Provisioning Services in App Orchestration 2.0

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Commissioning Editor: Linda Belliveau

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Introduction

- Use Citrix Provisioning Services with App Orchestration for:
  - Single-user and Multi-user operating systems
  - XenDesktop and XenApp Delivery Controllers
  - This document describes specific considerations that apply in each case.

Note:

This document describes integrating Provisioning Services with App Orchestration in a single domain. Using Provisioning Services across multiple domains is not supported.

Prerequisites

- It is assumed that the reader has experience and prior knowledge about:
  - Provisioning Services technology
  - Concepts such as computer image, vDisk, private vs. standard mode, and collection
  - Basic concepts and definitions are not described in depth unless they are considered necessary to add clarity or to make different aspects of App Orchestration easier to understand.

Single-user and Multi-user machines

- You can use the following types of Session Machines in an App Orchestration environment:
  - Single-user
  - Windows client operating systems, such as Windows 7 or Windows 8.x. These are referred to Windows OS machines or VDA in XenDesktop environments.
  - Provide access for a Single-user connecting to a machine or application.

Multi-user

- Windows Server operating systems, such as Windows 2008R2 or Windows 2012 R2. These are referred to as Server OS machines in XenDesktop environments.
- Provide access for multiple users connecting to a machine or application. Depending on the type of Delivery Controller (XenDesktop or XenApp) they are XenDesktop VDAs or XenApp servers.
In addition to being either Single-user or Multi-user, these Session Machines can be physical or virtual. Provisioning Services works well with either type.

Details about specific configuration, requirements and other considerations for using Provisioning Services in a deployment of App Orchestration are the objective of this document

- Many aspects of App Orchestration and the way its parts, components or subsystems behave are the same whether the machines involved are provisioned or not.

- The following sections only describe considerations for provisioned machines. The fundamentals and workings of App Orchestration are documented elsewhere.

**Recommended reading for App Orchestration**

To learn more about App Orchestration and as preparation or refresher before working with Provisioning Services and App Orchestration, see:

- [Getting started with Citrix App Orchestration](#)
- [App Orchestration Key Concepts and Terms](#)
- [App Orchestration Setup Checklist](#)
- [Understanding App Orchestration](#)

**Provisioning Services and App Orchestration**

App Orchestration lets you coordinate or *orchestrate* the configuration, deployment, and interaction of different Citrix products and technologies. Provisioning Services are especially advantageous in large or enterprise-sized environments. Because of its nature and the way it works, the most common role for Provisioning Services is supporting large, enterprise deployments of other Citrix products.

Although Provisioning Services is a complete, separate product, it is sometimes incorrectly considered as just an add-on or complement to XenDesktop or XenApp.

This sample screenshot shows how it is listed as **Other** role for XenApp. This occurs because Provisioning Services is more of an infrastructure component than a common product for end users access.

The keyword is *scalability*: it is when planning deployments of hundreds of machines that the idea of using Provisioning Services with its intrinsic advantages as the supporting infrastructure becomes very attractive.

See [Provisioning Services](#) for definitions, fundamentals and basics of the Provisioning Services technology.
It is important to clarify the meanings of provision or provisioning that appear in menu items, dialogs, and context-sensitive information pop-ups in App Orchestration. These may unintentionally mislead the user that these terms refer to the separate product Citrix Provisioning Services, when they do not. These terms are based solely on their broadly accepted meaning and without implied references to Provisioning Services or any other Citrix product. The following example shows a reference to the concept of Integrated Provisioning, which is not at all related to Provisioning Services.

This guide provides clear and specific references to Provisioning Services to avoid confusion between the different concepts.

Note:

Tests conducted to validate integrating App Orchestration with Provisioning Services were conducted Provision Services version 6.1 and 7.1.
Integrate Provisioning Services with App Orchestration

This section describes how to configure provisioned machines in an App Orchestration deployment. See the appendix for additional information and more details on related topics.

Prepare the Provisioning Server environment

You can install Provisioning Services in one server or multiple servers for added redundancy, high availability, and increased performance. There are no limitations or special requirements for App Orchestration. You do not need to create a new Provisioning Services environment for provisioned machines in App Orchestration if one is already available and functioning properly.

Prepare the master image

The initial or reference machine where the Provisioning Server agent or target device software is installed is commonly known as the Master image or Master VM. This machine can be a Windows Server such as 2008 R2 or 2012, or a Windows client such as Windows 7 or Windows 8.x.

The master target machine is ready when:

- Operating system installed and configured
- Any patches, updates, and any additional applications are installed

To prepare the master image:

- Install the Provisioning Services agent or Target Device Software. All provisioned machines need to constantly communicate with the Provisioning Server through the Provisioning Services agent.
- Install the remaining components, depending on the type of operating system and its use.
Configure a Windows client master image

For single-user machines, install the XenDesktop Virtual Desktop Agent (VDA), which is available from the XenDesktop folder in the Citrix Product Depot.

Run **Autoselect** and select the **Virtual Delivery Agent for Windows Desktop OS** to start the installation wizard.

Your installation options vary depending on the desired functionality, target users, installed applications installed, or devices connected on the endpoints.

However, consider the following general guidelines for Provisioning Services.

**Citrix Receiver**
Select Citrix Receiver when installing core components (though it is not necessary to configure it initially).
**Delivery Controller**

When configuring the Delivery Controller it is important to select **Do it later** for configuring the DDCs.

![Delivery Controller Configuration](image)

**Note:**

Citrix recommends selecting **Do it later** because App Orchestration automatically creates a Group Policy Object that configures the **ListOfDDCs** registry key with the names of the Delivery Controllers when a **subscription** is created.

**Firewalls**

Careful consideration is required when configuring the firewall on the targets. This option can be configured with exceptions or disabled.

![Firewall Configuration](image)
The following example shows the summary screen of all components installed in the Windows Client master target device.

![Summary screen of all components installed in the Windows Client master target device.](image)

Make sure that the **Restart machine** option is selected so that the master is rebooted when you finish installation. After the machine is rebooted, proceed to image it by creating the vDisk as described in **Create the master image**.

### Configure a Windows Server master image

You must install the Provisioning Services agent or *Target Device Software*, and the VDA agent for XenDesktop from the Citrix Product Depot.

**Note:**

Depending on what agents and software you want to install on the master image, you can use a Windows Server OS machine as a Multi-user VDA in a Session Machine catalog or as a XenApp Server in a XenApp farm.

**Multi-user VDA in XenDesktop**

When used as Multi-user VDA in XenDesktop, you run **Autoselect** and select the Virtual **Delivery Agent for Windows Server OS** when the start the wizard.
Follow the instructions for master image preparation as described in Configure a Windows client master image.

Because the machine is a server, it provides applications running concurrently to multiple users in separate sessions.

The following example shows the list of programs and features that appear after installing the XenDesktop VDA agent.

<table>
<thead>
<tr>
<th>Name</th>
<th>Publisher</th>
<th>Version</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Visual C++ 2010 x64 Redistributable - 10.0.30319</td>
<td>Microsoft Corporation</td>
<td>10.0.30319</td>
<td>13.6 MB</td>
</tr>
<tr>
<td>Microsoft Visual C++ 2005 Redistributable</td>
<td>Microsoft Corporation</td>
<td>8.0.56193</td>
<td>344 KB</td>
</tr>
<tr>
<td>Microsoft Visual C++ 2005 Redistributable (x64)</td>
<td>Microsoft Corporation</td>
<td>8.0.59192</td>
<td>629 KB</td>
</tr>
<tr>
<td>Microsoft Visual C++ 2008 Redistributable - x64 9.0.30729.4148</td>
<td>Microsoft Corporation</td>
<td>9.0.30729.4148</td>
<td>780 KB</td>
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<tr>
<td>Microsoft Visual C++ 2008 Redistributable - x86 9.0.30729.4148</td>
<td>Microsoft Corporation</td>
<td>9.0.30729.4148</td>
<td>588 KB</td>
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<tr>
<td>Microsoft Visual C++ 2010 x86 Redistributable - 10.0.30319</td>
<td>Microsoft Corporation</td>
<td>10.0.30319</td>
<td>11.0 MB</td>
</tr>
<tr>
<td>Citrix Receiver</td>
<td>Citrix Systems, Inc.</td>
<td>14.1.0.0</td>
<td></td>
</tr>
<tr>
<td>Citrix Virtual Delivery Agent 7.1</td>
<td>Citrix Systems, Inc.</td>
<td>7.1.0.4031</td>
<td></td>
</tr>
</tbody>
</table>
Note that the only difference between Windows Client OS machines and Windows Server OS machines is that Server OS machines have the Remote Desktop Services role installed, and multiple connections are created during VDA agent installation.

![Remote Desktop Session Host Configuration](image)

### Configuration for Remote Desktop Session Host server:

**Connections**

<table>
<thead>
<tr>
<th>Connection Name</th>
<th>Connection Type</th>
<th>Transport</th>
<th>Encryption</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICA-CGF</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICA-CGF-1</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICA-CGF-2</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICA-CGF-3</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICA-HTML5</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICA-TCP</td>
<td>Citrix ICA 3.0</td>
<td>tcp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDP-Tcp</td>
<td>Microsoft RDP 7.1</td>
<td>tcp</td>
<td>Client Compatible</td>
<td></td>
</tr>
</tbody>
</table>

**Edit settings**

**General**

- Delete temporary folders on exit: Yes
- Use temporary folders per session: Yes
- Restrict each user to a single session: Yes
- User logon mode: Allow all connections

**Licensing**

- Remote Desktop licensing mode: Not specified
- Remote Desktop license servers: Not specified

After completing the installation and verifying that everything is in order (such as services are started, no errors or warnings appear in the event logs) restart the machine. After rebooting the machine image the machine by creating the vDisk as described in Create the master image.

**Multi-user machine as a XenApp server**

After configuring the Master XenApp server, launch Role Manager to create a XenApp server master image.

1. Select Start > All Programs > Administrative Tools > Citrix > XenApp Server Role Manager.

**Note:**

Values for Licensing are not configured by default. You can manually configure Licensing mode and License servers manually on the master through Group policy as described in Specify a License Server for an RD Session Host Server to Use.
2. In Server Configuration Tasks, under XenApp, click Edit Configuration.
3. Select Prepare this server for imaging and provisioning.

The server is removed from the farm and then configured and left ready to rejoin after reboot. Since the server will be imaged rather than restarted, any target devices that boot off that image or vDisk automatically join the farm on startup, therefore populating the farm.

All the changes in the farm are written the database on the SQL Server, and the information is not lost when the provisioned servers are shut down or restarted.

Important:

When this wizard completes, click Finish. Do not reboot the machine. At this point, create the master image or vDisk.

With XenApp, provisioned machines have XenApp servers for Delivery Controllers. Delivery Controllers are the defining components for Delivery Sites in App Orchestration.

The target devices in a XenApp Delivery Site are XenApp servers. Therefore you must install XenApp 6.5 after installing of the Provisioning Services agent on the master image.

The server must be a member of a farm (by either joining an existing or creating a new one) to successfully run later when the wizard prepares it for imaging and provisioning.
XenApp also requires the App Orchestration agent and Image Analysis components, which are the files `CitrixCamAgentServices_64.msi` and `CitrixCamImageAnalysis_x64.msi` on the Citrix Product Depot.

<table>
<thead>
<tr>
<th>Name</th>
<th>Publisher</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citrix App Delivery Setup Tools</td>
<td>Citrix Systems, Inc.</td>
<td>1.0.1.211</td>
</tr>
<tr>
<td>Citrix App Orchestration Agent</td>
<td>Citrix Systems, Inc.</td>
<td>2.0.0.69</td>
</tr>
<tr>
<td>Citrix App Orchestration Image Analysis</td>
<td>Citrix Systems, Inc.</td>
<td>2.0.0.69</td>
</tr>
<tr>
<td>Citrix Common Commands</td>
<td>Citrix Systems, Inc.</td>
<td>1.3.0.0</td>
</tr>
<tr>
<td>Citrix Group Policy Client-Side Extension (x64)</td>
<td>Citrix Systems, Inc.</td>
<td>1.5.0.0</td>
</tr>
<tr>
<td>Citrix Group Policy Management (x64)</td>
<td>Citrix Systems, Inc.</td>
<td>1.5.0.0</td>
</tr>
<tr>
<td>Citrix HDX MediaStream for Flash - Server</td>
<td>Citrix Systems, Inc.</td>
<td>2.0.0.0</td>
</tr>
<tr>
<td>Citrix HDX WME Provider</td>
<td>Citrix Systems, Inc.</td>
<td>2.0.0.0</td>
</tr>
<tr>
<td>Citrix Hotfix Rollup Pack XA650W23GR2v6-4R02</td>
<td>Citrix Systems, Inc.</td>
<td></td>
</tr>
<tr>
<td>Citrix License Configuration Tool</td>
<td>Citrix Systems, Inc.</td>
<td>1.1.0.0</td>
</tr>
<tr>
<td>Citrix Offline Plug-in</td>
<td>Citrix Systems, Inc.</td>
<td>6.5.0.6684</td>
</tr>
<tr>
<td>Citrix Receiver (Enterprise)</td>
<td>Citrix Systems, Inc.</td>
<td>13.1.0.09</td>
</tr>
<tr>
<td>Citrix Single Sign-On Console</td>
<td>Citrix Systems, Inc.</td>
<td>5.0.0.6684</td>
</tr>
<tr>
<td>Citrix Xen Windows x64 PV Drivers</td>
<td>Citrix</td>
<td>6.2.233</td>
</tr>
<tr>
<td>Citrix XenApp 6.5</td>
<td>Citrix Systems, Inc.</td>
<td>6.5.0.0</td>
</tr>
<tr>
<td>Citrix XenApp Commands</td>
<td>Citrix Systems, Inc.</td>
<td>6.5.0.0</td>
</tr>
<tr>
<td>Citrix XenApp Management</td>
<td>Citrix Systems, Inc.</td>
<td>6.5.0.0</td>
</tr>
<tr>
<td>Citrix XenApp Migration</td>
<td>Citrix Systems, Inc.</td>
<td>6.5.0.0</td>
</tr>
<tr>
<td>Citrix XenApp Server Configuration Tool</td>
<td>Citrix Systems, Inc.</td>
<td>1.2.0.0</td>
</tr>
<tr>
<td>Citrix XenApp Server Role Manager</td>
<td>Citrix Systems, Inc.</td>
<td>1.1.1.0</td>
</tr>
</tbody>
</table>

When the XenApp 6.5 server is the master for servers that are integrated into an App Orchestration deployment, the farm already exists and the farm is the one created by the initial XenApp servers that defined the Delivery Site. You can obtain the values required to join the master image to the farm, the SQL server name and the database name, from these servers. Once the server joins the farm, you can prepare for provisioning, after the following verification.

- Check that the server is working correctly by launching the Citrix AppCenter console and running discovery.
- Make sure the setting for Single Sign-On is unchecked
You can point to any of the XenApp servers in the Delivery Site for discovery.

Discovery fails if anything in the server is corrupted or improperly configured. If discovery completes successfully is a good indication that the server is healthy.

At this point the Master XenApp server is ready. To image the server, create the vDisk as described in Create the master image.

Create the master image

Obtain the master image from the reference machine where the Provisioning Server agent or target device software is installed. The master image is a .vhd file created on the Provisioning Server by the imaging utility. It contains an image of the entire hard disk of the master target. The extension .vhd stands for Virtual Hard Disk and the image file is known as the vDisk.

Create a master image for a Single-user machine

For this type of machines the imaging is simple, if you are familiar with the common task of imaging. For a detailed description, see CTX125740, How to image a target device using the Imaging Wizard.

Create a master image for a Multi-user machine

1. Create the database for the farm on a full SQL Server. Do not use the SQL Express software available on the Citrix Product Depot to create a database on the XenApp server. No special configuration of the database required,
2. Select the option to create a database on the SQL Server Management Studio console, and enter the database name and then click OK.
3. Install XenApp 6.5 on a server, which is referred to as the Master XenApp Server.
4. Launch XenApp Role Manager and select the option to configure a new farm.
5. Enter the database server name, credentials to access it, and the name of the database created in step 1.
6. Select **Test Connection** to make sure that you can contact the SQL Server and the database.

7. After completing the configuration, the wizard starts the farm.

8. To verify, launch the Citrix AppCenter console and run discovery.
9. Make sure that Single Sign-On is unchecked, and specify LOCALHOST for the server used for discovery.

Discovery fails if anything in the farm is corrupted or improperly configured; otherwise a successful completion indicates that the XenApp farm is healthy.

10. For extra verification, publish and launch an application.

You must separately configure a StoreFront server to provide access to the published application. When the test is complete, delete the published application from the XenApp console.

11. Install the Provisioning Services Target Device software from a local drive and not over the network.

The Master XenApp server is now ready.

12. Create the image (vDisk) by selecting Start > All Programs > Administrative Tools > Citrix > XenApp Server Role Manager.

13. In Server Configuration Tasks, under XenApp, click Edit Configuration.

14. Select Prepare this server for imaging and provisioning.
The server is removed from the farm and then configured and left ready to join it back after reboot. Since the server will not be restarted but instead imaged, any target devices that boot off the image automatically join the farm on startup, therefore populating the farm.

Note that all the changes in the farm are written to the database on the SQL Server, and the information is not lost when the provisioned servers are shut down or restarted,
Create a device collection

Provisioning Services uses the setup wizard to create multiple virtual machines in a Collection of target devices. There are two setup wizards in the Provisioning Services console as shown in the following example. They differ in their interaction with XenDesktop and the virtualization infrastructure.

- XenDesktop Setup Wizard — Virtual machines are added to the Provisioning Services collection and also automatically to a Session Machine catalog. Therefore, it requires a Delivery Controller with proper permissions for the current user.
- Streamed VM Setup Wizard — Interacts only with the hypervisor, and not with XenDesktop. However, after creating the VMs, they can be imported into a XenDesktop catalog as an Existing type.

The distinction is important because when creating and then adding virtual machines to a catalog in App Orchestration, those created directly on the hypervisor using the Streamed VM Setup Wizard are created by Provisioning Services.

Important:

Always use the Streamed VM Setup Wizard for creating target devices in App Orchestration. Do not use the XenDesktop Setup Wizard in an App Orchestration environment. It communicates directly with the Delivery Site, which would interfere with App Orchestration’s interaction with Delivery Controllers.
Device Collections and the right Organizational Unit

Creating a device collection in Provisioning Services requires a destination Organizational Unit (OU). The OU is the container in Active Directory where the computer accounts are created when the target devices are created on the hypervisor. Although computer accounts can be relocated to different OUs (only if it is necessary and with the proper precautions), Citrix recommends that the selected destination OU is the same as the App Orchestration root OU when running the Streamed VM Setup Wizard for App Orchestration.

For example, when creating a catalog of provisioned machines in App Orchestration, always select Import externally-created Session Machines, as shown in the following example.
In the following example, two virtual machines are added to a catalog. These machines were created by Provisioning Services through the **Streamed VM Setup Wizard**. The symbols to the right of the last machine listed (in this case, the second one) allow dynamically adding or removing machines and thus decide the initial size of the catalog while creating it.

### Basic Settings

<table>
<thead>
<tr>
<th>Machine Name:</th>
<th>ft27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Name:</td>
<td>ft28</td>
</tr>
<tr>
<td>Domain:</td>
<td>ca.local</td>
</tr>
<tr>
<td>Datacenter:</td>
<td>DCenter0</td>
</tr>
</tbody>
</table>

### Machine account passwords in Provisioning Services

The following sources describe the importance of synchronizing the machine account password with Active Directory when using Provisioning Services.

- [CTX132289](#), *How to Troubleshoot Provisioning Server Machine Account Password*
- [Citrix Provisioning Server and Active Directory Machine Account Password Synchronization](#)
- [eDocs Provision Services](#), specifically **Provisioning Services Administration section for the release**

Failure to correctly configure correctly any of the following components may lead to multiple issues, such as targets failing to register or the inability to log on with domain accounts.

- Provisioning server
- vDisk
- Group Policy for target devices

For an example, see [CTX134340](#), *Error: The trust relationship between this workstation and the primary domain failed.*
The following example shows the Group Policy:

```
PVS Target Device
Computer Configuration (Enabled)

Policies
Windows Settings
Security Settings
Local Policies/Security Options
Domain Member

<table>
<thead>
<tr>
<th>Policy</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain member: Disable machine account password changes</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

User Configuration (Enabled)

No settings defined.
```

**Important:**

**This group policy must be linked to any OUs containing provisioned target machines.**

In any App Orchestration deployment there can be multiple OUs containing provisioned machine accounts. Therefore, it is important that the administrator makes sure to link the group policy to all Delivery Groups as soon as a new one is created.
Provisioned machines in the App Orchestration deployment

As previously described, you use the Streamed VM Setup Wizard from the Provisioning Services console to create a device collection, which is a collection of computer accounts in Active Directory associated to diskless VMs in a hypervisor. All the machines in the collection boot from the vDisk you created, and then the vDisk is streamed across the network by the Provisioning Server and attached to the targets at boot time.

Like other regular Session Machines, whether they are Single-user or Multi-user machines, provisioned machines in App Orchestration are deployed through a catalog. There are no special considerations for provisioned machines.

App Orchestration uses group policies to configure critical values on the different machines, and those group policies apply regardless of the machine being provisioned. In a sense, provisioned machines are transparent. The important consideration of machine account passwords for Provisioning Services is not a requirement of App Orchestration, but inherent to the way Provisioning Services works.

Create a new version of a Provisioning Services Session Machine Catalog

When implementing changes in a Session Machines Catalog (catalog), such as adding a new application, changes are first applied to one of the Session Machines. App Orchestration uses versioning to change all remaining machines in the catalog.
Selecting **Create new version** displays a dialog box similar to the following.

**Create New Version - W8.1x64**

**Machines will begin the upgrade process as soon as all users have logged off**

- ☐ Force users to log off by 10/31/2013 04:53 pm
- ☐ Do not force users to log off
- **☑ Complete upgrade process without admin intervention**

This option should be selected if an in-place upgrade script is being used (KB Article) or the machine is provisioned via PVS or another image-streaming technology such that a reboot is sufficient to upgrade the machine to a new version.

For Provisioning Services machines, only a reboot is necessary to upgrade the catalog to a new version. Provisioning Services has its own versioning mechanism that allows vDisks to remain in use the entire time that changes are performed, minimizing downtime for users. When the new version is ready, you need only reboot targets to implement the updated vDisk.

Because Provisioning Services has its own implementation of versioning, the App Orchestration new version update mechanism does not apply to provisioned machines. In addition, even Provisioning Services product versions that do not include versioning capability (such as 5.6) can implement updates without any intervention by App Orchestration other than handling the reboot of the targets.

Previously, you duplicated the vDisk, booted it from a target device in Private mode to make the changes, and then shut down the target to change the vDisk back to standard mode. With the new versioning method, you need only shut down and restart targets when a new vDisk becomes available, for the targets to get the updated vDisk.

App Orchestration’s new versioning feature lets you update Provisioned catalogs with minimal administrative intervention.

For more information see:

- [Provisioning Services: From Single Image Delivery to Single Image Management](#)
- [Provisioning Services 7.x Updating vDisks](#)
- [Provisioning Services 6.1 Updating vDisks](#)
Create provisioned machines

Although Provisioning Services can stream a vDisk to both types of machines, the following procedure assumes that only virtual machines are used with Provisioning Services.

In this example, the first machine is running Windows Server 2008 R2.

1. Assign the first machine to the catalog. This first Session Machine is used as the Master XenApp Server because adding it to the new catalog makes the App Orchestration wizard install all the required components and configure it, automatically installing the XenApp server, the App Orchestration agent, and configure the farm.

   Note:

   Previously this document described how the Master XenApp server was configured manually and joined to the XenApp farm before preparing it for imaging and provisioning. In this example, because App Orchestration perform those actions, this Master XenApp server, can also be prepared for imaging and provisioning. The results are the same and in fact, the first Session Machine in any catalog, (Single-user or Multi-user, as well as for a XenDesktop catalog) can be the machine with the master image.

2. When the installation activities complete and the workflows successfully complete, create the master image, provision the server, and create a vDisk after completing some post-install configuration activities.

   Caution:

   When a Windows Server in which XenApp 6.5 is installed but not configured to the catalog, no farm is created or joined. There is no .dsn file, and the IMA service is not started; basically the server is in standby.
Connecting to it displays the XenApp Role Manager:

The server only becomes active when it is added to a subscription or added to increase the capacity of a Delivery Group. The IMA service starts and it provides applications, as shown in the following example:

![Diagram of XenApp Role Manager](image-url)
After adding the server to the catalog, the XenApp server machine account remains in the App Orchestration root OU (in this example, Citrix) and the Delivery Site policy does not apply. Therefore, the IMA service fails to start because the **Database Server Name** and **Database Name** values in the policy are missing from the registry. The server is not a member of a farm so it is not operational.

![Registry Editor](image)

![Registry Editor](image)

3. Similarly, when the server is later assigned to a subscription, the machine account is automatically moved to the Delivery Group OU under the **Session Machines** container to which the Delivery Site Group Policy Object is linked. With the values required to start the IMA service applied, the server becomes a member of a farm, the **MF20.dsn** file is created and the server becomes active or operational.

At this point, the following has occurred:

- The first Multi-user machine (the Master XenApp Server) is a member of a new catalog but not of any XenApp farm
- The machine account is on the App Orchestration root OU
- XenApp6.5 is installed on the machine, but the IMA service is not started because the Group Policy Object values are not applied
- There is no **MF20.dsn** file in the IMA folder
- The server is not fully operational or active as a XenApp Session Machine

Therefore, the Master XenApp server is not ready for imaging and provisioning. The preparation for provisioning a XenApp server begins with removing the server from the farm, and it has been clearly established that this server is not a member of a farm. Also, even though imaging the server is technically possible, any target devices booting from that image or vDisk is by definition identically configured to the master. That is they also will not be members of any farm, and would just start the XenApp Role Manager as shown in the previous example.

4. To prepare for imaging the Master XenApp Server for temporarily become a member of a farm.
   a. Log on to the machine and when the XenApp Role Manager wizard starts automatically, configure licensing
   b. Join the XenApp Delivery Controller farm, responding to the prompts for database server name, admin credentials, and the name of the database. These are the same values entered originally when creating the Delivery Site.
c. When the Master XenApp server joins the farm the **MF20.dsn** file is created and the IMA service starts, but only because the required values were entered in the XenApp Role Manager wizard. Because the server is still in the App Orchestration root OU, the Group Policy Objects don’t apply. It is important that the **MF20.dsn** file has the proper values because the file is not deleted when the server is shut down or restarted, nor destroyed when the server is prepared for imaging and provisioning. The file is present in all the provisioned XenApp servers that boot from the master image of the Master. Correct values can prevent some potential issues.

The following example shows what happens when the Master server joins a test farm instead of the XenApp Delivery Site farm and then is imaged:

5. Launch the Citrix AppCenter console and run discovery pointing to either or both of the two Delivery Controllers for the site. Running discovery is necessary because the name of the servers is retained and then discovery work automatically, on any provisioned server. There are no published applications nor are they needed. If the discovery process completes without errors then the XenApp server is healthy and can be imaged for provisioning as described in the next step.

6. From the Citrix program group, launch the XenApp Server Role Manager and run the option to prepare the server for imaging and provisioning. This removes it from the farm and configures it to rejoin after reboot.

7. Exit the wizard but do not reboot.

   **Note:**

   **Because the server is removed from the farm, it no longer appears as a member when running discovery from the Delivery Controllers.**

8. Create the master image of the Master XenApp Server.

9. When the vDisk creation is complete, (which may take approximately 30 minutes for a typical scenario), set it to standard mode and configure the XenApp servers in the Provisioning Services collection to use this vDisk.

There are now two XenApp servers configured as Delivery Site controllers, and there are many others available machines as needed to create a Multi-user Session Machine catalog. You can create additional Provisioned XenApp servers by using the Streamed VM Setup Wizard, then adding it to the catalog, create new Delivery Groups, or add capacity to existing ones.
Next, provisioned XenApp servers serve applications (offerings) to different group of users by virtue of subscriptions. And how Delivery Groups correlate to the familiar concept of Worker Groups in XenApp

Create a Multi-user (provisioned) Session Machine Catalog

Once provisioned XenApp servers are available, you can add them to a catalog.

The following example shows what happens in Active Directory compared to how the same elements appear in the Citrix AppCenter console.

When creating a catalog, the Session Machines remain in the App Orchestration root OU.

When machines are part of a subscription the computer accounts are moved to the OU created for the Delivery Group.

In the follow example, there are three Delivery Groups with XenApp machines, all of which have the same Group Policy Object for the XenApp Delivery Site linked. That is, they are members of the same farm but subscribed to different offerings; serving different applications for different groups of users related to one or more tenants.
The following example shows how the Delivery Groups in App Orchestration correspond to Worker Groups in XenApp.

Important:
As mentioned in Machine account passwords in Provisioning Services, you must apply a specific machine account password for the group policy to all provisioned machines:
In the following example, the administrator must manually link the Provisioning Services group policy to all the Delivery Groups as they are created.

Alternatively you can edit the Group Policy for the Delivery Site that App Orchestration creates automatically, and add the machine account password setting to the policy. When App Orchestration creates a new Delivery Group, it automatically links to the Group Policy, essentially automating the process. However, you must make sure that the machine account password setting is only applied to Delivery Groups containing provisioned machines and never to non-provisioned machines.
Create a provisioned XenApp farm

This section is included as a general reference about provisioning XenApp version 6.5 servers.

1. Create the database for the farm on a full SQL Server. Do not use the SQL Express software available on the Citrix Product Depot to create a database on the XenApp server. No special configuration of the database required.
2. Select the option to create a database on the SQL Server Management Studio console, and enter the database name and then click OK.
3. Install XenApp 6.5 on a server, which is referred to as the Master XenApp Server.
4. Launch XenApp Role Manager and select the option to configure a new farm.
5. Enter the database server name, credentials to access it, and the name of the database created in step 1.
6. Select Test Connection to make sure that you can contact the SQL Server and the database.
7. After completing the configuration, the wizard starts the farm.
8. To verify, launch the Citrix AppCenter console and run discovery.
9. Make sure that **Single Sign-On** is unchecked, and specify **LOCALHOST** for the server used for discovery.

![Citrix AppCenter Console](image)

Discovery fails if anything in the farm is corrupted or improperly configured; otherwise a successful completion indicates that the XenApp farm is healthy.

10. For extra verification, publish and launch an application.

   You must separately configure a StoreFront server to provide access to the published application. When the test is complete, delete the published application from the XenApp console.

11. Install the Provisioning Services Target Device software from a local drive and not over the network.

    The Master XenApp server is now ready.
12. Create the image (vDisk) by launching the XenApp Role Manager and selecting the option to prepare the server for provisioning.

The server is removed from the farm and then configured and left ready to join it back after reboot. Since the server will not be restarted but instead imaged, any target devices that boot off the image automatically join the farm on startup, therefore populating the farm.

Note that all the changes in the farm are written the database on the SQL Server, and the information is not lost when the provisioned servers are shut down or restarted,

References and additional reading

CTX129993 - Provisioning Services 6.x Administrator's Guide
CTX129994 - Provisioning Services 6.x Installation and Configuration Guide
CTX117374 - Best Practices for Configuring Provisioning Server on a Network
CTX127549 - Provisioning Services Best Practices
CTX124185 - Provisioning Services Antivirus Best Practices
CTX135360 - Planning, Implementing and Troubleshooting Provisioning Services