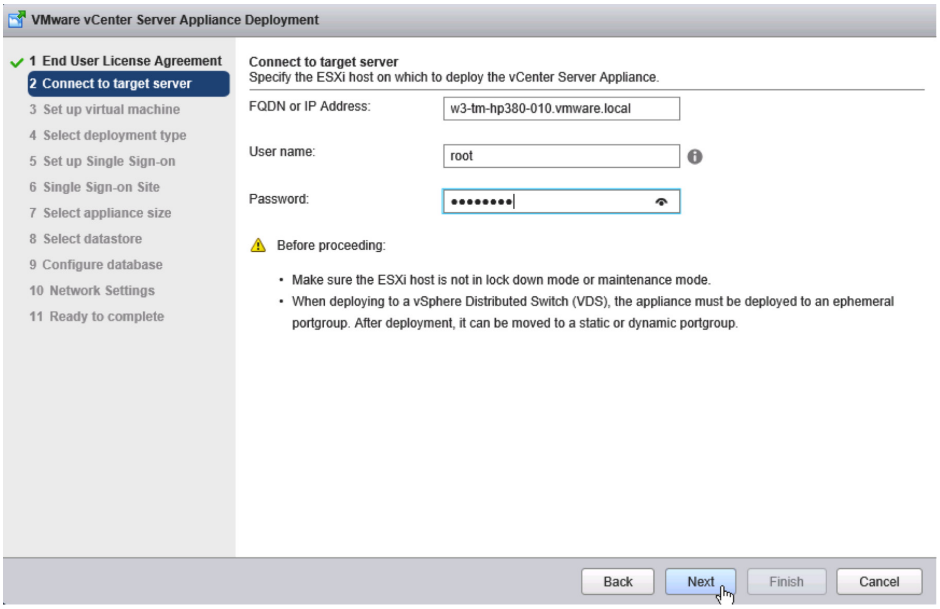


vCenter Server Appliance Deployment

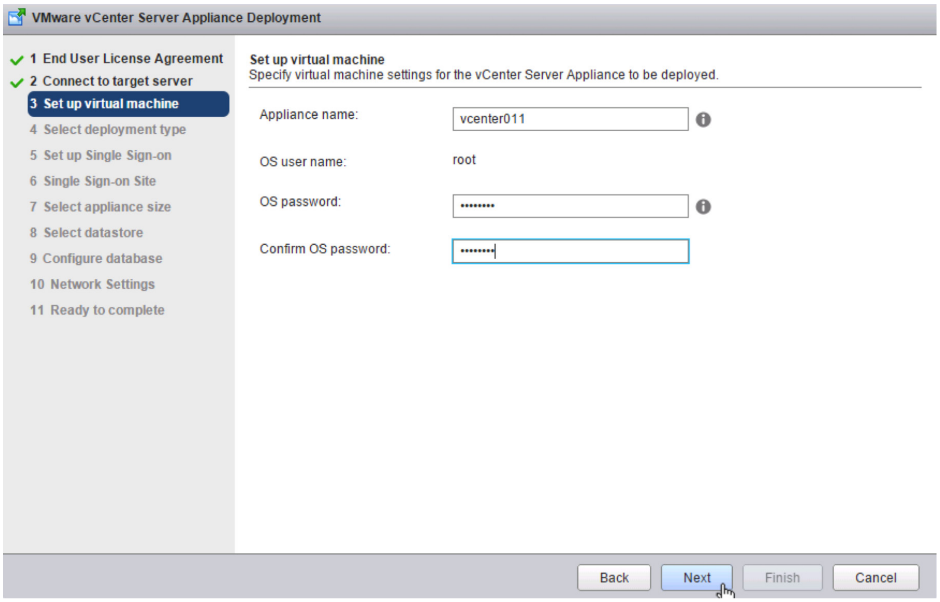
1. Mount the ISO image on a PC.
2. Open the vcsa folder and install the plug-in.
3. In the root of the ISO image, double-click the vcsa-setup.html file.
4. Wait until you are prompted to enable the client integration plug-in to run. Click **Install**.



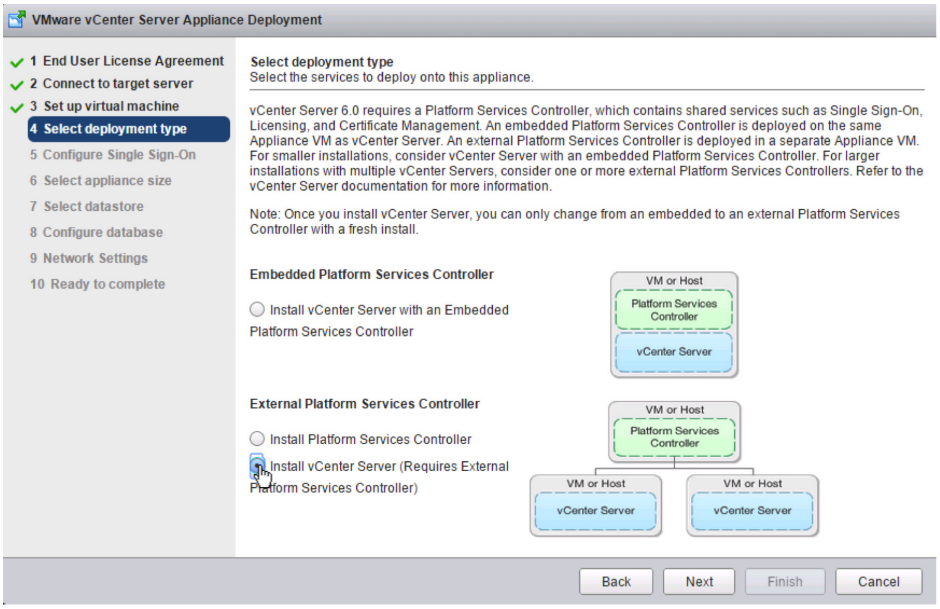
5. Accept the license agreement and click **Next**.
6. Enter a target host, a **user name**, and a **password** on the host with root access.



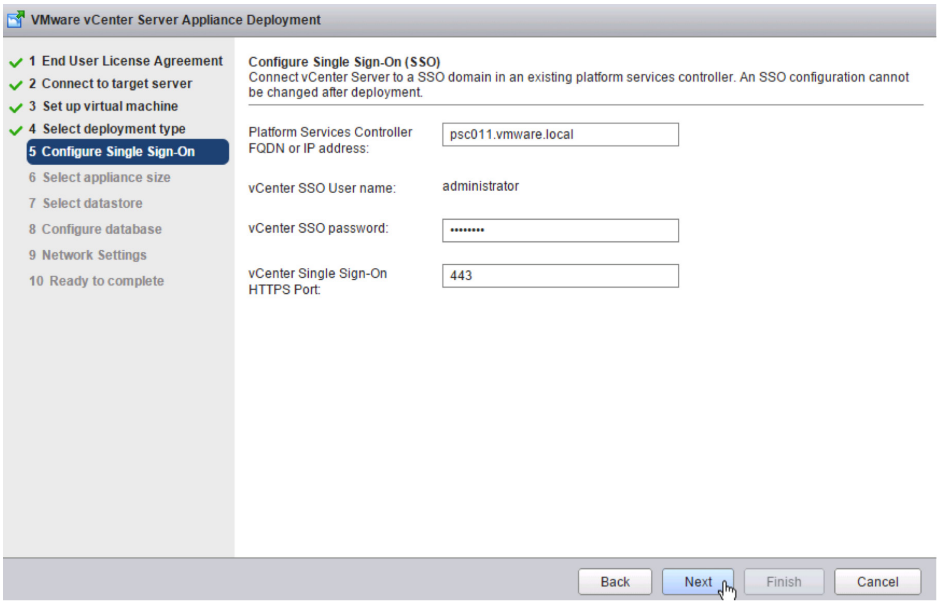
7. Click **Yes** to accept the host's certificate.
8. Enter **Appliance name** and the root **password** you want to assign. Click **Next**.



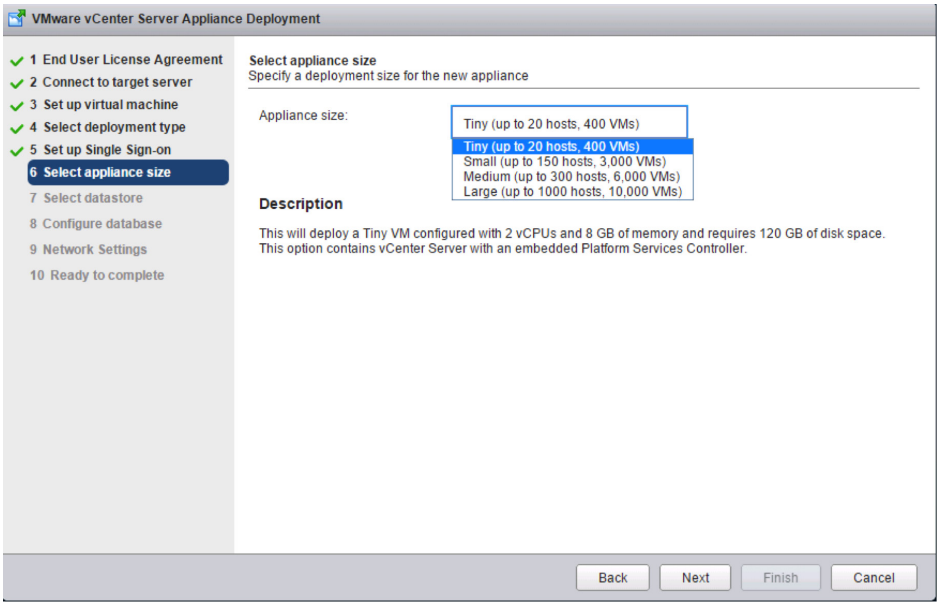
9. Under **External Platform Services Controller**, select **Install vCenter Server**. Click **Next**.



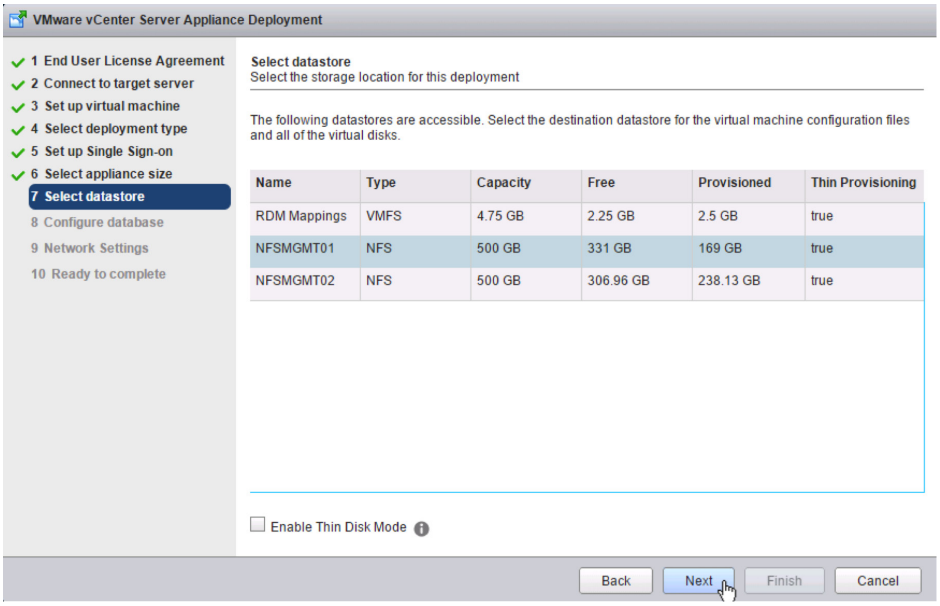
10. Enter the external **Platform Services Controller FQDN** and **vCenter SSO password**. Click **Next**.



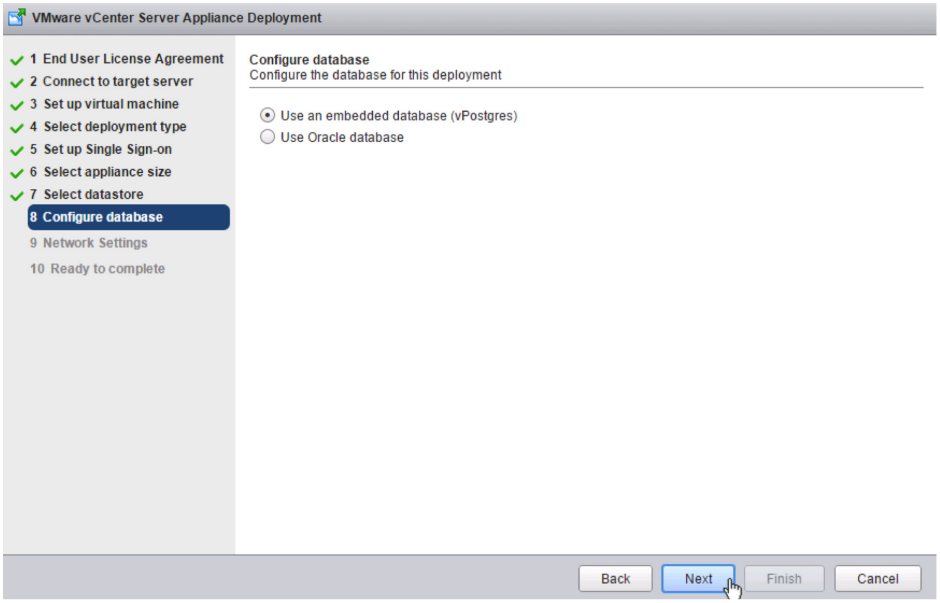
11. Select **Appliance size** from the drop-down list. Click **Next**.



12. **Select datastore** to deploy the appliance on. Click **Next**.

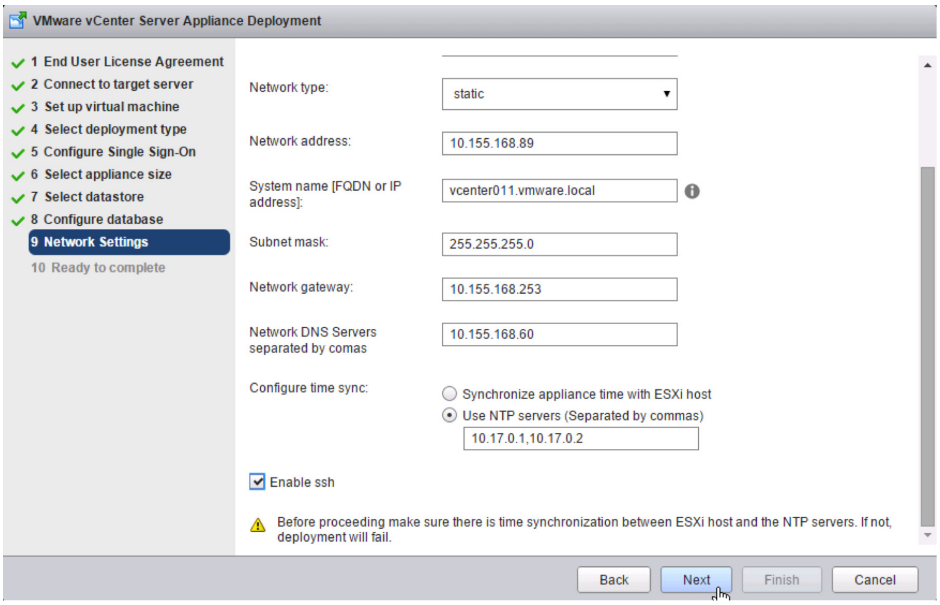


13. Select **Use an embedded database (vPostgres)**, which is recommended, or **Use Oracle database**. Click **Next**.

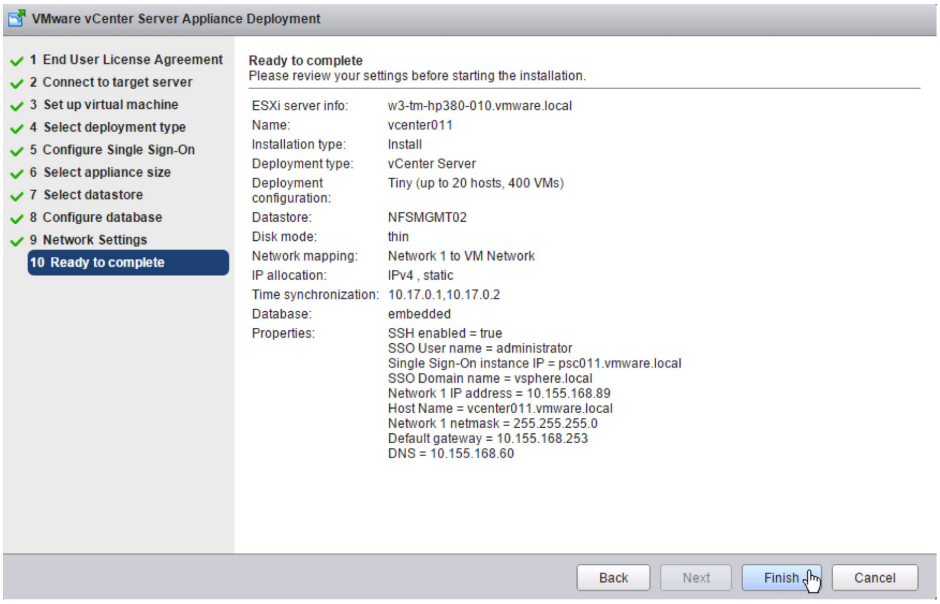


14. Enter **Network settings** and click **Next**.

NOTE: The FQDN or IP address entered here must be resolvable by the DNS server specified or the deployment will fail.

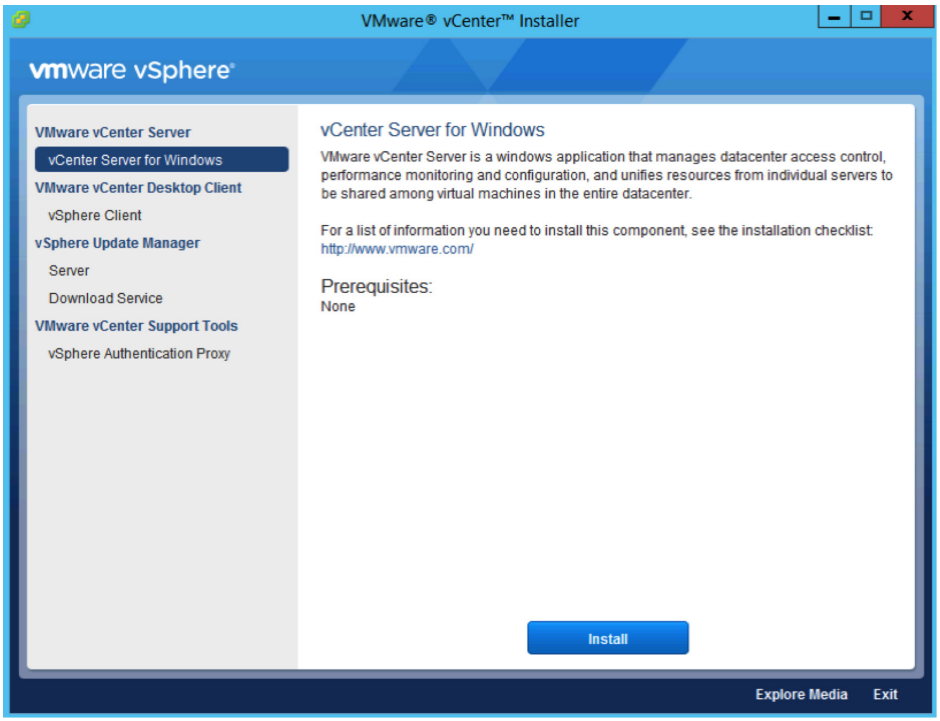


15. Review and click **Finish**.

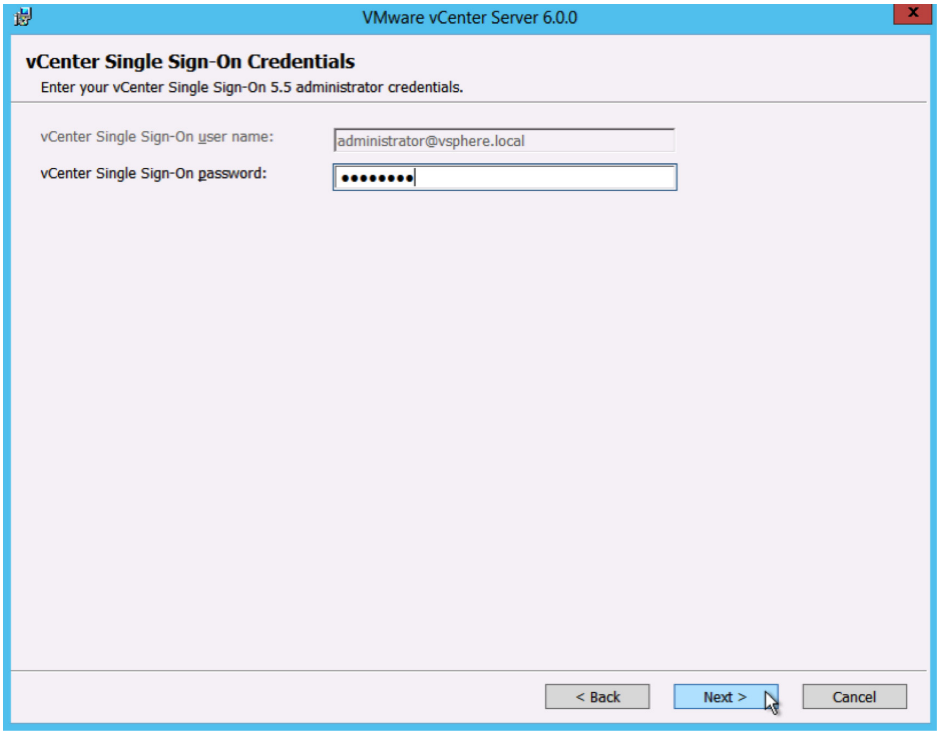


Upgrade External vCenter Single Sign-On

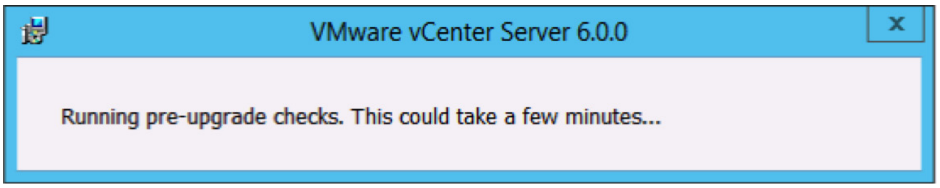
1. Back up the vCenter Single Sign-On and vCenter Server machines.
2. Log in to the vCenter Single Sign-On machine.
3. Mount the vCenter Server 6.0 ISO image.
4. If autorun does not start, execute autorun.exe.
5. Select **vCenter Server for Windows** and click **Install**.



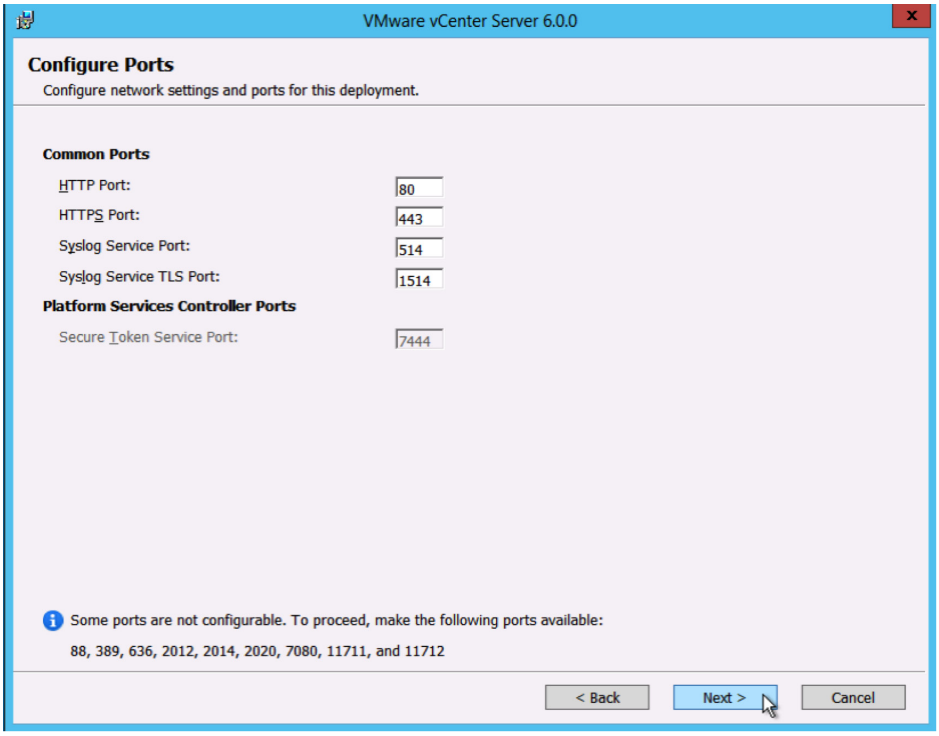
6. Click **Next**.
7. Accept the license agreements.
8. Enter the **vCenter Single Sign-On password** for the administrator@vsphere.local account. Click **Next**.



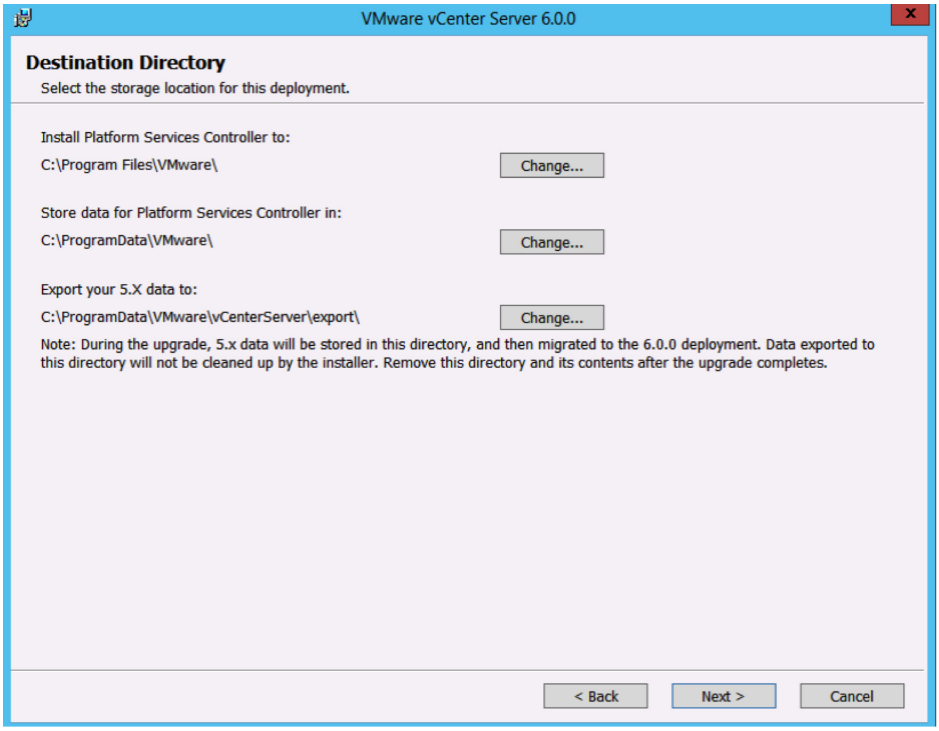
9. Wait for the **pre-upgrade checks** to complete.



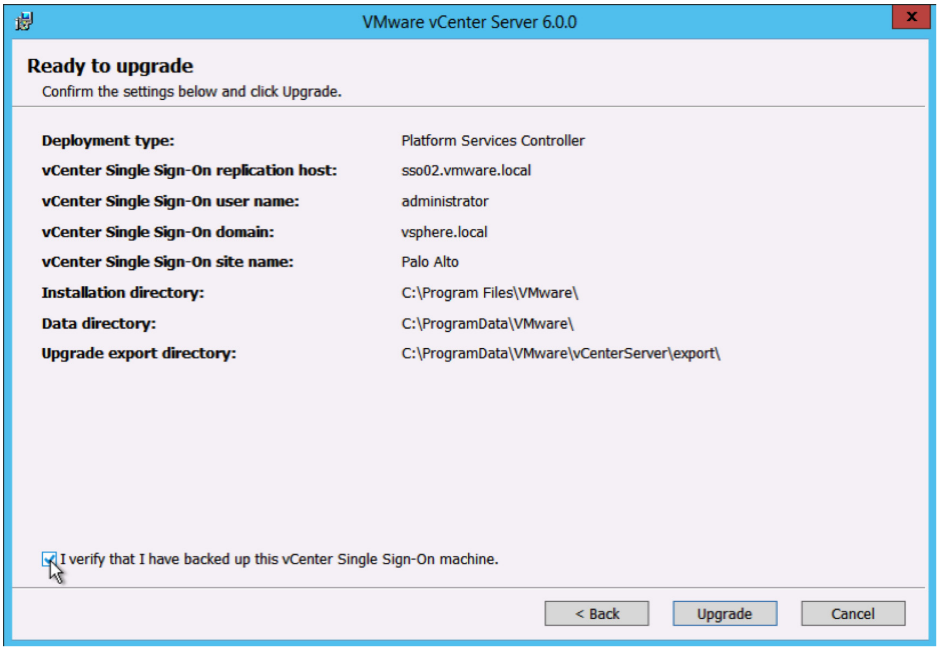
10. Accept the default ports and click **Next**.



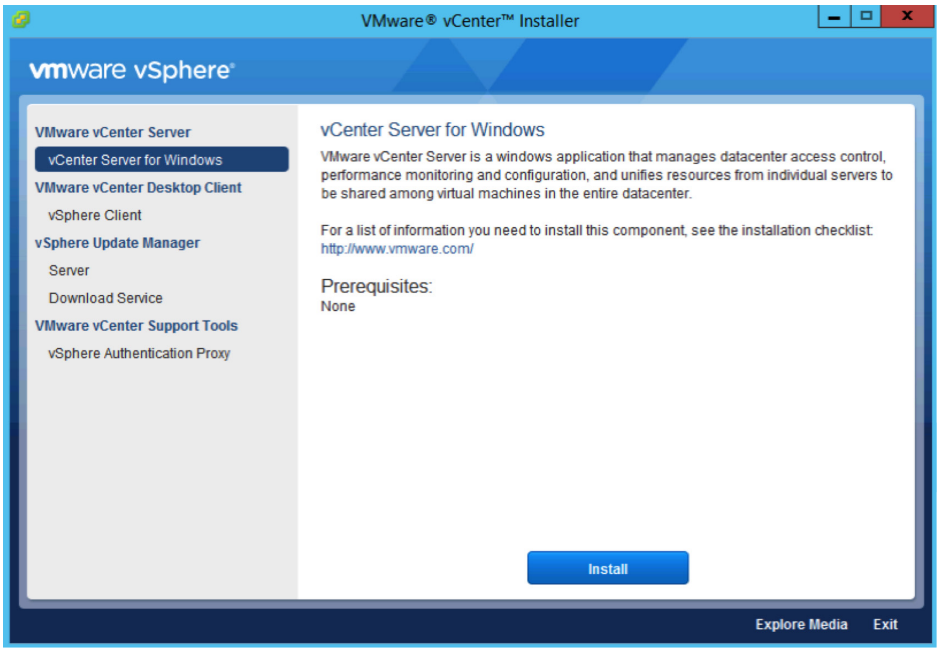
11. Select your installation path or take the defaults. Click **Next**.



12. Check **I verify that I have backed up this vCenter Single Sign-On machine**. Click **Upgrade**.

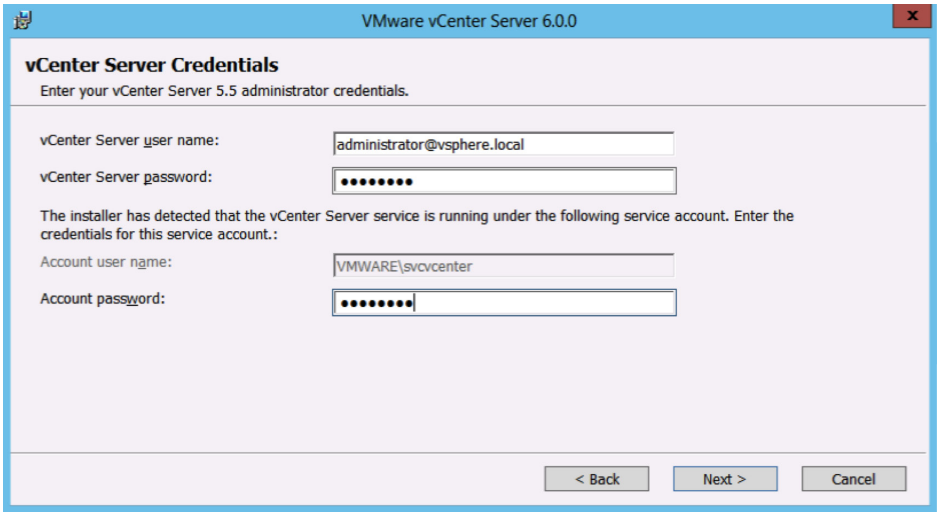


13. Click **Finish**.
14. Log in to the vCenter Server you want to upgrade.
15. Mount the vCenter Server 6.0 ISO image.
16. If autorun does not start, execute autorun.exe.
17. Select **vCenter Server for Windows** and click **Install**.

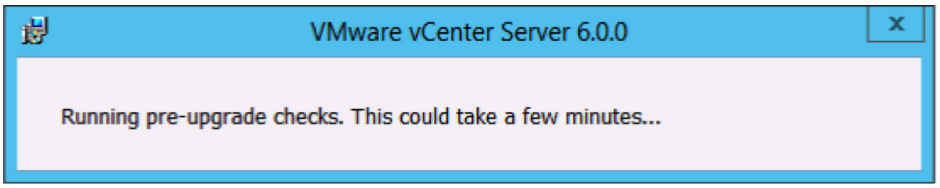


18. Click **Next**.
19. Accept the license agreements.

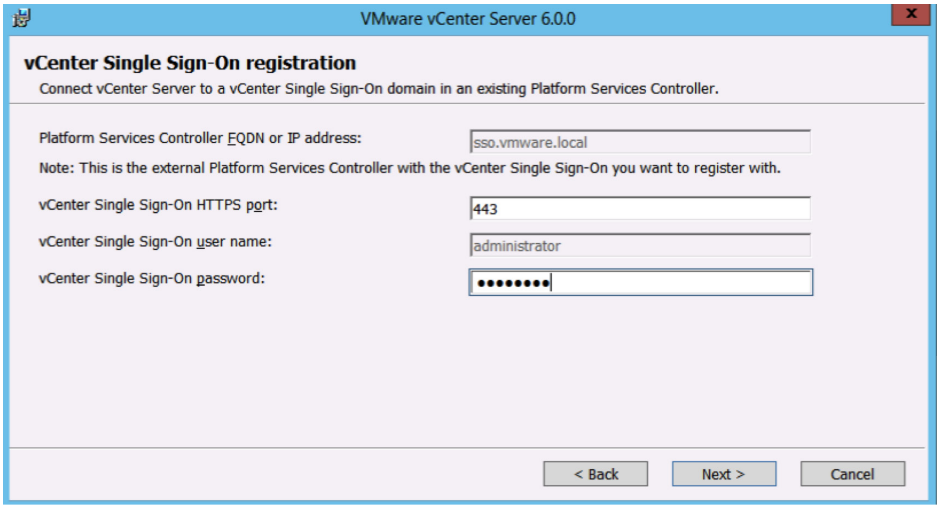
20. Enter the **vCenter Server password** for the administrator@vsphere.local account and the **Account password** for the service account (if applicable). Click **Next**.



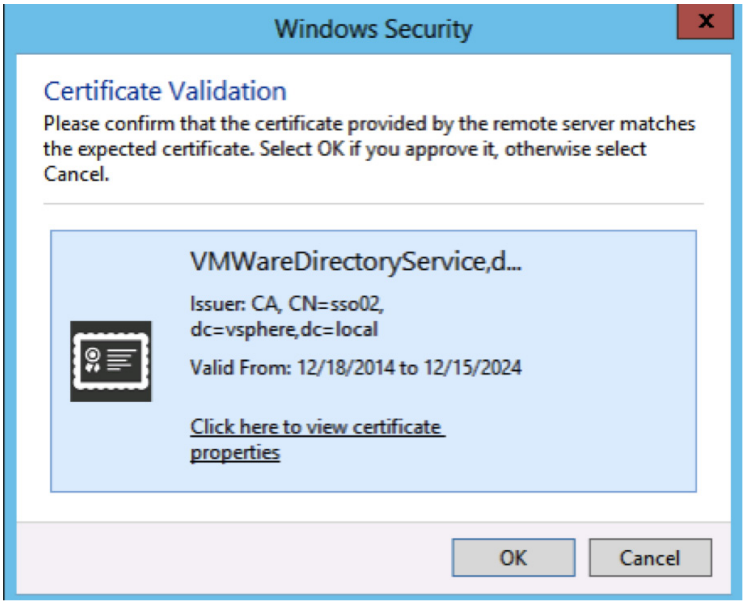
21. Wait for the **pre-upgrade checks** to complete.



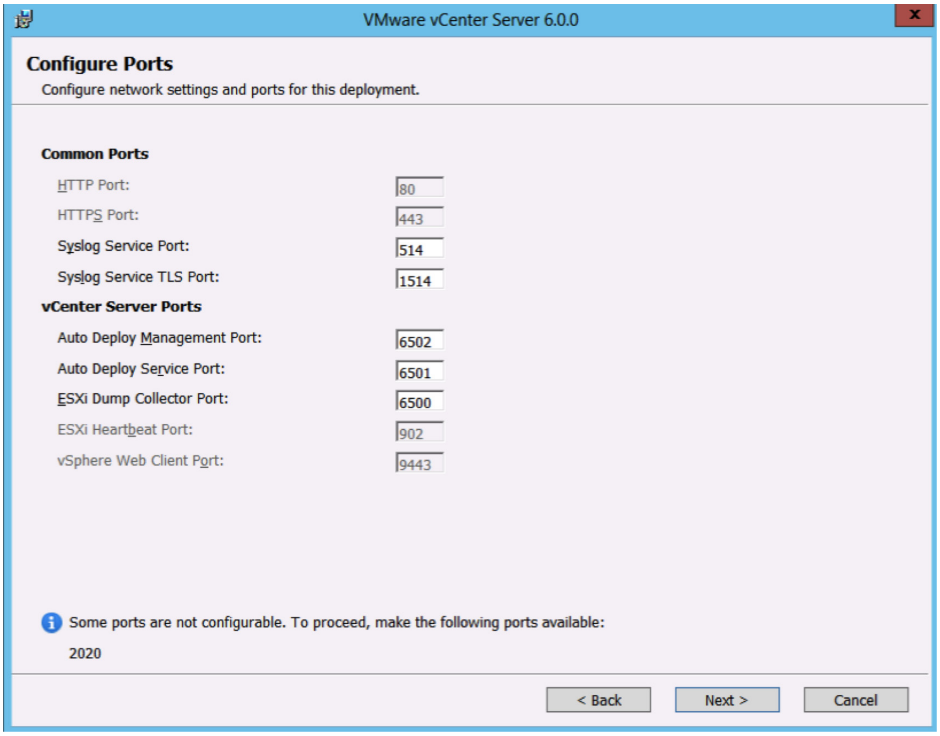
22. Enter the **vCenter Single Sign-On password** for the administrator@vsphere.local account. Click **Next**.



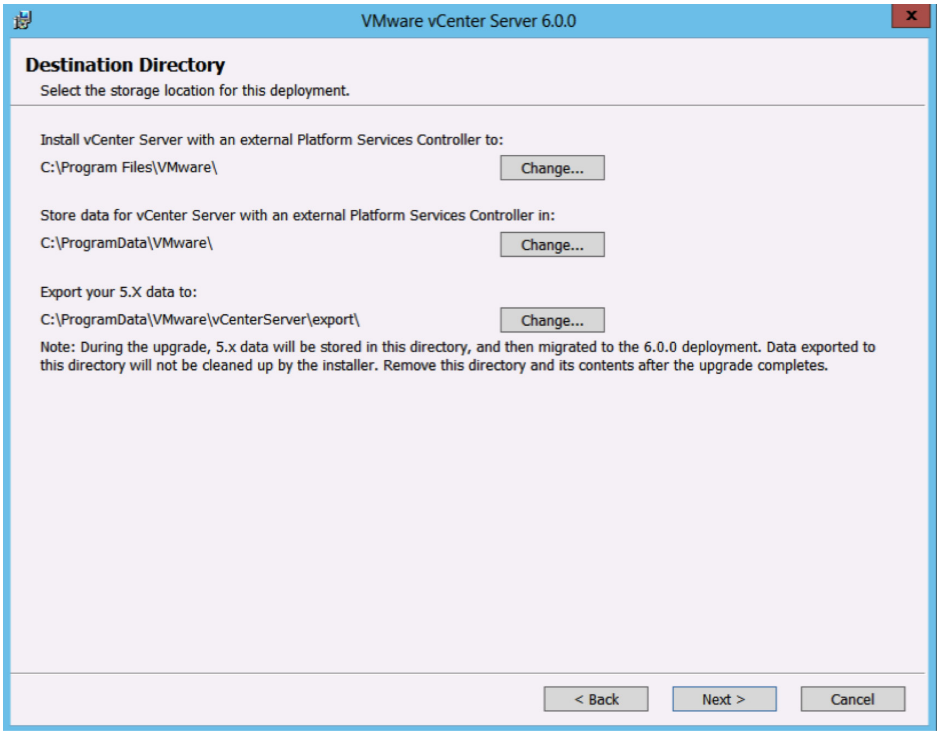
23. Click **OK** to accept the certificate.



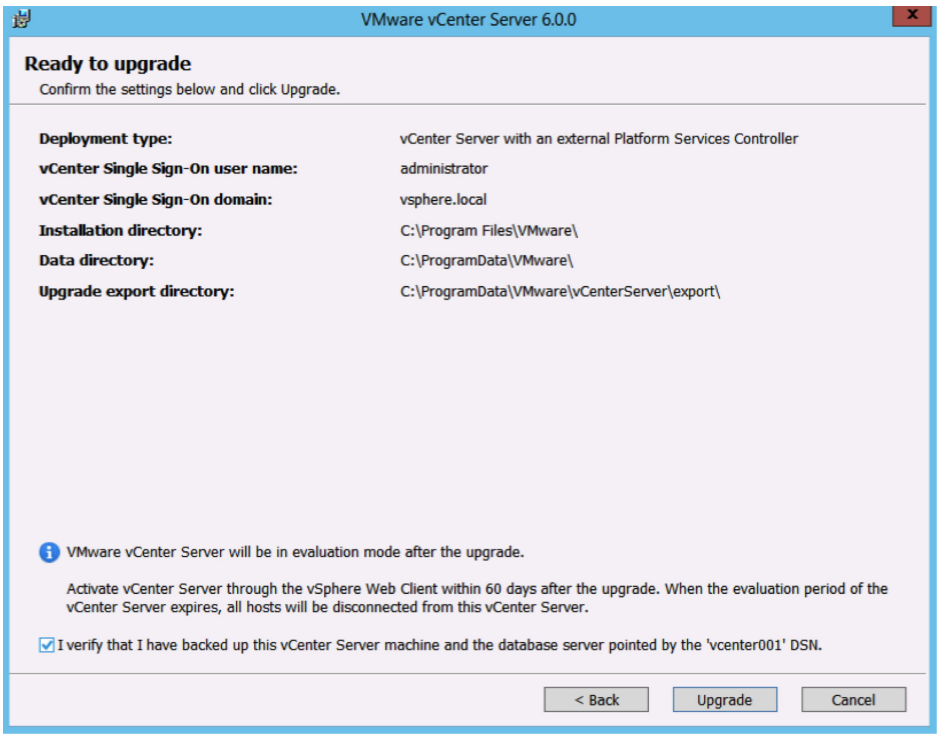
24. Accept the default ports and click **Next**.



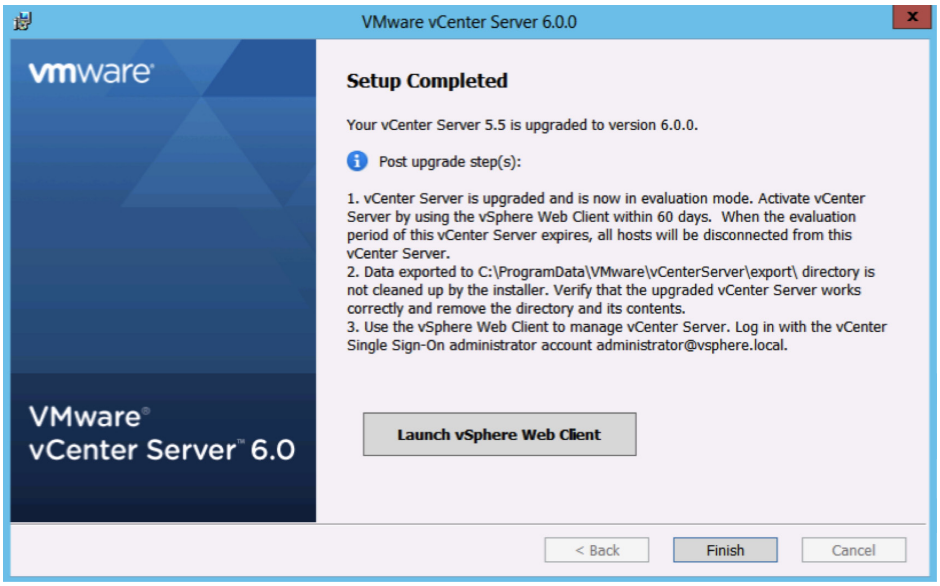
25. Accept or change the installation paths as necessary. Click **Next**.



26. Check the box to verify that you have backed up the vCenter Server and its database. Click **Upgrade**.



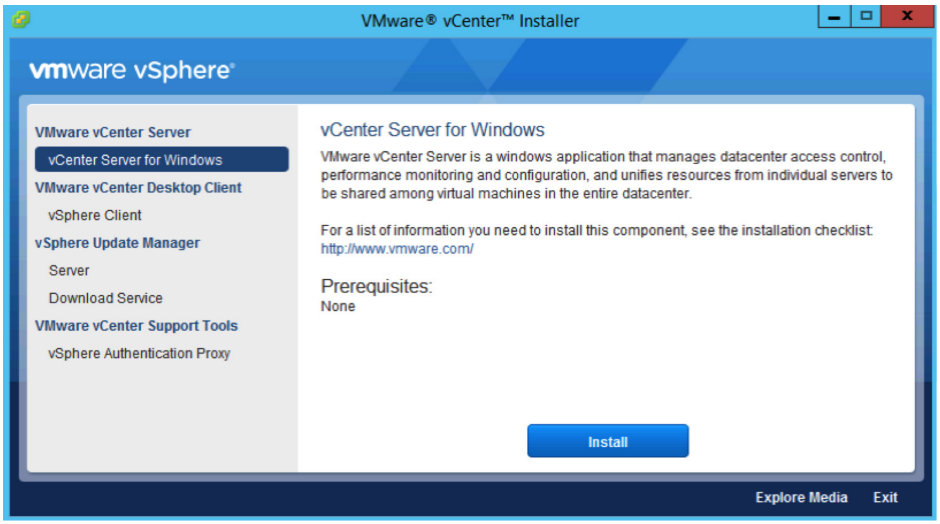
27. When completed, click **Finish**.



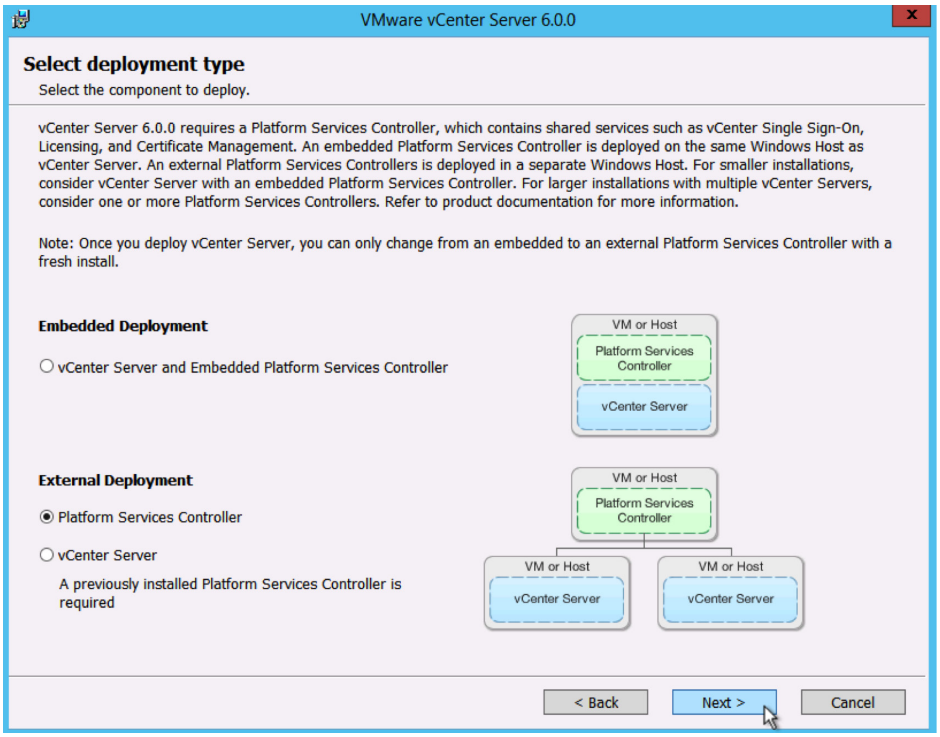
Fresh vCenter Single Sign-On High Availability Deployment

Windows Deployment

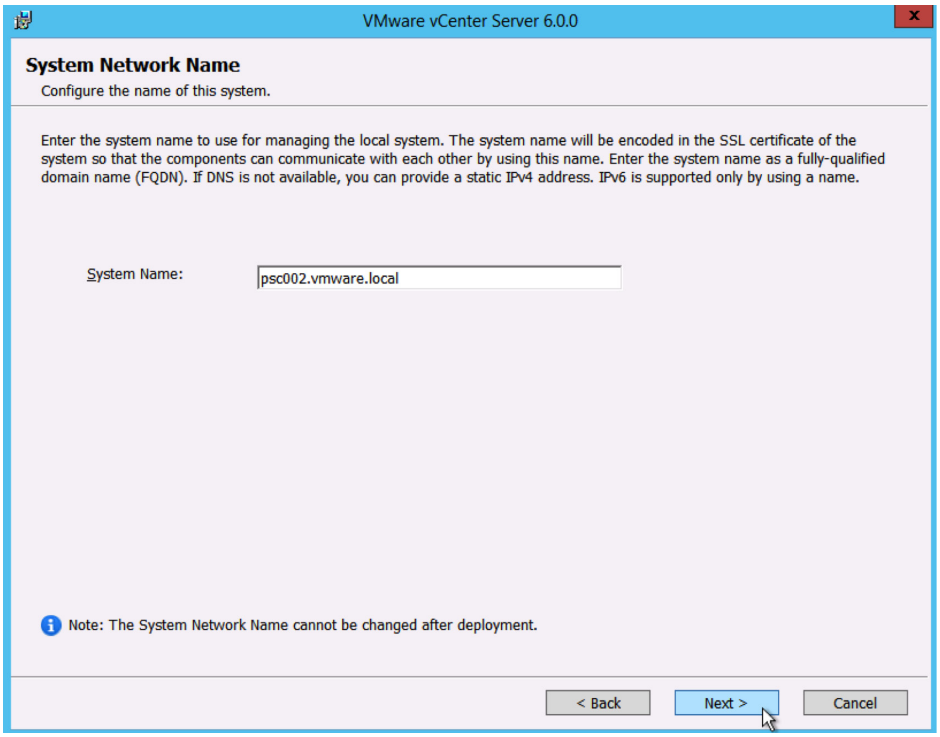
1. Complete steps 1–12 in the "Fresh External Platform Services Controller Deployment" section.
2. Log in to the second Windows Server to become a Platform Services Controller.
3. Mount the vCenter Server 6.0 ISO image.
4. If autorun does not start, execute autorun.exe.
5. Select **vCenter Server for Windows** and click **Install**.



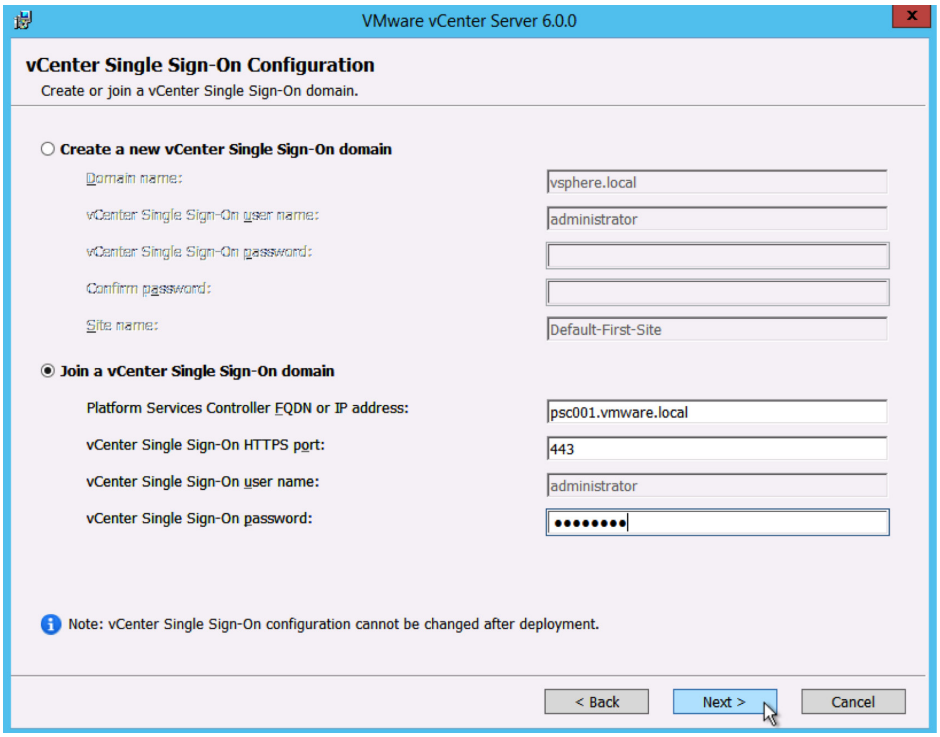
6. Click **Next**.
7. Accept the license agreements.
8. Under **External Deployment**, select **Platform Services Controller**. Click **Next**.



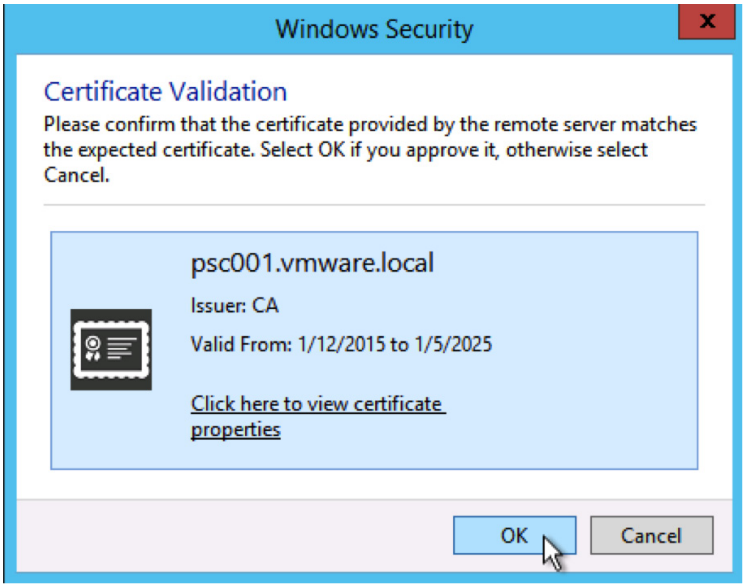
9. Verify the **System Name** and click **Next**.



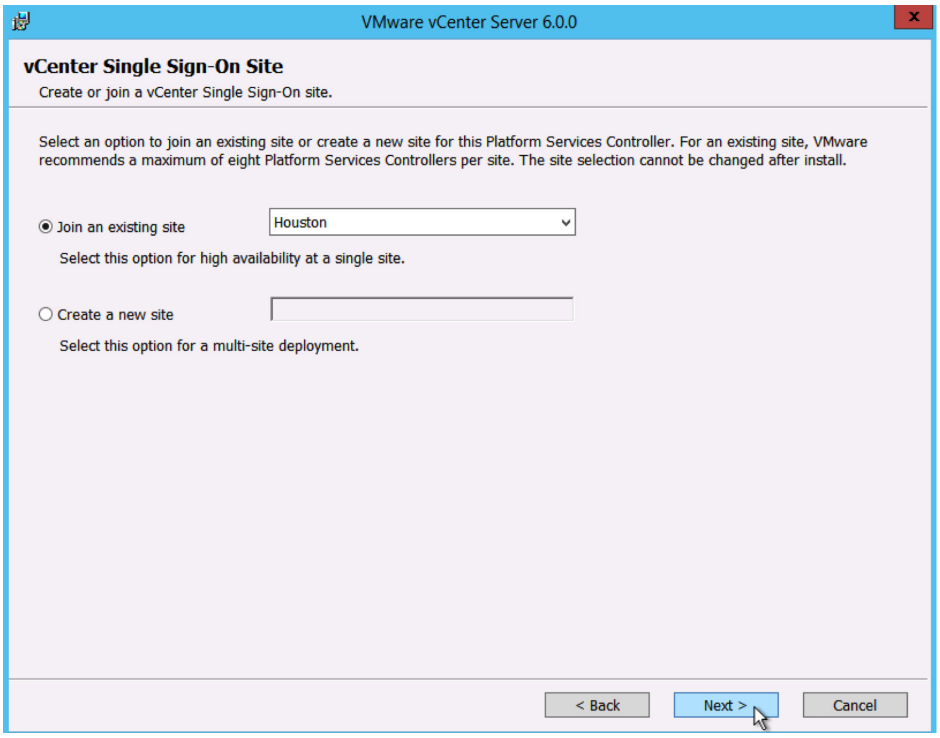
10. Select **Join a vCenter Single Sign-On domain** and enter the **FQDN** and **password**. Click **Next**.



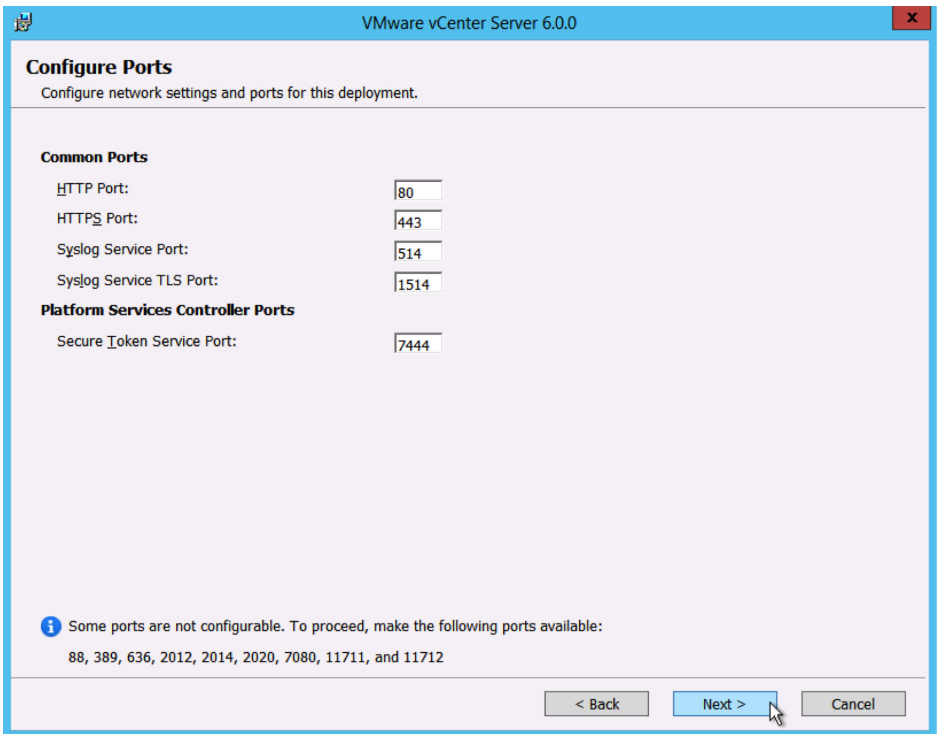
11. Click **OK** to accept the certificate from the Platform Services Controller.



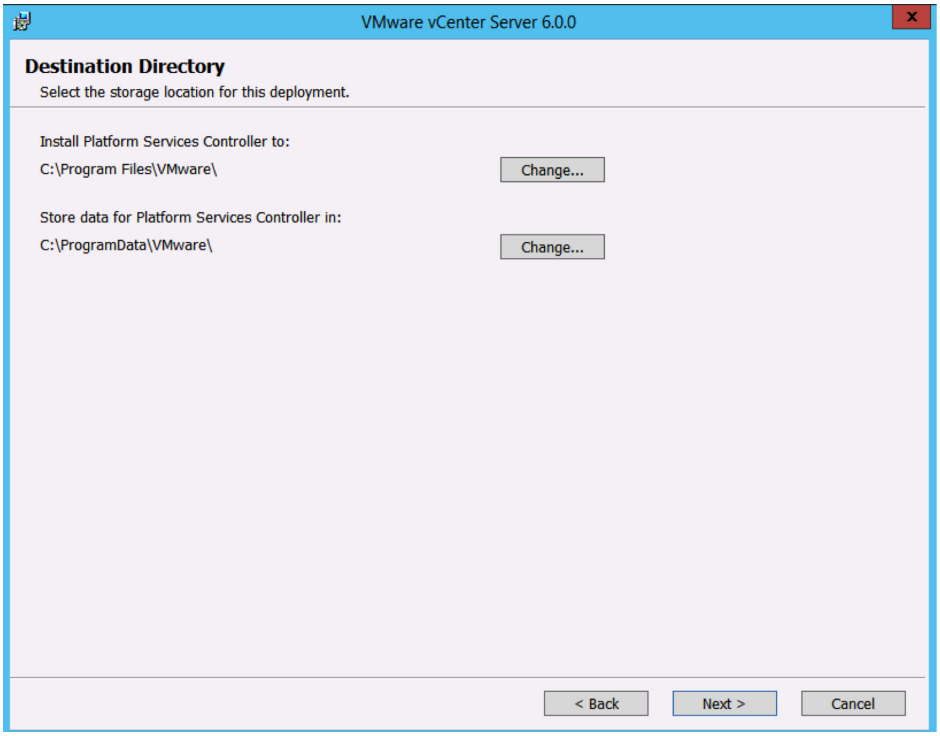
12. Select **Join an existing site** and enter the site. Click **Next**.



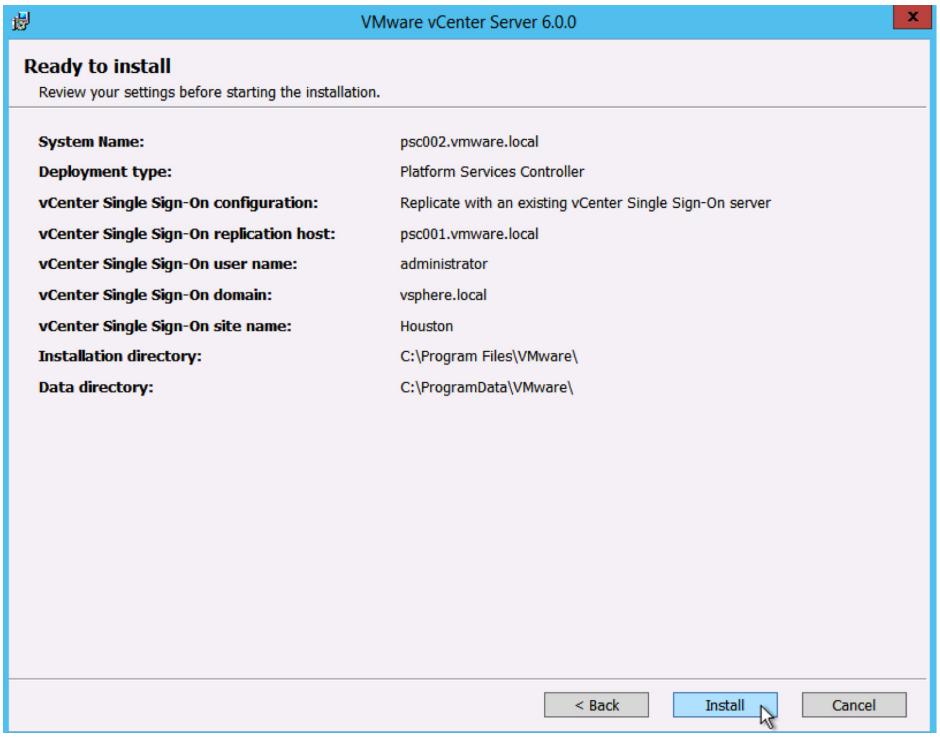
13. Accept the default ports and click **Next**.



14. Accept or change the installation paths as necessary. Click **Next**.

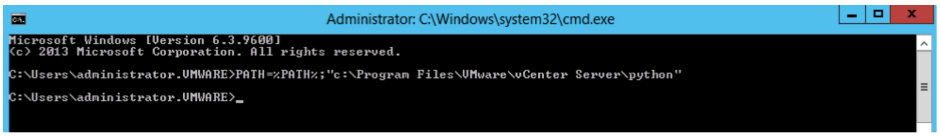


15. Review and click **Install**.



16. Log back in to the first Platform Services Controller.
17. Download the vCenter Single Sign-On high availability configuration scripts from the vCenter Server product download page.
18. Extract the vCenter Single Sign-On high availability scripts to c:\sso-ha.
19. Open a command prompt.
20. Add Python to your path by typing:

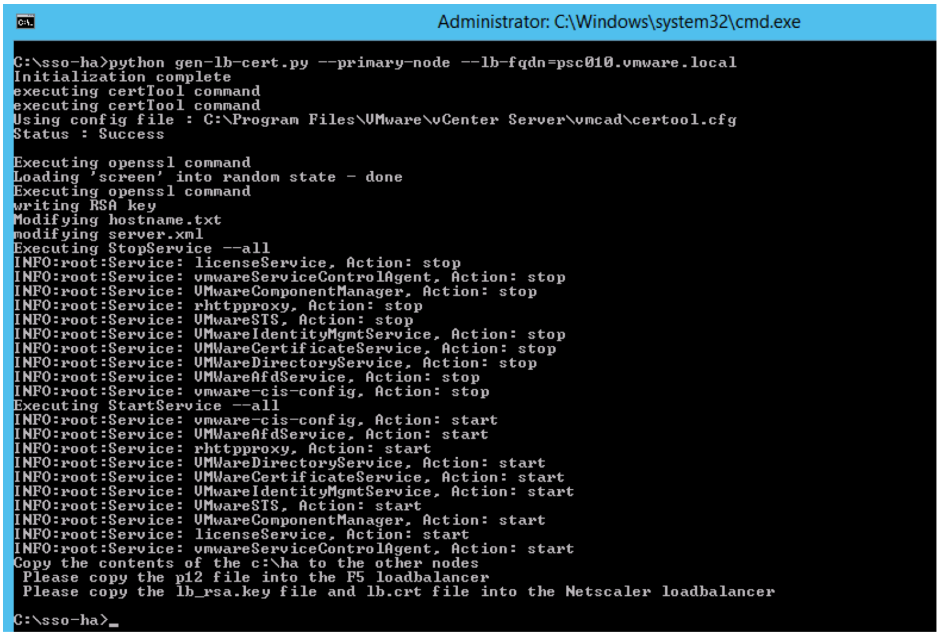
```
PATH=%PATH%;%VMWARE_PYTHON_HOME%
```



21. Change directories to c:\sso-ha.
22. Run:

```
python gen-lb-cert.py --primary-node --lb-fqdn=loadbalancerFQDN
```

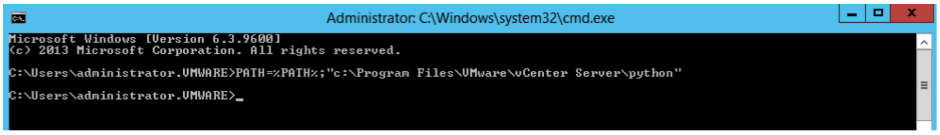
where *loadbalancerFQDN* is the FQDN of the load balancer's virtual IP (VIP) used for load-balancing the Platform Services Controllers.



23. Set up your load balancer to balance between the two or more Platform Services Controllers on ports 443, 2012, 2014, 2020, 389, and 636.
    a. An SSL certificate (generated earlier and stored in c:\ha) is required for port 443 only.
    b. For configuration steps for the F5 BIG-IP, see the appendix in this document.
24. Create a forward and reverse DNS entry for the VIP created to load balance the Platform Services Controller traffic.
25. Log in to the second Platform Services Controller.

26. Copy the sso-ha and ha folder from the first Platform Services Controller into the c: drive.
27. Copy C:\ProgramData\VMware\vCenterServer\cfg\sso\keys from the first Platform Services Controller to c:\ha\keys.
28. Open a command prompt.
29. Add Python to your path by typing:

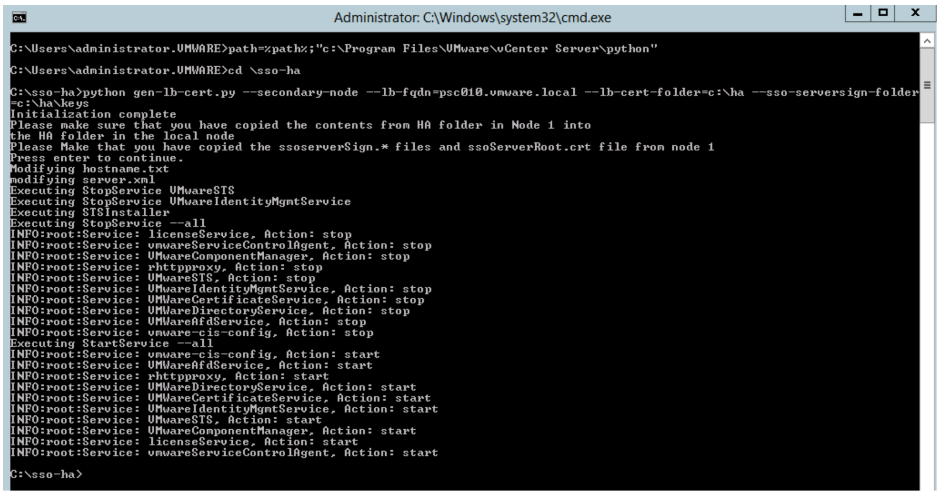
```
PATH=%PATH%;%VMWARE_PYTHON_HOME%
```



30. Change directories to c:\sso-ha.
31. Run:

```
python gen-lb-cert.py --secondary-node --lb-fqdn=loadbalancerFQDN --lb-cert-
folder=C:\ha --sso-serversign-folder=c:\ha\keys\
```

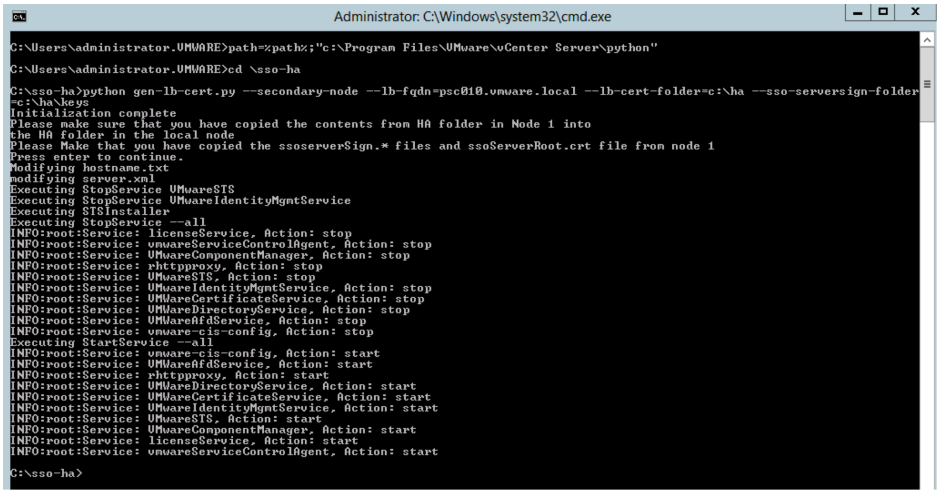
where *loadbalancerFQDN* is the FQDN of the load balancer's VIP used for load-balancing the Platform Services Controllers.



32. Repeat steps 26–32 for any additional Platform Services Controllers.
33. On one Platform Services Controller, update the endpoint URL by running:

```
python lstoolHA.py --hostname=FQDNofLocalMachine --lb-fqdn=loadbalancerFQDN --lb-cert-
folder=C:\ha --user=Administrator@SSODomain --password="password"
```

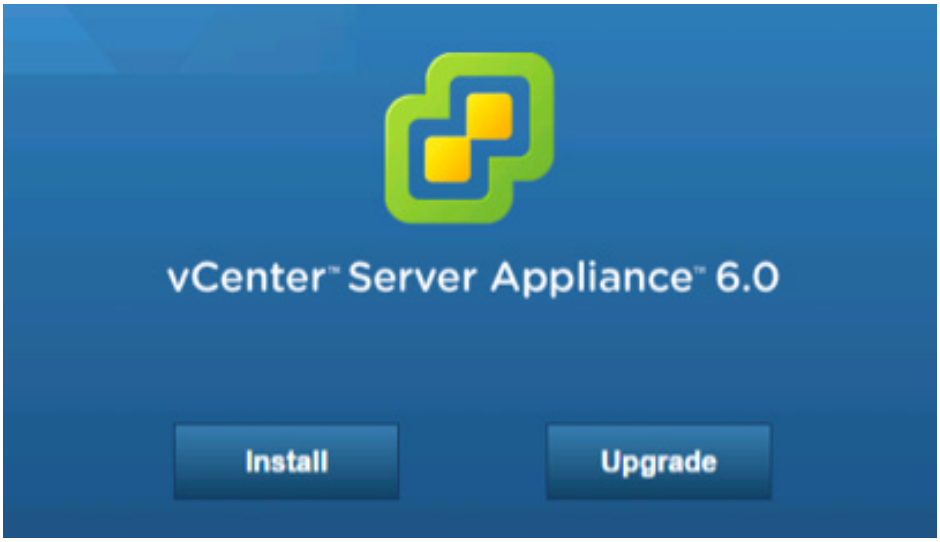
where *FQDNofLocalMachine* is the FQDN of the machine where the script is being run, *loadbalancerFQDN* is the FQDN of the load balancer's VIP used for load balancing the Platform Services Controllers, *SSODomain* is the vCenter Single Sign-On domain (by default vsphere.local), and *password* is the password for the vCenter Single Sign-On administrator. The password parameter is optional; if not specified, you will be prompted for it.



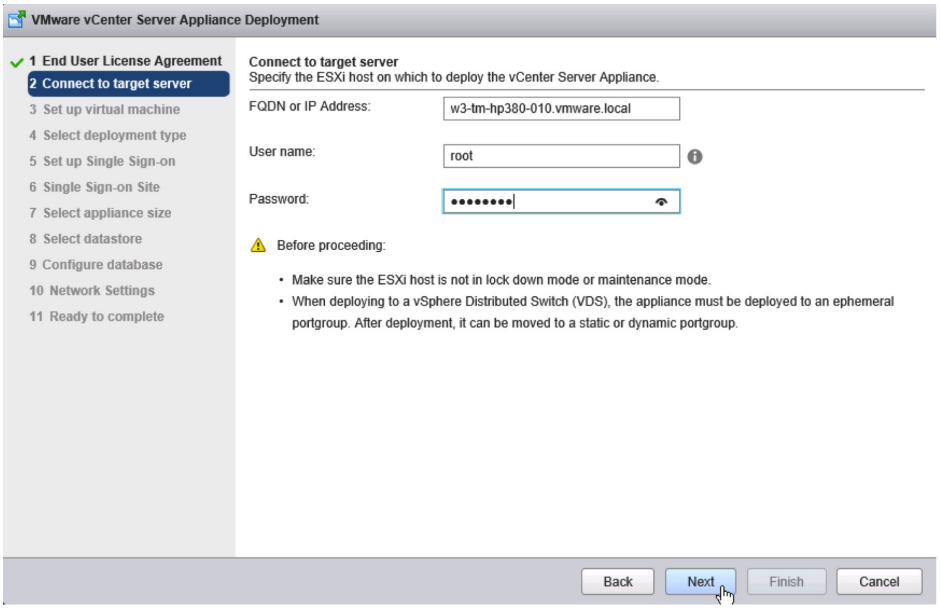
34. Follow the steps to install a new external vCenter Server. When asked for the Platform Services Controller, enter the FQDN of the load balancer's VIP.

vCenter Server Appliance Deployment

1. Complete steps 1–14 in the "Fresh External Platform Services Controller Deployment" section.
2. Click **Install** to start the installation for the second Platform Services Controller.

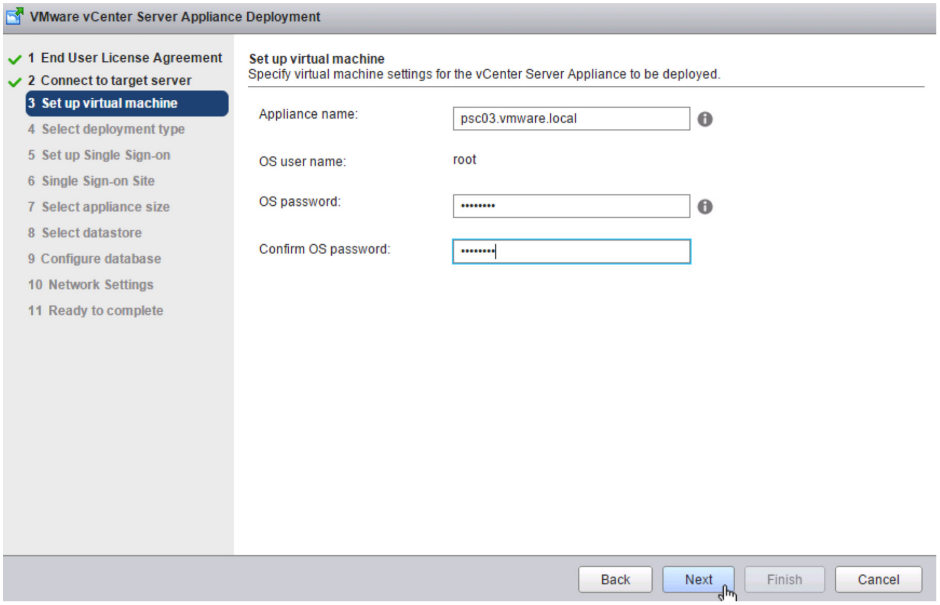


3. Accept the license agreement and click **Next**.
4. Enter a target host and a **User name** and **Password** on the host with root access.

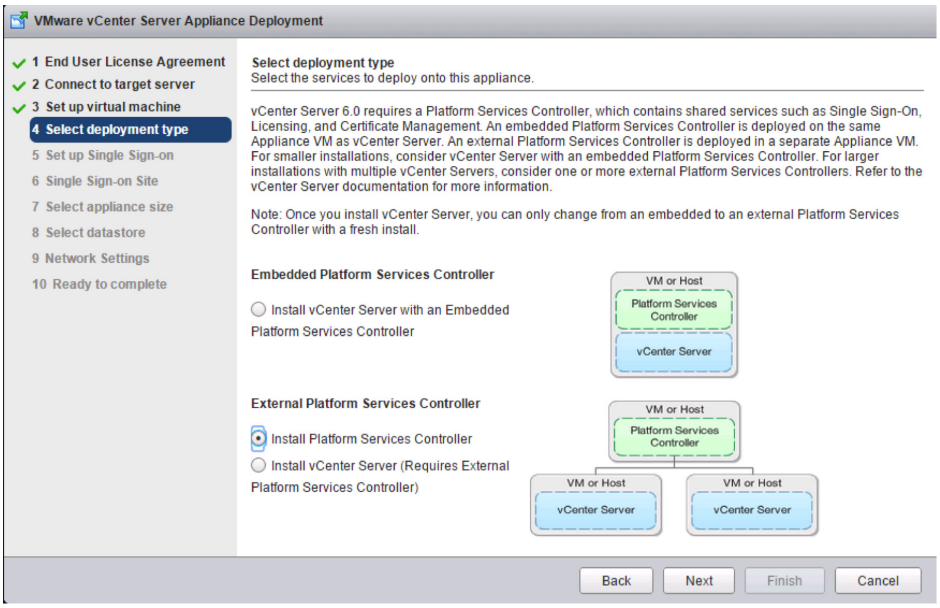


5. Click **Yes** to accept the host's certificate.

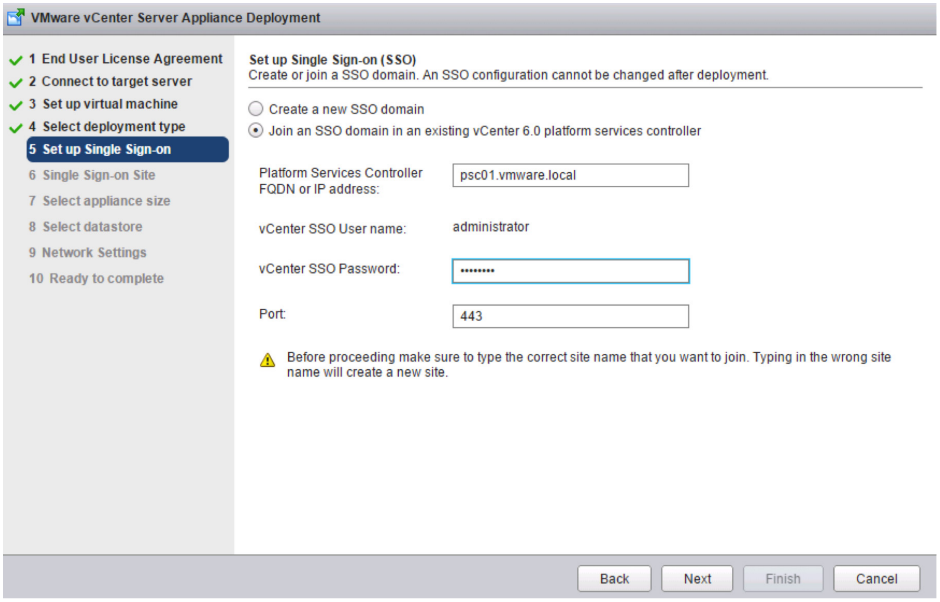
6. Enter an **Appliance name** and the root **password** you want to assign. Click **Next**.



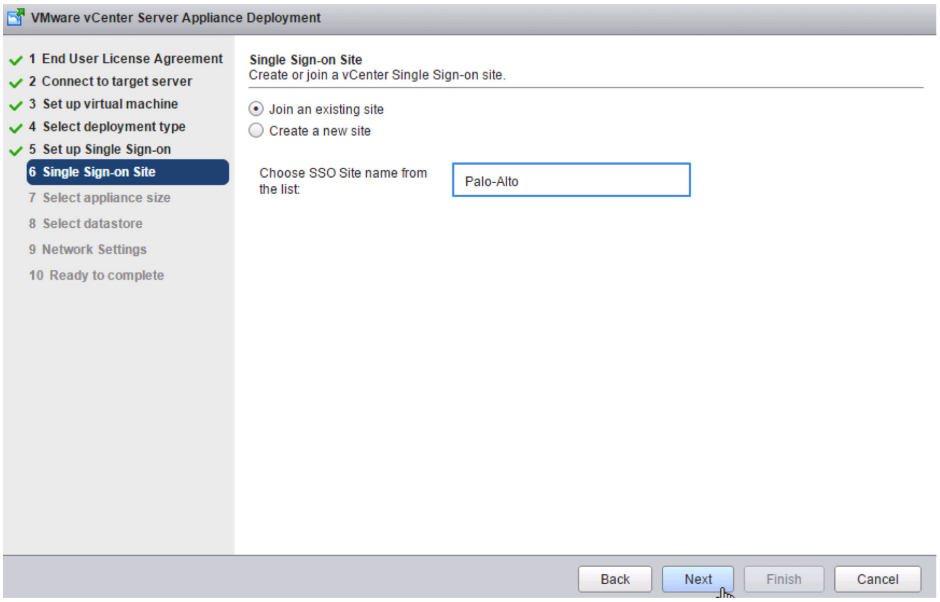
7. Under **External Platform Services Controller**, select **Install Platform Services Controller**. Click **Next**.



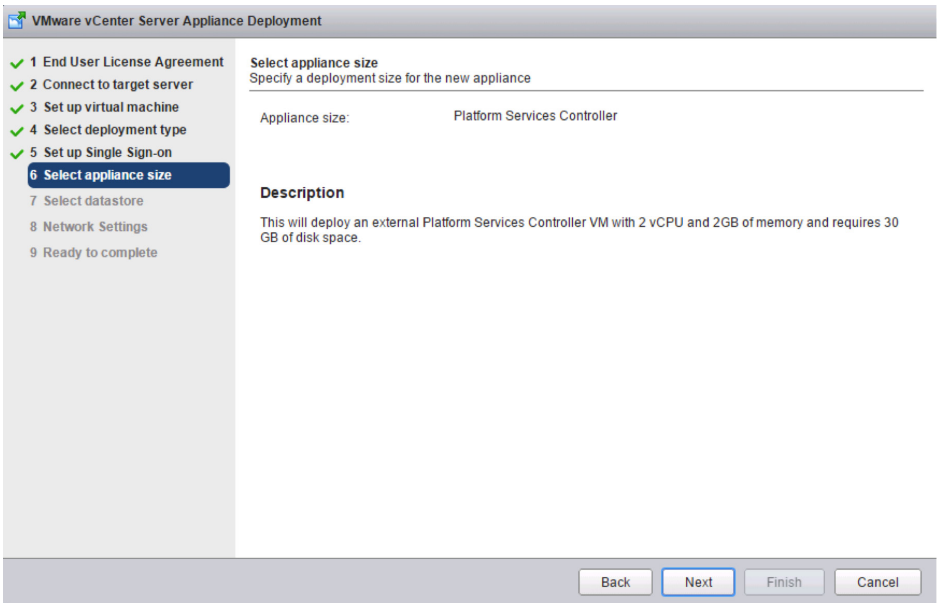
8. Select **Join an SSO domain** and enter the **FQDN** and password. Click **Next**.



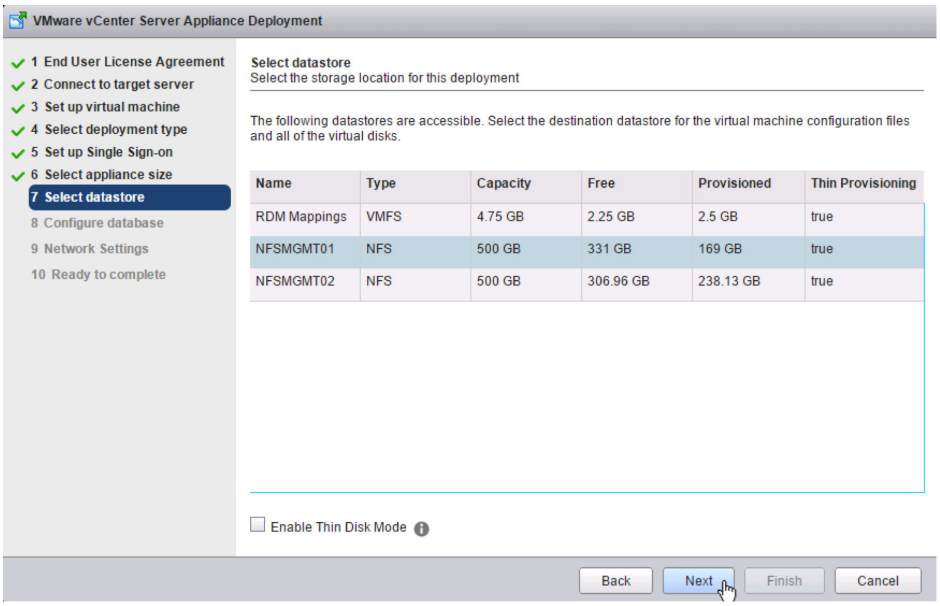
9. Select **Join an existing site**. Choose the site and click **Next**.



10. Click **Next**. There is only one appliance size for the Platform Services Controller.

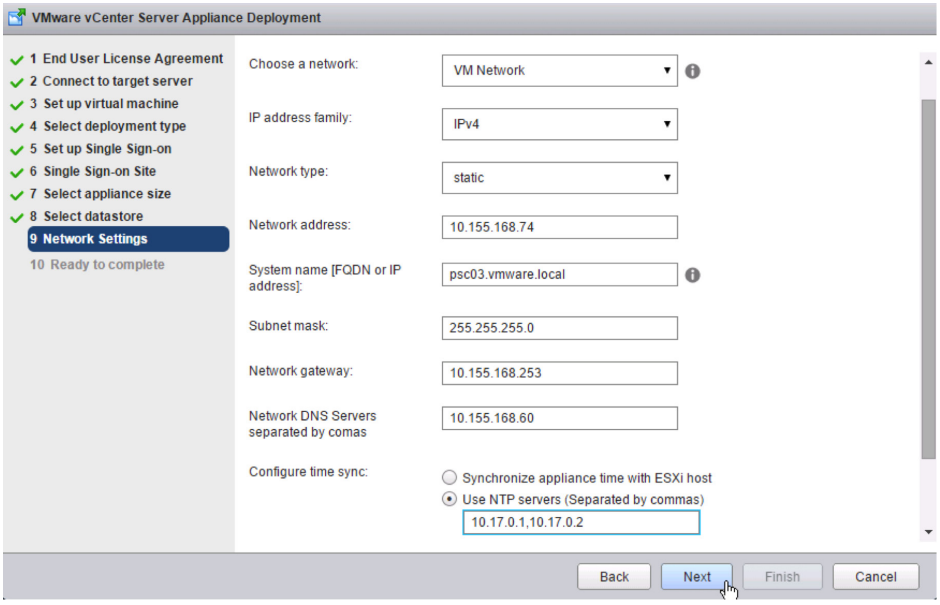


11. Select a datastore to deploy the appliance on and click **Next**.

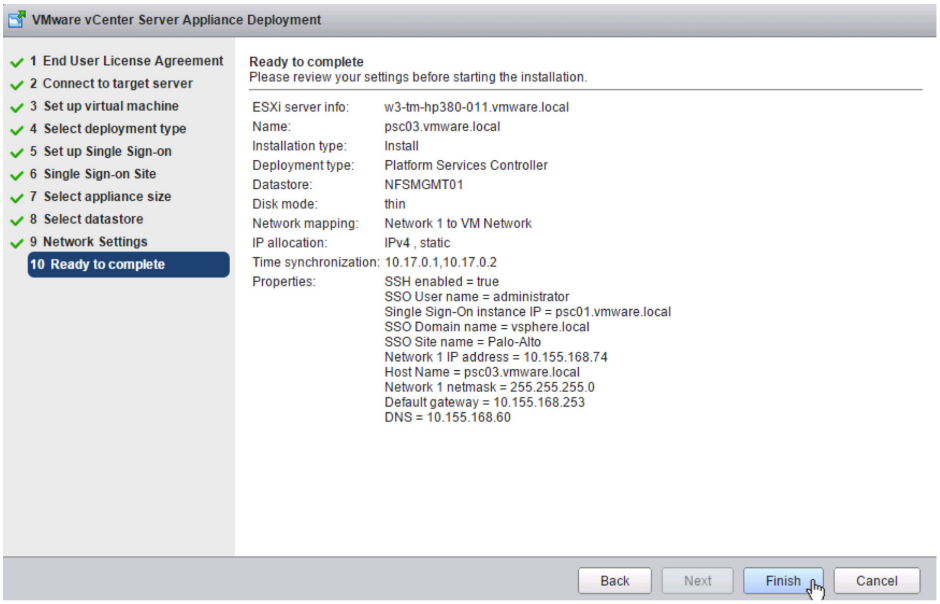


12. Enter **Network Settings** and click **Next**.

NOTE: The FQDN and IP addresses entered here must be resolvable by the DNS server specified or the deployment will fail.



13. Review and click **Finish**.



14. Connect to the first Platform Services Controller via SSH.
15. Type:

```
shell.set --enabled True
```

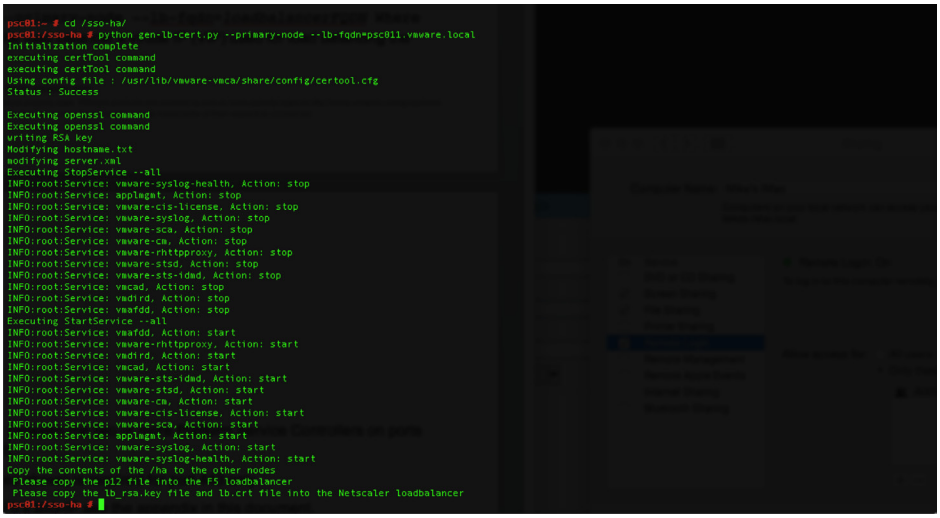
16. Type:

```
shell
```

17. Download the vCenter Single Sign-On high availability configuration scripts from the vCenter Server product download page.
18. Extract the vCenter Single Sign-On high availability scripts to /sso-ha.
19. Change directories to /sso-ha.
20. Run:

```
python gen-lb-cert.py --primary-node --lb-fqdn=loadbalancerFQDN
```

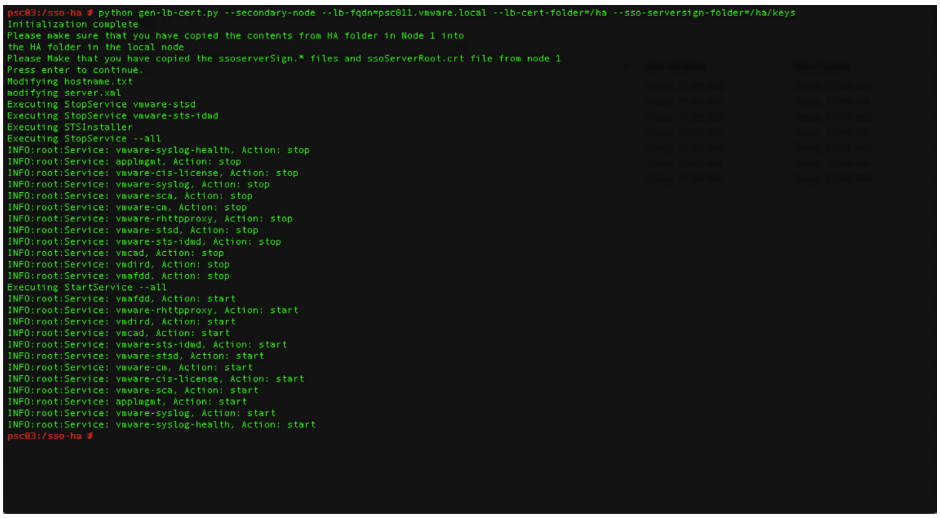
where *loadbalancerFQDN* is the FQDN of the load balancer's VIP used for load-balancing the Platform Services Controllers.



21. Set up your load balancer to balance between the two or more Platform Services Controllers on ports 443, 2012, 2014, 2020, 389, and 636.
    a. An SSL certificate (generated earlier) is required for port 443 only.
    b. For configuration steps for the F5 BIG-IP, see the appendix in this document.
22. Create a forward and reverse DNS entry for the VIP created to load-balance the Platform Services Controller traffic.
23. Connect to the second Platform Services Controller via SSH.
24. Copy the /sso-ha and /ha folder from the first Platform Services Controller.
25. Copy /etc/vmware-sso/keys/ from the first Platform Services Controller to /ha/keys.
26. Change directories to /sso-ha.
27. Run:

```
python gen-lb-cert.py --secondary-node --lb-fqdn=loadbalancerFQDN --lb-cert-folder=/ha
--sso-serversign-folder=/ha/keys
```

where *loadbalancerFQDN* is the FQDN of the load balancer's VIP used for load-balancing the Platform Services Controllers.

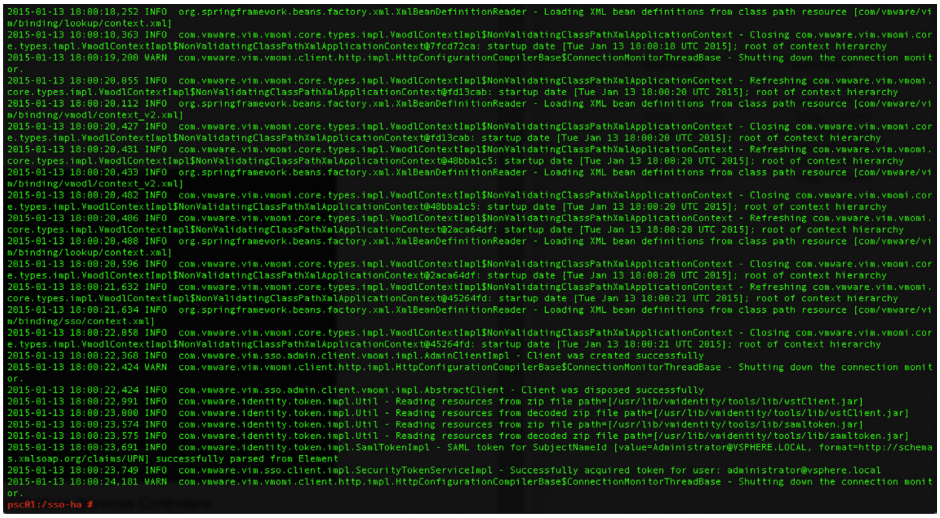


28. Repeat steps 24–28 for any additional Platform Services Controllers.

29. On one Platform Services Controller, update the endpoint URL by running:

```
python lstoolHA.py --hostname=FQDNofLocalMachine --lb-fqdn=loadbalancerFQDN --lb-cert-folder=/ha --user=Administrator@SSODomain --password=password
```

    where *FQDNofLocalMachine* is the FQDN of the machine where the script is being run, l*oadbalancerFQDN* is the FQDN of the load balancer's VIP used for load-balancing the Platform Services Controllers, *SSODomain* is the vCenter Single Sign-On domain (by default, vsphere.local), and *password* is the password for the vCenter Single Sign-On administrator. The password parameter is optional; if not specified, you will be prompted for it.

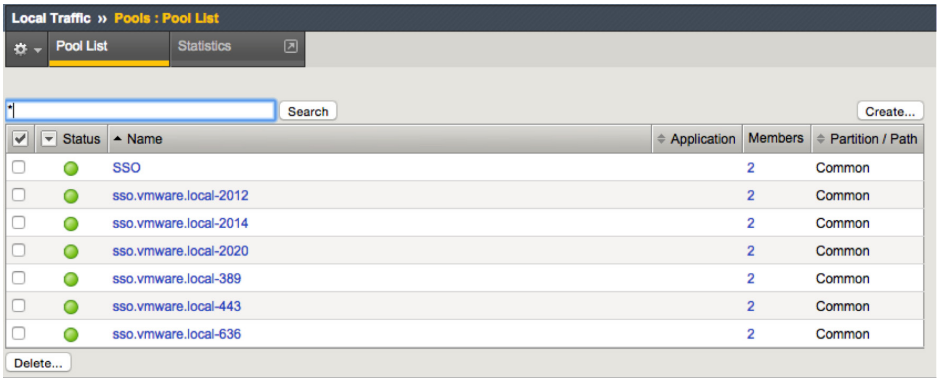


30. Follow the steps to install a new external vCenter Server. When asked for the Platform Services Controller, enter the FQDN of the load balancer VIP.

Upgrade of vCenter Single Sign-On High Availability

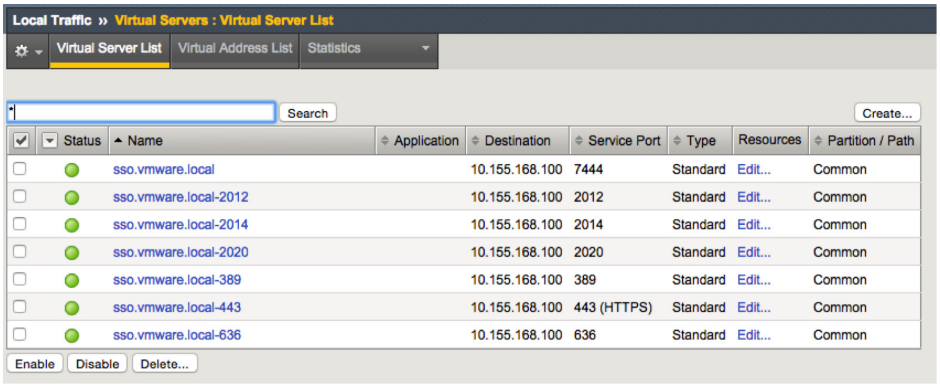
1. Back up all vCenter Single Sign-On machines.
2. Log in to the load balancer. In this example, we're using an F5 BIG-IP.
3. Create a pool for ports 443, 2012, 2014, 2020, 389, and 636. Set health monitors to use **TCP** and **Load Balancing Method** to **Round Robin**.

When complete, the **Pool List** should look like this:

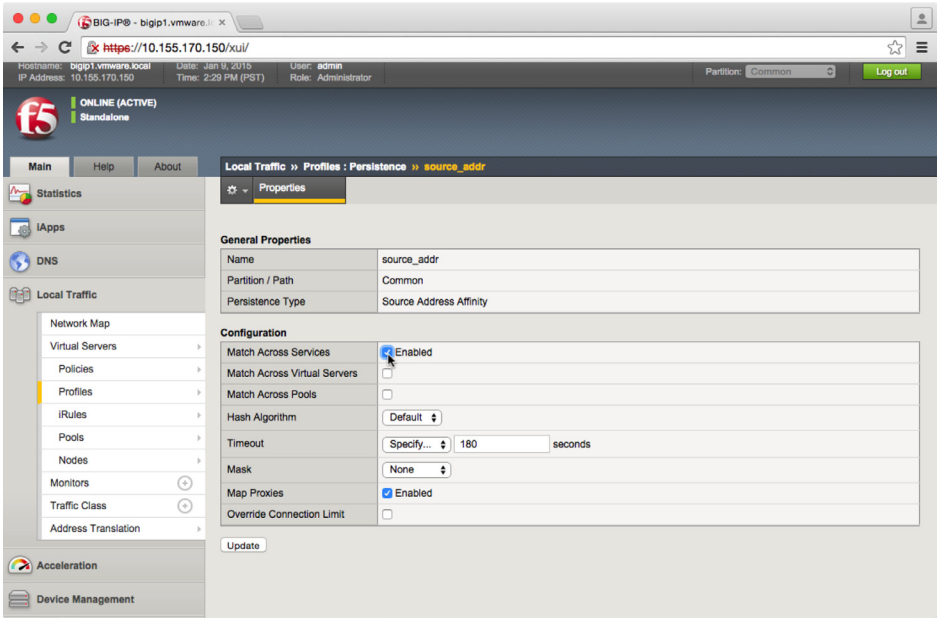


4. Create a virtual server using the same IP address as the original vCenter Single Sign-On high availability virtual server for each of the new pools. Use **TCP** for each virtual server. Set **Source Address Translation** to **Auto Map** and **Default Persistence Profile to Source Address**. Assign the client and server SSL profiles created when setting up vCenter Single Sign-On high availability for vCenter Server 5.5 to port 443 only. No other port requires a client or server SSL profile.

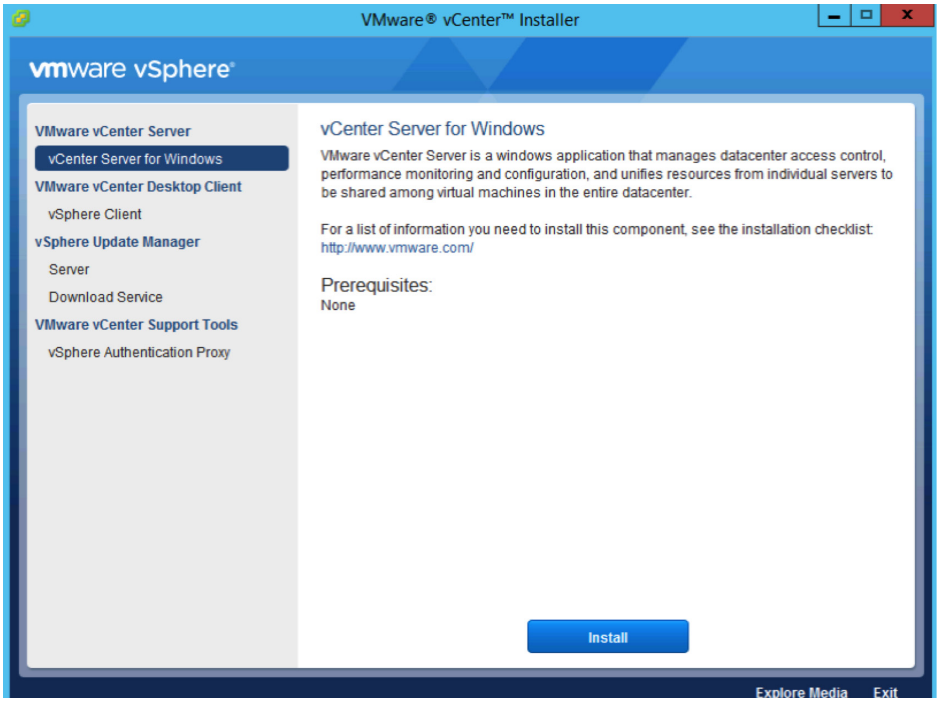
When complete, the **Virtual Server List** should look like this:



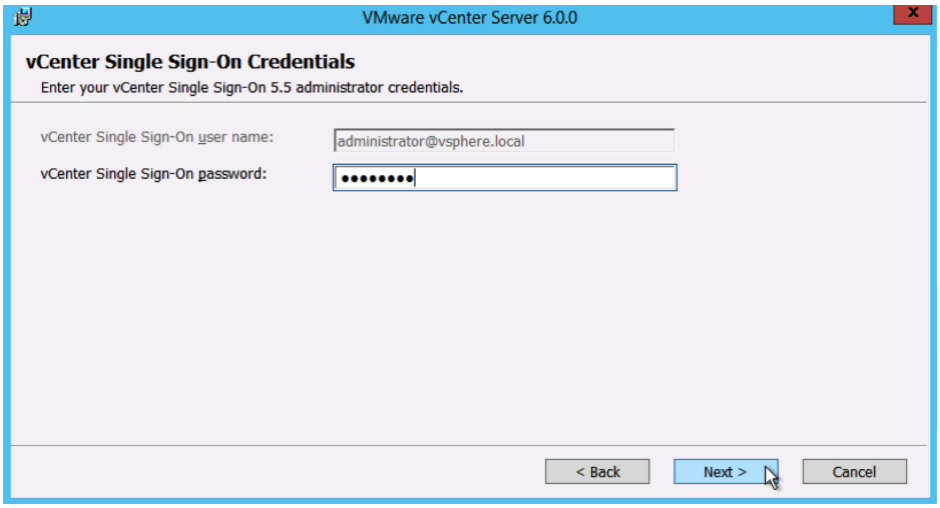
5. Edit the **source_addr Persistence Policy** and check the **Match Across Services** box.



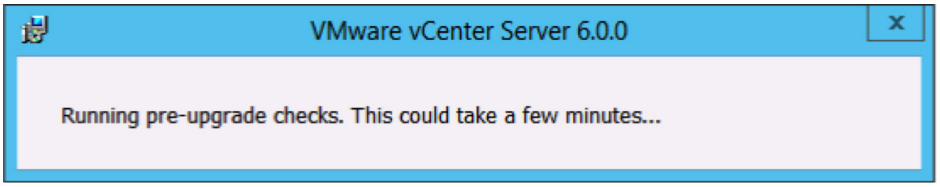
6. Log in to one of the vCenter Single Sign-On machines in your high availability configuration.
7. Mount the vCenter Server 6.0 ISO image.
8. If autorun doesn't start, execute autorun.exe.
9. Select **vCenter Server for Windows** and click **Install**.



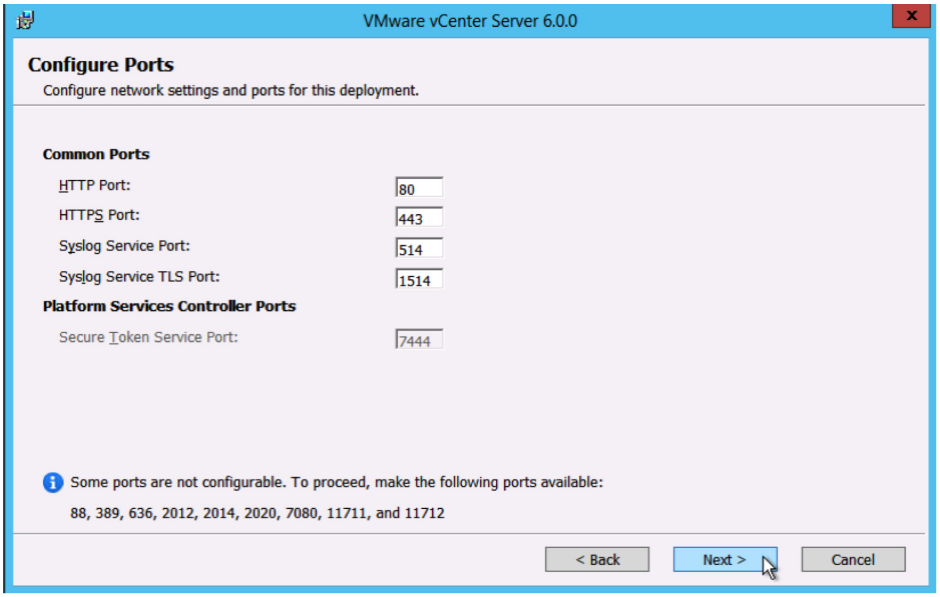
10. Click **Next**.
11. Accept the license agreements.
12. Enter the **password** for the administrator@vsphere.local account and click **Next**.



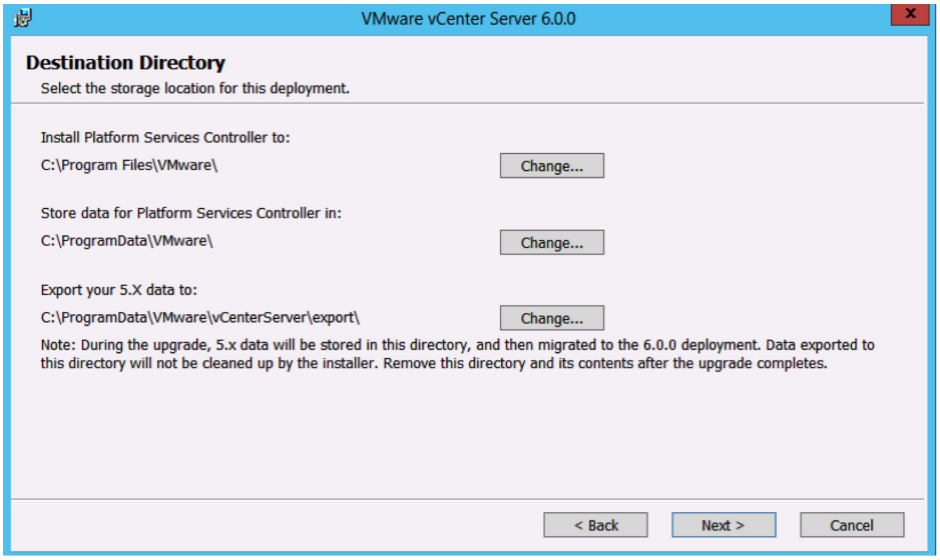
13. Wait for the **pre-upgrade checks** to complete.



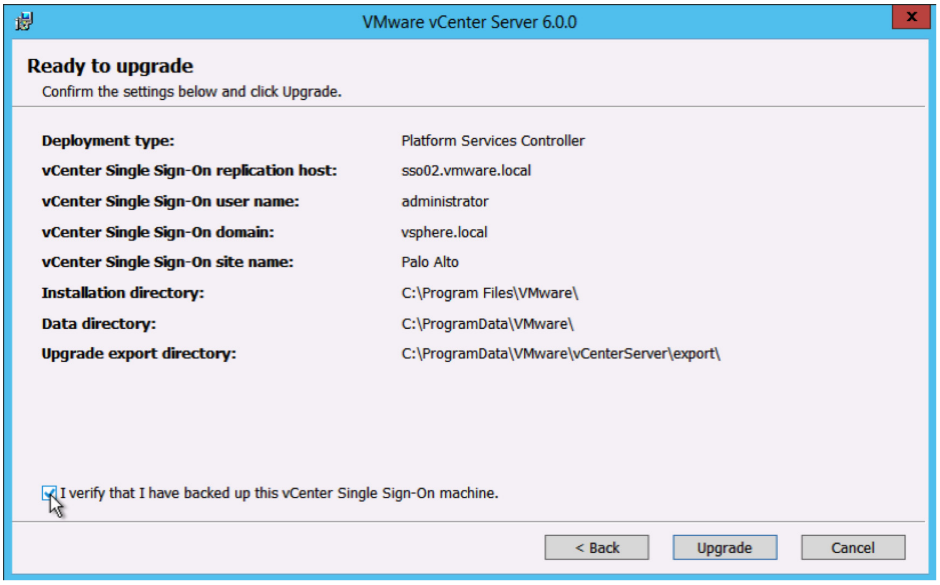
14. Review the ports and click **Next**.



15. Choose your installation path or take the defaults. Click **Next**.



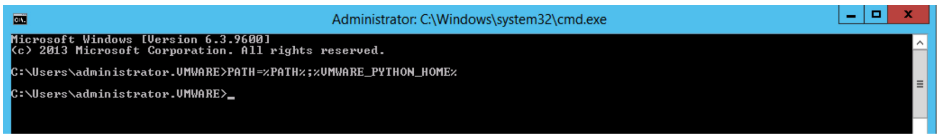
16. Check **I verify that I have backed up this vCenter Single Sign-On machine**. Click **Upgrade**.



17. Click **Finish**.
18. Repeat steps 6–17 on the remainder of the vCenter Single Sign-On machines.
19. Download the vCenter Single Sign-On high availability configuration scripts from the vCenter Server product download page.
20. Extract the vCenter Single Sign-On high availability scripts to c:\sso-ha.
21. Create a folder named HA in the root of c:\.
22. Copy rui.crt and rui.p12 from c:\certs\sso to c:\ha and Root64.cer from c:\certs to c:\ha.
23. Rename rui.crt to lb.crt, rui.p12 to lb.p12, and Root64.cer to root.cer.
24. Open a command prompt.

25. Add Python to your path by typing:

```
PATH=%PATH%;%VMWARE _ PYTHON _ HOME%
```

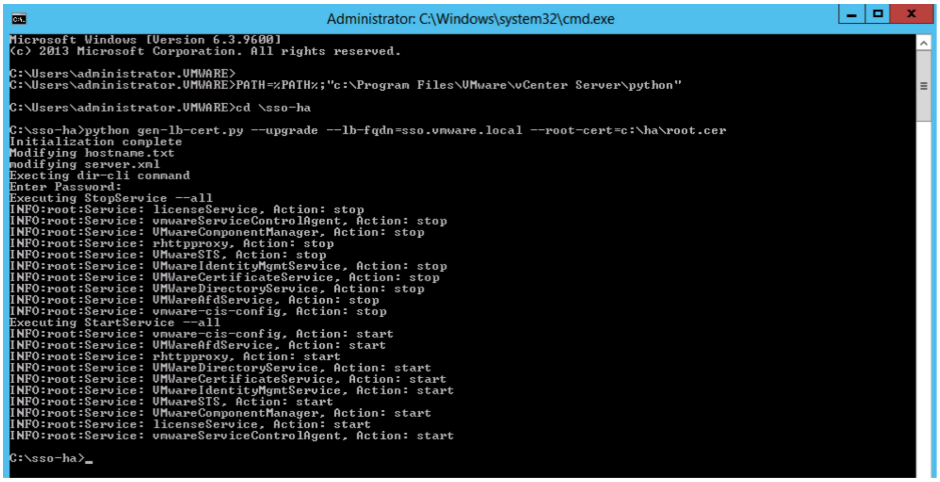


26. Change directories to c:\sso-ha.

27. Run:

```
python gen-lb-cert.py --upgrade --lb-fqdn=loadbalancerFQDN --root-cert=c:\ha\root.cer
```

where *loadbalancerFQDN* is the FQDN of the load balancer's VIP used for load-balancing vCenter Single Sign-On.



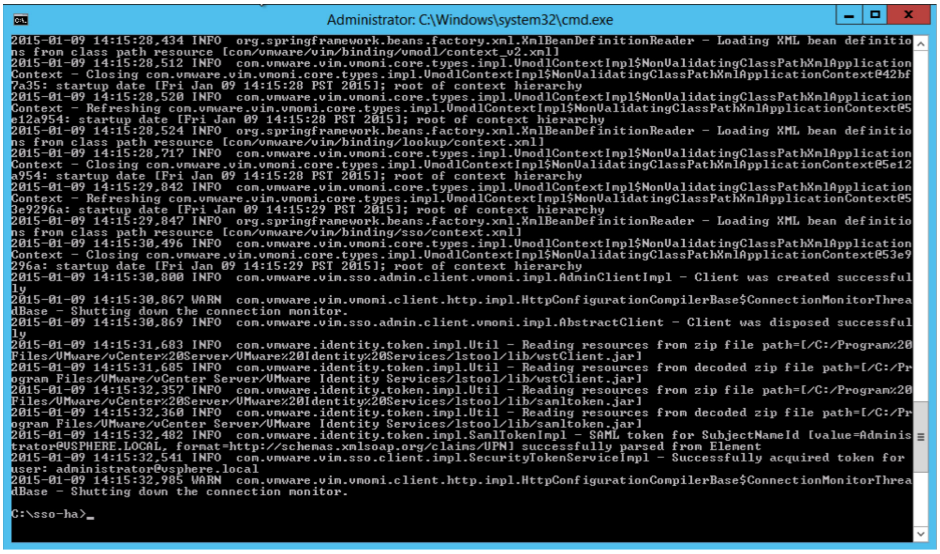
28. When prompted, enter the **password** for the administrator@vsphere.local account.

29. Repeat steps 19–28 on the remaining Platform Services Controllers.

30. On one Platform Services Controller in the site, run:

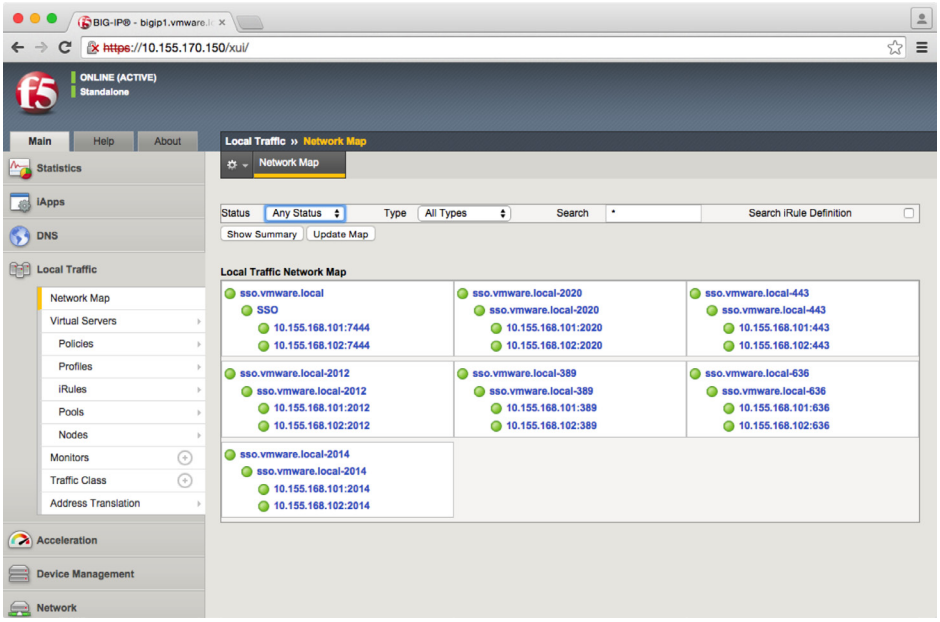
```
python lstoolHA.py --hostname=FQDNofLocalMachine --lb-fqdn=loadbalancerFQDN --lb-cert-folder=C:\ha --user=Administrator@vsphere.local --password="password"
```

where *FQDNofLocalMachine* is the FQDN of the Platform Services Controller the command is being run on, loadbalancerFQDN is the FQDN of the load balancer's VIP used for load-balancing vCenter Single Sign-On, and password is the password for the administrator@vsphere.local account. The password parameter is optional; if not specified, you'll be prompted for it.



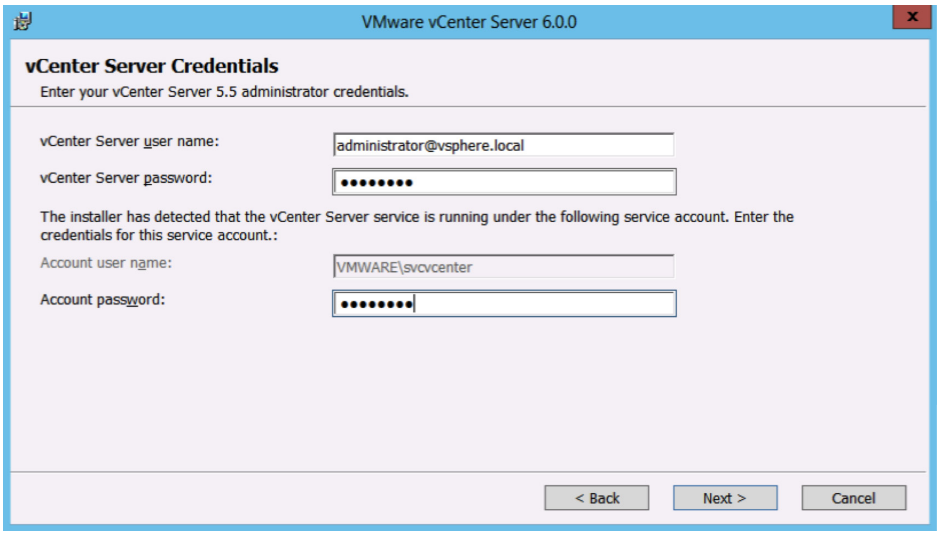
31. View the **Network Map** and verify that all services are up (green).

See "Appendix" for full configuration instructions for the F5 BIG-IP load balancer.

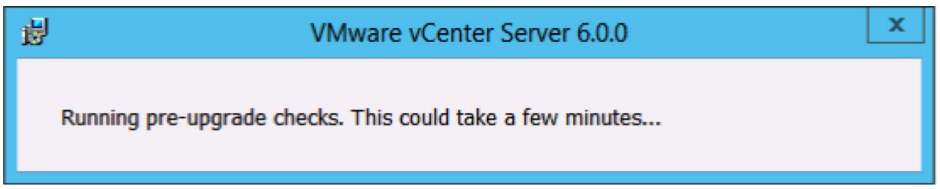


32. Log in to the vCenter Server you want to upgrade.
33. Mount the vCenter Server 6.0 ISO image.
34. If autorun doesn't start, execute autorun.exe.
35. Select **vCenter Server for Windows** and click **Install**.

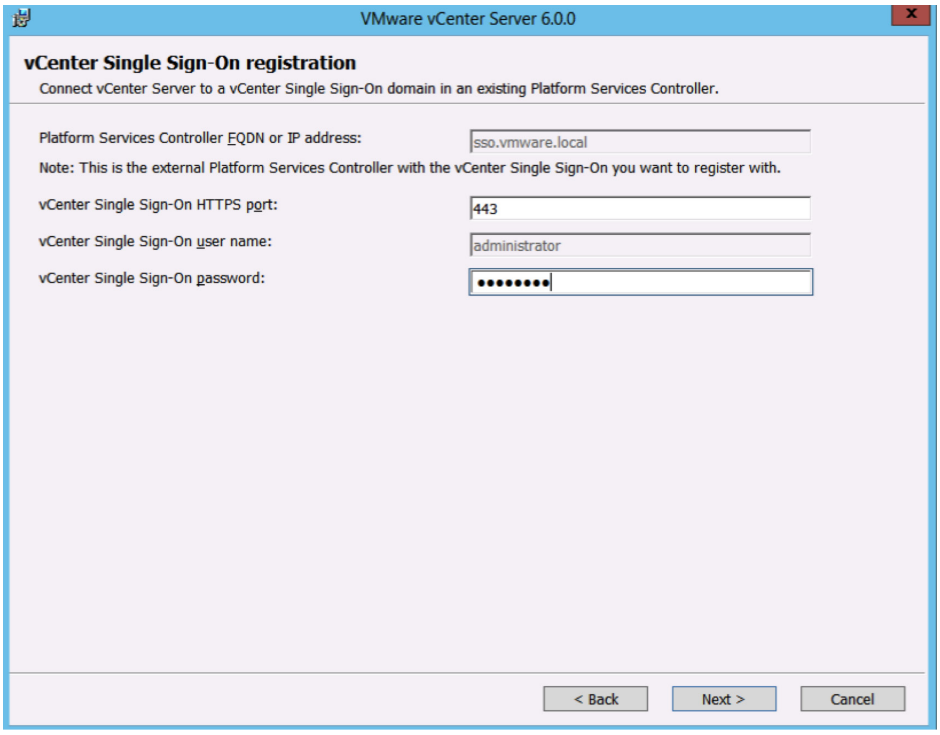
36. Click **Next**.
37. Accept the license agreements.
38. Enter the **password** for the administrator@vsphere.local account and the **password** for the service account (if applicable). Click **Next**.



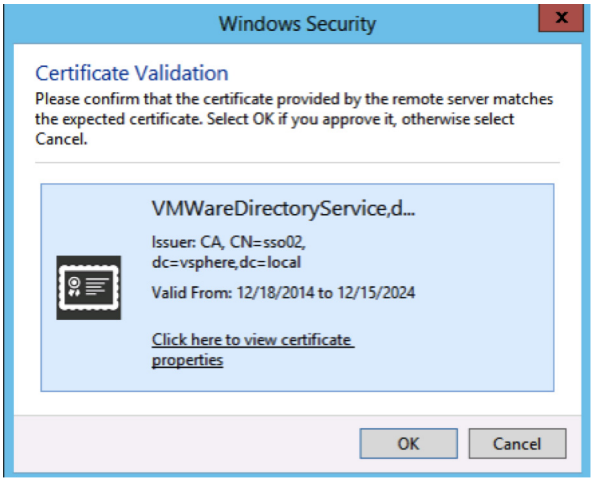
39. Wait for the **pre-upgrade checks** to complete.



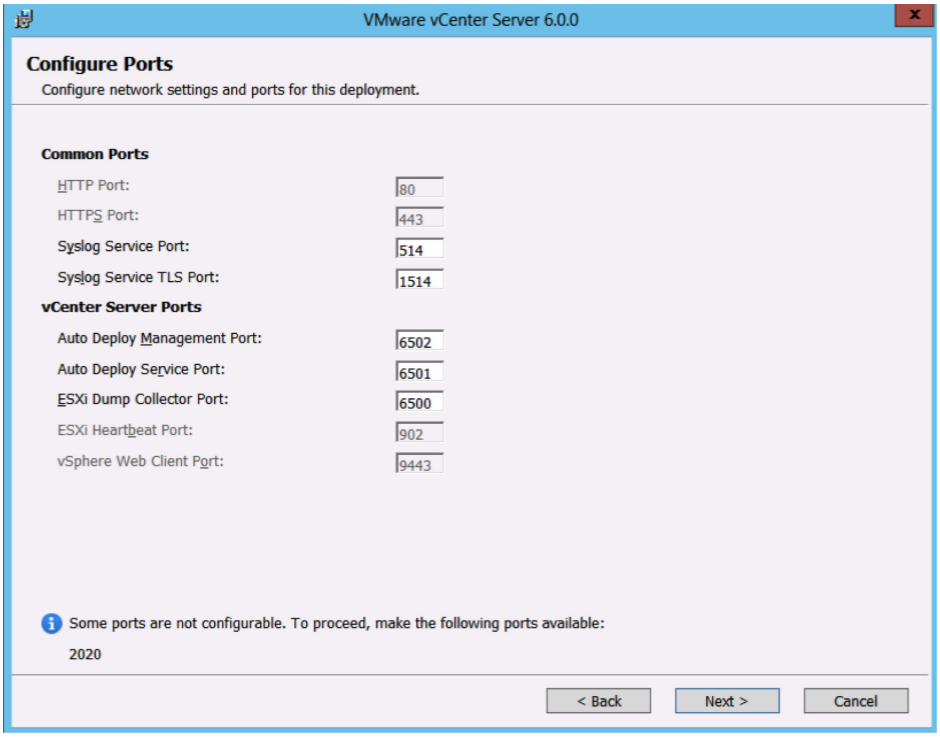
40. Enter the **password** for the administrator@vsphere.local account. Click **Next**.



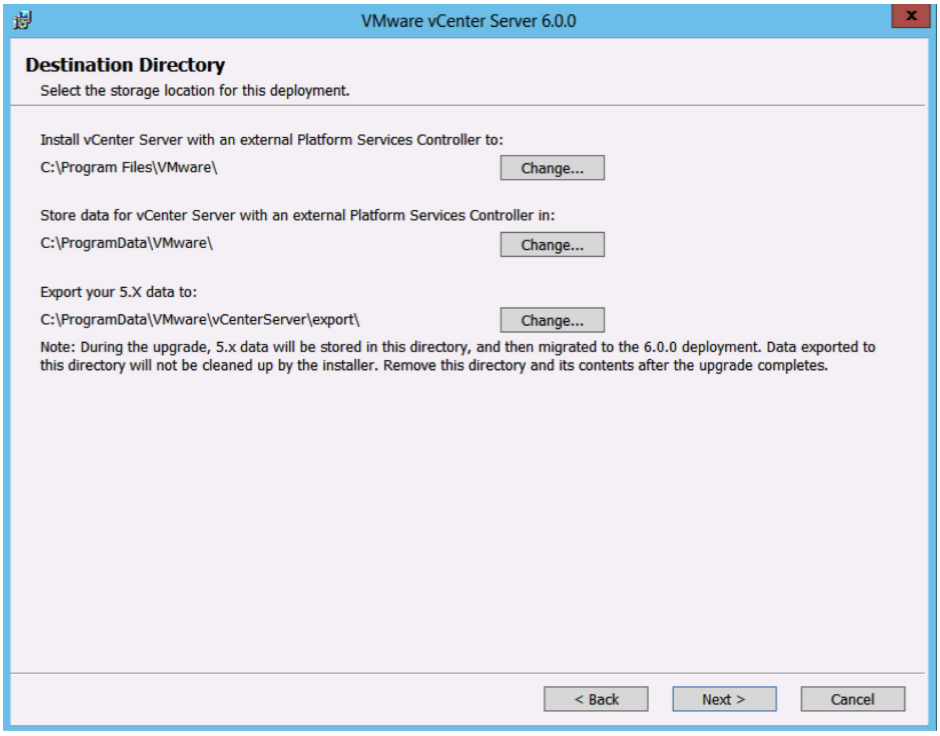
41. Click **OK** to accept the certificate.



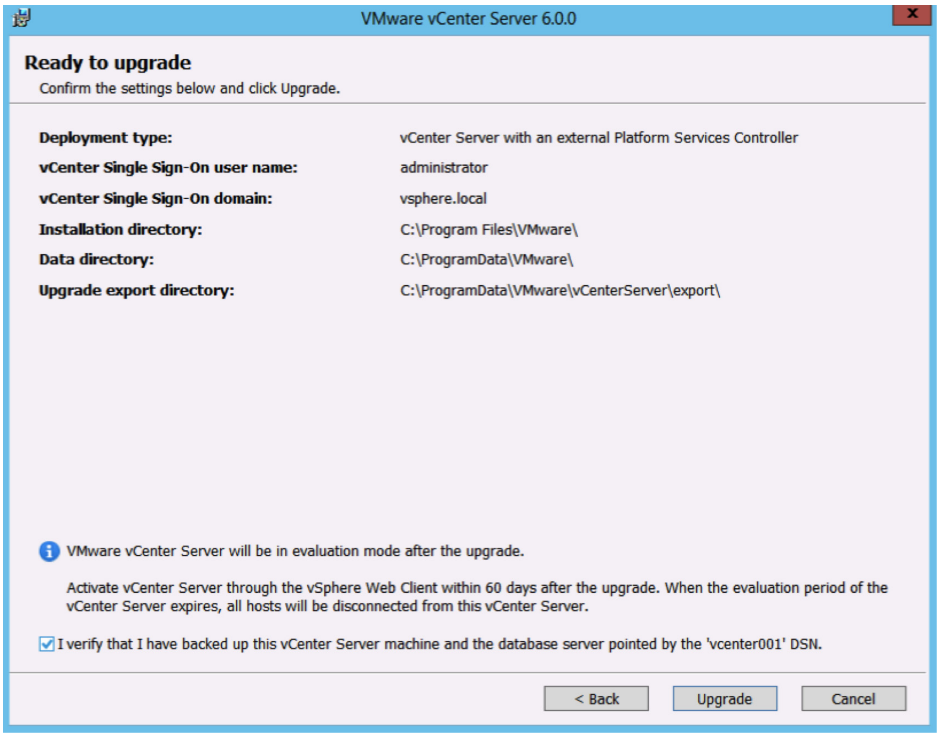
42. Accept the default ports and click **Next**.



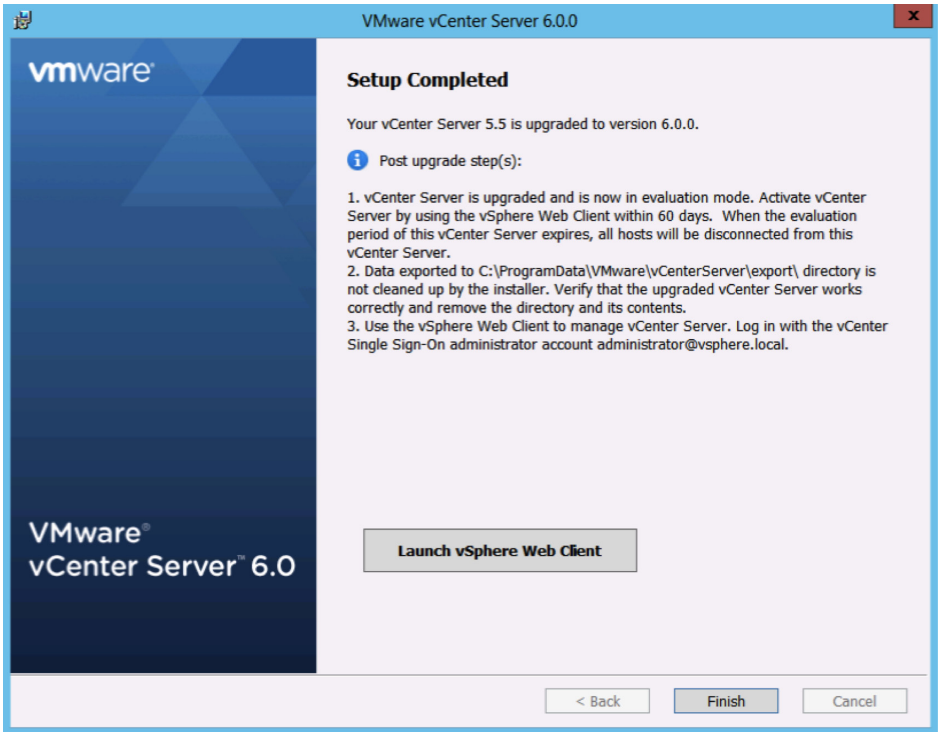
43. Accept or change the installation paths as necessary. Click **Next**.



44. Check the box to verify that you have backed up the vCenter Server and its database. Click **Upgrade**.



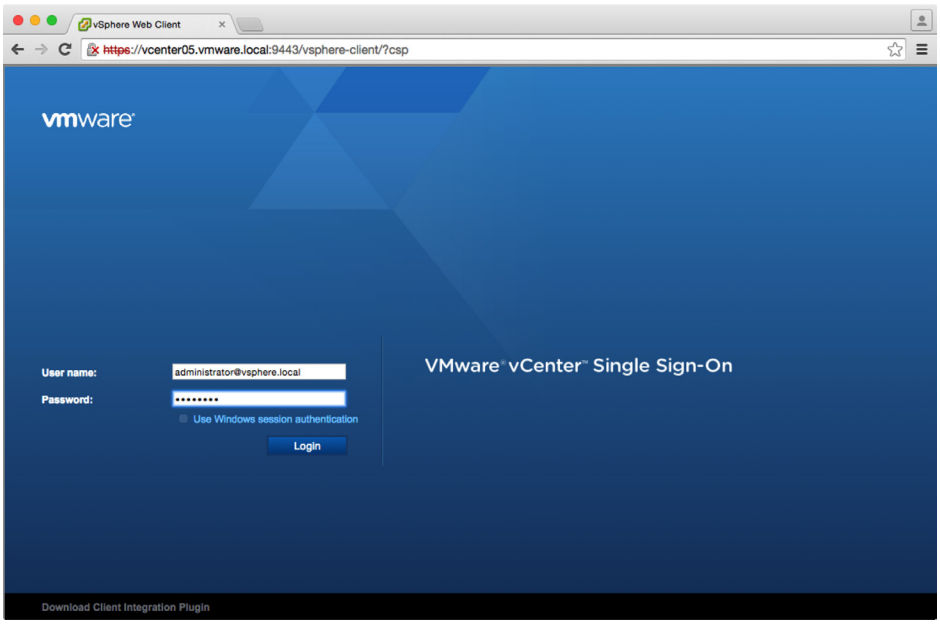
45. When completed, click **Finish**.



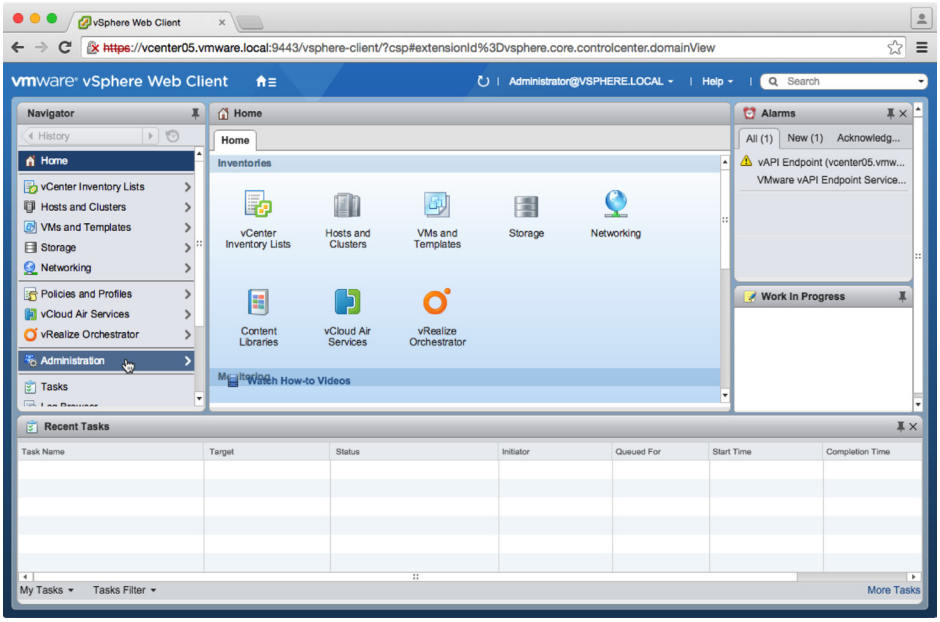
Postdeployment Steps

Configure Identity Sources

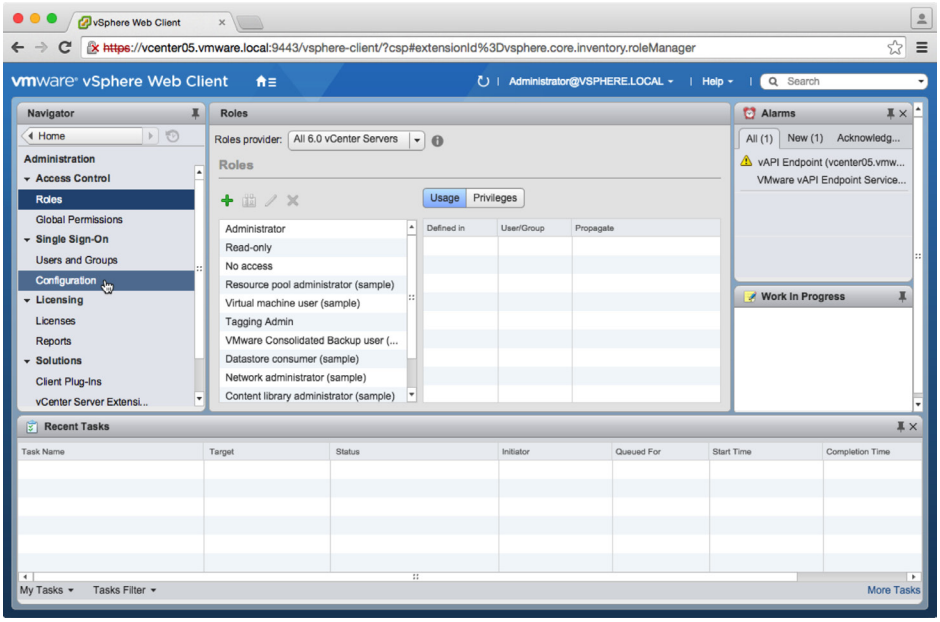
1. Open your Web browser and navigate to https://vcenter:9443, where *vcenter* is the FQDN of the vCenter Server.
2. Log in with **User name** administrator@vsphere.local and the **Password** used during installation.



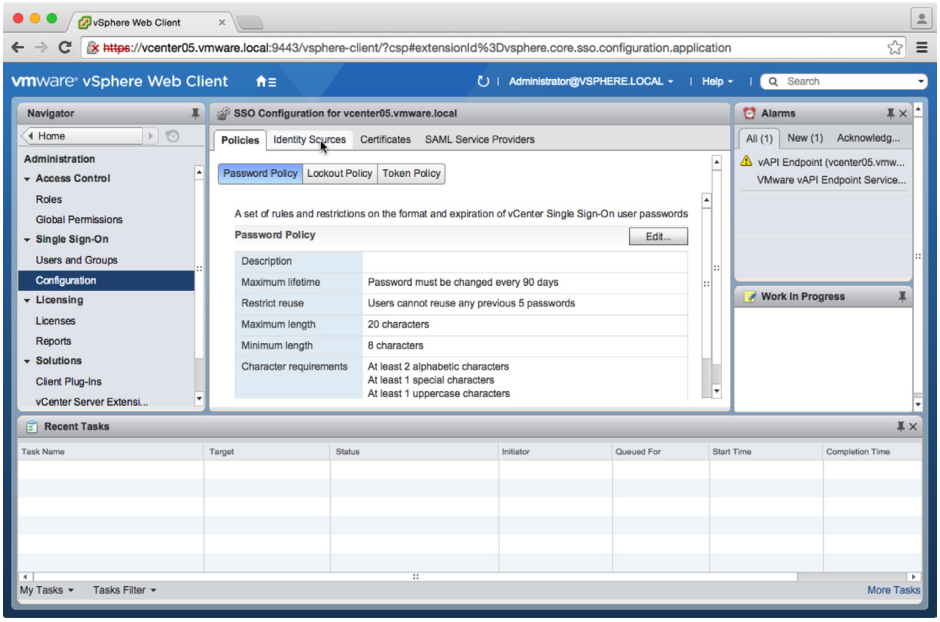
3. Click **Administration** in the left-hand **Navigator** pane.



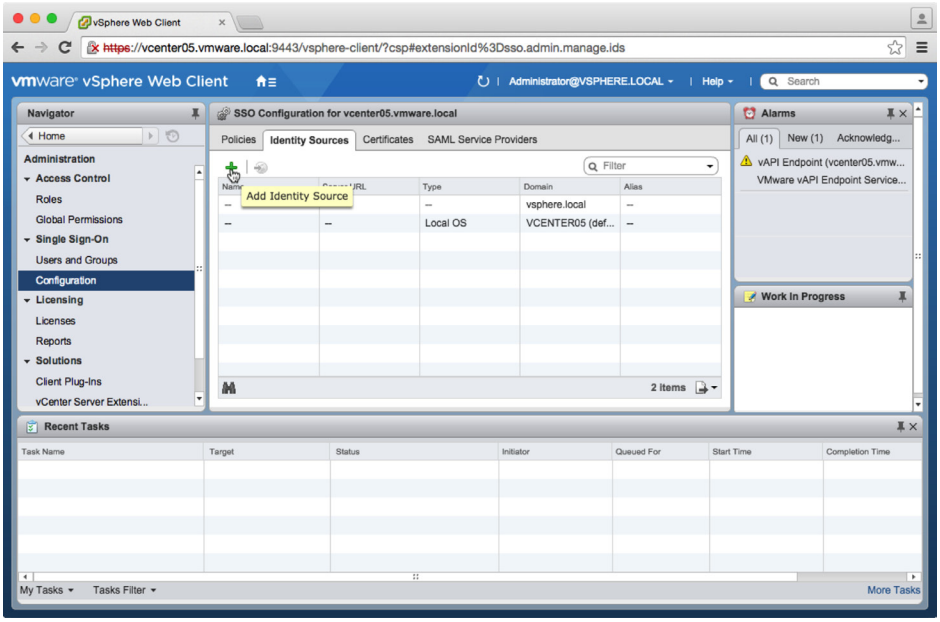
4. Click **Configuration** under vCenter **Single Sign-On**.



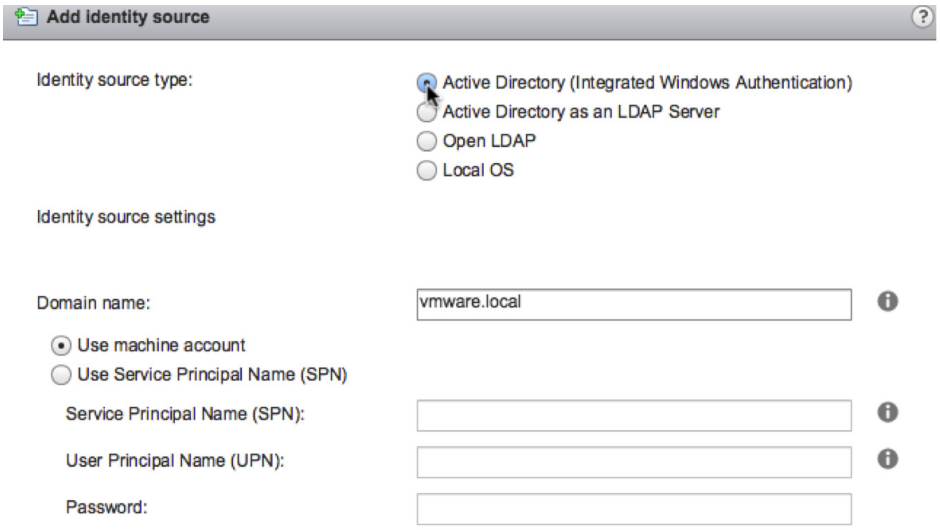
5. Click **Identity Sources**.



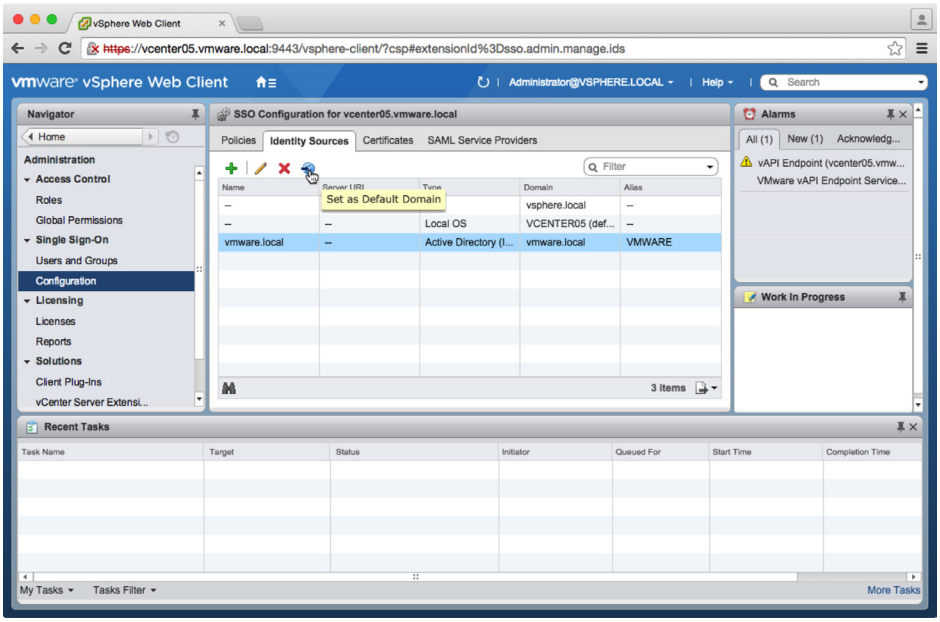
6. Click the **green plus** icon to **Add Identity Source**.



7. If using Microsoft Active Directory, select **Active Directory (Integrated Windows Authentication)**. It will autopopulate the root domain in the forest. If using Open LDAP, select and configure it.



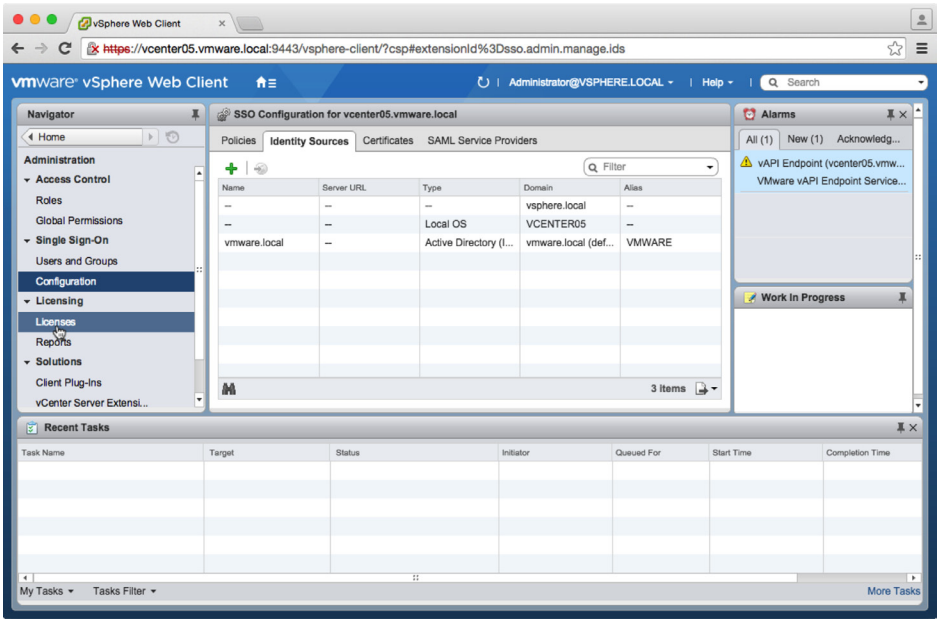
8. Highlight the newly added identity source. Click the **Set as Default Domain** icon.



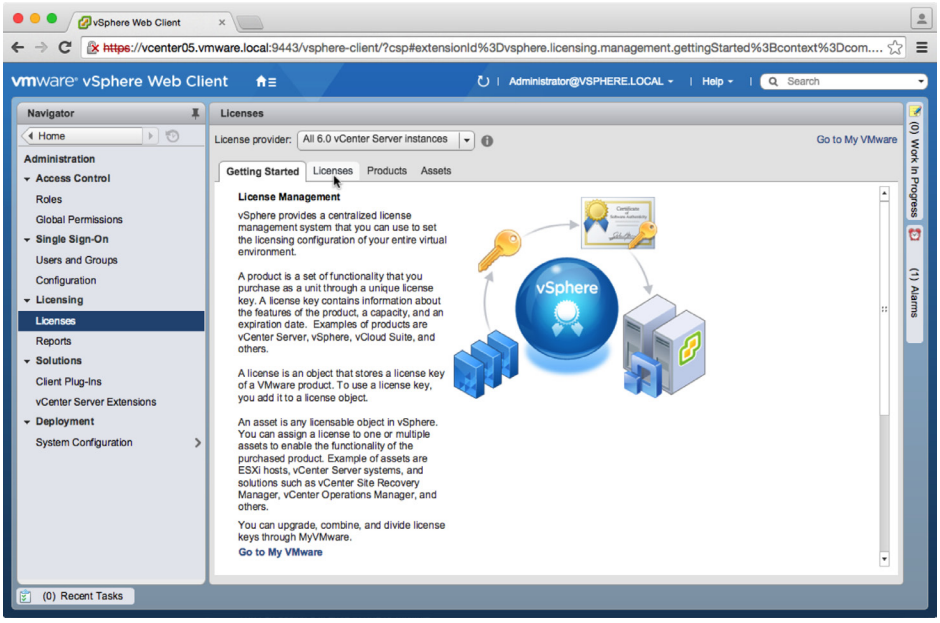
9. Click **Yes** in the pop-up.

License Management

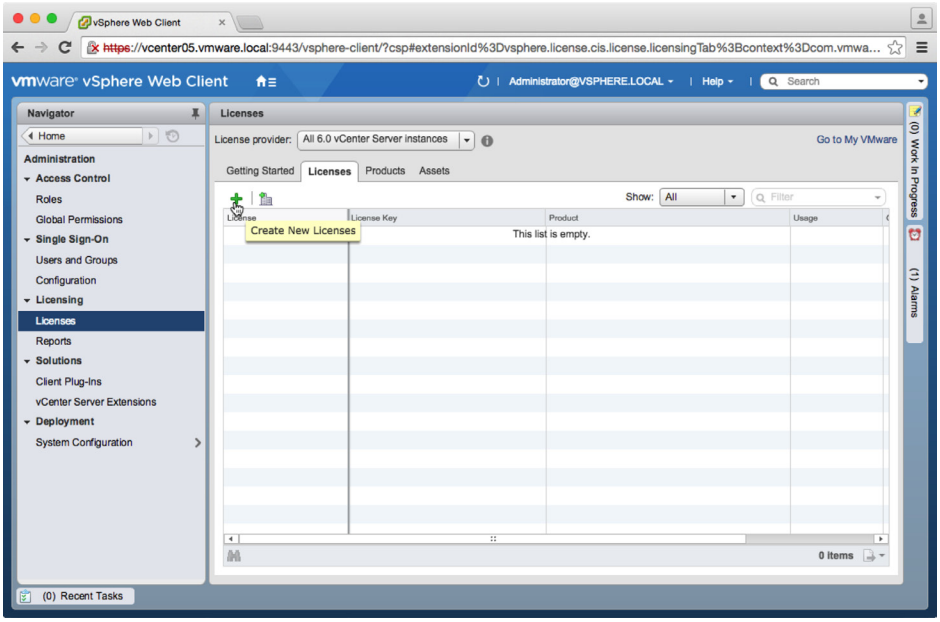
1. Click **Licenses** in the left-hand **Navigator** pane.



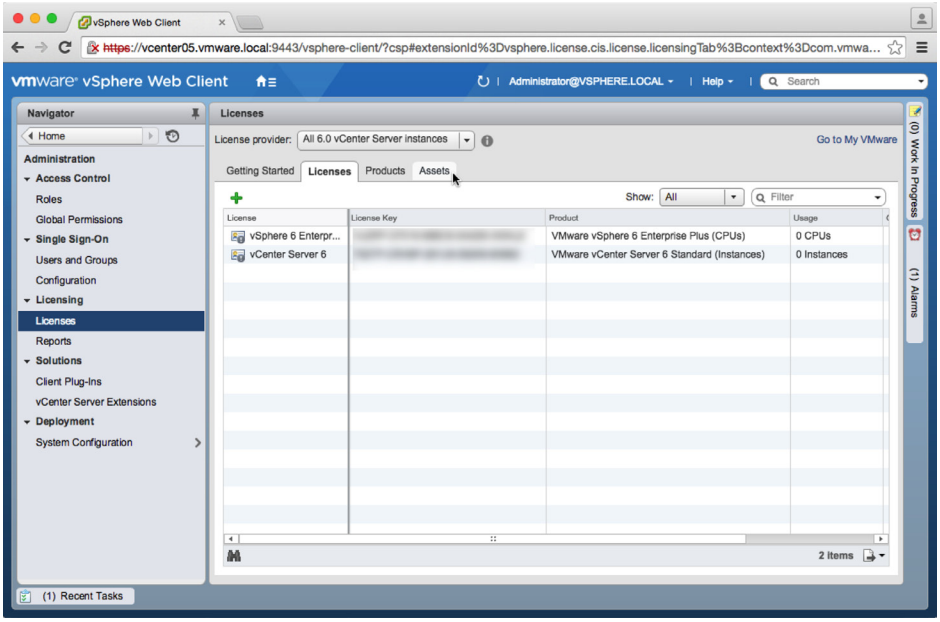
2. Click **Licenses**.



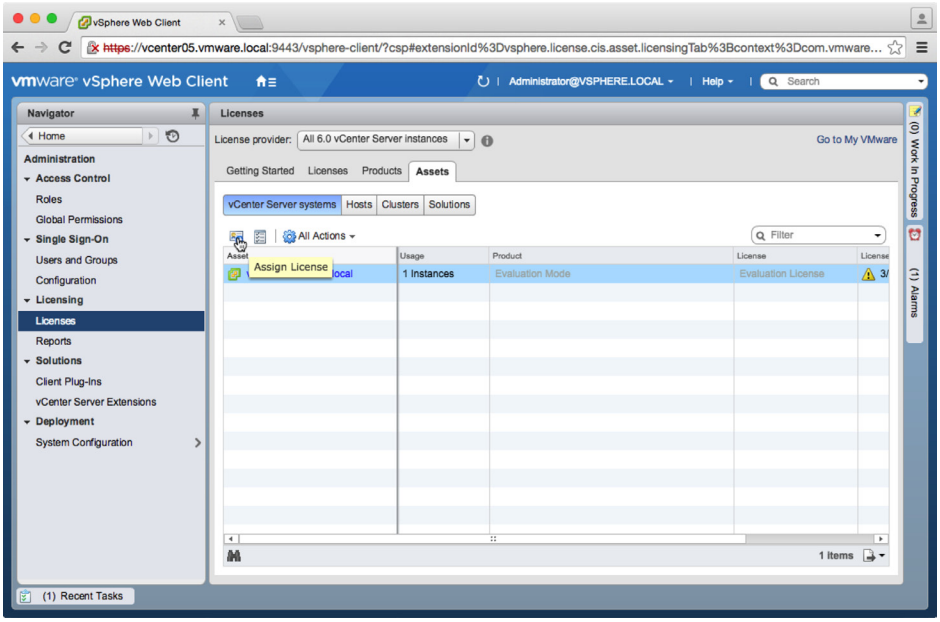
3. Click the **green plus** icon to add your licenses.



4. Enter your license keys, one per line, and click **Next**.
5. Give each license a descriptive name and click **Next**.
6. Click **Finish**.
7. Click **Assets**.



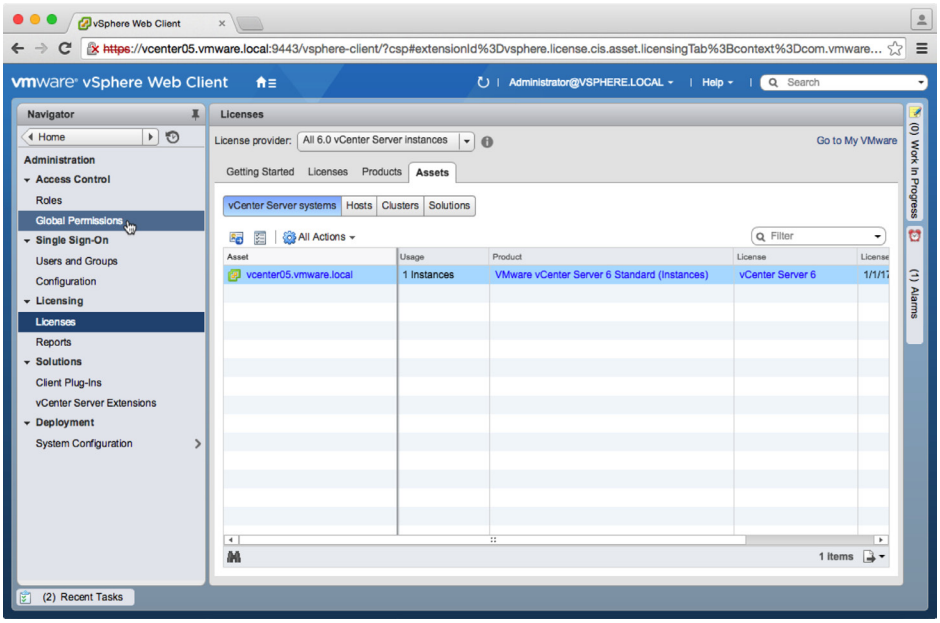
8. Highlight **vCenter Server systems** in evaluation mode and click the **Assign License** icon.



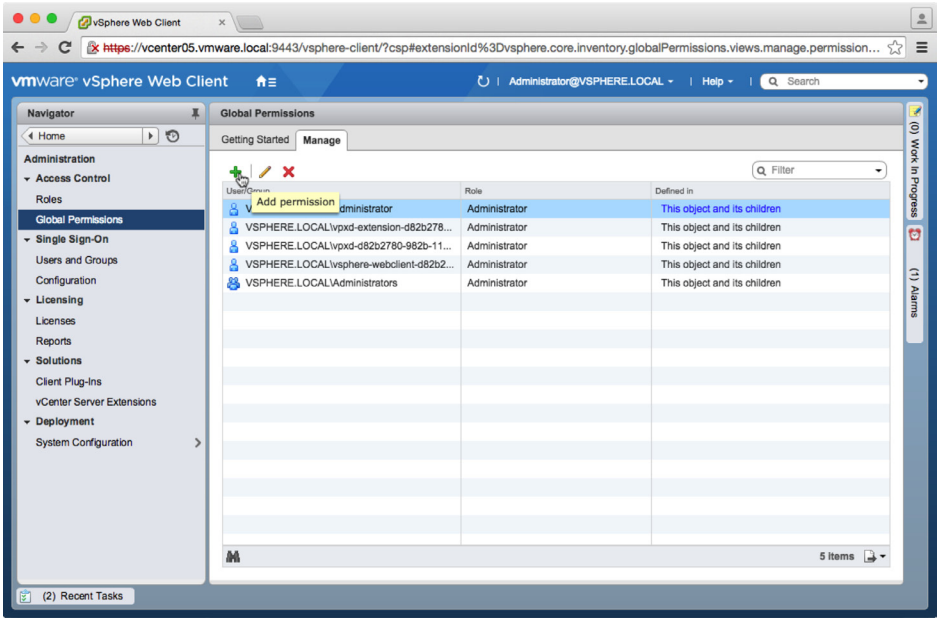
9. Select the vCenter Server license entered earlier and click **OK**.

Global Permissions

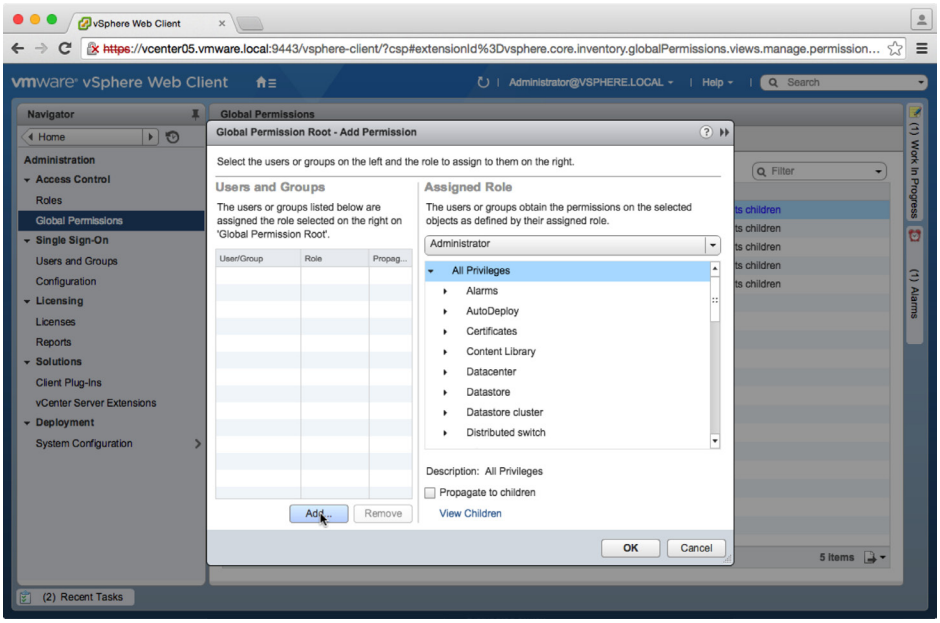
1. Click **Global Permissions** in the left-hand **Navigator** pane.



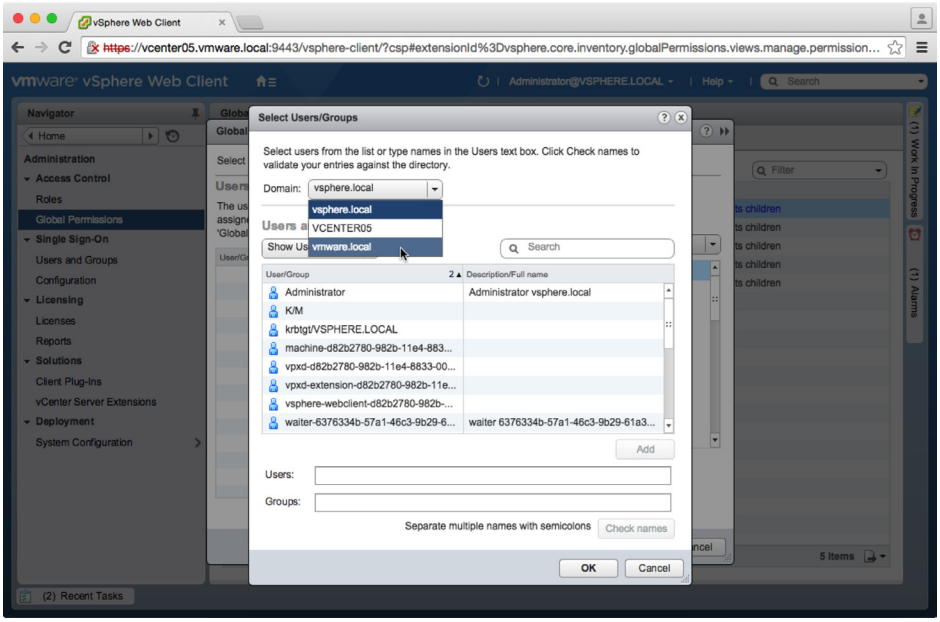
2. Click **Manage**.
3. Click the **green plus** icon to add a permission.



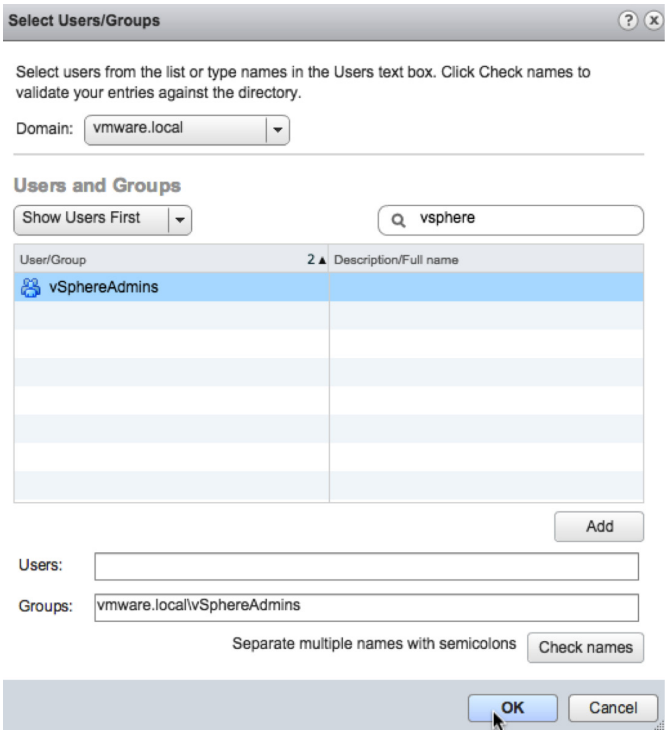
4. Click **Add**.



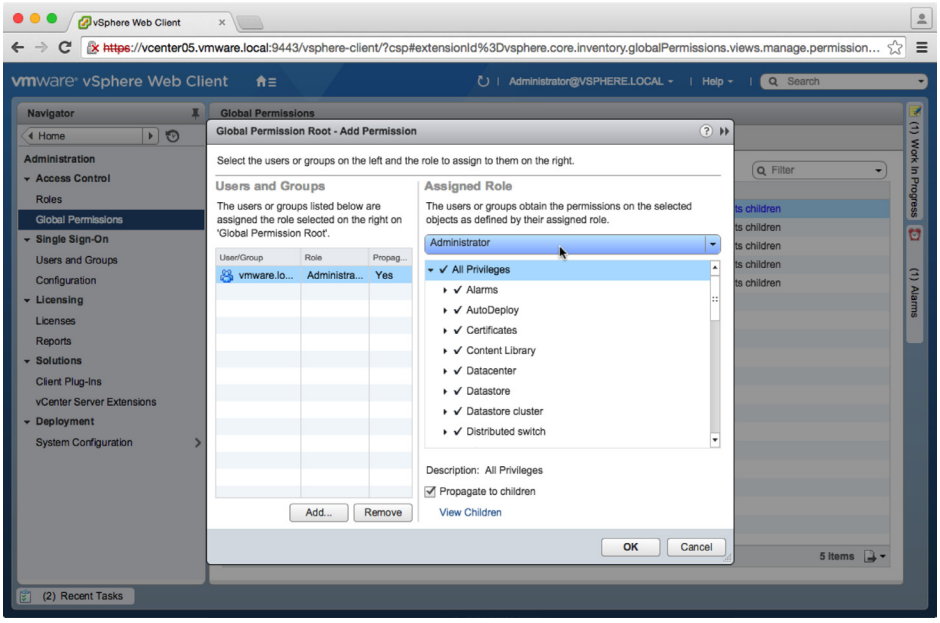
5. Select your Active Directory domain or other identity source you added earlier.



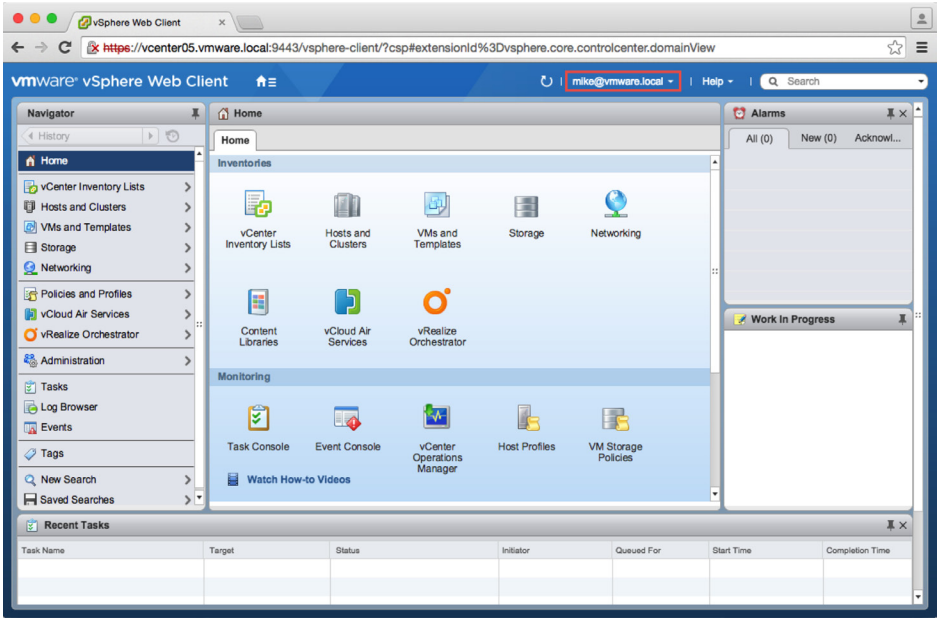
6. Add your vSphere Administrators group or users. Click **OK**.



7. Ensure that the **Administrator** role is selected and **Propagate to children** is checked. Click **OK**.



8. You can now log out and back in to vSphere Web Client as an **Administrator** you just added.



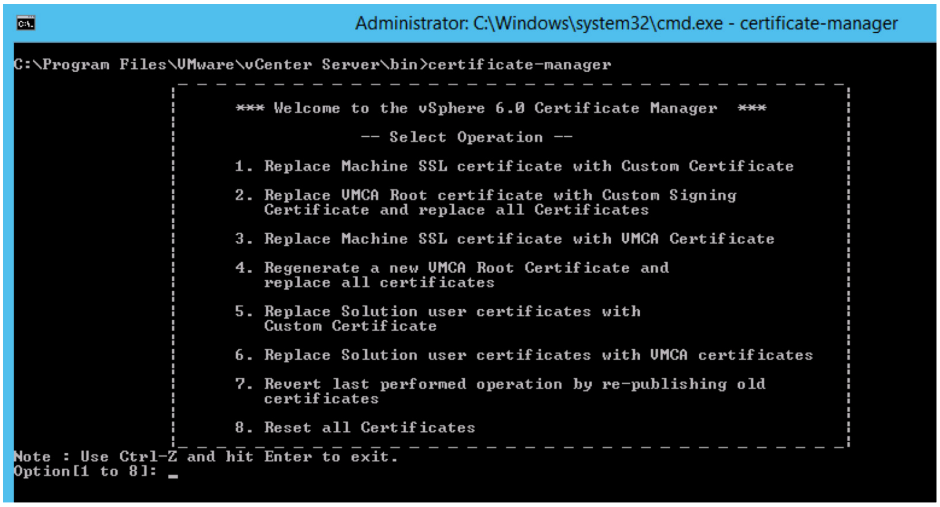
Certificate Management

In most cases, certificate replacement in vSphere 6.0 is not necessary. This is because the Platform Services Controller contains the VMware Certificate Authority (VMCA), which issues certificate authority (CA) signed certificates with a validity period of 10 years.

These certificates are issued to solution users—the users created when a solution such as vCenter Server, vCenter Inventory Service, and so on, is registered with vCenter Single Sign-On—and are utilized as certificate endpoints. These users are issued certificates instead of individual services. This enables the services associated with a solution user to utilize the same certificate, substantially reducing the number of certificates required to manage in the environment.

ESXi hosts are also issued certificates from the VMCA when the hosts are added to the vCenter Server inventory or when vCenter Server is upgraded.

When certificates must be changed—such as when making the VMCA a subordinate of an existing enterprise CA or when generating new solution user certificates after the VMCA mode has changed—the certificate manager utility can be used.



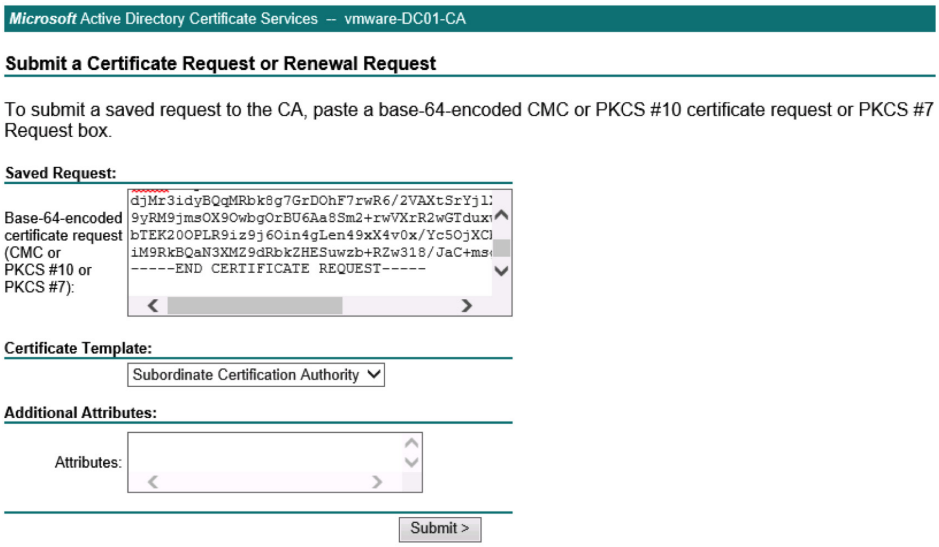
Make the VMCA a Subordinate Certificate Authority

1. Log in to the Platform Services Controller.
2. Using openssl, generate a certificate request.

```
openssl genrsa -out c:\certs\psc001.key 2048
openssl req -new -key c:\certs\psc001.key -out c:\certs\psc001.csr
```

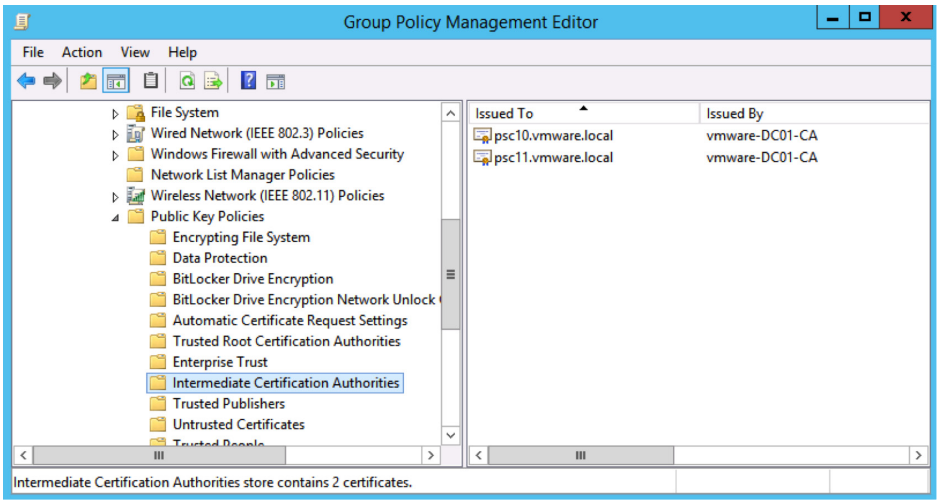
   a. Answer questions to build the request.

   b. Submit the request to a CA. Use the subordinate CA template for the request.



c. Download the certificate in Base 64 format; save it to c:\certs.

3. Wait at least 24 hours before continuing. The VMCA requires that the certificate have a valid date of at least 24 hours prior.
4. Run certificate-manager from c:\program files\vmware\vCenter Server\bin for Windows installs or /usr/lib/vmware-vmca/bin/certificate-manager for vCenter Server Appliance.
5. Choose option 2: **Replace VMCA Root certificate with Custom Signing Certificate and replace all Certificates**.
6. Enter the administrator@vsphere.local password.
7. Answer all questions as you did earlier when creating the certificate request.
8. When asked to provide a valid custom certificate for root, enter the path to the certificate obtained earlier.
9. When asked to provide a valid custom key for root, enter the path to the .key file generated with openssl earlier.
10. Enter **Y** to continue to replace the certificate.
11. Add the certificate to a Windows Group policy as an intermediate CA. This will enable client machines —such as those using vSphere Web Client—to trust the certificates issued by the VMCA.

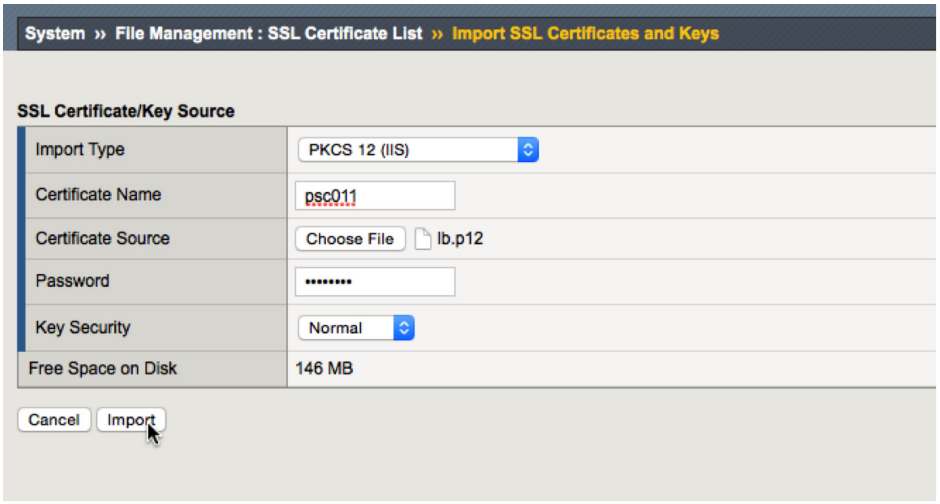


Appendix

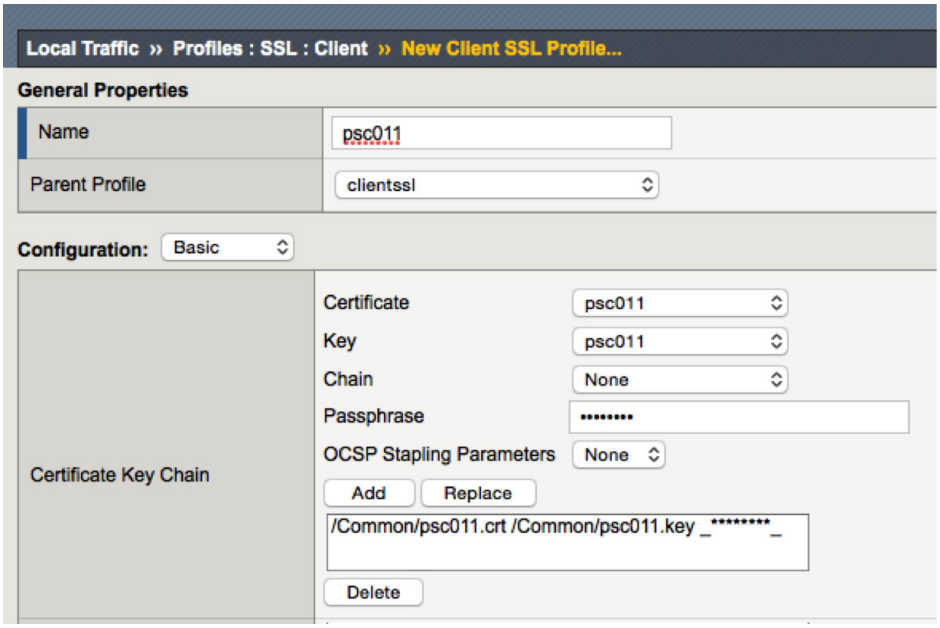
Configure the F5 BIG-IP Load Balancer

1. Download the lb.p12 file from the ha folder of one of the Platform Services Controllers.
2. Log in to the F5 BIG-IP configuration Web page.
3. Click **System**.
4. Open **File Management**, **SSL Certificate List**.
5. Click **Import**.
6. For **Import Type**, select **PKCS 12**. Provide a descriptive **Certificate Name**. Browse for the **Certificate** downloaded earlier. Enter **changeme** for the **Password**. Click **Import**.

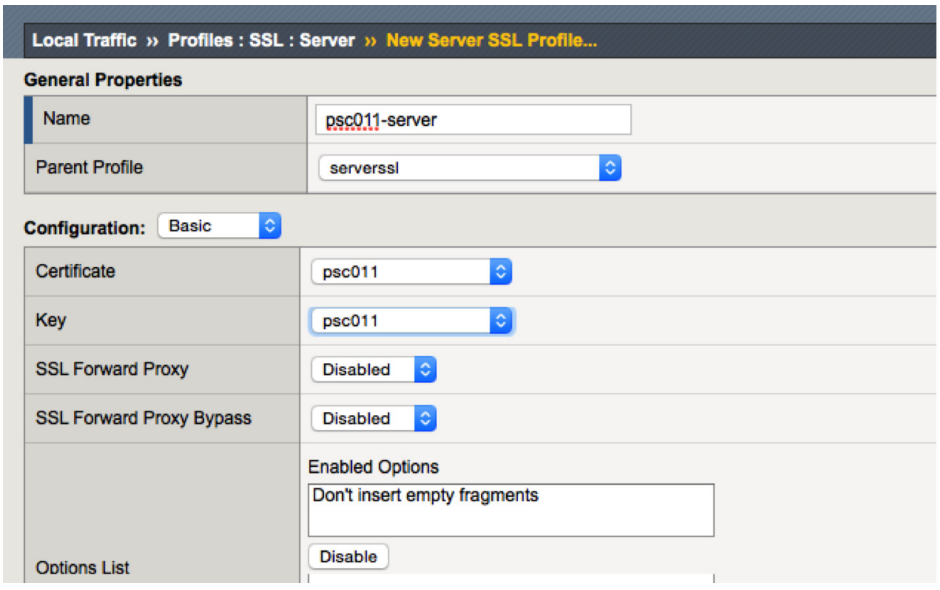
NOTE: If you want to use a custom password when running the gen-lb-cert.py --primary-node command on the first Platform Services Controller to generate the certificates, add the following: --password=yourPassword.



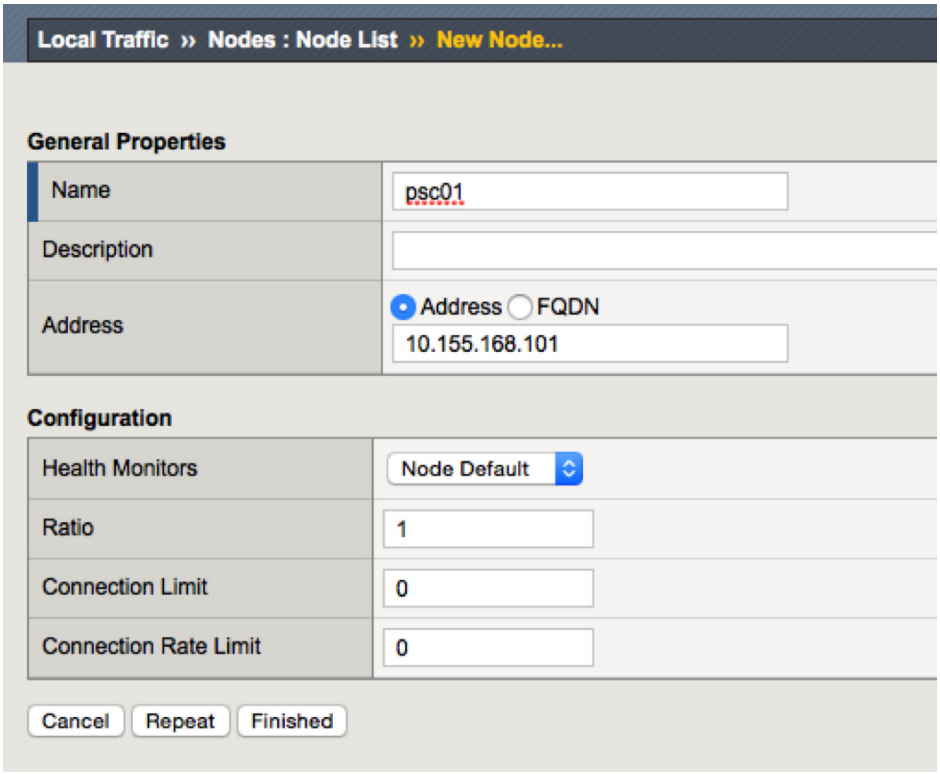
7. Click **Local Traffic**.
8. Open **Profiles**, **SSL**, **Client**.
9. Click **Create**.
10. Provide a descriptive **Name**.
    a. Click **Custom**.
    b. Choose the **Certificate** and **Key** installed earlier.
    c. Enter the **Passphrase** for the certificate.
    d. Click **Add**.
    e. Scroll to the bottom and click **Finished**.



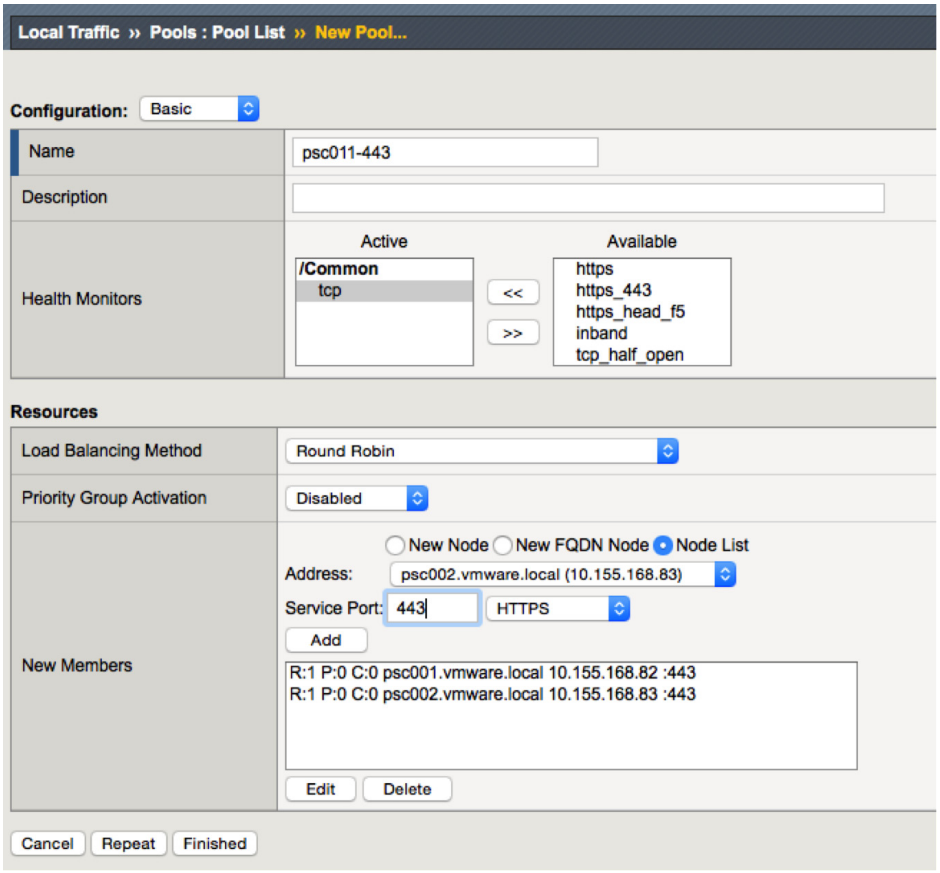
11. Open **Profiles**, **SSL**, **Server**.
12. Click **Create**.
13. Provide a descriptive **Name**.
    a. Click **Custom**.
    b. Choose the **Certificate** and **Key** installed earlier.
    c. Click **Add**.
    d. Scroll to the bottom and click **Finished**.



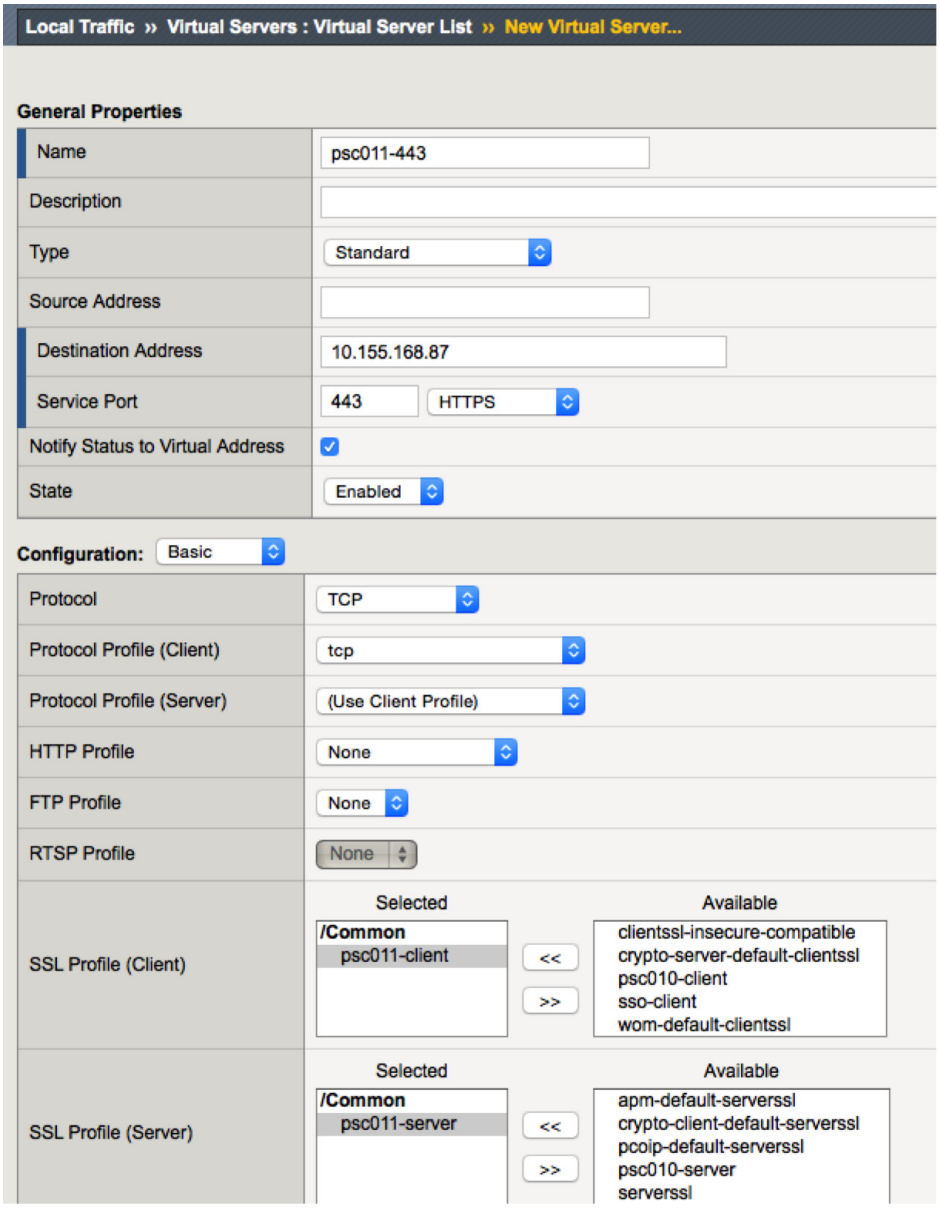
14. Open **Nodes**, **Node List**.
15. Click **Create**.
16. Add all Platform Services Controllers as a node. Use **Repeat** to speed up the process.

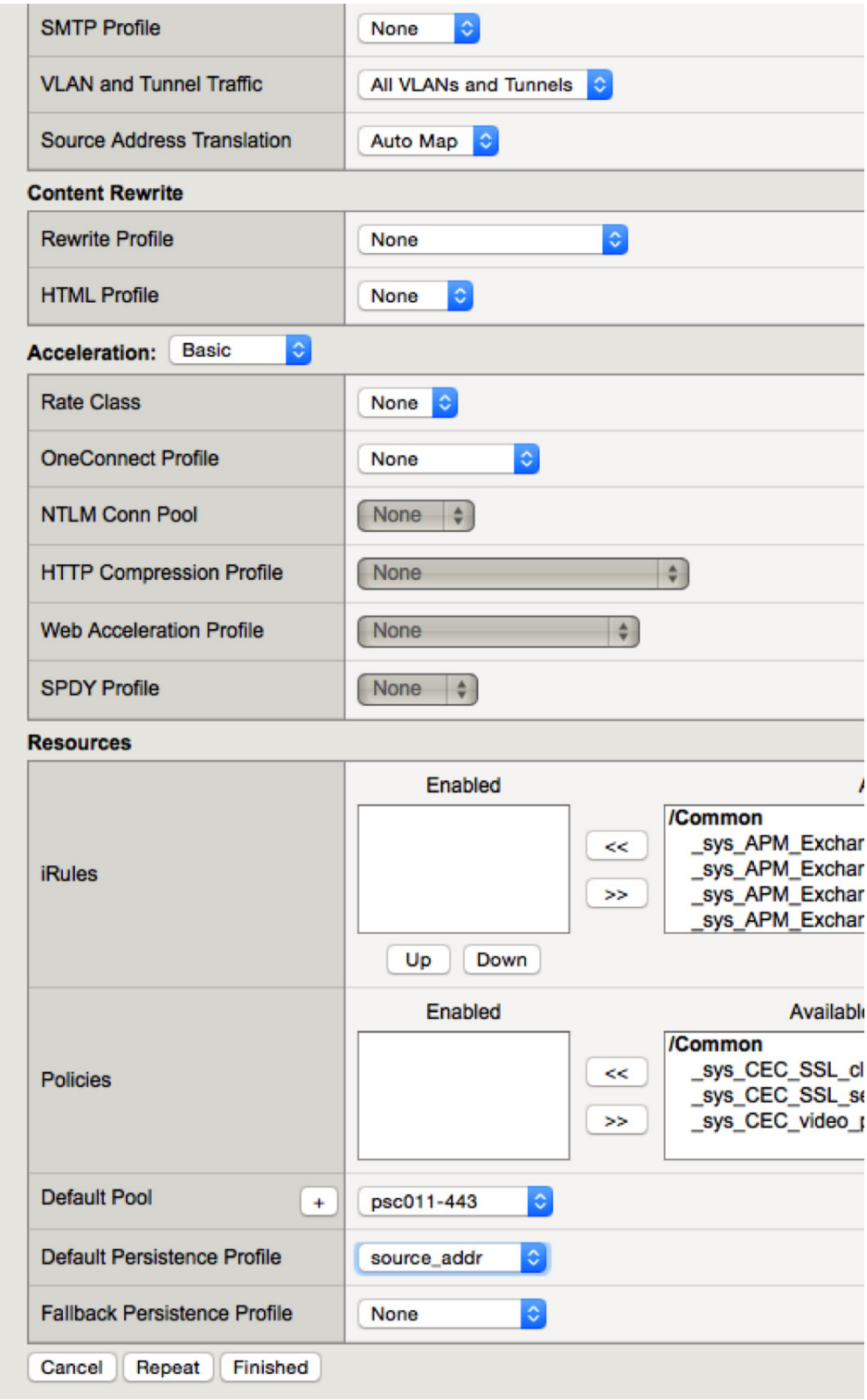


17. Open **Pools**, **Pool List**.
18. Click **Create**.
19. Create six pools, one each for port 443, 2012, 2014, 2020, 389, and 636.
    a. All pools have the same **Configuration**, **tcp** for monitoring, and **Round Robin** for **Load Balancing Method**.
    b. Use **Repeat** to save time: Remove the existing members from the list.

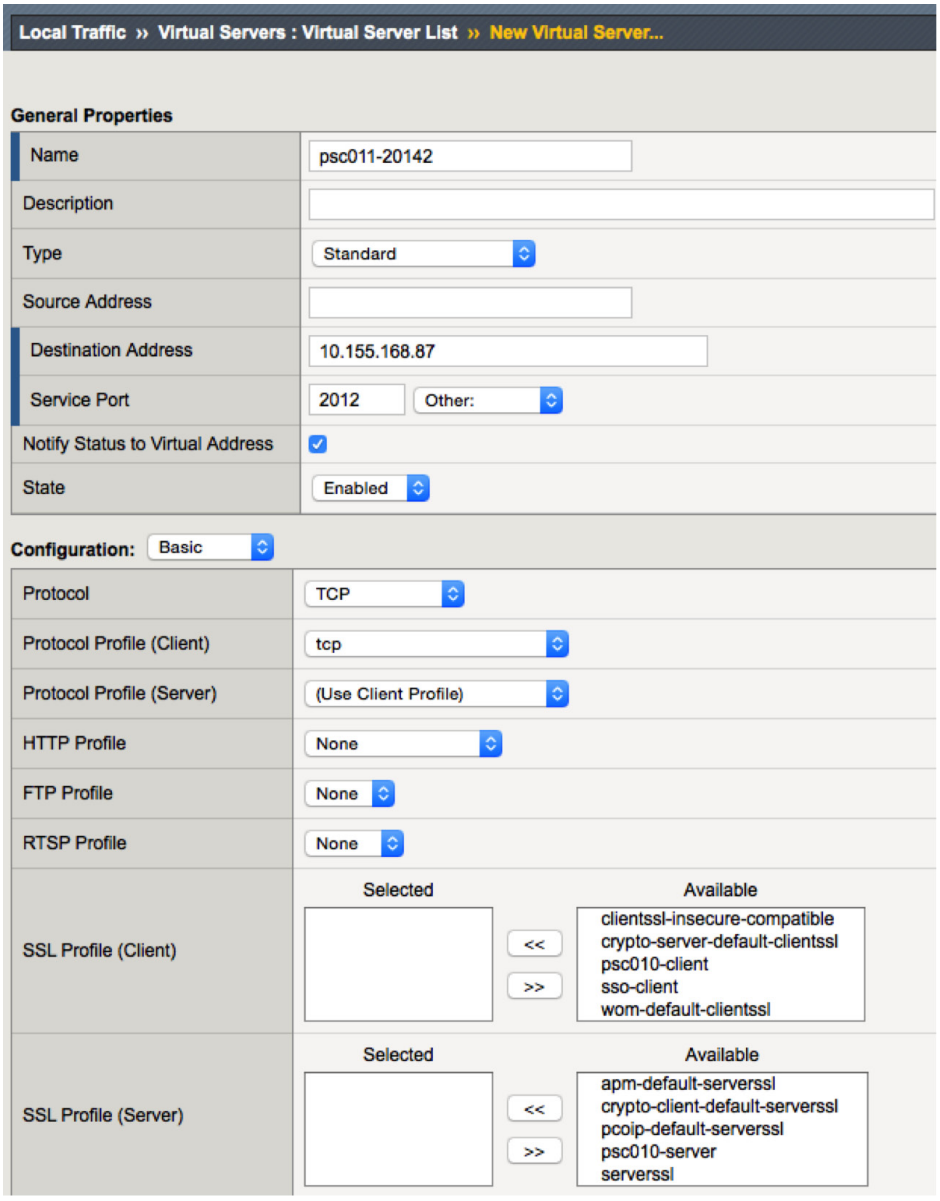


20. Open **Virtual Servers**, **Virtual Server List**.
21. Click **Create**.
22. All virtual servers—except the one for port 443—have the same configuration.
    a. Provide a descriptive **Name**.
    b. Enter the **Destination Address**.
    c. For **Service Port**, enter **443**.
    d. For **SSL Profile (Client)**, select the client profile created earlier.
    e. For **SSL Profile (Server)**, select the client profile created earlier.
    f. For **Source Address Translation**, select **Auto Map**.
    g. For the **Default Pool**, select the pool created for port 443.
    h. For the **Default Persistence Profile**, select **source_addr**.
    i. Click **Finished**.

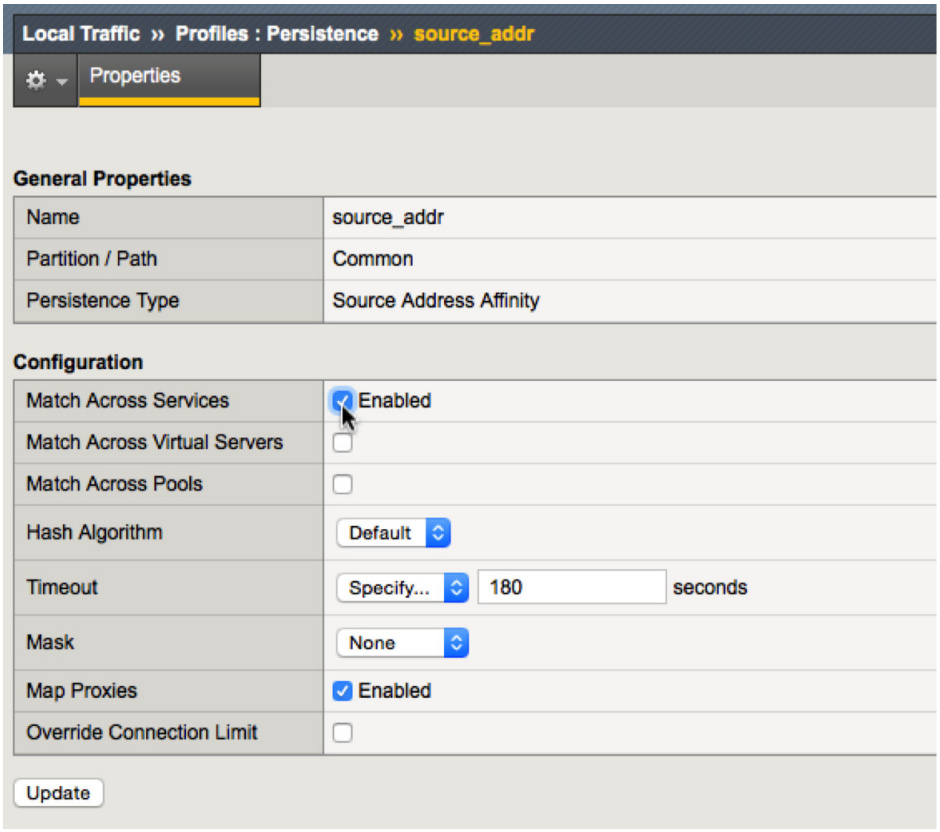

Local Traffic » Virtual Servers : Virtual Server List » New Virtual Server...
General Properties
Name
psc011-443
Description
Type
Standard
Source Address
Destination Address
10.155.168.87
Service Port
443
HTTPS
Notify Status to Virtual Address
State
Enabled
Configuration:
Basic
Protocol
TCP
Protocol Profile (Client)
tcp
Protocol Profile (Server)
(Use Client Profile)
HTTP Profile
None
FTP Profile
None
RTSP Profile
None
SSL Profile (Client)
Selected
/Common
psc011-client
<<
>>
Available
clientssl-insecure-compatible
crypto-server-default-clientssl
psc010-client
sso-client
wom-default-clientssl
SSL Profile (Server)
Selected
/Common
psc011-server
<<
>>
Available
apm-default-serverssl
crypto-client-default-serverssl
pcoip-default-serverssl
psc010-server
serverssl



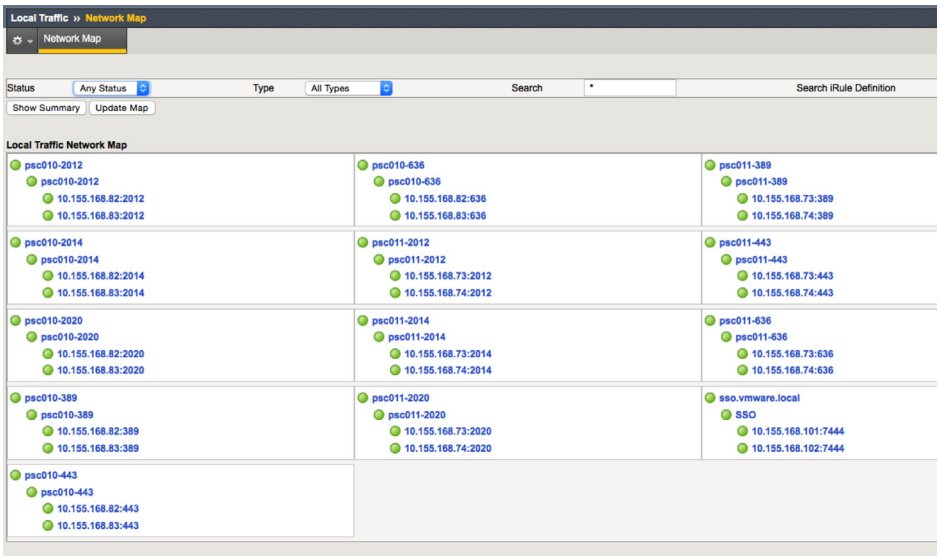
23. Repeat step 22 for all other ports: 2012, 2014, 2020, 389, and 636. All settings are the same, except there is no **SSL Profile (Client)** or **SSL Profile (Server)** and the **Service Port** and **Default Pool** should match. For example, if the **Service Port** is 2012, the **Default Pool** should be the pool set up for port 2012.



24. Open **Profiles**, **Persistence**.
25. Click **source_addr**.
26. Check **Match Across Services** and click **Update**.



27. After both Platform Services Controller nodes have been installed and configured, click **Network Map** and verify that all services are up (green).



Scripted vCenter Server Installations

vCenter Server Appliance can be deployed via custom JSON files from a command line. The ISO ships with examples for deploying an embedded (vCenter Server and Platform Services Controller), management (vCenter Server), and Platform Services Controller appliance.

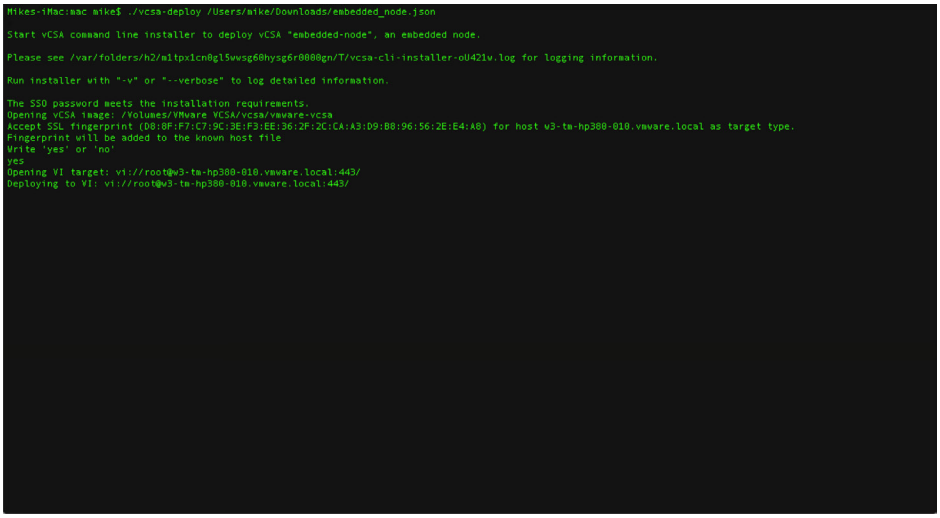
There are command-line utilities for 64-bit Linux, Mac OS X, and Windows.

The following is a sample embedded JSON file:

```
{
  "__comments":
  [
    "Will deploy an embedded VCSA to host 10 in the MGMT Cluster"
  ],

  "deployment":
  {
    "esx.hostname":"w3-tm-hp380-010.vmware.local",
    "esx.datastore":"NFSMGMT01",
    "esx.username":"root",
    "esx.password":"VMware1!",
    "deployment.option":"tiny",
    "deployment.network":"VM Network",
    "appliance.name":"embedded-node",
    "appliance.thin.disk.mode":true
  },

  "vcsa":
  {

    "system":
    {
      "root.password":"VMware1!",
      "ssh.enable":true
    },

    "sso":
    {
      "password":"VMware1!",
      "domain-name":"vsphere.local",
      "site-name":"PaloAlto"
    }
  }
}
```

To deploy vCenter Server Appliance from this file, save it on your local system. From a command line, navigate to the utilities folder for your OS. For example, on Mac OS X, this is /Volumes/VMware VCSA/vcsa-cli-installer/mac. Now run vcsa-deploy followed by the full path to the custom JSON file. For example:

```
./vcsa-deploy /Users/mike/Downloads/embedded_node.json
```



References

vSphere 6.0 Documentation Center
http://pubs.vmware.com/vsphere-60

Additional Resources

VMware vSphere 6.0 Feature Walkthroughs
http://featurewalkthrough.vmware.com/#!/vsphere-6-0

VMware Mobile Knowledge Portal
http://www.vmwaremkp.com

About the Author

Mike Brown is a senior technical marketing manager in the Integrated Systems Technical Marketing group. Mike has worked in the IT industry for more than 17 years. His focus is on reference architectures for VMware vCloud Suite® and the software-defined data center (SDDC) as well as VMware vCenter Server, VMware vCenter Single Sign-On, and VMware vSphere Web Client. Mike has multiple industry certifications, including VMware Certified Design Expert (VCDX).

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