Citrix XenApp Installation Guide

Citrix XenApp™ 5.0 for Microsoft® Windows Server® 2008

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Welcome

This preface describes how to find the information needed to implement Citrix XenApp 5.0 and its components, and it includes:

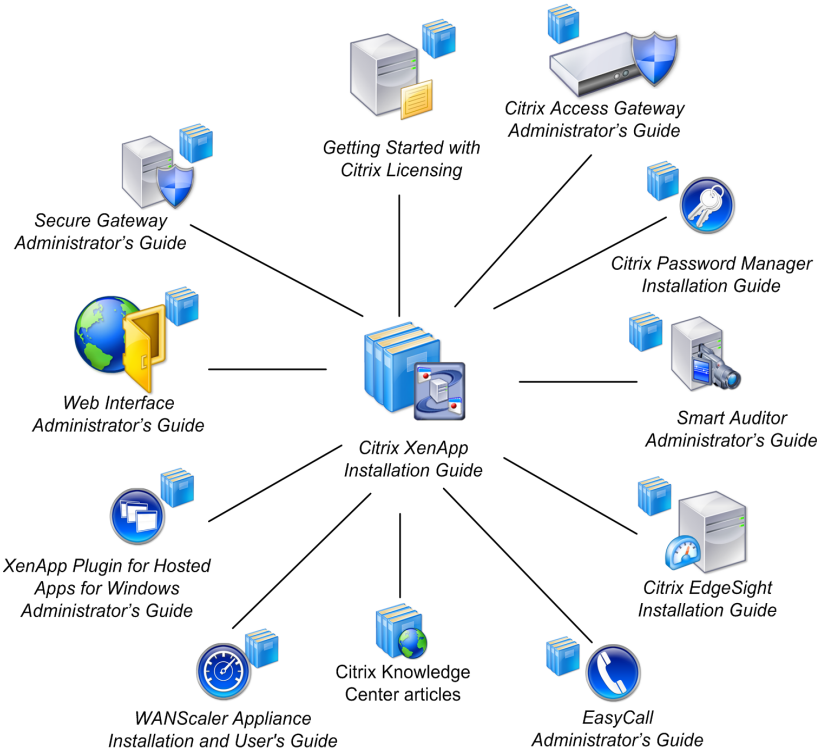
- How to find the installation instructions for XenApp components
- A list of white papers, Knowledge Base articles, and other resources you might find helpful when you are installing XenApp
- How to use Citrix documentation in general
- How to contact Citrix Technical Support and how to enroll in Citrix training courses

Be sure to review the *Readme for Citrix XenApp* before installing Citrix XenApp.

How to Use This Guide to Install XenApp

This guide helps you install XenApp and plan the implementation that will eventually go into production in your environment.

Because a typical XenApp deployment often comprises many XenApp components, all of which have their own Setup instructions, this guide does not provide details about these installations. Instead, installation instructions for components such as the Web Interface, Secure Gateway, the plugins, Access Gateway, and Platinum components are provided in their respective installation or administrator's guides.



This illustration provides an overview of the installation resources available for planning your XenApp deployment.

Organization of the XenApp Installation Guide

This table lists tasks you might perform and the sections containing the pertinent information:

Task	See this section
Learning about farm architecture and installation concepts	"Learning XenApp Installation Concepts" on page 15
Planning your server farm deployment	"Planning Your XenApp Deployment" on page 25
Creating the data store database	"Data Store Database Reference" on page 173
Preparing your environment to install XenApp	"Preparing to Install XenApp" on page 61
Creating a farm	"Creating a New XenApp Farm" on page 75

Task	See this section
Migrating an existing XenApp farm	“Migrating to XenApp 5.0” on page 95
Installing XenApp using scripts, answer files, and transforms	“Custom XenApp Installation Reference” on page 125
Installing XenApp using Windows Installer Commands (msiexec)	“XenApp Windows Installer Properties Reference” on page 139
Methods of provisioning servers in large environments	“Provisioning Farm Servers” on page 113
Configuring XenApp after installation	“Configuring and Provisioning XenApp” on page 113

This guide also includes information that is not specific to installation, such as general information about database maintenance and the User Account Control (UAC).

The data store requirements are in the *Citrix XenApp Installation Checklist*.

If You are New to XenApp

If you never installed XenApp before, consider reading:

- “Planning Your XenApp Deployment” on page 25
- “Preparing to Install XenApp” on page 61
- “Creating a New XenApp Farm” on page 75
- “Configuring and Provisioning XenApp” on page 113

Before you begin planning your implementation, set up a test farm in a laboratory environment so that you can become familiar with XenApp Setup.

You can install XenApp on systems that meet the requirements to run Windows Server 2008 with the Terminal Services and Web Server roles configured and follow the instructions in “Preparing to Install XenApp.” For a small test farm, use Microsoft Access to host the data store.

If You Installed XenApp Before

If you installed XenApp before, consider reading:

- “What’s Changed in XenApp Setup in This Release?” on page 96, which provides information about changes to features and changes that impact installation scripts
- “Choosing to Run Setup with User Account Control Enabled or Disabled” on page 65, which provides tips for installing XenApp with Microsoft’s User Account Control (UAC) enabled

- “Choosing a Farm Migration Strategy” on page 99
- “Working with Mixed Farms” on page 107
- The overviews of new features are provided in *Getting Started with Citrix XenApp*

  This guide also provides a table listing which features are available in each edition.

Installation Resources

Use these resources to help plan your XenApp deployment:

- The *Citrix XenApp Installation Checklist* contains the installation prerequisites for XenApp.
- The *Citrix XenApp Administrator's Guide*. This guide provides information about core XenApp features, including publishing, administrator accounts, and security.
- The Citrix XenApp readme, the Citrix XenApp Plugin 11.*x* for Windows readme and the Readme for Citrix Licensing for Windows.
- The *Getting Started with Citrix Licensing* guide.
- The *XenApp Plugin for Hosted Apps for Windows Administrator's Guide*, which outlines plugin deployment.
- Component-specific documentation, such as the *Secure Gateway for Windows Administrator's Guide*, *Web Interface Administrator's Guide*, and *Citrix Application Streaming Guide*. Typically, if there is not a specific installation guide for a component, the component’s installation is documented in its administrator’s guide.
- The sample answer file template for unattended installations, which you can copy and customize for your needs, is in the XenApp installation media in Support\Install\UnattendedTemplate.txt.
- The following Citrix white papers or their replacements provide information about specialized installation topics:
  - *How to Include the License Server Information in an Unattended Installation* (CTX105536)
  - *Understanding MSI Installation Logs* (CTX415447)

  At the time of this printing, these were available from the Citrix Knowledge Center.

Additional resources you might find helpful, depending on the Citrix products in your environment, include the:

- *Citrix Access Gateway Administrator's Guide*
- *Citrix EdgeSight Installation Guide*
- *WANScaler Appliance Installation and User's Guide*
- *EasyCall Administrator's Guide*

New Names for Citrix Presentation Server Components

Citrix XenApp is the new name for Citrix Presentation Server. The following clients and components have been updated to reflect that product name.

- *Citrix XenApp Advanced Configuration* is the new name for the Presentation Server Console
- *Citrix XenApp Plugin for Hosted Apps* is the new name for the plugin for server-side virtualization (formerly named Citrix Presentation Server Client), which contains the following plugins:
  - Citrix XenApp, formerly named Program Neighborhood Agent
  - Citrix XenApp Web Plugin, formerly named the Web Client
  - Program Neighborhood
- *Citrix XenApp Plugin for Streamed Apps* is the new name for the plugin for client-side virtualization, formerly named the Citrix Streaming Client
- *Citrix XenApp Provider* is the new name for the WMI Provider
- *Citrix XenApp Management Pack* is the new name for the System Center Operations Manager and MOM Management Packs

Finding Documentation

"Welcome to Citrix XenApp" (Read_Me_First.html), which is included on the installation media, contains links to documents that will help get you started. It also contains links to the most up-to-date product documentation for XenApp and its components, plus related technologies. After installing documentation and help from Autorun, you can access this document by clicking **Start > All Programs > Citrix > XenApp Server > Documentation**.

The Citrix Knowledge Center Web site, http://support.citrix.com, contains links to all product documentation, organized by product. Select the product you want to access and then click the **Documentation** tab from the product information page.

Known issues information is included in the product readme.

See the *Citrix XenApp Comparative Feature Matrix* at http://www.citrix.com/xenapp/comparativematrix for information about which features are supported in the XenApp editions.

To provide feedback about the documentation, click the **Article Feedback** link located on the right side of the product documentation page.

Documentation Conventions

For consistency, Windows Vista and Windows Server 2008 (64-bit) terminology is used throughout the documentation set; for example, “Documents” rather than “My Documents” and “Computer” rather than “My Computer” are used.

Citrix XenApp documentation uses the following typographic conventions.

Convention	Meaning
Boldface	Commands, names of interface items such as text boxes, option buttons, and user input.
Italics	Placeholders for information you provide. For example, filename means you type the actual name of a file. Italics are also used for new terms and titles of books.
`Monospace`	Text displayed in a text file.
{braces}	In a command, a series of items, one of which is required. For example, {**yes** | **no** } means you must type yes or no. Do not type the braces themselves.
[brackets]	In a command, optional items. For example, [/**ping**] means you can type /**ping** with the command. Do not type the brackets themselves.
| (vertical bar)	In a command, a separator between items in braces or brackets. For example, { **/hold** | **/release** | **/delete** } means you must type **/hold** or **/release** or **/delete**.
... (ellipsis)	The previous item(s) in the command can be repeated. For example, /route:*devicename*[,…] means you can type additional *devicename*s separated by commas.

Getting Support and Training

Citrix provides an online user forum for technical support. This forum can be accessed at http://support.citrix.com/xenappforum/. The Web site includes links to downloads, the Citrix Knowledge Center, Citrix Consulting Services, and other useful support pages.

The Citrix Knowledge Center (http://support.citrix.com) offers a variety of technical support services, tools, and developer resources.

Information about Citrix training is available at http://www.citrix.com/edu/.

Learning XenApp Installation Concepts

This topic introduces XenApp installation concepts, including:

- XenApp Setup Terminology
- Basic Farm Concepts Overview
- Introduction to XenApp Infrastructure Servers

Review this information before designing your farm architecture.

XenApp Setup Terminology

XenApp Setup comprises two installation wizards:

- **Create a New Farm**. The first time you install XenApp, select **Create a New Farm** in the installation wizard and Setup creates the farm with that server hosting specific roles.

  The server where you installed XenApp and created the farm is the *first farm server* or the *Create farm* server. The path in Setup you take after selecting **Create a New Farm** is the *Create Farm*.

- **Join an Existing Farm**. When you run Setup on servers after installing XenApp on the first farm server, you take a different path in Setup and XenApp references the settings you specified on the first farm server. These servers join the existing farm and communicate with the first server in the farm.

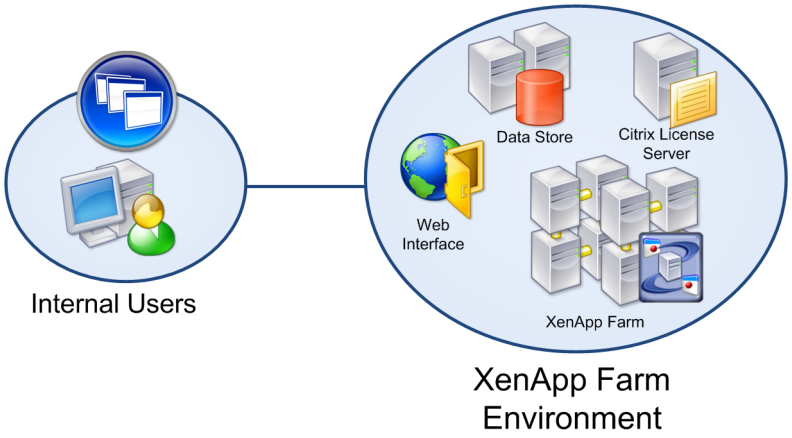
Some additional terminology used in the installation documentation:

- **Multi-user environment.** This is any environment, including XenApp and Terminal Services, where applications are published on servers for use by multiple users simultaneously.
- **Application servers.** The farm servers that host published applications.

- **Infrastructure servers.** The farm servers that host infrastructure services, such as the data store or the license server. Typically, they do not host published applications.
- **Production farm.** A farm that is in regular use and accessed by users in your organization.
- **Design Validation Farm**. A farm that is set up in a laboratory environment, typically as the design or blueprint for the production farm.
- **Pilot farm.** A preproduction pilot farm used to test a farm design before deploying the farm across your organization. A true pilot is based on access by select users, and then, subsequently, adding users until all users access this farm for their everyday needs.
- **Enumeration**. The process in which a client transmits data to locate servers on the network and retrieves information about the server farm's published applications. During enumeration, Citrix XenApp Plugin for Hosted Apps communicates with the Citrix XML Service or the ICA browser, depending on the browsing protocol selected in the plugin.

Basic Farm Concepts Overview

This topic assumes that you understand the basic concepts in XenApp such as the client-server architecture, redirection, and application publishing. For a review of these concepts and features, see *Getting Started with Citrix XenApp*.



This illustration depicts a basic deployment of Citrix XenApp.

Understand these concepts to plan your farm:

- **Citrix Licensing.** A Citrix License Server is a required component for all XenApp deployments. Install the license server on either a shared or stand-alone server, depending on your farm's size. After you install the license server, download the appropriate license files and add these to the license server. For instructions, see the *Getting Started with Citrix Licensing Guide*.

- **Data Store.** The data store is the database where servers store farm static information, such as configuration information about published applications, users, printers, and servers. Each server farm has a single data store.

- **Data Collector**. A data collector is a server that hosts an in-memory database that maintains dynamic information about the servers in the zone, such as server loads, session status, published applications, users connected, and license usage. Data collectors receive incremental data updates and queries from servers within the zone. Data collectors relay information to all other data collectors in the farm. By default, the first server in the farm functions as the data collector.

  By default, the data collector is configured on the first farm server during the Create Farm Setup and all other servers are configured so they have equal rights to become the data collector if the data collector fails. When the zone's data collector fails, a data collector election occurs and another server takes over the data collector functionality. Farms determine the data collector based on the election preferences set for a server.

  The data collector is an infrastructure server and applications are not typically published on it.

- **Zone.** A *zone* is a grouping of XenApp servers that communicate with a common data collector. In large farms with multiple zones, each zone has a server designated as its data collector. Data collectors in farms with more than one zone function as communication gateways with the other zone data collectors.

  The data collector maintains all load and session information for the servers in its zone. All farms have at least one zone, even small ones. The fewest number of zones should be implemented, with one being optimal. Multiple zones are necessary only in large farms that span WANs.

- **Streaming File or Web Server**. Applications can be delivered to users by either streaming or hosting the applications on the server. If you are streaming applications, either to client or server, you must install a streaming file server in your environment. When streaming applications, you create profiles of the application and then store the profile on a file or

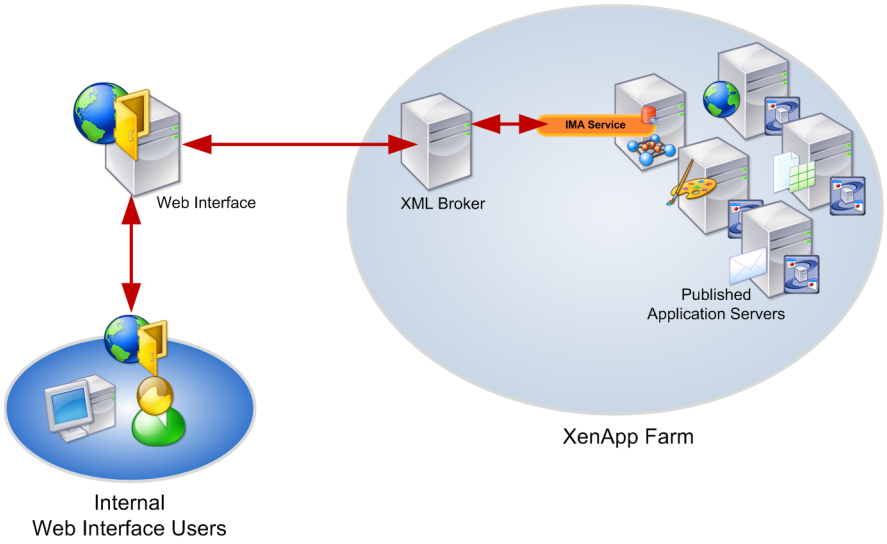
Web server. The profile consists of the manifest file (.profile), which is an XML file that defines the profile, as well as the target CAB files, a hash key file, the icons repository (Icondata.bin), and a scripts folder for pre-launch and post-exit scripts.

- **Web Interface.** The Web Interface is a required component in any environment where users access their applications using either the XenApp plugin or a Web browser. Install the Web Interface on a stand-alone computer; however, where resources are limited, the Web Interface is sometimes collocated with other functions. For instructions, see the *Web Interface Administrator's Guide*.
- **XenApp Web and XenApp Services Sites**. XenApp Web and XenApp Services sites (formerly known as Access Platform and Program Neighborhood Agent Services sites, respectively) provide an interface to the server farm from the client device. When a user authenticates to a XenApp Web or XenApp Services site, either directly or through the XenApp plugin or the Access Gateway, the site:
  - Forwards the user's credentials to the Citrix XML Service
  - Receives the set of applications available to that user by means of the XML Service
  - Displays the available applications to the user either through a Web page or by placing shortcuts directly on the user's computer
- **Citrix XML Service and the Citrix XML Broker.** The Citrix XML Broker functions as an intermediary between the other servers in the farm and the Web Interface. When a user authenticates to the Web Interface, the XML Broker:
  - Receives the user's credentials from the Web Interface and queries the server farm for a list of published applications that the user has permission to access. The XML Broker retrieves this application set from the Independent Management Architecture (IMA) system and returns it to the Web Interface.
  - Upon receiving the user's request to launch an application, the broker locates the servers in the farm that host this application and identifies which of these is the optimal server to service this connection based on several factors. The XML Broker returns the address of this server to the Web Interface.

  The XML Broker is a function of the Citrix XML Service. By default, the XML Service is installed on every server during XenApp Setup. However, only the XML Service on the server specified in the Web Interface functions as the broker. (The XML Service on other farm servers is still

running but is not used for servicing end-user connections.) In a small farm, the XML Broker is typically designated on a server dedicated to several infrastructure functions. In a large farm, the XML Broker might be configured on one or more dedicated dedicated servers.

The XML Broker is sometimes referred to as a Citrix XML Server or the Citrix XML Service. For clarity, the term XML Broker is used to refer to when the XML Service functions as the intermediary between the Web Interface and the IMA service, regardless of whether it is hosted on a dedicated server or collocated with other infrastructure functions.



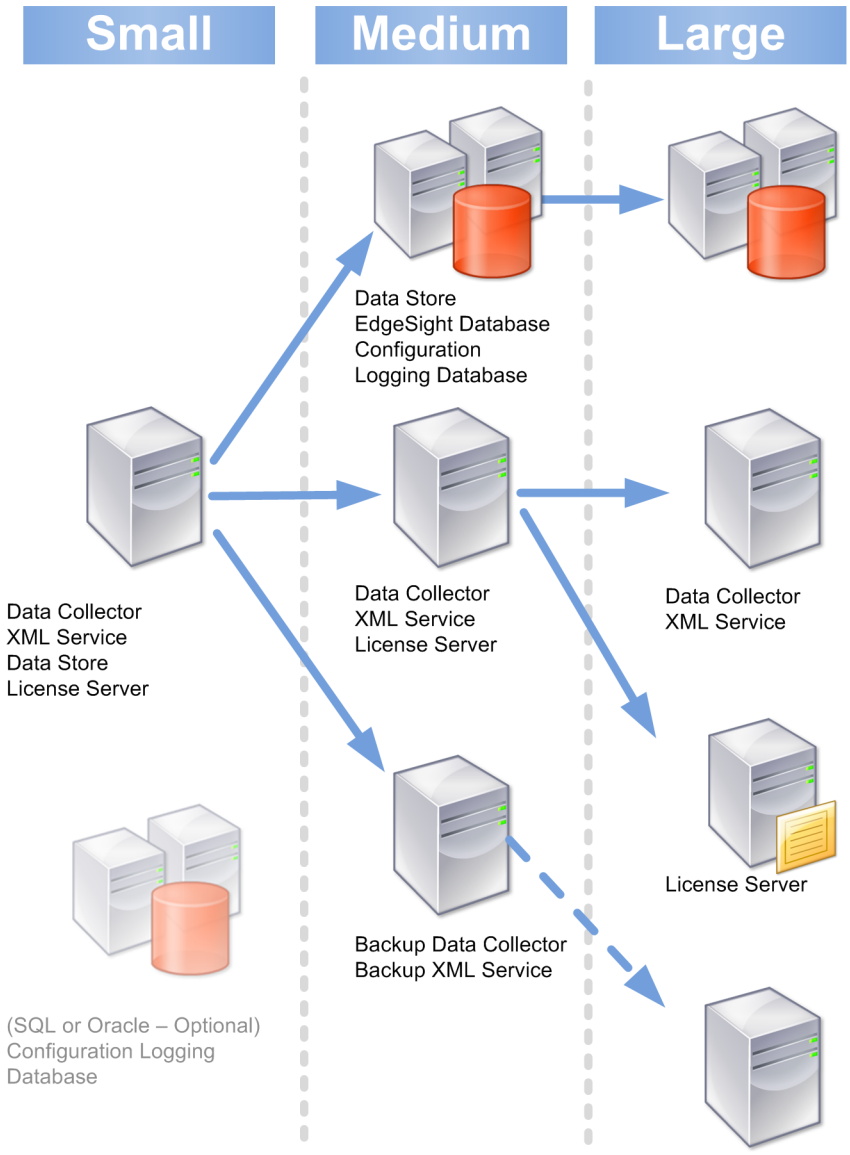
This illustration uses a large farm to show how the Web Interface and the XML Broker work together. (1) The user connects to the Web Interface through the XenApp plugin or a Web browser; (2) the Web Interface contacts the XML Broker to determine which applications are available for this user; (3) the XML Broker queries the IMA service for this information and returns the results to the Web Interface; (4) the Web Interface displays the available applications to the user either through a Web page or by placing shortcuts directly on the user's computer.

Introduction to XenApp Infrastructure Servers

XenApp farms have two types of servers: infrastructure servers and member servers that host published applications. *Infrastructure servers* perform specific functions and do not typically host published applications, except in small farms. The services include:

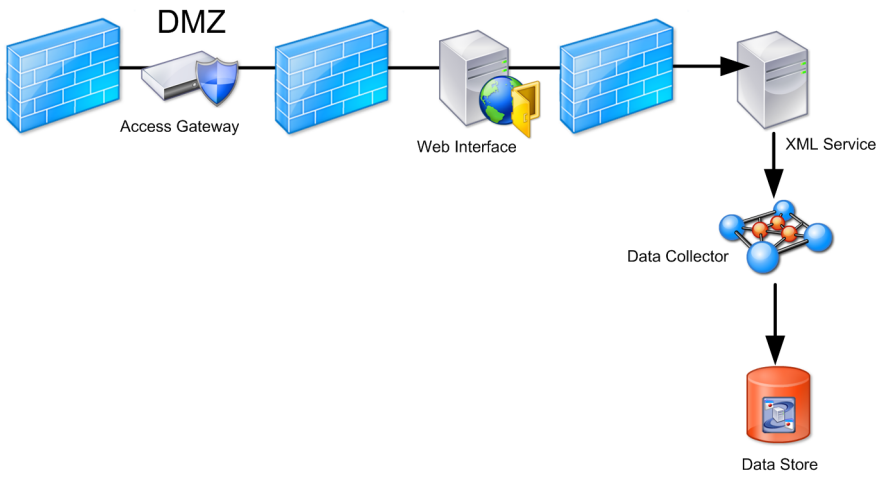
- **Farm infrastructure services.** Data store, data collector, and the Citrix XML Broker.
- **Access infrastructure services.** Web Interface, Secure Gateway (optional), and Access Gateway (optional).
- **Additional services.** Citrix License Server, Streaming File or Web Server (optional), a computer for profiling applications, Configuration Logging database (optional), EdgeSight database (optional), and SmartAuditor player (optional).

One or more of these infrastructure services can be grouped together in small farms. In large deployments, each service runs on one or more dedicated servers.



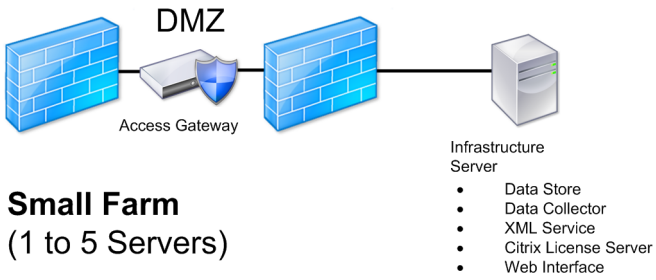
This illustration suggests what infrastructure functions can be grouped on the same server, depending on the size of your environment.

However, factors besides size can affect how infrastructure functions are grouped together. Specific security concerns, virtualized servers, and user load all play a part in deciding which functions can be collocated.



This illustration depicts infrastructure servers in a large farm. The Web Interface, the XML Service, the data collector, and the data store are deployed on separate servers.

A good way to think of the division between infrastructure servers and published application servers is to think of an infrastructure server as the *controller server* and the published application servers as the *worker servers*. The controller server provides the infrastructure that manages and supports the worker servers, which host the applications. Typically, in larger farms, you segregate the controller functions onto distinct servers. For small farms, however, you might have one controller server hosting infrastructure functions and multiple worker servers hosting published applications.



This illustration depicts a small farm's infrastructure server communicating with the Access Gateway. In this scenario, the data store, the data collector, the XML Service, the Citrix License Server, and the Web Interface are installed on one infrastructure server.

Small farms that require redundancy might have one or two infrastructure servers. For example, in a small farm with an Access data store, the data store might be configured on the same server as the data collector and the XML Broker and, perhaps even, the Citrix License Server and the Web Interface.

Medium and large farms might group infrastructure servers and services together when they have similar functions. For example, the XML Broker might be grouped with the data collector. In some larger deployments, each infrastructure service would likely have one or more dedicated servers. For example, in large farms, the Citrix License Server and the Web Interface are typically hosted on separate servers.

Planning Your XenApp Deployment

This topic focuses on the planning and design considerations for your farm, including:

- Tasks for Designing and Deploying a Farm
- Planning for Applications and Server Loads
- Planning Infrastructure Servers
- XenApp Hardware Configurations
- Considering Your Network Infrastructure

Tasks for Designing and Deploying a Farm

Applications are key to XenApp farms and drive all planning decisions you make for your farm. The major decisions made during your planning process all stem from points:

- What applications to publish on the farm, which ones work, which ones require changes to work, and which ones are not candidates for publishing?
- How will users access their applications?
- How to configure applications?

These decisions drive your network infrastructure, farm design, and hardware requirements. A typical process for planning a XenApp farm includes:

1. Becoming familiar with XenApp and XenApp Setup by creating a small, one-server or two-server test farm.
2. Deciding which applications to deliver to users.
3. Determining how you want to deliver applications; either virtualized on the server or the client. Do this by testing and evaluating the applications, as well as considering peripheral requirements.
4. Determining where to install the applications on XenApp servers and which applications can be collocated.

5. Determining how many servers you need for the applications.
6. Determining the total number of servers you need for your farm and evaluating hardware requirements.
7. Creating the network infrastructure design and defining the installation processes.
8. Creating a pre-production pilot farm based on your farm design.
9. Testing the pilot farm.
10. Releasing the farm into production.

When designing your farm, Citrix strongly recommends creating a detailed design document as the blueprint for your new environment. A XenApp farm design document should incorporate the design decisions associated with each component and functional area for architecture, operating system configurations, user access, and application delivery. Use the topics in this chapter as a guide to the areas to cover.

The document creation process drives you to analyze the limitations and requirements of your environment, raise design concerns that could impede success, and plan for growth requirements.

Planning for Applications and Server Loads

Before you can determine how many servers you need in your farm and on which servers to install applications, decide what applications you want to deliver and how you want to deliver them. This topic outlines how to determine what applications to publish and how to deliver them.

Assessing Applications for XenApp Compatibility

Before publishing applications on a production farm, ensure that they are compatible with the server operating system and are multiuser compatible. Application compatibility drives the application delivery method (accessed from the server, streamed to server, or streamed to client desktops). Many applications support multiuser environments and work in XenApp without any additional configuration.

When you design your farm, evaluate whether or not applications are compatible with multiuser environments and, if so, the application server's scalability. Before testing applications for compatibility, search the Internet or the application's support forums to see how the application works with Terminal Services or XenApp. Terminal Services-compliant and Windows Logo certified applications experience few, if any, issues compared with noncompliant applications.

Initial application compatibility testing typically involves publishing the application so that is installed and hosted on a server in a test farm and having multiple test users connect to it.

After initial testing, it should become apparent what applications work and what applications have issues. Applications that function correctly should be tested for conflicts with other applications you want to install on the server and, then, scalability.

Applications that do not function correctly might not have been designed for multiuser, multiapplication environments. Applications not designed for these environments can conflict with other applications or have scalability or performance issues. Registry settings, attempts to share files or DLLs, requirements for the exclusive use of files or DLLs, or other functionality within an application can make it incompatible. You can resolve some application issues through streaming, using features like Virtual IP, or siloing the application.

After testing, if these solutions do not work, you might need to find and fix the root cause of the problem. To identify root applications issues, consider using tools like the Microsoft Application Compatibility Toolkit (ACT) or Microsoft's Windows Sysinternals. Examples of common issues include:

- .INI files that contain hard-coded file path names, database connection settings, and read/write file locking configurations that need to be reconfigured to prevent file conflicts.
- Custom applications developed with hard-coded paths in the registry.
- Applications that use the computer name or IP address for identification purposes. Because a server can run multiple instances of the application, all instances could use the same IP address or computer name, which can cause the application to fail.

When you find any of these hard-coded settings or other conflicts, document the setting in your farm design document. After you find resolutions to these issues, design your farm and test your design by creating a pilot test farm.

Basic Factors to Consider for Applications

Consider these factors when defining your farm's hardware and operating system configuration:

- Can I run the applications I want to provide to users on Windows Server 2008, Terminal Services, or on XenApp 5.0? Citrix recommends testing non-Vista-compliant applications on Windows Server 2008 before you publish them on your farm.
    - Some non-Vista-compliant applications run on Windows Server 2008 using its Application Compatibility feature

    - Consider using Presentation Server 4.5 with Feature Pack 1 for applications that do not run under Windows Server 2008's Application Compatibility feature
    - If users require any features that are not supported in this release, such as PDA Sync, you might need to deploy a farm that includes Presentation Server 4.5 with Feature Pack 1

- How many users do I anticipate will want to connect to each application during peak and off-peak hours? Do I need to allocate servers for load balancing?
- Will users be accessing certain applications frequently? Do I want to publish all of these applications on the same server to facilitate session sharing and reduce the number of connections to a server? If you want to use session sharing, you might also want users to run applications in seamless windows. For information about session sharing and seamless windows, see "Sharing Sessions and Connections" on page 136.
- Will my organization need to provide proof of regulatory compliance for certain applications? Will any applications undergo a security audit? If you intend to use SmartAuditor to record sessions on these servers, install the SmartAuditor agent on these servers. In addition, make sure the servers have sufficient system resources to ensure adequate performance.
- Will any of my applications be graphically intensive? If so, consider using the XenApp SpeedScreen, Memory Utilization Management, or CPU Utilization Management features as well as more robust hardware for sessions hosted on these servers.

If you have applications that require Presentation Server 4.5 or Windows Server 2003, determine how you want to manage your mixed-farm requirements. Use one of these scenarios:

- One farm that runs both Presentation Server 4.5 and XenApp 5.0. Use this only as part of a farm migration strategy and not as a permanent solution.
- One farm for Presentation Server 4.5 and one farm for XenApp 5.0. Use the Web Interface to provide one consolidated access point for users. Citrix recommends this strategy where a mixed farm is a permanent requirement.

For more information, see the *SmartAuditor Administrator's Guide*.

Evaluating Application Delivery Methods

Determining the application delivery method is a factor in determining the number of servers in a farm and their individual hardware requirements.

How you choose to deliver applications depends on your organization's needs. For example, some organizations use XenApp to streamline administration. In other organizations, the existing hardware infrastructure might affect the delivery method you select, as can the types of applications you want to deliver. Each delivery method has different benefits; some methods will suit your environment better than others.

Applications can be delivered to users as:

- **Hosted and Accessed from Server**. Applications are installed on the server, where the processing takes place, and accessed from the server. This is the traditional XenApp publishing model. For many organizations, this provides the lowest cost of ownership for IT resources because this option provides the highest scalability.

- **Streamed to server**. Executables for applications are put in packages (called *profiles)* and stored on a file server; however, application processing takes place on the server. One of the main differences between streaming an application to the server and hosting the application on the server is that streamed applications are stored on a central file server, the *streaming file share*, and provide application isolation by design.

  When streaming applications to the server, all servers require the XenApp Plugin for Streamed Apps. However, the client devices require only a XenApp Plugin for Hosted Apps.

- **Streamed to client**. Applications are stored on a file or Web server; however, application processing takes place on the client device and not the server. When applications are streamed to the client device (*streamed to desktop*), the user experience is similar to running applications locally. When streaming to the client, the client devices must have the XenApp Plugin for Streamed Apps. Similar to the stream to server model, the executables for applications are stored on the streaming file share. To run applications enabled for offline access, client devices must also have the XenApp Plugin for Hosted Apps.

Installed and hosted on the server or streamed to server	Streamed to client
Advantages: • There is a more consistent user experience regardless of the client device. • You can maintain and manage applications centrally. • In many cases, streaming to server lets conflicting applications run on the same server without needing to silo them. • Client devices do not require extensive resources, such as hard drives. These delivery methods support thin clients.	**Advantages**: • Users can have the local application experience, but you manage the applications centrally. • Users might have a better experience when resource-intensive applications, such as graphics or CPU-intensive applications, are streamed to client. The traffic for applications streamed to client is not sent over the ICA channel.
Disadvantages: • Farm servers require sufficient resources to support the applications.	**Disadvantages**: • Client devices must have sufficient resources to run the applications locally; the client devices cannot be thin clients. • Client devices must run Windows XP or Vista operating systems.

The requirement for a central file server is not necessarily an impediment to deploying streamed applications in organizations with branch offices because the streaming file share can be deployed on a Web Server, as described in "Planning for Application Streaming Components" on page 42.

Combining Application Delivery Methods

You can run applications in *dual mode* in which XenApp tries to stream the application to the client device first but uses another access method if streaming to client is not supported on the client device. You can specify that some users, such as sales personnel, run applications streamed to client when they are accessing the applications from Windows devices and then run them as hosted applications when they are accessing them from handheld mobile or kiosk-type devices.

Some situations require specific application delivery methods. If users need to access applications when they are offline (not connected to the farm), consider streaming applications. If your users have thin clients, install and deliver applications from farm servers.

For more information about application delivery, see the *XenApp Administrator's Guide* and the *Citrix Application Streaming Guide*.

Choosing Between Published Desktops and Published Applications

Before selecting the method for delivering applications, decide if you want to publish the desktop or publish applications.

- **Publishing the desktop**. Presents the users with an entire Windows Server desktop when they log onto XenApp. However, the desktop should be locked down for security reasons.
- **Publishing applications**. Lets you publish specific applications and deliver only these applications to users. This option provides greater administrative control and is used most frequently.

You can use policies to prevent users from accessing local devices and ports with both methods of application delivery, so you do not need to publish the desktop for this purpose.

Locating Applications on Servers

When designing your farm, consider the following:

- The servers on which the applications are installed
- If load balancing or preferential load balancing changes your need to dedicate servers to mission-critical or highly used applications
- The geographic location of the servers delivering applications (for WANs and organizations with branch offices)

Determining Whether or Not to Group Applications on Servers

Traditionally, the two main strategies for grouping applications on servers are "siloing" applications and "not siloing" applications.

- **Siloed Applications.** When applications are *siloed* on farm servers, each server has a limited number of applications. Some servers might have only one application, whereas others might have a set of interrelated applications. For example, you might install a medical application on Server A and on Server B install an enterprise resource planning (ERP) application. However, if the ERP application is integrated with email, you might also have an email client on Server B. Siloing is sometimes required when applications have unique hardware requirements, for business reasons, to segregate mission-critical applications or to separate frequently-updated applications. However, siloing applications is not as efficient as nonsiloed applications for hardware use and network traffic.

- **Nonsiloed Applications.** When you take a *nonsiloed* approach to installing applications, you install all applications on each server. Applications can be installed traditionally or in isolation (installing them in separate profiles).

Although nonsiloed applications are more common, applications are siloed to address specific requirements.

Citrix recommends installing applications that interact with each other on the same server or including them in the same streaming profile. For example, if an application interacts with an email client by letting users send email notifications, install the application and the email client on the same server. Likewise, if applications, such as Microsoft Office, share settings and preferences, install them on the same server.

Siloed	Nonsiloed
Advantages: • It is easy to track the application's location and usage • The centralization makes it is easy to configure and maintain the application • Other applications do not interfere with the application you installed • Can be useful for mission-critical applications	**Advantages**: • Reduces the number of servers required for applications in small- to medium-sized farms • Might simplify user permissions and the need to ensure consistent settings during application installation • A single server is accessed by each user and session sharing is ensured
Disadvantages: • Additional servers are required to ensure sufficient redundancy	**Disadvantages**: • Cannot be used when applications conflict with other applications

Because of features like Load Manager and Preferential Load Balancing, you might find that you do not need to silo mission-critical applications or applications with high levels of peak usage.

When an application "conflicts" with other applications, rather than silo it on one server, consider streaming the application. Streaming the application effectively isolates it, which allows "conflicting" applications to run on a single server and reducing the need for silos.

Planning Server Loads and Dedicating Servers for Applications

As you determine the applications to install on servers, consider how you want to balance server loads. You might want to load balance resource-intensive, mission-critical, or high-availability applications. XenApp offers two methods of load balancing:

- **Load Manager** lets you balance new connections to the server. When a user launches the first published application, that user's session is

established on the least loaded server in the farm, based on criteria you configured.

When the user launches a second application that is published on that same server, the existing session is shared, and no load management occurs. However, if that application is not published on the same server, Load Manager is invoked and another load-balancing decision is made.

Load-balancing is enabled by default. When you publish an application on multiple servers, load balancing automatically ensures that the user is sent to the least-loaded server.

- **Preferential Load Balancing** lets you allocate a specific portion of CPU resources to a specific session or application. You can use Preferential Load Balancing to assign importance levels (Low, Normal, or High) to specific users and applications. For example, doctors in a hospital could be specified as important users and MRI scans or X-rays could be specified as important applications. These important users and applications with higher levels of service have more computing resources available to them. By default, a Normal level of service is assigned to all users and applications.

  As a result, different application workloads can co-exist on a server; simply assign important applications a higher importance level.

The key difference between the Load Manager and Preferential Load Balancing features is that the Preferential Load Balancing can be used to treat each session differently whereas Load Manager treats each session the same.

Although you can use applications as the basis for Load Manager decisions, Citrix does not recommend it. Citrix recommends invoking Load Manager based on the server only.

Citrix does not recommend load balancing across zones on a WAN. For information about load balancing, see the *Load Manager Administrator's Guide*. For information about Preferential Load Balancing, see the *XenApp Administrator's Guide*.

Note: See the feature comparison matrix at http://www.citrix.com/xenapp/comparativematrix for information about which XenApp editions support the Preferential Load Balancing feature.

Determining How to Install Applications

In large farms, installing applications on servers can be time consuming. Also, applications on load-balanced servers require identical configuration options and settings. To solve these issues, you can choose to install these applications by using Installation Manager, installation scripts, Microsoft System Center Configuration Manager (formerly known as Systems Management Server (SMS)), or streaming the applications.

Centralizing or Distributing Application Servers

In decentralized environments, you might choose to locate application servers centrally with the infrastructure servers (for example, in a data center) or decentrally, near the users who access the applications or in the same geographic region as the users.

Citrix recommends placing application servers logically near any data sources. For example, when an enterprise resource planning application exists, collocate those XenApp servers within the same data center. Another example might be a multinational corporation that uses Microsoft Exchange 2007 as the data source for email. Although the company could centralize all the Exchange servers at the primary data center, they would be more likely to enable the Exchange servers within each region and then locate the XenApp servers hosting Outlook there as well.

For organizations with geographically dispersed sites, consider the advantages and disadvantages between centralizing and decentralizing servers outlined in the following table:

Servers centralized at one site	**Servers distributed across multiple sites**
Advantages: • Centralized server administration and support. • Centralized application management. • Potentially better physical security than in branch offices.	**Advantages**: • Enhanced business continuity and redundancy; if one site loses connection, it does not affect all application access. • When data is maintained at different sites, placing servers at those sites provides users with local access to the data. • Sites can administer their own servers. • Zone Preference and Failover can be invoked if multiple zones.
Disadvantages: • Single point of failure; if the site loses connectivity, users have no alternative access.	**Disadvantages**: • Server-to-server communication crosses the WAN. • If users need access to multiple sites, you might need to coordinate and replicate domains, trusts, user profiles, and data. • Sites might need added local administration and support.

Deciding How Many Farms to Deploy

Most organizations deploy a single farm. However, there are some circumstances in which deploying multiple farms makes sense. Before deploying XenApp, decide whether to implement a single farm or multiple farms. This decision is influenced by:

- **Location and needs of the users or your organization**. If your organization is a service provider, you might want to dedicate a farm to each organization for which you provide service. Multiple farms might make it easier to demonstrate compliance with specific service level agreements.
- **Geographical layout of your organization**. If your IT infrastructure is organized by region and managed in a decentralized manner, multiple farms could improve farm performance. Multiple farms could also save time when coordinating farm administration and simplify troubleshooting farm-wide issues.
- **Network infrastructure limitations.** In WANs with high latency or error rates, multiple farms may perform better than a single farm with multiple zones.
- **Organizational security policies concerning server communications.** Consider multiple farms if your organization needs to segregate data based on security level. Likewise, you might need multiple farms for regulatory compliance.

There is no exact formula for determining the ideal number of farms, but there are some general guidelines that can help you make this decision.

Deploying a Single Farm. In general, a single farm meets the needs of most deployments. For very large deployments with thousands of servers, breaking the environment into multiple farms can increase performance. A significant benefit to deploying a single farm is needing only one data store database.

Deploying Multiple Farms. Consider using multiple farms when you have geographically dispersed data centers that can support their own data store database or you do not want communication between servers within the farm to cross a firewall or WAN.

Citrix regularly tests farm scalability based on 1000-server farms.

This table compares single and multiple farm deployments to help you plan your server environment:

Farm Element or Component	Single Farm	Multiple Farms
Data Store	The farm has one data store.	Each farm must have a data store.
Data Store Replication	Citrix recommends that you replicate the data store to remote sites when using one farm in a WAN environment.	If each remote site is a farm with its own data store, there is no need for data store replication.
Load Balancing	You can load balance an application across the farm.	You cannot load balance an application across servers in different farms.
Firewall Traversal	If the farm spans multiple sites, firewall ports must be open for server-to-server communication.	Site-based farms eliminate the need to open firewall ports for server-to-server communication.
Server-to-server Communication	Data store information is synchronized with member servers through notifications and queries. When a farm has multiple zones, data collectors communicate dynamic information such as logons and application use across the farm.	Multiple farms might improve performance over a single farm when server-to-server traffic crosses a WAN link or when the farm is very large.
Management Tools	You can monitor and configure the farm from a single Management Console and need to log on to only one farm to do so.	You can monitor and configure multiple farms from the Access Management Console. Communicating with multiple farms from the console requires logging on to each farm.

Sharing Components Between Farms

Some Citrix components can be shared between multiple farms; consequently, it is not necessary to consolidate all servers in one farm to prevent deploying these components multiple times:

- **Web Interface**. Sharing Web Interface between farms provides users with central access to applications published on different farms.
- **SmartAuditor**. SmartAuditor is not limited to a single farm. With the exception of the SmartAuditor Agent, all components are independent of the server farm. For example, you can configure multiple farms to use a single SmartAuditor Server.
- **Citrix Licensing**. You can manage multiple farms using one Citrix License Server; however, performance might be affected if you use only one license server for all servers in a WAN.
- **EdgeSight**. You can use EdgeSight and Resource Manager powered by EdgeSight to monitor multiple farms. Note that servers running Presentation Servers 4.5 agents appear as endpoints.

Planning Infrastructure Servers

Infrastructure servers host functionality that supports the farm, such as the data store, data collector, XML Broker, license server, and other services listed in “Introduction to XenApp Infrastructure Servers” on page 20.

Regardless of your farm size, Citrix recommends having at least one server dedicated to infrastructure functions. For example, in a five server farm, Citrix recommends installing all infrastructure functions on one server and publishing applications on the other four servers.

Publishing applications on the infrastructure server slows down application enumeration. If you decide to install infrastructure functions on a server hosting published applications, choose a server that hosts an infrequently used and not resource-intensive application (or lower the load threshold for that server so that it accepts fewer connections).

While farm size (small, medium, large) as determined by the number of servers, can indicate the general category your farm is in, one of the most important factors to consider is the number of user connections. Because applications can scale differently from server to server (some servers might support 100 user connections, others might support only ten), looking solely at the number of servers might be misleading. Determine how you want to group infrastructure functions by designing an initial configuration, based on typical small, medium, and large farm groupings in “Introduction to XenApp Infrastructure Servers” on page 20. After you test your pilot farm, fine-tune your design based on testing results.

As you add user connections in your test configuration, watch the Windows Performance Monitor counters listed in the table that follows carefully. Checking these counters at the following times is critical:

- When the peak number of users is connecting simultaneously to the farm; this usually occurs in the morning.
- When the peak number of users is connected to the farm; this usually occurs during the day.

If the counters exceed the criteria listed in the table, break apart the infrastructure functions on to separate servers until the counter metric no longer exceeds that which is listed in the table.

Performance Monitor Counter Name	**Criteria**
CPU	> 85% - 90%
Memory	> 80%
ResolutionWorkItemQueueReadyCount	> 0 for extended periods of time

Performance Monitor Counter Name	Criteria
WorkItemQueueReadyCount	> 0 for extended periods of time
LastRecordedLicenseCheck-OutResponseTime	> 5000 ms

Typically, you need to evaluate the LastRecordedLicenseCheck-OutResponseTime counter only in large farms. For information about XenApp Performance Monitor counters and their functions, see the *Citrix XenApp Administrator's Guide*.

Before running XenApp Setup, you also need to plan your data store configuration and, possibly, prepare the database as described "Data Store Database Reference" on page 173.

Planning for Data Collectors

There are three things to consideration when planning for data collectors:

- If you need a dedicated data collector
- If you do not need a dedicated data collector, what infrastructure services can share the same server
- If you need a zone in each geographic region, which means that you need data collectors for those regions as well

To maintain consistent information between zones, data collectors relay information to all other data collectors in a farm. Data collectors communicate with each other constantly, creating network traffic.

On most networks, Citrix recommends reducing the number of data collectors and zones. For example, if you have a farm with 100 servers that are all in one location, Citrix recommends only having one zone with a dedicated data collector (although you can have backup data collectors).

In general, data collector memory consumption increases as farm size increases. However, memory consumption is not significant. For example, the Independent Management Architecture service running on the data collector typically uses 300 MB on a 1000 server farm.

Likewise, CPU usage is not significant. A data collector hosted on a dual-processor server can support over 1000 servers in its zone. In general, CPU usage increases as the number of servers in a zone increases, the number of zones increases, and the number of users launching applications increases.

To configure a server as a data collector, install XenApp on the server you want to host the data collector functionality and configure the server as the data collector after Setup as described in "Configuring Data Collectors after Setup" on page 121.

Data collectors are configured as follows during Setup:

- The first server in the farm (the one you run the Create Farm Setup on) is the default data collector.
- All subsequent servers (the ones you run the Join Farm Setup on) have lesser but equal rights to become a data collector. However, you can designate one server per zone as the back-up data collector to reduce server election traffic.

Planning for WANs by Using Zones

In general, Citrix recommends using the fewest number of zones possible, with one being optimal. If all farm servers are in one location, configuring only one zone for the farm does not reduce performance or make the farm harder to manage.

However, in large geographically segmented networks, such as organizations with data centers on different continents, grouping geographically-related servers in zones can improve farm performance.

In environments that require zones, consider the design carefully. Data collectors must replicate changes to all other data collectors in the farm. Also, bandwidth consumption and network traffic increase with the number of zones.

Separate zones are not required for remote sites, even ones on separate continents; latency is the biggest factor in determining whether or not servers should be put in their own zone. For large farms with servers in different geographic regions, create zones based on the location of significant numbers of servers.

Also decide if you want to configure failover zones or preferred zones. If a zone fails, you can configure for user connections to be redirected to another zone (failover) or control to which zones specific users connect (preference). Failover requirements might determine the number of zones required.

For example, an organization with 20 farm servers in London, 50 servers in New York, and three servers in Sydney could create two or three zones. If the Sydney location has good connectivity to either New York or London, Citrix recommends grouping Sydney with the larger location. Conversely, if the WAN connection between Sydney and the other locations is poor or zone preference and failover is required, Citrix recommends configuring three zones.

Consider these zone design guidelines:

- If a site has only a small number of servers, group that site in a larger site's zone.
- If your organization has branch offices with low bandwidth or unreliable connectivity, do not place those branch offices in their own zone. Instead

group them with other sites with which they have the best connectivity. When combined with other zones, this might form a hub-and-spoke style of zone configuration.

- If you have more than five sites, group the smaller sites with the larger zones. Citrix does not recommend exceeding five zones.

The first zone in the farm is created during Create Farm Setup. You can create additional zones during the Join Farm Setup.

Planning for the Web Interface and the XML Broker Communications

The Web Interface and the XML Broker are complementary services. The Web Interface provides users with access to applications. The XML Broker determines which applications appear in the Web Interface, based on the user's permissions. Your goals and security configuration determine whether to dedicate a server to these functions and where to locate them in your topology.

Dedicating Servers for the Web Interface and the XML Broker

When determining whether or not to dedicate servers to the Web Interface and the XML Broker, consider scalability and security.

In small- to medium-sized farms, you can:

- Run XenApp and the Web Interface on the same server, depending on your security considerations.
- Group the XML Broker with other infrastructure services, such as the data collector or the data store in very small farms (one to five servers). Citrix recommends grouping the data collector with the XML Broker whenever possible.
- Citrix recommends grouping the XML Broker with the data collector.

In larger farms, Citrix recommends:

- Configuring the XML Broker on data collectors or dedicated servers. In deployments with dedicated servers for infrastructure functions, dedicate a server to the XML Broker to accommodate authentication traffic.
- Running the Web Interface on dedicated Web servers.

In large environments with multiple XML Brokers, you can use the Web Interface to failover Web Interface requests to other servers running the Citrix XML Service. For information, see the *Web Interface Administrator's Guide*.

Considering Security

The location in your environment for the Web Interface and the XML Broker, depends on your organization's security requirements:

- When users access the Web Interface from the Internet, Citrix recommends locating the Web Interface server on the internal network and the Citrix XML Broker with the XenApp farm. Shielding the XML Broker from the external Internet, protects the XML Broker and the farm from Internet security threats.
- If you must place the Web Interface in the DMZ and want to secure the connection between the XML Broker and the Web Interface, put the Web Interface server in the DMZ with Secure Gateway or Access Gateway. This configuration requires putting the Web Interface on a separate Web server. Install a certificate on the Web Interface server and configure SSL Relay on the servers hosting the Citrix XML Broker.
- In very small farms, configuring the Web Interface and the XML Broker on the same server eliminates having to secure the link from the Web Interface to the farm. This deployment is primarily used in environments that do not have users connecting remotely. However, this might not be possible if your organization does not want Web servers, such as Internet Information Services (IIS), in the farm.

You can use any of these protocols for connections between the XML Broker and Web Interface:

- **HTTP.**
- **HTTPS.** If you secure the connection with HTTPS, IIS must host the XML Broker with port sharing enabled. Select the **Share default TCP/IP port with Internet Information Server option** during XenApp Setup (and enable HTTPS in the IIS Manager.)
- **SSL/TLS.** If you secure the connection with SSL/TLS, the XML Broker can share a port with IIS or use its own dedicated port. Use SSL Relay to configure SSL/TLS support on the XML Broker and Web Interface servers. However, if the XML Broker is sharing a port with secure IIS (HTTPS), ensure SSL/TLS does not conflict with the IIS port. You can display the port in use by checking what port number appears in the SSL Relay tool for the Relay Listener port. By default, XenApp uses port 444.

Configuring the Web Interface and the XML Broker

Configuring a dedicated Web Interface server requires running Web Interface Setup on the target server.

Configuring a dedicated server for the XML Broker is done by:

1. Running XenApp Join Farm Setup on the target server. (You need to install core XenApp on that server only and not any of the consoles or other features.)
2. Specifying the port you want to use for the XML Service during XenApp Setup.

   During XenApp Setup, you might want to change the TCP port over which XenApp communicates with the XML Service (the XML Broker).
3. Configuring the Web Interface to communicate with the XML Service over the port you specified.
4. Not publishing any applications on the server functioning as the XML Broker.

Installation instructions and design recommendations for the Web Interface are provided in the *Web Interface Administrator's Guide*; however, you can install the Web Interface on the same server as XenApp during XenApp Setup.

Important: If you change the port used by the Citrix XML Service on the XML Broker, set the correct port in the plugin. Specify a port number when you add a server to the Address List under Server Location in the plugin. If you also use the Web Interface, be sure it uses the correct port for Citrix XML Service communication. For more information about using the Web Interface and the plugins, see their respective administrator's guides.

Planning for Application Streaming Components

Streaming applications require a streaming file share to store the executables of published streamed applications and a profiler workstation to create the packages (called *profiles*) of those executables.

Citrix Streaming Profiler

Streaming applications requires a workstation for creating the application profiles that are ultimately stored on the streaming file share. To stream applications, install the Citrix Streaming Profiler on a separate, clean workstation with an operating system similar to that of your end-users. Use this workstation to profile applications for streaming.

Streaming File Share Server

Citrix suggests the following hardware for the streaming file share server:

- Network-attached storage (NAS) or storage area network (SAN) solution, if feasible.
- A RAID storage configuration, depending on the fault-tolerant solution desired.
- A single 1 Gbps network card or multiple 100 Mbps cards.
- If your network infrastructure and configuration does not support this speed, use dual network cards. This configuration doubles the connection speed of a traditional single network-card configuration.

Streaming file shares can be hosted on either a file server or a Web server. There are two possible configurations for the streaming file share in environments with branch offices:

- **A streaming file share in each branch office hosted on network file servers.** For performance reasons and, in some countries, legal reasons, it is not possible for branch offices to connect to a network file server in an organization's main office. Consequently, if you want to store streaming profiles on a network file server, configure a streaming file share in each branch office. For example, a Citrix Branch Repeater can be used to host profile files.
- **A streaming file share in the main office hosted on a Web Server.** Using a Web server sends all the traffic between the client devices and the file share over either HTTP or HTTPS, which is inherently faster than a file transmission protocol.

Using a Web server for the file share reduces the need to have a file share in each branch office for performance reasons. Instead of putting a file share at each branch office, you can put all the profiles on the Web server file share at the main office.

For more information about sizing the streaming file share, see the Citrix Knowledge Center.

XenApp Hardware Configurations

The number of users that a XenApp server can support depends on several factors, including:

- The server's hardware specifications
- The applications deployed (because of the applications' CPU and memory requirements)
- The amount of user input being processed by the applications
- What you consider to be maximum desired resource usage on the server (for example, 90% CPU usage or 80% memory usage).

Some general recommendations for selecting and configuring farm hardware include:

- **RAID**. In multiprocessor configurations, Citrix recommends a RAID (Redundant Array of Independent Disks) setup. XenApp supports hardware and software RAID.
- **Reducing Hard Disk Failure**. Hard disks are the most common form of hardware failure. You can reduce the likelihood of hardware failure with a RAID 1 (mirroring) and RAID 5 (striped set with distributed parity) configuration. If RAID is not an option, a fast Serial Attached SCSI (SAS) or a Small Computer System Interface (SCSI) Ultra-320 drive is recommended.
- **Disk Speed**. Faster hard disks are inherently more responsive and might eliminate or curtail disk bottlenecks.
- **Number of Controllers**. For quad or eight-way servers, Citrix recommends installing at least two controllers: one for the operating system and another to store applications and temporary files. Citrix recommends isolating the operating system as much as possible, with no applications installed on its controller. This principle also applies in small farms. If possible (assuming a multicore or multiprocessor system), install the operating system on a separate hard drive from XenApp and the applications. This prevents input/output "bottlenecks" when the operating system needs to access the CPU. Distribute hard drive access load as evenly as possible across the controllers.

  Dual-processor (dual-core) deployments combine overall efficiency and a lower total cost of ownership. However, once a system has a dual-core processor, implementing additional processors does not necessarily provide proportionate performance increases. Server scalability does not increase linearly with the number of processors: scalability gains level off between eight to sixteen CPU cores.

- **Hard Disk Partitions.** Partition and hard-disk size depend on the number of users connecting to the XenApp server and the applications on the server. Because each user's Terminal Services profile is loaded on the server, consider that large numbers of user profiles can use gigabytes of disk space on the server. You must have enough disk space for these profiles on the server.
- **Operating System.** Running Windows Server 2008, 64-bit edition on 64-bit computers can optimize processor resources. Limitations on the amount of kernel memory available in 32-bit operating systems can reduce user scalability. You can work around 32-bit architecture limitations by using 32-bit and 64-bit applications on a 64-bit operating system.

Considering Your Network Infrastructure

Your network infrastructure has a significant impact on your farm's design and performance. These topics help you assess and plan for specifics in your environment:

- Designing Terminal Services User Profiles
- Defining Accounts and Trust Relationships
- Recommendations for Active Directory Environments
- Planning a Successful User Experience
- Planning for Active Directory Federated Services

Designing Terminal Services User Profiles

Terminal Services user profiles define the user-specific Windows Server 2008 environment and preference settings, including desktop appearance and color options. Citrix recommends setting Terminal Services profiles for all users to avoid inconsistencies. Terminal Services user profiles are distinct from Windows user profiles.

Effectively designing Terminal Services user profiles can significantly improve the performance and manageability of a XenApp environment. Issues such as slow logons, loss of user settings, profile corruption, and excessive administration effort can result from suboptimal user profile designs.

When a user logs on, the user's profile is loaded onto the XenApp server. If a Terminal Services profile is not designated, the user's Windows profile is used. If there is no Windows profile, the user's existing local profile on the server is used or created.

To design user profiles in a Terminal Server environment, choose the solution that is best for your environment, and then plan for the storage of the profiles. In a XenApp environment, Terminal Server profiles behave as follows:

- **Local Profiles** are stored on each farm server and are initially created based on the default user profile. A user accessing applications in a load-managed XenApp farm creates an independent profile on each server. Users can save changes to their local profile on each individual server, but changes are only available to future sessions on that server. Local profiles require no configuration; if a user logging onto a XenApp server does not have a profile path specified, a local profile is used.

  Although local profiles are the default, Citrix does not recommend using them because profiles are created for each user on every server to which they have connected, which leads to an inconsistent user experience.

- **Roaming Profiles** are stored in a central location for each user. The information in roaming profiles, such as a printer or a registry setting, is available to all XenApp servers in the environment. Configuring a user for a roaming profile requires you specify the user's Terminal Server Profile Path to a particular location on a file server. The first time the user logs on to a XenApp server, the default user profile is used to create the user's roaming profile. During logoff, the profile is copied to the specified location on a file server.

- **Mandatory Profiles** are stored in a central location for each user. However, the user's changes are not retained on logoff. Configuring a user for a mandatory profile requires you create a mandatory profile file (NTUSER.MAN) from an existing roaming or local profile, and assign the users' Terminal Services profile path to the location where the file can be accessed.

  Citrix recommends, where feasible, using mandatory profiles if they address the defined requirements.

- **Multiple Profiles** combine two or more of the three basic profile types (local, roaming, or mandatory) for the same user. Multiple profiles are useful in environments with load-managed groups or *application silos*. For example, in a XenApp farm with two load-managed groups serving SAP and Microsoft Office, you can configure users with a mandatory profile for the SAP servers and a roaming profile for the Microsoft Office servers. Multiple profiles are also useful for farms that span WAN connections so that profiles can be accessed from local file servers.

  However, multiple profiles are more complex to administer and maintain and are not widely used.

Citrix recommends storing roaming profiles and permanent user data on a centralized file server, storage area network (SAN), or Network Attached Storage (NAS) unit that can adequately support the environment. Locate this storage medium logically near XenApp to reduce the number of router hops required and ensure optimal logon times.

When defining user profiles for your XenApp environment, consider:

- **If users need to save their settings.** User requirements and expectations determine which user profile type to use. If users run applications such as Microsoft Office where particular settings need to be retained, consider a roaming profile. If users do not need to save settings, using a mandatory profile solution can ease administration.
- **If applications store settings in the registry.** If the application you are publishing references the HKEY_CURRENT_USER (HKCU) hive in the registry, use a roaming or multiple-profile solutions.
- **Printer provisioning.** If you provision printers by auto-creating client printing devices and use client device printing settings, you can use mandatory profiles. To save printer settings, use XenApp's Printer properties retention policy rule.
- **Applications in Load Managed Groups or "silos."** If applications are siloed in load-managed groups, roaming profile designs make profile setting loss or corruption possible. For example, users accessing SAP and Microsoft Office at the same time can overwrite roaming profile settings made in the Office session if the user logs off from the Office session before the SAP session. Consider multiple profile designs for farms employing load-managed groups.

This table compares the various profile options:

	Advantages	Disadvantages
Local Profile	• No requirement for file server for profile storage • Not susceptible to corruption	• Settings are not consistent across servers and sessions • Consumes local disk space
Roaming Profile	• Settings are saved across sessions • Consistency	• Slower logon times
Mandatory Profile	• Fast Logon • Not susceptible to corruption	• Settings are not saved across sessions
Multiple Profiles	• Benefits of both mandatory and roaming profiles	• Potential for additional file server space requirements • Additional administration and maintenance

When configuring profiles, designate profiles within Active Directory policies, if possible, not user properties.

In addition to profile type, folder redirection is generally recommended. This ensures that the user data stored in the designated folders does not need to be written to the profile. Folder redirection is typically useful for both mandatory and roaming profiles. Although you can configure folder redirection in Windows Server 2008, Citrix provides a feature for folder redirection. For more information, see the documentation about Special Folder Redirection in the *Citrix XenApp Administrator's Guide*.

Defining Accounts and Trust Relationships

When planning your farm, consider how users will access resources. When multiple servers host the same published application, users could be connected to any of these servers when they access the resource. Therefore, if a user does not have permissions for all servers, the user might not be able to access the resource. To avoid these issues, you might need to establish domain trust relationships between users or servers.

Note: If you change the servers hosting applications and this changes the trust intersection, applications can become unavailable to users not in that trust intersection.

Considerations when Configuring System Account

Consider the following when deciding how to configure your Citrix administrator accounts:

- One full authority administrator account must always exist for the server farm. Citrix XenApp prevents you from deleting the last full authority administrator account. However, if no administrator accounts exist in the farm data store database, a local administrator account can log on to the Access Management Console to set up Citrix administrator accounts.
- To create effective Citrix administrator accounts, ensure that all users you are going to add as Citrix administrators are Domain Users for the domain in which your farm resides. Users who are Citrix administrators who take server snapshots must also be authorized Windows Management Instrumentation (WMI) users on each server for which they are taking snapshots.
- If you want to enable the Independent Management Architecture (IMA) encryption feature during Setup, Citrix recommends that you install XenApp using the same network credentials. To install XenApp as a local administrator, see "Enabling IMA Encryption as a Local Administrator" on page 70.

Including Servers from Other Domains in Farms

XenApp supports trust-based routing; servers in domains that do not trust each other can be members of the same farm.

When a server needs to perform one of the following operations on an untrusted domain, the server determines from the data store which servers can perform the operation and routes the request to the most accessible server:

- Authenticating a Citrix administrator to the Access Management Console or the Advanced Configuration tool
- Refreshing the display or launching an application in Program Neighborhood and Web Interface
- Enumerating users and groups in the Access Management Console
- Resolving users or groups when adding users to published application, printer auto-creation lists, or defining new Citrix administrators

Requests to enumerate applications are routed to a server that has the required domain trust relationship if the originating server does not.

Recommendations for Active Directory Environments

Citrix recommends configuring server farms with Active Directory so that:

- XenApp servers are in their own Organizational Units (OUs).
- All servers reside in the same domain.
- The server farm domain has no trust relationships with non-Active Directory domains, as this can affect operations requiring trusted domains.
- The server farm is in a single Active Directory forest. If your farm has servers in more than one forest, users cannot log on by entering user principal names (UPNs).

  UPN logons use the format *username@UPN identifier*. With Active Directory, UPN logons do not require a domain to be specified, because Active Directory can locate full UPN logons in the directory. However, if multiple forests exist in the server farm, problems arise if the same UPN identifier exists in two domains in separate forests.

  Important: Because there is no efficient way to perform account resolution, Citrix XenApp does not support UPN logons if a server farm spans multiple Active Directory forests.

Active Directory User Permission Considerations

Active Directory security groups can affect authenticating to published applications, the Advanced Configuration tool, and Program Neighborhood filtering.

Review the following table for best practice guidance:

	Authenticating to published applications	**Authenticating to Advanced Configuration tool**	**Program Neighborhood filtering**
Domain Global Groups	No adverse effects.	No adverse effects.	No adverse effects.
Domain Local Groups	**Recommendation:** All servers that load balance an application must be in the same domain if a domain local group is authorized to use the application. **Rationale:** Domain local groups assigned to an application must be from the common primary domain of all the load balancing servers. When you publish applications, domain local groups appear in the accounts list if the first condition above is met and accounts from the common primary domain are displayed. If a published application has users from any domain local groups and you add a server from a different domain, domain local groups are removed from the configured users list, because all servers must be able to validate any user with permission to run the application.	**Recommendation:** If a user is a Citrix administrator only by membership in a domain local group, the user must connect the console to a server in the same domain as the domain local group. **Rationale:** If the user connects the console to a server in a different domain than the domain local group, the user is denied access to the console because the domain local group is not in the user's security token.	**Recommendation:** All servers in the farm must be in the same domain for Program Neighborhood filtering to work properly. **Rationale:** If a user is a member of a domain local group, the group is present in the user's security token only when logging on to a computer in the same domain as the domain local group. Trust-based routing does not guarantee that a logon request is sent to a server in the same domain as the domain local group. It guarantees only that the request is handled by a server in a domain that trusts the user's domain.

	Authenticating to published applications	Authenticating to Advanced Configuration tool	Program Neighborhood filtering
Universal Groups	**Recommendation:** If universal groups are assigned permission to the application, all servers that manage the application must be in an Active Directory domain. **Rationale:** A server in a non-Active Directory domain could authenticate the user to run the application. In this case, universal groups are not in the user's security token, so the user is denied access to the application. It is possible for a server in a non-Active Directory domain to load balance an application with servers in an Active Directory domain if the domains have an explicit trust relationship.	**Recommendation:** If a user is authenticating to the console and is a Citrix administrator only by membership in a universal group, the console must connect to a server that belongs to an Active Directory domain in the universal group's forest. **Rationale:** Non-Active Directory domain controllers and domains outside a universal group's forest have no information about the universal group.	**Recommendation:** No Active Directory domains in the forest to which the servers belong have explicit trust relationships with non-Active Directory domains. **Rationale:** Non-Active Directory domains have no knowledge of universal groups and the domain controllers exclude a universal group from a user's security token. As a result, applications might not appear in Program Neighborhood.

In addition to the recommendations in the table, if a user is a member of a domain local group, the group is in the user's security token only when the user logs onto a computer in the same domain as the domain local group. Trust-based routing does not guarantee that a user's logon request is sent to a server in the same domain as the domain local group.

Network configurations do not affect authentication to the Access Management Console because the Access Management Console only allows pass-through authentication.

Planning for Active Directory Federated Services

XenApp supports Active Directory Federated Services (AD FS) when used with the Citrix Web Interface. If your organization needs to provide a business partner with access to published applications, AD FS might be a better alternative than creating multiple new user accounts on the enterprise domain. If you plan to use AD FS with XenApp, Citrix recommends doing the following:

- During Setup for each XenApp server in your farm, select the port sharing with IIS option and ensure that IIS is configured to support HTTPS.
- Set up a trust relationship between the server running the Web Interface and any other servers in the farm communicating with the Web Interface through the Citrix XML Broker.

  The Web Interface must be able to access the certificate revocation list (CRL) for the Certificate Authority used by the federation servers.

- If you are provisioning your farm by imaging, configure trust requests on the server before you take the image. See the information about configuring the XML Service port in the *Citrix XenApp Administrator's Guide*. These trust requests must be enabled on each server in the farm and cannot be set at a farm level.
- To prevent external users from having unauthorized access to services on farm servers, configure all XenApp servers for constrained delegation. To provide users with access to resources on those servers, add the relevant services to the Services list using the MMC Active Directory Users and Computers snap-in.

For more information about these tasks and configuring support for AD FS, see the *Web Interface Administrator's Guide*.

Planning for System Monitoring and Maintenance

When designing XenApp farms, include a monitoring and management strategy to ensure your environment's sustainability. Consider incorporating one or more monitoring tools into your environment and customizing them to provide alerts based on metrics associated with hardware, software, and usage requirements. Citrix EdgeSight is an excellent tool for monitoring XenApp farms.

Designing for monitoring and management should include hardware, software, performance, and network areas. For hardware monitoring, Citrix recommends the hardware management tools provided by most server vendors. Citrix suggests customizing the default Resource Manager and EdgeSight metrics because they might not meet your organizations specific monitoring needs.

Securing Application Delivery

The Citrix XenApp architecture (including its related components) is designed to allow secure access to resources by users. It is also designed to enable administrators to control and monitor access to each resource and component.

Several complementary XenApp components are secure by design and help provide end-to-end security, including but not limited to the following:

- Citrix Password Manager
- Citrix Access Gateway
- Secure Gateway

Deployment planning is not complete unless administrators consider securing all accessible parts of XenApp. See also "Securing Server Farms" chapter in the *Citrix XenApp Administrator's Guide*.

Area to secure/consider	Refer to this topic or guide
Access to Server farms	"Securing Access to Your Servers" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
XenApp data store	"Securing the Data Store" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
Client-server communications, firewalls, Secure Gateway, and Secure Ticket Authority	"Securing Network Communications" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
User authentication, including implementing smart cards and Kerberos authentication,	"Configuring User Authentication" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
Changes to a server farm, including securely tracking changes to the farm	"Logging Administrative Changes to a XenApp Farm" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
	"Encrypting Sensitive Configuration Logging Data" in the "Securing Server Farms" chapter of the *Citrix XenApp Administrator's Guide*
Secure Gateway	*Secure Gateway for Windows Administrator's Guide*
Access Gateway	*Citrix Access Gateway Enterprise Edition Administrator's Guide* or the *Citrix Access Gateway Standard Edition Administrator's Guide*
Citrix Password Manager	*Citrix Password Manager Installation Guide*

Securing Remote Access

If users will connect to your farm over the Internet, either now or in the future, consider the following:

- Increasing security through two-factor authentication (adding a second authentication method such as RSA tokens).
- Limiting automatic printer driver installation on servers (enabled by default) if users are connecting from devices with locally attached printers. See the printing chapters in the *XenApp Administrator's Guide*.
- Employing a SmartAccess strategy. For example, using the Access Gateway and configuring policies that limit access according to conditions on the user's client device or location. See the *Access Gateway Administrator's Guide*.

- How you will deploy plugins to users, especially if they connect from airport kiosks or other public locations. See the *XenApp Plugin for Hosted Apps for Windows Administrator's Guide*.
- Securing connections to published applications with SSL/TLS. If plugins in your environment communicate with your farm across the Internet, Citrix recommends enabling SSL/TLS encryption when you publish a resource. If you want to use SSL/TLS encryption, use either the SSL Relay feature (for farms with fewer than five servers) or the Secure Gateway to relay ICA traffic to the XenApp server.

You can also use SSL Relay to secure Citrix XML Broker traffic.

Configuring Firewalls for Remote Access

If your users will connect to the farm remotely, you can use either the Access Gateway or the Secure Gateway to control remote access to the farm. You must set your firewall ports to communicate with Secure Gateway and the server farm. See the administrator's guides for Secure Gateway and Access Gateway.

Important: For XenApp to function on Windows Server 2008, XenApp Setup reconfigures the default Windows Firewall port settings to allow incoming connections, such as those from ICA traffic and the Citrix Independent Management Architecture service. For a complete list of the ports XenApp uses, see the *Citrix XenApp Administrator's Guide*.

Planning a Successful User Experience

When you are planning your farm, consider the following factors that can impact your users' experience:

- Factors that Affect Session Start-up Times
- Planning Your Printing Configuration

Factors that Affect Session Start-up Times

Sessions that start quickly are integral to your users' experience and satisfaction. These factors can cause sessions to start slower than necessary:

- **Printer autocreation policy settings.** When designing your printing configuration, consider limiting the number of printers that are autocreated if session start time is a factor.

- **Network activities occurring independently of sessions.** Standard operations, such as logging on to Active Directory, querying Lightweight Directory Access Protocol (LDAP) directory servers, loading user profiles, executing logon scripts, mapping network drives, and writing environment variables to the registry, can affect session start times. Also, connection speed and programs in the Startup items within the session, such as virus scanners, can affect start times.
- **Roaming profile size and location.** When a user logs onto a session where Terminal Services roaming profiles and home folders are enabled, the roaming profile contents and access to that folder are mapped during logon, which takes additional resources. In some cases, this can consume significant amounts of the CPU usage. Consider using Terminal Services home folders with redirected personal folders to mitigate this problem.
- **Whether the data collector has sufficient resources to make load balancing decisions efficiently.** In environments with collocated infrastructure servers, Citrix suggests hosting the Citrix XML Broker on the data collector to avoid delays.
- **License Server Location.** For WANs with multiple zones, where the license server is in relation to the zone.

Planning Your Printing Configuration

Another critical factor for user satisfaction is their ability to print easily, quickly, and to the closest printer, regardless of how much a user changes location. Your printing configuration directly affects how long sessions take to start and the traffic on your network.

Planning your printing configuration requires determining what printing pathway you want to use, how you want to provision printers in sessions, and how you want to maintain printer drivers. Citrix strongly recommends that you plan your printing configuration, including deciding what printing policies to set, when you design your farm.

Citrix recommends considering these printing configurations and implementing the ones that pertain to your environment:

- Using Citrix Universal printer drivers and the Universal Printer whenever possible. This results in fewer drivers and less troubleshooting.
- Disabling the automatic installation of printer drivers, which is the default setting.
- Adjusting printer bandwidth using XenApp policy rules, if appropriate.

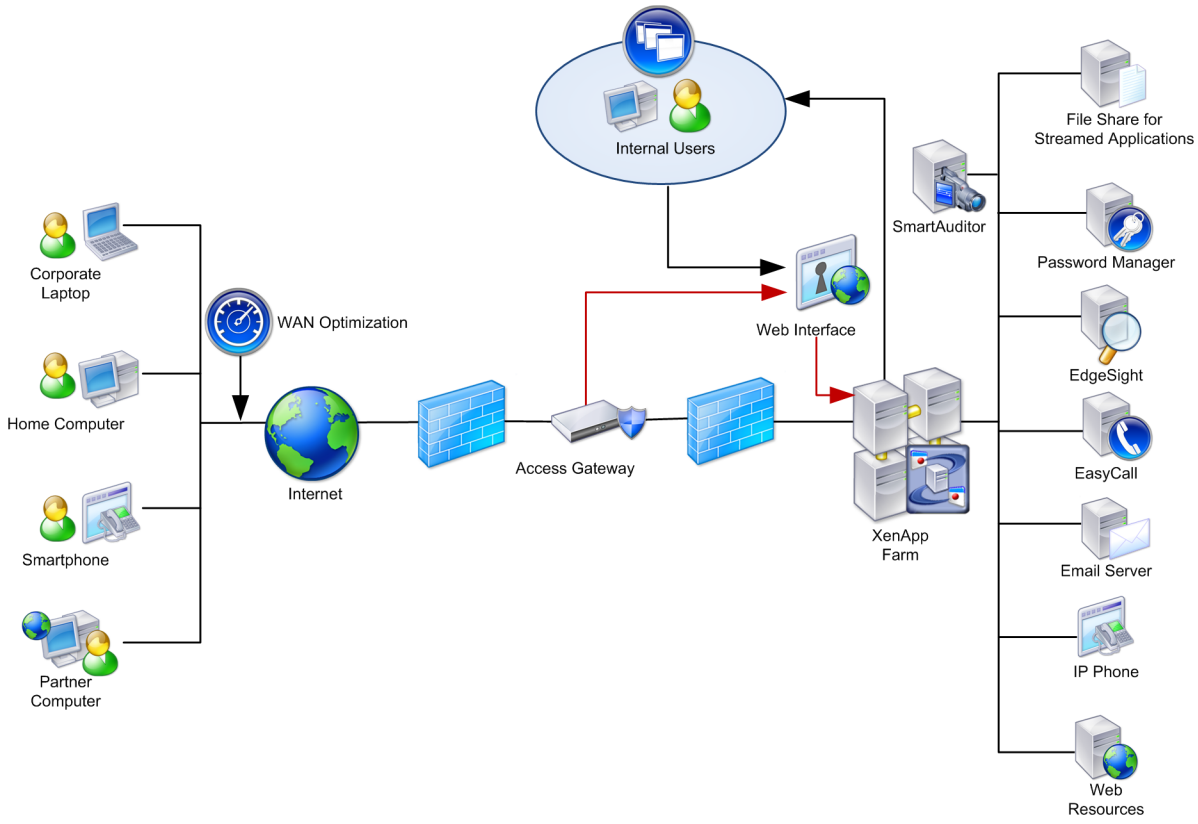
- If printing across a WAN, using the XenApp Print job routing policy rule to route print jobs through the client device. This routes the job along the ICA virtual channel and, consequently, exploits ICA compression.
- Testing new printers with the Stress Printers utility, which is described in the Citrix Knowledge Center.

Choosing printers that are tested with multiuser environments is essential. Printers must be PCL or PS compatible and not host-based. The printing manufacturer determines whether printers work in a XenApp environment, not Citrix. Some companies have done extensive testing with XenApp and published white papers indicating which printers they support.

For information about planning your printing configuration and purchasing printing hardware, see the printing documentation in the *XenApp Administrator's Guide* for XenApp 5.0. For information about the impact on the end-user experience, see the *XenApp Plugin for Hosted Apps for Windows Administrator's Guide*

Integrating Platinum Edition Components in Your Farm

If you have the Platinum Edition of XenApp, there are additional, optional components that you can install.



This illustration shows a deployment of XenApp, Platinum Edition.

As a general principle, install the XenApp farm and its required components first. Then, after installing XenApp and its supporting infrastructure servers, install Platinum components, logically moving away from the core farm functions, as denoted by the XenApp farm in the illustration.

If you choose to deploy Platinum components, note the following:

- **EdgeSight or Resource Manager powered by EdgeSight**

  The EdgeSight Server includes a database server and a Web server, which can be located on the same computer or on different computers.

  Alternatively, if your XenApp data store is hosted on an SQL Server, you can collocate the EdgeSight database with the data store. However, Citrix recommends monitoring the database server to ensure it is not overloaded.

  To avoid errors in performance measurement, do not install the EdgeSight database on any farm servers hosting user sessions. For information about factors to consider when integrating EdgeSight or Resource Manager, see "Planning for System Monitoring and Maintenance" on page 52.

- **Password Manager**

  Citrix Password Manager provides password security and single sign-on access to Windows, Web, and terminal emulator-based applications running in the Citrix environment, as well as applications running on the desktop. Consider deploying Password Manager if you have multiple applications in your farm that require authentication.

  Password Manager service is typically installed on its own server. See the *Citrix Password Manager Installation Guide* for information about Password Manager design. The server hosting the Password Manager Service and central store contains highly sensitive user-related information. Citrix recommends using a dedicated server and placing that server in a physically secure location.

- **SmartAuditor**

  SmartAuditor allows you to record the on-screen activity of any user's session, over any type of connection, from any server running XenApp. SmartAuditor records, catalogs, and archives sessions for retrieval and playback. Consider deploying SmartAuditor if you have applications that require monitoring for compliance or regulatory reasons.

  SmartAuditor requires a separate desktop workstation for the player. While there are multiple ways to deploy SmartAuditor's Administration components (SmartAuditor Database, SmartAuditor Server, and SmartAuditor Policy Console), these components are typically installed on a server dedicated to Administration. When there is a large volume of recording data, such as when recording sessions for one or more farms, these components might be installed on dedicated servers.

- **Access Gateway**

  Access Gateway is a UNIX-based appliance that lets you control access to published applications on a XenApp server, based on conditions, such as the client device and user location. Consider deploying the Access Gateway

when you have mobile or remote users, especially when they connect from computers that do not belong to your organization, such as airport kiosks.

The Access Gateway can prevent access to applications and limit access to features, such as hard drives or printing functionality, when the client device does not meet certain requirements. The Access Gateway is typically installed in the DMZ. There are specific design considerations when you are deploying the Access Gateway with the Web Interface.

For more information, see “Planning for the Web Interface and the XML Broker Communications” on page 40 and the respective documentation for these components.

While Access Gateway user licenses are included with Platinum, the Access Gateway appliance is sold separately.

- **EasyCall**

  EasyCall lets users hover over phone numbers in published, streamed, or installed Windows applications and have that number automatically dialed for them.

  Platinum Edition includes the EasyCall Agent licenses; however, EasyCall also requires an EasyCall appliance, which is sold separately.

- **WAN Optimization Powered by Citrix WANScaler**

  WANScaler appliances can accelerate general network traffic to any remote or mobile user. WANScaler’s advanced acceleration features give your remote users in-office performance wherever they are. WANScaler can accelerate application delivery for streamed applications or applications installed and hosted on the server.

  While WANScaler user licenses are included with Platinum, to use WANScaler, you must purchase one or more Citrix WANScaler 8500 or 8800 appliances.

Many Platinum components also require installing plugins or clients on farm servers or user workstations, as described in “Installing Agents for Platinum Components” on page 73. You can find the Setup instructions and design considerations for Platinum components in their respective administrator’s guides.

Related topics:

“Installing Additional XenApp Components” on page 72

Preparing to Install XenApp

Deploying XenApp across a farm requires repeating the same installation on many servers. Often, performing a traditional wizard-based installation on each server in the farm is too time consuming to be feasible.

The method of installation you choose is directly related to the way in which you want to provision the servers in your farm. In many environments, deploying cloned images, such as Provisioning Server, is the standard method of performing large, corporate-wide installations.

Citrix recommends choosing an installation method that lets you install servers quickly in the event of server failure or network growth.

Before installing XenApp, invest time to plan your environment, ensure that your servers are prepared correctly for the installation, and choose the necessary configuration options.

Important: Before installing Citrix XenApp, review the *Citrix XenApp 5.0 for Microsoft Windows Server 2008 Installation Checklist*.

Autorun-Invoked XenApp Installations

Invoke wizard-based installations from the Autorun program, autorun.exe. Starting installation by double-clicking on the .msi file is not supported. Use wizard-based installations if you need to install an individual component, install XenApp on small farms, or when creating images for server provisioning. One key difference between starting a wizard-based installation from the Autorun and custom installation methods is that when you invoke Setup from the Autorun, Setup automatically installs most non-Windows system requirements.

A wizard-based installation manually installs XenApp and requires selecting options for every page of the wizard. As a result, it is not an appropriate installation method for large farms that are created without imaging.

Related topics:

“Creating a New XenApp Farm” on page 75

Custom XenApp Installations

XenApp supports several custom installation methods, which provide more control over installation options than wizard-based installations. Custom installations often provide a scalable approach for server provisioning.

Custom installations let you control many aspects of the Setup or its ultimate configuration, such as the ability to change local accounts for Citrix services to domain accounts, prevent non-administrative users from connecting to the desktop of the server, and control the reboots after Setup. XenApp supports several different types of custom installations:

- **Transforms.** In large environments, if you deploy XenApp to multiple servers simultaneously through Active Directory or Configuration Manager, install XenApp using transforms with XenApp Setup (mps.msi). Use the transforms included with XenApp to customize the XenApp Setup properties. To perform this type of installation, Citrix recommends that you have Windows Installer and installation database knowledge. You also need a third-party MSI editing tool. Before installing using transforms, review “XenApp Windows Setup Property Names and Values” on page 139.

- **Windows Installer Commands.** XenApp supports installation through Windows Installer commands (msiexec). Windows Installer commands provide additional control over Setup options not available during wizard-based installations. Like transform-based installations, Windows Installer command installations require a solid understanding of the XenApp MSI properties. Windows Installer commands can be used separately or combined with transforms for Active Directory deployments. To install system prerequisites and install XenApp in one action, create scripts with Windows Installer commands.

- **XenApp Unattended Installation.** Using the Unattended Installation Template, create an *answer file* that provides responses to installation options during XenApp Setup. The sample answer file is included in installation media; it uses the values in “XenApp Windows Installer Properties Reference” on page 139. Answer files provide an installation that is ready to use with only minimal customization on your part. Consequently, unattended installations are one of the easiest ways to perform custom installations and generate Windows Installer command lines. Since answer files are text files with a small file size, they are easy to store and compare to other answer files using a file comparison utility. However, unattended installations are not as powerful as Windows Installer Commands or transforms, and you cannot use unattended installations to provision servers using Active Directory.

- **Integrating Citrix Hotfixes into Your Custom Installation**. If you want to store an easily repeatable version of your custom installation that includes other information or items, such as Citrix hotfixes, consider creating an administrative installation of XenApp or the Citrix XenApp Plugin for Hosted Apps. Administrative installations are typically used to prepare a package with answers or patches that you want applied when someone runs the resulting Windows Installer command line.

When choosing a XenApp installation method, select a method that you can repeat easily, such as scripting, answer files, or imaging. Having a repeatable way to build XenApp servers quickly makes it easier to reinstall if a server fails, saves time and resources, and ensures consistent configurations, which minimizes troubleshooting efforts.

When performing custom installations, consider enabling Windows Installer logging. This provides a detailed summary of installation actions, which assists in troubleshooting.

To become familiar with XenApp Setup, start by creating small single-server test farm using the wizard-based installation.

Related topics:

"Custom XenApp Installation Reference" on page 125

"XenApp Windows Installer Properties Reference" on page 139

Preparing Your Environment for XenApp Installation

Before you install the components included with Citrix XenApp Setup, review the *Citrix XenApp 5.0 for Microsoft Windows Server 2008 Installation Checklist* to ensure that your servers are prepared for product installation. The installation checklist includes system requirements for each component.

To prepare to create the farm

- On the server that will host the data store, install the database software, if necessary, and create the farm data store.
- Install Citrix Licensing. You can install this on a stand-alone or shared server and install licensing before or after XenApp Setup; however, since XenApp Setup prompts you for licensing information, you might find it more convenient to install it before Setup.

  For information about installing the license server, see the *Getting Started with Citrix Licensing Guide*.

- If you are using the Web Interface or the Citrix XenApp plugin for user access, install the Web Interface and configure a XenApp Web or XenApp Services site. For information, see the *Web Interface Administrator's Guide*.

To prepare individual farm servers for setup

These points apply to all servers on the farm, including the first server in the farm.

- Review the guidance on installing in a Windows Server 2008 environment in the Installation Checklist and the considerations for the User Account Control.
- Ensure that the operating system on which you are installing XenApp has its clock set to the correct time.
- If you are performing an Unattended Installation, create a Data Source Name (DSN) file and copy the file to each server in the farm making any necessary modifications. This is not necessary if the data store is hosted on an Access database.
- Install the appropriate database client on each server in the farm. This is not necessary if the data store is hosted on an Access database.
- Install one of the Citrix XenApp plugins on each server before you run Setup.
- If you want to change the accounts under which the Citrix Print Manager Service and the CPU Utilization Mgmt/CPU Rebalancer service run, create those accounts on each server before running Setup and run Setup as a domain administrator.
- If you want to use the MUI support in XenApp, ensure Windows Server 2008 language option is set to English.

Related topics:

"Choosing to Run Setup with User Account Control Enabled or Disabled" on page 65

"Creating a DSN File for XenApp Setup" on page 181

"Installing Citrix XenApp Plugins on Servers" on page 68

"Substituting Domain Accounts for Local Accounts" on page 68

"To enable Windows MUI support" on page 70

Planning for the XenApp Installation

There are various decisions you should make before starting the XenApp installation. Some XenApp farm configurations and features, such as shadowing, require that you plan their deployment before you start creating your farm.

Choosing to Run Setup with User Account Control Enabled or Disabled

You can run XenApp Setup with UAC enabled or disabled, depending on your preference. This topic provides guidance about the following:

- Multiuser access to applications
- Accounts required for Citrix management features
- Installing XenApp with UAC enabled
- Managing printer drivers and queues

Multiuser Access to Applications

To allow multiuser access to an application, install the application as a Built-in Administrator or enable the **Create Users** setting when prompted by UAC.

Accounts Required for Citrix Management Features

These XenApp management features and tools require users be domain administrators, delegated administrators, or part of the Administrators group on the local computer:

- Access Management Console
- Advanced Configuration tool
- XenApp Commands
- SSL Relay tool
- Speedscreen Latency Reduction Manager

These permissions are in addition to any requirements for the feature, such as having a Citrix administrator account.

Installing XenApp with UAC Enabled

Consider the following suggestions before performing setup when UAC is enabled:

- If you are performing a wizard-based installation, invoke Setup by right-clicking Autorun (autorun.exe) and selecting **Run as Administrator**.

Performing an Autorun-based installation runs Setup at its highest manifest and elevates your privilege levels accordingly.

Note: You cannot start Setup by double-clicking mps.msi or MF_Autorun.msi.

- To perform Setup as any user other than the Built-in administrator, start Setup by right-clicking on the Autorun.exe file and selecting **Run as Administrator**. If you double-click the executable, you cannot install XenApp under User mode.
- Specify for Windows to elevate the UAC level automatically, without prompting, by configuring a Local Security Policy setting:
  - In Windows Server 2008, specify **Elevate without prompting** for the **User Account Control: Behavior of the elevation prompt for administrators** in the Local Security Policy.
- Specify for Windows to elevate the UAC level without prompting, through an Active Directory Default Domain Policy:
  - On your Domain Controller, edit the **Default Domain Policy** to set the **Security Policy Setting in User Account Control: Behavior of the elevation** prompt for administrators in **Admin Approval Mode to Elevate without prompting**.

  This prevents you from having to enable this setting on each server before installation, provided you join the domain before installing XenApp. When a computer joins the domain, the domain policy is applied automatically.

If you want to perform a silent installation, command-line based , or unattended installation of XenApp with UAC enabled and you are not a built-in Administrator, you can do so by:

- Running the UnattendedInstall.exe by specifying it on the command line in an elevated command prompt window. For example, run:

  ```
  UnattendedInstall.exe MPS.msi c:\Unattended.txt
  ```

  To elevate the command prompt, right-click on the command prompt menu command and select Run as Administrator. This elevated mode is also known as Admin Approval Mode.
- Running installations, including scripts, from an elevated command prompt.
- Running installation using batch files from an elevated command prompt. To do so, specify the batch file on the command line in an elevated

command-prompt window (as described previously for the UnattendedInstall.exe).

Managing Printer Drivers and Queues

If UAC will be enabled on your farm servers, Citrix recommends enabling the **Print Services** role so that you can manage printer drivers and print queues on clients.

Supported Languages

The information in this topic provides guidance as to supported operating system languages, not editions.

XenApp Language Edition	Operating System Language Edition
XenApp, English edition	Windows Server 2008, English edition Windows Server 2008, Russian edition Windows 2008 Simplified Chinese Windows 2008 Traditional Chinese Windows 2008 Korean
XenApp, French edition	Windows Server 2008, French edition
XenApp, German edition	Windows Server 2008, German edition
XenApp, Japanese edition	Windows Server 2008, Japanese edition
XenApp, Spanish edition	Windows Server 2008, Spanish edition

Windows Multilingual User Interface Pack (MUI) is supported only on the English edition of Windows.

For information about the supported operating system editions, see the *Citrix XenApp Installation Checklist*.

Related topics:

“To enable Windows MUI support” on page 70

Additional Pre-Installation Considerations

To use Philips SpeechMike devices with XenApp, you must install the drivers on all servers hosting sessions that record audio. Citrix recommends installing the Philips drivers before installing XenApp.

Installing Citrix XenApp Plugins on Servers

XenApp Setup requires installing at least one Citrix XenApp plugins before or during Setup for functionality such as the pass-through client authentication and shadowing to work correctly. If you invoke Setup from the Autorun, this is done automatically for you by default.

If you want to stream applications or think you might want to in the future, Citrix recommends installing the Citrix XenApp Plugin for Streamed Apps, which is installed by default, on all servers in your farm.

Related topics:

"Installing a XenApp Plugin Before Setup" on page 127

"Task 4: Configuring Passthrough Client Authentication" on page 80

Substituting Domain Accounts for Local Accounts

By default, the XenApp Setup creates local accounts to run the following XenApp services:

XenApp Service	Default Local User Account
Citrix Print Manager Service	ctx_cpsvcuser
CPU Utilization Mgmt/CPU Rebalancer	ctx_cpuuser
Configuration Manager for the Web Interface Service	Ctx_ConfigMgr

Citrix strongly recommends that if you want to change local accounts to domain accounts that you do so before you install XenApp. Changing service accounts after Setup is not supported.

Run Setup as a domain administrator or the accounts are not created correctly. If you are changing the accounts for services and your farm has servers in multiple domains, the domains must have trust relationships with each other.

To substitute your newly-created domain account for the local account, during XenApp installation, perform Setup using a method that employs Windows Installer Commands, specify the property for the service, and provide the new domain account name as a parameter.

For instructions on how to specify the accounts during Setup, see "XenApp Windows Setup Property Names and Values" on page 139. For a list and full description of XenApp accounts and their privileges, see the *Citrix XenApp Administrator's Guide*.

Planning for Configuration Logging and IMA Encryption Before Setup

The IMA encryption feature provides a more robust AES encryption algorithm to protect sensitive data in the IMA data store. Enabling IMA encryption provides an additional layer of security for the data preserved by the Configuration Logging feature.

If you do not enable IMA encryption, XenApp uses the standard encryption used in previous versions of XenApp. IMA encryption, Configuration Logging, and when to enable these features are described in more depth in the *Citrix XenApp Administrator's Guide*.

You can enable IMA encryption during or after XenApp Setup. However, it is easier to enable it during Setup.

To enable IMA encryption during installation, generate a key, which is used for all the servers in your farm, and specify that key during Setup. You can generate the key before or during Setup.

If you are performing a large-scale deployment of Citrix XenApp, Citrix recommends doing one of the following if you want to enable IMA encryption:

- Deploying XenApp by using images
- Generating a key, putting the key in a folder on your network, using a UNC path to specify the location, and performing an unattended installation

---

Note: Mapped drives are not supported for specifying the path for the key during installation.

If you choose to generate the key before Setup, you must generate it by using CTXKEYTOOL, which is described in commands reference in the *Citrix XenApp Administrator's Guide*.

If you have multiple farms in your environment, Citrix recommends that you generate separate keys for each farm.

Related topics:

"Enabling IMA Encryption After Installation" on page 205

"Step 5: Enabling IMA Encryption" on page 85

"Custom XenApp Installations" on page 62

Enabling IMA Encryption as a Local Administrator

Citrix recommends that if you plan to enable IMA encryption during Setup and you want to connect to the data store indirectly, as is the case with SQL Server Express and Access by default, you install XenApp using a domain account that has local administrative privileges on the server.

You cannot enable IMA encryption when you join a farm, either during Setup or when changing farms, if you are logged in as a local administrator and you attempt to connect to the data store indirectly. If you use a local administrator account that is not part of the Citrix Administrator group, configure all local administrators as Citrix Administrators, after running Setup on the first server in the farm.

To configure local administrators as Citrix administrators

This procedure is required only for farms on which you are connecting to the data store indirectly.

1. In the Access Management Console, expand the **XenApp** node.
2. In the left pane, under the **Farm** node, select the **Administrators** node and select **Action > New > Add administrator**.
3. On the **Add Citrix Administrator** page, select the **Add local administrators** check box.

   Selecting this option adds all previously created local administrators to the Citrix Administrators group and automatically adds any local administrators you create in the future to the Citrix Administrators group.

To enable Windows MUI support

XenApp supports Microsoft Windows Multilingual User Interface Pack (MUI) for Windows Server 2008. Users connecting from non-English language clients see their environment and applications in the language that corresponds with their language setting, provided the server's operating system and applications support it and the corresponding language packs are installed on the server. While XenApp supports Windows MUI, some XenApp components do not display in the non-English language.

1. Before you install XenApp, make sure the Windows Server 2008 language option is set to English. The language setting is found in **Regional and Language Options**. For more information, see your Microsoft documentation.
2. Install the English version of XenApp.
3. Install the Windows MUI language packs you want to deliver to users, and install any applications, MUI or native, required.

Note: Changing the Windows Server 2008 Language option to another language after you install XenApp might lead to display issues.

Planning for Shadowing Before Setup

Decide if you want to support session shadowing before you run Setup. *Session shadowing* monitors and interacts with user sessions. When you shadow a user session, you can view everything that appears on the user's session display.

Session shadowing also lets you use your keyboard and mouse to remotely interact with the user session if desired. Shadowing can be a useful tool for user collaboration, training, troubleshooting, and monitoring by supervisors, help desk personnel, and teachers.

Shadowing is protocol-specific. This means you can shadow ICA sessions over ICA and Remote Desktop Protocol (RDP) sessions over RDP only.

During Setup, you can limit or disable shadowing. You can disable shadowing of ICA sessions on all servers in a server farm, for example, if legal privacy requirements prohibit shadowing of users' sessions. Alternatively, you can disable shadowing on servers that host sensitive applications, such as personnel or payroll applications, to protect confidential data.

Important: Shadowing restrictions are permanent. If you disable shadowing or enable shadowing but disable certain shadowing features during Setup, you cannot change the restrictions later. You must reinstall XenApp on the server to change shadowing restrictions.

Any user policies you create to enable user-to-user shadowing are subject to the restrictions you place on shadowing during Setup.

Shadowing is a server-level setting, so you can enable shadowing on one server and disable it on another. Because shadowing restrictions are permanent, you cannot rerun Setup to configure shadowing after you create your farm if you disabled the default shadowing support when you installed the server.

Citrix does not recommend disabling shadowing as a substitute for user- and group-specific connection policies.

Related topics:

"Step 7: Configuring Session Shadowing" on page 88

Installing Additional XenApp Components

You can launch the Setup programs for the following XenApp components from the XenApp Autorun:

- Web Interface
- Resource Manager and EdgeSight
- SmartAuditor
- Citrix Licensing
- Secure Gateway

Many of these components require their own servers or have different installation prerequisites or considerations than XenApp. As a result, the *Citrix XenApp Installation Guide* does not give complete Setup instructions nor does it provide comprehensive prerequisites. With the exception of the Access Management Console, instructions for installing these components are provided in their respective administrator's and installation guides.

When installing a deployment that includes these additional components, install them in the order that follows. Although the sequence presented is not mandatory for all components, it reduces the need to manually configure options after Setup because you did not have information, such as server or site names available.

1. **Citrix Licensing**, including the Citrix License Server and the License Management Console. See also "To prepare to create the farm" on page 63.
2. **Web Interface**. Installing the Web Interface and creating a Web Services site before installing XenApp lets you provide a response for the site name when prompted by XenApp Setup. If you are deploying the Citrix XenApp plugin, install the Web Interface and create a XenApp Services site.

   Note: You can also install the Web Interface after installing XenApp. In some situations, this might be easier and preferable.

   ---

3. **XenApp**. See "Creating a New XenApp Farm" on page 75 for specifics about its installation sequence and "To prepare to create the farm" on page 63 for the order in which to install specific prerequisites.
4. **Access Management Console**. It is possible to install the Access Management Console on a remote computer, such as your workstation, as well as on XenApp servers. However, for the Web Interface, you must install the Access Management Console on the same server.

To install the Access Management Console for XenApp, Password Manager, and the Access Gateway on the same server, install the extensions in the following order:

1. Access Gateway
2. Password Manager
3. XenApp

5. **EdgeSight or Resource Manager powered by EdgeSight**.
6. **Secure Gateway.** Installing the Secure Gateway after installing XenApp lets you complete the Secure Gateway configuration wizard. If you install the Secure Gateway before you create your farm, you must re-run the Secure Gateway configuration wizard by re-running Setup. Secure Gateway is not typically installed on a XenApp server.
7. **Password Manager.**
8. **SmartAuditor.**

Additional Feature Planning Before Setup

In addition, Citrix recommends, if possible, making these decisions before you run Setup:

- If you want to stream applications, install the XenApp Plugin for Streamed Apps when you run Setup.
- If you want to use the XenApp Management Pack for Microsoft Operations Manager 2005 or Microsoft Systems Center Operations Manager 2007 to monitor either your XenApp farm or Citrix Licensing, install the XenApp Provider and the Licensing Provider, which are the XenApp Windows Management Instrumentation (WMI) providers.

For information about streaming, see the *Citrix Application Streaming Guide*. For information about Systems Center Operations Manager and Microsoft Operations Manager, see the *Management Pack Administrator's Guide*.

Related topics:

"Step 1: Selecting Components of XenApp" on page 83

Installing Agents for Platinum Components

If you choose to deploy Platinum components, note the following:

- **EdgeSight**. You must install the EdgeSight agent on the XenApp servers and client devices you want to monitor.

- **Citrix Password Manager**. Install and publish the Citrix Password Manager Plugin on each server that publishes applications requiring authentication. The plugin provides credentials for published applications only. You can also install the Citrix Password Manager Plugin locally on client devices and use it for local applications.
- **SmartAuditor**. The SmartAuditor agent is installed on the servers hosting the applications you want to monitor. The agent must be installed after you install the server software for XenApp.
- **EasyCall**. Install the EasyCall client on the client devices or make it available to users by publishing it on your farm.

You can install the EdgeSight agent and Password Manager Plugin when you are installing the server software for XenApp by enabling their installation.

You can find the Setup instructions and information about Platinum components in their respective administrator's and installation guides.

Creating a New XenApp Farm

Before creating a new XenApp farm, read “Planning Your XenApp Deployment” on page 25 and prepare your environment according to the instructions in “To prepare to create the farm” on page 63.

You create a farm the first time you install XenApp. When you install XenApp on subsequent computers, Setup prompts you to join the farm you started on the first computer. A typical a high-level installation sequence is:

1. Prepare your database for data-store configuration during XenApp Setup.
2. Install a one of the Citrix XenApp Plugins on the server on which you are creating the farm.
3. Install the Access Management Console and the Advanced Configuration tool.
4. Create your farm by installing XenApp on the server you want to function as the data collector.

   Note: When you are creating your farm, do not use a name with a hyphen if you intend to use Oracle as your Configuration Logging database.

5. Install XenApp on the other infrastructure servers and then the servers hosting published applications by using the Join Farm Setup.
6. After installation, restart the servers in the farm.

After installing XenApp, perform the required post-installation configuration tasks before users can log on to published resources.

Related topics:

“Migrating an Existing Server Farm to XenApp 5.0” on page 95

“Configuring XenApp after Installation” on page 122

Prerequisites and Assumptions for the Sample Installation

This topic presents a sample installation sequence designed to explain XenApp server Setup options. In this installation, you:

- Perform a wizard-based installation of XenApp, Platinum edition invoked from the Autorun.
- Install all XenApp management tools on one computer.
- Already installed Citrix Licensing and Web Interface. As a result, both components are disabled in this procedure.

  For information about installing Citrix Licensing and Web Interface, see the *Getting Started with Citrix Licensing Guide* and *Web Interface Administrator's Guide*.
- Want to use the Citrix XenApp plugin and the Web Interface as your access methods. In addition, you want to stream some applications to the server, so you are installing the Citrix XenApp Plugin for Streamed Apps on the server.
- Install the XML Service to be shared with Internet Information Services (IIS). As a result, you already configured IIS on the server on which you are installing XenApp.
- Install the EdgeSight Agent since you will be monitoring the server using EdgeSight.

This sample procedure provides instructions for both relational ("third-party") and small databases. For third-party databases, the procedure assumes you already designated the data store on a database server and you have credentials for that database. To use this sample procedure with SQL Server 2005 Express, install it on the first server in the farm before you install XenApp.

While the information in this topic is based on using a Autorun-based installation to install XenApp components, the sequence and explanations apply to other types of installations, including the unattended installation.



Note: The topics here include a Task number in their headings for clarity. Each step that requires a specific response to move to the next step or task in the sample procedure, includes a response that is flagged by a checkmark, so that you can duplicate this sample installation sequence, if desired.

Creating the First Server in the Farm

The sequence of Setup pages might vary based on the options you select during Setup. At a high level, the tasks to create a farm are:

- Task 1, 2: Installation path selection
- Task 3: Component selection
- Task 4: Configure pass-through client authentication
- Task 5: Specify licensing
- Task 6, 7, 8: Installing the management tools and XenApp

Although these tasks refer specifically to an Autorun-invoked installation, the general grouping of installation tasks also applies to other installation methods, such as unattended installation.

When you create a new farm, run Setup on the computer you want to be the data collector for the first (or only) zone.

For the installation instructions for Platinum components, see their respective administrator's and installation guides.

Related topics:

"Installing Agents for Platinum Components" on page 73

Task 1: Choosing the Edition (Initial Autorun Page)

Start the installation by double-clicking the autorun.exe. Starting Setup by double-clicking on mps.msi does not start Setup.

The initial Autorun page has the following options:

Installation Checklist. Click to display XenApp installation prerequisites and system requirements. Citrix recommends reading the installation checklist to ensure you are not delayed unnecessarily during Setup.

Platinum Edition, Enterprise Edition, Advanced Edition. Your installation path and the components available for installation vary according to the edition you select.

When you purchase XenApp, you can select from three editions: Platinum Edition, Enterprise Edition, and Advanced Edition. For questions about which edition to choose, contact your reseller or go to the product information area of the Citrix Web site.

Citrix on the Web. Provides links to the Citrix Web site and the Citrix Support Web site.



*Select **Platinum Edition**.*

Task 2: Choosing an Installation Category

Select an installation category (presented as if you chose **Platinum Edition** in the previous page):

- **Application Virtualization**. Installs Citrix Licensing, XenApp, Web Interface, Access Management Console, Advanced Configuration tool, and Documentation.
- **Application Session Recording.** (Platinum Edition.) Installs the SmartAuditor administration features, the SmartAuditor Player, and the SmartAuditor Agent.
- **Application Performance Monitor**. (Enterprise and Platinum Editions.) Installs EdgeSight Server and the EdgeSight Agent.
- **Single Sign On.** (Platinum Edition.) Installs the Citrix Password Manager service, the plugin, and the Central Store.
- **Common Components**. Installs components such as the Citrix XenApp Plugins, Streaming Profiler, Access Management Console, XenApp Configuration tool, Web Interface, Secure Gateway, Citrix Licensing, and Documentation



*Select **Application Virtualization**.*

Task 3: Selecting Components

After selecting **Application Virtualization** as your installation category, the following pages appear:

- The **License Agreement** page.
- The **Prerequisites Installation** page, which lists the components, roles, and features to install before installing XenApp. Some prerequisites install automatically when you start Setup from the Autorun. See the *Citrix XenApp Installation Checklist* for details about required components.
- The **Component Selection** page. This page lets you select the major components you want to install. By default, all components, except the license server and the EdgeSight agent, are enabled for installation. When you click **Next**, a sequence of separate Setup wizards guides you through the installation of selected XenApp components.

Depending on the components selected, some configuration options described in this topic might not be available or might appear in different order. Install any or all of these components:

- **Citrix Licensing.** (Disabled by default.) Installs or upgrades the licensing components needed to run your Citrix product.

  To run, every server farm must have access to a Citrix License Server, as described in the *Getting Started with Citrix Licensing Guide*.

  Do not install Citrix Licensing every time you run XenApp Setup. Instead, point your XenApp servers to a common license server.

- **Access Management Console.** Manages all your Citrix components from a single location, which snaps in to the Microsoft Management Console (MMC).

- **Web Interface.** Disable this option to follow this sample installation procedure.

- **Citrix XenApp**. Installs XenApp and its components. The options you can select for XenApp are explained in “Task 7: Installing XenApp and its Components” on page 83. It has two suboptions:

  - **Pass-through client**. Installs Program Neighborhood and the Citrix XenApp plugin. You can select to install one or both plugins.

    If you disable these options, install, at a minimum, the client engine, which is included in Clients\ica32\XenAppWeb.exe and provides the functionality for pass-through client authentication.

  - **Citrix XenApp Plugin for Streamed Apps**. Installs the plugin required for streaming applications. Even if you are not streaming applications on this server, install this client to stream applications on other servers in the farm.

    If you choose to install this client manually, install it from Clients\Streaming\XenAppStreaming.exe.

- **Citrix XenApp Advanced Configuration.** Manages printing, policies, load manager, and zones. You can also install this tool on stand-alone computers to use remotely.

- **XenApp Document Library**. Installs the XenApp Document Library, which is a help system that includes documentation from all major components of XenApp, including the clients and XenApp server. If you disable this component, no help will appear in any server-side XenApp components.

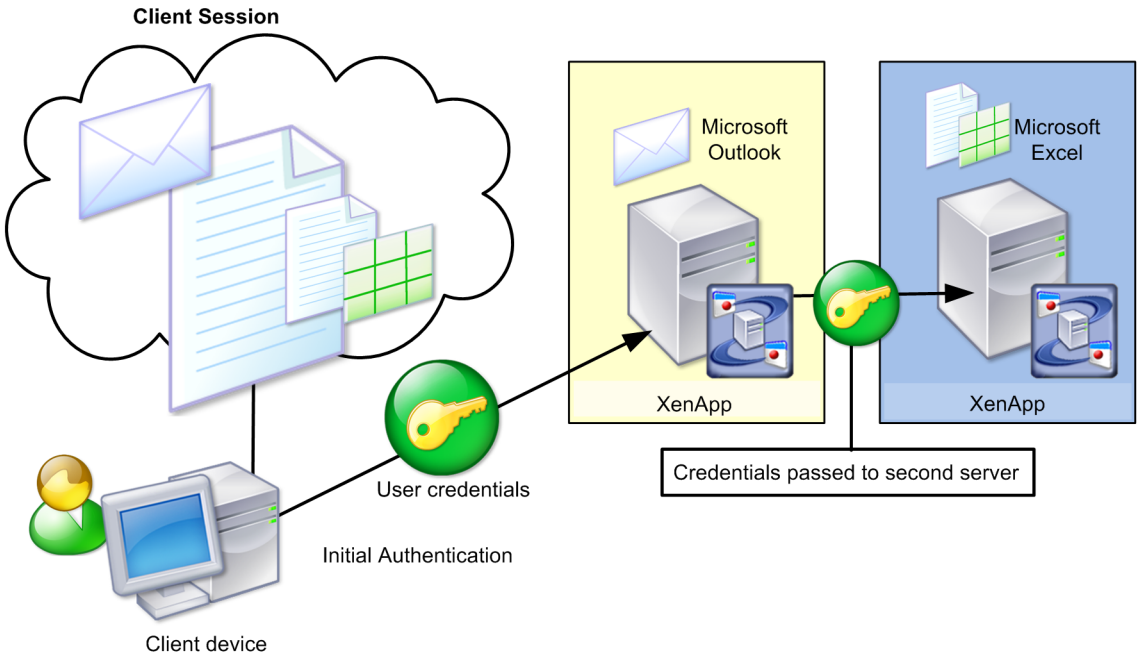
- **EdgeSight Presentation Server Agent**. (Disabled by default.) To monitor servers with Resource Manager powered by EdgeSight, install this agent on all farm servers.

Note: Upgrading any XenApp 5.0 component from an early release for technological preview, such as the Beta and Release Preview, is not supported.

*Select **Access Management Console**, **XenApp** and its default client selections, the **XenApp Advanced Configuration**, **XenApp Document Library**, and the **EdgeSight Agent**.*

Task 4: Configuring Passthrough Client Authentication

Citrix recommends enabling *passthrough client authentication*. When the user connects to applications published on different servers, passthrough client authentication enables XenApp to automatically pass a user's credentials from the initial server to the server hosting the next application. This prevents the user from having to re-authenticate when opening applications on different servers.



In this illustration, XenApp passes the user's credentials from the server hosting Microsoft Outlook to the server hosting Microsoft Excel when the user opens the Microsoft Excel attachment from an email message hosted on a different server

Note: The pass-through authentication functionality discussed in this topic is not the same functionality provided by Citrix Password Manager or password management applications in general. Citrix uses the term *single sign-on* to refer to Password Manager functionality.

Enabling pass-through authentication requires configuring components on all XenApp application servers and enabling pass-through authentication in the clients installed on end-user client devices. The latter is described in the *XenApp Plugin for Hosted Apps for Windows Administrator's Guide*. If the pass-through authentication feature is not enabled before deploying the clients to end users, users must reinstall the clients with this feature enabled before pass-through authentication will work.

To configure pass-through client authentication functionality on the server, install any Citrix XenApp Plugin for Hosted Apps — Program Neighborhood, the Citrix XenApp plugin, or the Citrix XenApp Web Plugin — on each XenApp server before Setup. If you are deploying the XenApp plugin as the client for users, install the XenApp plugin on your server as the pass-through client. Then, configure these pages during Setup:

- **Passthrough Authentication for the Passthrough Client.** Select **Yes** to enable pass-through client authentication.
- **Server Address for the Passthrough Client.** If you installed the Citrix XenApp plugin as the pass-through client, specify the URL for your XenApp Services site. For example, http://*yourservername*/Citrix/PNAgent.

  If you installed the Web Interface on this server, specify either **localhost** or the full URL for the XenApp Services site. If you installed the Web Interface on a different server, specify the full URL for the XenApp Services site.

  If you have not installed the Web Interface yet, you can click **Next** and enter it after installation.

  Note: If you are provisioning your servers by cloning (by using a third-party cloning program like Symantec's Altiris) or using them in a virtual environment, specify the name of the Web Interface server and not localhost.



*Select **Yes** and specify the full URL for the XenApp Services site in the **Server Address for the Passthrough Client** box.*

Task 5: Installing the License Server

If you disabled the Citrix Licensing component in the Component Selection page, a **Warning!** page appears. It has two options:

- **Install a license server now**. Selecting this option launches the license server Setup. This program installs the Citrix License Server and the License Management Console.

  For information about installing the licensing components and obtaining licenses from Citrix, see the *Getting Started with Citrix Licensing Guide*.

- **I already have a license server, or will use the installation media to install one later.** Selecting this option lets you specify the name of an existing license server or install a license server later. If you select this option, Setup prompts you to enter a license server name later.

  You can defer installing the licensing components until after Setup and provide the license server name in XenApp.



*Select **I already have a license server, or will use the installation media to install one later**.*

Task 6: Installing the Access Management Console

The Access Management Console is a framework into which you install features, known as snap-ins or *extensions*. Each extension provides additional administrative functionality for your Citrix environment. When installing the Platinum Edition, extensions for components such as Password Management are installed.

Note: Do not install different versions of Access Management Console on the same server.



*Select **Finish** when prompted after installing the Access Management Console. Setup configures the XenApp Plugins after installing the Access Management Console.*

Task 7: Installing XenApp and its Components

If you select XenApp on the **Component Selection** page, wizard pages appear prompting you to install XenApp and its various components.

Step 1: Selecting Components of XenApp

The components appearing on this page vary based on the edition of XenApp you are installing. Click **Disk Cost** to view the amount of disk space the selected components require. This page does not appear if you are installing the Advanced Edition.

Application Streaming. Provides application streaming to servers and desktops.

Load Manager. Provides the ability to load balance user connections across servers to more effectively use server resources.

WMI Providers. Installs the XenApp Provider, which is XenApp's Windows Management Instrumentation (WMI) provider.

The Citrix XenApp Management Pack, used with the XenApp Provider, monitors the health and performance of XenApp and license servers in a MOM environment.

Install the XenApp Provider on each server you want to monitor with Operations Manager.



*Select **Application Streaming**, **Load Manager**, and **WMI Providers**, which are enabled by default.*

Step 2: Creating the Server Farm

At this point in Setup, create the farm by creating the connection to the data store. Before doing so, determine:

- What you want to name the new server farm.
- The name of the database hosting the farm's data store and have credentials to authenticate to it. (If you are using Microsoft Access, the database is created on the first server on which you run Setup.)
- Which user account should be granted full access to all farm management tasks initially. Log on and install XenApp with those credentials.

Three pages appear during the process of creating a server farm:

- **Create or Join a Server Farm**
- **Create a Server Farm**
- **Assign Farm Administrator Credentials**

After you complete the **Create a Server Farm** page, Setup configures the data store and how the data store communicates with the farm.

*On the Create or Join a Server Farm page, select **Create a new farm**.*



Step 3: Specifying the Data Store

Use one of these procedures, depending on the database that you want to use for the data store:

- To create a server farm with a SQL Server, Oracle, or DB2 data store
- "To create a server farm using Access or SQL Server Express for the data store" on page 84

To create a server farm with a SQL Server, Oracle, or DB2 data store

Use this procedure to configure a data store connection when the data store is in a Microsoft SQL Server database, an Oracle database, or an IBM DB2 database.

1. On the **Create a Server Farm** Setup page, enter a name for the new server farm. Farm names can include spaces but cannot be more than 32 characters in length.
2. Select **Use the following database on a separate database server** and select the database from the list.

   Important: If your driver does not appear in the list, cancel Setup, install the driver, and then restart Setup.

3. If you want to change the server farm zone name (**Default Zone**), clear the **Use default zone name** check box and enter the new name.

   Note: Citrix recommends limiting the number of zones that you create to no more than one zone per geographic location. Do not create a zone for each subnet in your domain.

4. Click **Next** and create a new data source connection to the database.

   Setup automatically creates a Data Source (DSN) file based on the information you enter and names it MF20.dsn. For instructions for configuring connections to Microsoft SQL Server, Oracle, and IBM DB2 databases, refer to the appropriate database documentation.

To create a server farm using Access or SQL Server Express for the data store

- To use SQL Server 2005 Express for your farm data store, install it on the server before you install XenApp as described in "Installing Microsoft SQL Server Express" on page 190.

- To use a Microsoft Access database as the farm data store, Setup creates the database on the first server in the farm when you select Access as the database.

For both database types, subsequent servers that join the farm connect to the first server using the default TCP port 2512.

1. On the **Create a Server Farm** Setup page, enter a name for the new server farm. Farm names can include spaces but cannot be more than 32 characters in length.
2. Select **Use a local database on this server** and select the database from the list.
3. If you want to change the server farm zone name (**Default Zone**), clear the **Use default zone name** check box and enter the new name.
4. Click **Next** and continue with Setup.



*On the **Create a Server Farm** page, select **Use the following database on a separate database server**. Use the default zone name.*

Related topics:

"Choosing a Database" on page 174

Step 4: Assigning Farm Administrator Credentials

Enter the domain credentials for the user who you want to be the first administrator on the farm. This administrator has full permissions to the farm after XenApp is installed and can create additional administrator accounts in the Access Management Console.

Step 5: Enabling IMA Encryption

IMA encryption provides more robust encryption of sensitive data in the IMA data store. If you enable this feature during Create Farm Setup, Setup forces you to enable it on all servers that join the farm and requires the key you specified during this step. After enabling IMA encryption, you cannot disable it without reinstalling all existing farm servers.

Important: See "Planning for Configuration Logging and IMA Encryption Before Setup" on page 69 for information about preparing your environment to enable IMA encryption and when to load a key before Setup.

During Create Farm Setup, either specify a key generated before installation using CTXKEYTOOL or create one during Setup. To enable IMA encryption during Setup, keys must be specified and *loaded* (activated in the data store). Specifying a key does not necessarily load it.

If you have multiple farms in your environment, Citrix recommends that you generate separate keys for each farm.

Citrix recommends installing XenApp using network credentials when enabling IMA encryption during Setup. For information about enabling IMA encryption when performing XenApp Setup as a local administrator, see "Enabling IMA Encryption as a Local Administrator" on page 70.

To enable IMA encryption when creating a farm

1. On the **Enable IMA Encryption** page, select the **Enable IMA Encryption** check box and click **Next**.
2. On the **IMA Encryption Key Type** page, select one of the following options:

   - **Install Key From File.** Select if you already generated a key file for this farm and the file is on a USB flash drive, diskette, or location to which you have access.

     This option specifies the key file for a server *and* loads it simultaneously. The key does not have to be stored on the local computer. If you already loaded the key, use the **Use Previously Loaded Key** option.

     If you select this option, see "To install a key from a file" on page 86 for additional instructions.

   - **Generate and Install New Key.** Select if you have not yet generated a key for this farm. This option generates a key and installs it on the local computer.

     If you select this option, see "To generate a new key file and install the key" on page 87 for additional instructions.

   - **Use Previously Loaded Key.** Select if you generated a key using the CTXKEYTOOL and loaded it on this server before you started Setup. If you loaded a valid key, the **Citrix Licensing Settings** page appears.

     This option is not available if a key is not present on the local computer.



*Select **Generate and Install New Key**.*

To install a key from a file

1. Select **Install Key From File**.
2. Browse to the location of the key file.

   If the key file is on a network location, use a UNC path to specify the location.

After you select the key file, the **Citrix Licensing Settings** page appears. This indicates that you successfully loaded the key.

3. Continue to "Step 6: Specifying the Citrix License Server" on page 87.

To generate a new key file and install the key

1. Select **Generate and Install New Key**.
2. Save the key to any folder on your local computer.

   Citrix strongly recommends choosing a meaningful key name, such as one that matches its associated farm. For example, C:**Alpha Farm Key****alphafarmkey.ctx**. You can specify any extension that is not in use.

   After you click **Save**, the **Citrix Licensing Settings** page appears. This indicates you successfully configured and enabled IMA encryption.

Important: Citrix strongly recommends backing up the key file, as described in the *XenApp Administrator's Guide*.

Step 6: Specifying the Citrix License Server

Before users can connect to XenApp, you must configure the first server in the farm to use a Citrix License Server. Select one of the following options:

- **Enter the host name for the machine hosting your Citrix License Server.** Enter the port number, if the license server is not using the default port number (27000). By default, servers joining the farm use the information you enter here.

Note: When specifying a license server, you cannot leave the license server name blank.

- **Enter the correct host name later.** If you do not know the license server name and port number, you can enter this information later using the Access Management Console.



*Select **Enter the host name for the machine hosting your Citrix License Server** and enter the name of your license server. Use the default port.*

Step 7: Configuring Session Shadowing

Session shadowing lets you monitor and interact with users' sessions. When you shadow a user session, you can remotely view the user's session display and interact with the session using your own keyboard and mouse.

Caution: Shadowing restrictions are permanent. If you disable shadowing or shadowing features during Setup, you cannot reconfigure them after Setup and they apply to any policies for user-to-user shadowing. Do not disable shadowing as a substitute for user- and group-specific connection policies.

During Setup, you can limit or disable shadowing as follows:

Prohibit shadowing of user sessions on this server. Permanently disables user-session shadowing on this server.

Allow shadowing of user sessions on this server. Enables user-session shadowing by the server. You can apply the following restrictions:

- **Prohibit remote control.** By default, authorized users can view a session they are shadowing and use their keyboard and mouse to interact with it. This option lets authorized users know their session is being shadowed.
- **Force a shadow acceptance popup.** By default, an acceptance prompt notifies users when an authorized user attempts to shadow their sessions. Select this option to prevent authorized users from shadowing sessions without sending an acceptance prompt.
- **Log all shadow connections.** You can log shadowing attempts, successes, and failures in the Windows event log. Select this option to enable logging.

For more information about shadowing, see the *Citrix XenApp Administrator's Guide*.



*Select **Allow shadowing of user sessions on this server** and select **Force a shadow acceptance popup**.*

Step 8: Configuring the Citrix XML Service Port

XenApp uses the Citrix XML Service to supply the Web Interface server, and its connecting clients, with the names of applications available in a farm. By default, Setup configures the Citrix XML Service to share the default TCP/IP communication port (port 80) with Microsoft Internet Information Services (IIS).

If you intend to send data to the Web Interface over a secure HTTP connection using SSL, be sure that the Citrix XML Service is set to share its port with IIS and that IIS is configured to support HTTPS. If you intend to install the Web Interface on the same server as the XML service, select the port sharing option.

The **Configure Citrix XML Service Port** page, where you configure the XML Service in Setup, has two options:

- **Share default TCP/IP port with Internet Information Services**. (Default.) If you select this option, the XML Service communicates over whatever you configured IIS to communicate over. By default, IIS communicates over port 80 for HTTP traffic and, if configured, port 443 for HTTPS traffic. A common scenario when you would want to select this option is if you have the Web Interface and XenApp installed on the same server.

  If you choose to share a port between IIS and the XML Service and you want to change the XML Service port after installation, you must do so manually. There is no option on the **Server Properties > XML Service** page.

  You can run the XML service over port 443 using SSL in two ways:

  - Configure IIS for HTTPS traffic on port 443, and choose port sharing in XenApp Setup.
  - Configure SSL relay on port 443. It does not matter whether you choose port sharing or not.

  Note: If you want the XML service to share a port with IIS, you must install the Web Interface before running XenApp Setup.

- **Use a separate port**. Opens a different port number on the XenApp server for the XML Service's communications with the Web Interface and the clients. Select this option if you:

  - Want to install the XML Service on a dedicated XML server
  - Do not want the Citrix XML Service to share the TCP port with IIS

  If, during Setup, you plan to specify a port number other than the default, make sure other applications do not use the new port number. For a list of ports in use, type `netstat -a` at a command prompt. Make a note of the port number you specify. If you change the default port, configure Web Interface servers and any clients connecting to it to use the new port number.

  Important: All servers in the farm must use the same TCP port for the Citrix XML Service.



*Select **Share default TCP/IP port with Internet Information Server**.*

Step 9: Adding Users to the Remote Desktop Users Group

Only users who are members of the Remote Desktop Users group can connect to published applications. By default, there are no users in the Remote Desktop Users group. Until you add users to this group, only administrators can connect remotely to the server.

If user accounts are already on the server, Setup can add users to the Remote Desktop Users group. This Setup page has three options:

- **Add the Authenticated Users now**. Adds the domain accounts in the Windows Users group to the Remote Desktop Users group. This option ensures that any users you add in the future to the Users group are also added to the Remote Desktop Users group.
- **Add the list of users from the Users group now**. Copies all current users from the Users group to the Remote Desktop Users group. After Setup, if you add any user accounts, you must add the accounts to the Remote Desktop Users group manually.
- **Skip this step, and add users later**. Does not add any users to the Remote Desktop Users group. Choosing this option means that no users can connect to published applications until you add them to the Remote Desktop Users group in Windows Server 2008.



*Select **Add Authenticated Users now**.*

Task 8: Installing XenApp Advanced Configuration

If you select **XenApp Advanced Configuration** on the **Component Selection** page, Setup prompts you to install the Advanced Configuration tool.

Note: Do not install different versions of the XenApp Advanced Configuration tool on the same server.

Task 9: Installing XenApp Document Library

If you select **XenApp Document Library** on the **Component Selection** page, Setup prompts you to install the product documentation.

Note: XenApp prompts you to restart at the end of installation. You must restart XenApp for it to integrate with Terminal Services properly.

Joining a Server Farm

After installing the first server in the farm and management components such as the XenApp Advanced Configuration tool and the Access Management Console, you can install XenApp on other servers.

When you install XenApp on subsequent servers, you *join* the farm you created and see a subset of the options in the Create Farm Setup. XenApp Setup prompts you for the name of your farm and references its settings.

During a Join Farm Setup, the installation wizard prompts you to join a farm directly or indirectly. It is possible to have a mixture of servers that communicate directly and indirectly with the data store.

The following topic provides information only about the tasks of installation in the Join Farm Setup that differ from the Create Farm Setup.

Before you join servers to an existing server farm, have the following information handy:

- If you are using a database (Microsoft SQL Server, Oracle, or IBM DB2) on a dedicated server, you need to know which type of database is configured to host the data store. You also need the logon credentials of a user authorized to access the database.
- If you are using a database (Microsoft Access or SQL Server Express) on the first server in the farm, you need the name of that server and the logon credentials of a user authorized to access the database.

If you enabled IMA encryption when you created the farm, either:

- Copy the key the key you used for the first server in the farm to a network share that you must specify with a UNC path
- Access the key, which you generated when you created the farm, from a portable storage device, such as a USB flash drive

Citrix recommends that you delete the key from the server after you complete the installation of the farm.

Task 1: Initial Setup When Joining a Farm

Until you reach the **Create or Join a Server Farm** page of the Citrix XenApp for Windows Setup wizard, Setup is identical whether you are joining or creating a farm. When you are joining a farm, install whatever components you want on that server. Servers joining farms might not need as many components as the first server in the farm. See “Creating the First Server in the Farm” on page 77 for details about the initial pages in Setup.

Task 2: Joining a Server Farm

In the **Create or Join a Server Farm** page of the installation wizard, select **Join an existing farm**. Configure the server's connection to the existing server farm. You create a direct or indirect connection to the data store by either:

- Creating an ODBC data source that you can use to connect directly. Typically, this option is used for enterprise databases, such as Oracle, SQL Server, or DB2.
- Specifying the name of the server where you installed XenApp initially or the name of the server through which you want to connect to the data store (an intermediary server). Typically, this option is used for Microsoft Access or SQL Server Express.

However, if you have more than one zone in your farm, specify the name of the zone you want to add the server to on the **Join a Server Farm** page, clear the **Use default zone name** check box, and enter name of the zone to which you want add the server. For environments with only one zone, leave the **Use default zone name** check box selected to join the zone created on the first server in the farm.

To connect to the data store directly

1. In the **Join a Server Farm** page, select **one of the following: Connect directly to the database using ODBC**. Select your database from the list and click **Next**.
2. Configure the ODBC driver associated with the database you are using.

   For instructions for doing this for Microsoft SQL Server, Oracle, and IBM DB2 databases, see the documentation for the relevant database.

To connect to a server that contains the data store

1. In the **Join a Server Farm** page, select **Connect to a database on this server**, specify the name of the server hosting the Access or SQL Server Express database, and click **Next**. The default communication port is 2512.
2. On the **Access the Database on a Citrix XenApp computer** page, specify credentials for the server to which you are connecting, and click **Next**.

   After connecting to the data store, either the **Citrix Licensing Settings** page or the **IMA Encryption Key Type** page appears depending if IMA encryption is enabled on the farm you are joining.

Related topics:

"Planning the XenApp Data Store" on page 173

"Connecting to the Data Store" on page 175

Task 3: Specifying the Location of the IMA Encryption Key File

Setup automatically detects if IMA encryption is enabled on the farm you are joining and prompts you to specify the location of the same key used on the first server in the farm.

When you enable IMA encryption during Join Farm Setup, you can take one of these actions:

- Add the key file to each computer before installation
- Put the key file in a shared network location that is accessible by specifying a UNC path
- Put the key file on a portable storage device, such as CD or USB drive that you use for every installation

When performing custom installations or provisioning servers in large environments, consider storing the key file in a shared network location or including it as part of the image of the server on which you are deploying XenApp.

Note: If you add a key file to a network location, ensure that you have explicit rights to the key file so that you are not prompted for your credentials when you run Setup. See “Storing the Key on a Shared Location” on page 207 for additional information.

Choose one of the following methods of specifying the location of a key file when you are joining a farm:

- **Install Key From File.** Select this option if you did not load a key file on this server. Then follow the procedure “To install a key from a file” on page 86.
- **Use Previously Loaded Key.** Select this option if you already loaded the key for this farm onto this server. If you loaded a valid key, the **Citrix Licensing Settings** page appears.

Note: The **Use Previously Loaded Key** option is available only if you loaded a key on this server before you began Setup. Because you cannot generate a new key when you are joining a farm, the **Generate and Install New Key** option is disabled.

To verify that IMA encryption is enabled and configured properly on the servers, use the query option in the CTXKEYTOOL command, which is located in the Support folder in the installation media. Documentation for this tool is in the *Citrix XenApp Administrator's Guide*.

Task 4: Using Farm Licensing Settings

The license server can use either the same settings as the farm or point to a different license server. On the **Citrix Licensing Settings** page, select one of these options:

- **Enter the host name for the machine hosting your Citrix License Server.** Points to a different license server than the other servers in the farm.
- **Use the global farm settings for the license server.** Points to the same license server as the rest of the servers in the farm.
- **Enter the correct host name later.** If you do not know the license server name and port number, you can enter this information later using the Access Management Console.

For more information about licensing, see *Getting Started with Citrix Licensing* guide.

Migrating to XenApp 5.0

This topic provides information about migrating your existing farm to XenApp 5.0. Throughout this topic, the term *migrating* denotes the process of moving data and settings from an older release to this release.

This topic also contains the information needed when working in a mixed-farm environment. A mixed farm consists of servers running different versions of XenApp and Presentation Server.

If you did not install XenApp previously, see "Preparing to Install XenApp" on page 61 and "Creating a New XenApp Farm" on page 75.

Migrating an Existing Server Farm to XenApp 5.0

When you want to move servers in your farm to the next release, there are three different ways in which you can do so:

- ***Server Migration***. A new installation of XenApp on a clean system in an existing farm. Because you do this by performing a full installation (not the Upgrade wizard), no settings are carried over on the server. However, the server gets its farm settings from the existing farm.
- ***Farm Upgrade***. The existing farm and data store are maintained. But, at least one server in the farm is migrated to the new XenApp release.
- ***Farm Migration***. A new farm and data store are created, based on the installation of at least one new server (that is, the first server in the farm).

This topic describes server migrations, farm upgrades, and farm migrations. To migrate to the latest release of XenApp, Citrix recommends you follow one of our *migration* processes so that you preserve farm configurations, including policy, printing, licensing, and farm settings.

Before you begin migrating your farm to XenApp, review the following topics, which provide useful information to simplify your migration:

- "What's Changed in XenApp Setup in This Release?" on page 96
- "Choosing a Farm Migration Strategy" on page 99
- "Migration Requirements" on page 103

If you want to run XenApp in a mixed-farm environment (that is, with servers running two different versions of XenApp in one farm), see "Working with Mixed Farms" on page 107.

What's Changed in XenApp Setup in This Release?

Before you install the latest release of XenApp, note the following changes, which might change either your farm deployment or the operating systems of the servers on which you want to publish applications:

- "Changes Affecting Farm Design" on page 96
- "General Changes to Setup" on page 97
- "Changes Affecting Custom Installations" on page 97
- "Changes to Components, Features, and Settings" on page 98
- "Windows Server 2008 Changes Affecting XenApp" on page 99

Changes Affecting Farm Design

These changes might affect the location of components in your Citrix environment:

- Citrix does not recommend creating a zone for each subnet in your environment. Unless your farm is dispersed across a WAN, Citrix recommends having only one zone in your environment. For performance reasons on WANs, Citrix recommends using only one zone for each large geographically dispersed data center. To minimize the number of zones, Citrix recommends connecting locations with only a few servers to a larger zone if good WAN connectivity exists.
- Due to the operating system requirements for the XenApp 5.0 release, Citrix does not recommend installing the SmartAuditor server on the same server as XenApp. This might change the location of SmartAuditor components in your topology.

General Changes to Setup

These changes affect the sequence or packaging of installation components:

- The XenApp Media Kit, which contains the installation media, is now on a DVD.

  The server URL in the **Server Address for the Passthrough Client** page no longer defaults to localhost because this can create issues for server provisioning.

- The XenApp Plugin for Hosted Apps for Windows installation now has its own .msi file, XenAppHosted.msi.

- Plugins must be installed before you begin XenApp Setup, which is done by default in the Autorun-invoked installation only.

- The XenApp Advanced Configuration tool now has its own installation package, CMC.msi. This package is on the installation media in Administration\XenApp Advanced Configuration. Although still installed by default, the XenApp Advanced Configuration tool is no longer included as part of the core XenApp Setup (mps.msi).

- The XenApp_Documentation.msi replaces the previous documentation installation package, docs.msi.

- The **Create a Server Farm** page in XenApp Setup no longer uses your server's subnet as the default zone name.

- The Access Management Console now supports uninstalling all Access Management Console extensions simultaneously.

Changes Affecting Custom Installations

If you use scripts or answer files to install XenApp, note these changes:

- There is no longer a default installation type. When installing using Windows Installer commands (msiexec), set the CTX_MF_SERVER_TYPE property regardless of what type of installation you are performing or Setup fails.

- To simplify updating the plugins, the XenApp Plugin for Hosted Apps installation in XenApp Setup now references the .msi file for the plugins, XenAppHosted.msi. This affects the XenApp server installation scripts as follows:

  - Because plugins must be installed before you begin XenApp Setup, add commands to install the plugins before the commands for installing XenApp.

    - Passthrough authentication configuration has changed. When performing customized installations, such as with scripts, configure passthrough authentication as part of the XenApp Plugin for Hosted Apps installation, which must precede XenApp installation.
    - Because the plugins now have their own .msi, some of their Setup properties have changed: CLIENT_INSTALLDIR is now INSTALLDIR and ADDLOCAL was added.
- XenApp Setup fails without the plugins and you might not get a warning message if you install XenApp silently.
- XenApp Setup has the following changes to msi files:
    - There are separate .msi files for the XenApp Advanced Configuration tool (Administration\XenApp Advanced Configuration\cmc.msi)
    - The XenApp_Documentation.msi replaces the previous documentation installation package, docs.msi

  Alter your scripts to account for the new .msi files and their associated properties, and ensure they are in the correct sequence.

Changes to Components, Features, and Settings

These changes might affect how you design your farm or how you install components:

- To run this release, you must have the license server (Version 11.5) that is available from autorun or from the Citrix download site. If you are running an earlier version of the license server, upgrade your license server to Version 11.5. To find the license server version, see the *Getting Started with Citrix Licensing* guide.
- XenApp 5.0 does not support Active Sync or Windows Mobile. If you must support PDAs or other mobile devices, do so from a computer running Presentation Server 4.5 with Feature Pack 1 (that is, run two farms in parallel or have a mixed-farm environment).
- Remapping server drive letters is no longer supported in XenApp 5.0.
- Conferencing Manager is no longer included as part of XenApp. Citrix recommends using Citrix GoToMeeting instead.
- The Access Management Console now supports uninstalling all Access Management Console extensions simultaneously.
- Citrix has replaced Resource Manager with Resource Manager powered by EdgeSight in XenApp 5.0.

- If you use Resource Manager, see *Finding EdgeSight Documentation*, which tells you where to find more information about using Resource Manager powered by EdgeSight
- Resource Manager powered by EdgeSight cannot monitor computers running Presentation Server 4.5 with Feature Pack 1

For monitoring in a mixed-farm environment, use Resource Manager for the computers running Presentation Server 4.5 with Feature Pack 1 and Resource Manager powered by EdgeSight for the XenApp servers. Alternatively, you can use EdgeSight for XenApp, included with the Platinum edition, to monitor both versions.

Windows Server 2008 Changes Affecting XenApp

Citrix strongly recommends you review changes in Windows Server 2008 before migrating to XenApp 5.0. It is critical to understand the differences in settings and behavior between Windows Server 2003 and Windows Server 2008.

Some applications published successfully in a Windows Server 2003 environment might not behave as expected if they are not Windows Vista or User Account Control (UAC) compliant.

Two key points:

- There are restrictions on running non-Vista compliant applications on Windows Server 2008. For information, see “Choosing to Run Setup with User Account Control Enabled or Disabled” on page 65.
- In Windows Server 2008, the **Restrict each user to a single session** option in the Terminal Services Configuration tool is now enabled by default. To ensure users can connect to multiple sessions simultaneously, Citrix recommends setting this option to **No**.

  Citrix recommends using the server and farm-wide settings in XenApp to control the number of concurrent sessions a user can launch.

Choosing a Farm Migration Strategy

There are two different migration methods:

- Migrating servers individually, which gradually converts the farm to the current release and maintains the existing farm name and data store
- Creating a new farm and as you reimage or create servers with the next release, adding them to this new farm and manually copying over farm settings and policies

These methods have different advantages, depending on your environment and goals. Both migration methods require taking the server to be migrated off the network and then removing it from the farm through the Access Management Console.

Gradually Converting Servers

If your farm is running Presentation Server 4.5 with Feature Pack 1, you can perform a *phased* migration by joining newly imaged XenApp 5.0 servers to the existing farm as you remove Presentation Server 4.5 with Feature Pack 1 servers.

This type of migration maintains existing policies and their rules. When a XenApp 5.0 server joins a Presentation Server 4.5 with Feature Pack 1 farm, any policy rules introduced with the new release are set to **Not Configured**. On the XenApp 5.0 server, you can enable new rules in existing farm policies. However, servers running earlier releases disregard the new rules.

The migration of any server in a farm, regardless of zone designation, upgrades the entire farm and places the farm into a mixed-farm mode. If a pilot zone is used for pre-production testing and XenApp 5.0 is installed on a server in this zone, the farm is now running in mixed mode. Unexpected issues might develop. Citrix strongly recommends that all testing be done in a segregated farm to avoid impacting production users.

Gradually converting farm servers means running a mixed-farm environment for the period that you are migrating individual servers, which can make administration more complex. Although it lets you keep your farm in production, it is not as “clean” a method as creating a new farm. Citrix recommends running in mixed-mode for the shortest period of time possible.

Creating a New Farm

Consider creating a new farm where a significant number of changes will be implemented. This method reduces the possibility of data corruption. If your existing farm is based on any version except Presentation Server 4.5 with Feature Pack 1, you must create a new farm because mixed-mode is supported only with this version.

The creating a new farm method does not retain settings, so you must manually key in all policies and configurations. While migrating your farm, consider using the Web Interface as the primary point of entry. This lets users access both the old farm and the new farm during the migration period because the Web Interface can merge applications available from different farms and display them on the same Web page.

Design Considerations When Migrating

In addition to the changes in XenApp 5.0 that affect farm design, consider the following factors as you plan your migration:

Infrastructure Server Design. As farms expand in size or the number of user connections increases, you might need to increase the number of servers dedicated to hosting infrastructure in your environment. For example, if you have added application servers to your farm, you might need to migrate from a infrastructure server hosting the Citrix License Server, the data collector and the XML Broker to a server hosting just the data collector and the XML Broker or a dedicated server for each function. If you did not do so as you expanded your farm, a good time to consider your infrastructure server design is when you migrate to the next version of XenApp.

To assess your need for infrastructure servers, follow the guidance given in "Planning Infrastructure Servers" on page 37 about using Performance Counters to evaluate infrastructure-server performance.

Load Manager Design. Because 64-bit servers support a higher number of users, consider revisiting your farm's Load Manager design to ensure its efficiency, particularly if the Default or Advanced Load Evaluator are part of your farm's existing design. If your load evaluators use percentages primarily, such as CPU or memory, you might not need to reconfigure your load-balancing implementation. If you migrated your servers to 64-bit hardware, you might be able to reduce the number of load balanced servers because 64-bit servers can support more resources.

Migrating to Access Gateway. When migrating your farm to XenApp 5.0, evaluate your security configuration and determine if you want to replace the Secure Gateway with the Access Gateway for remote access.

Some of the benefits of replacing the Secure Gateway with the Access Gateway are that the Access Gateway:

- Supports additional applications and protocols.
- Consolidates all remote access solutions in one appliance. The Access Gateway also secures remote farm connections and access to non-published resources, such as email, internal Web applications, and network file shares.
- Replaces a server in the DMZ with a hardened appliance.
- Allows you to add VPN functionality while retaining the ability to access published applications.
- Allows a broad range of client devices to connect to published applications in the secure network using XenApp plugins.

Migrating to the Access Gateway can change your farm topology. When you remove Secure Gateway from the DMZ and replace it with the Access Gateway, you can move the Web Interface to your internal secure network. The Access Gateway authenticates and authorizes users and then connects to the Web Interface. This provides greater security because there are two fewer Windows servers in the DMZ.

At a high level, the process for migrating from the Secure Gateway to the Access Gateway includes:

- Opening the appropriate firewall ports
- Determining whether you want to migrate the security certificates from Secure Gateway or create new ones for the Access Gateway
- Installing the Access Gateway appliance

For more information, see the *Secure Gateway to Access Gateway Migration Guide* included with the Access Gateway documentation.

Defining a Migration Plan

Planning your migration is critical for its success. A good migration plan defines four key steps: requirements, the design, testing, and implementation.

1. **Defining Requirements**

   Identify and confirm the business, technical, and user requirements. Business requirements could include the cost of ownership or personnel requirements. Technical requirements might be based on existing infrastructure and technical complexity. User requirements might include passthrough authentication and ease of access.

2. **Documenting the Design**

   The design document is a blueprint for the new environment, much like a blueprint for a building. It incorporates new features and major changes that will impact the server farm.

   Citrix recommends creating detailed design documents for migration similar to the ones you create for initial installation.

3. **Testing**

   It is important to test the effect of new functionality—how changes in Windows Server 2008 affect your farm configuration.

4. **Implementation Plan**

   When migrating to a new version of XenApp, create a timeline. Depending on the type of migration you choose, migration could take place over many months. Typically, an implementation plan might be based on the design

document and include a project plan with timelines, resources, and dependencies.

The implementation plan often includes the method of imaging servers, configuration of settings, application installation method, help desk training, user training, the stages of the rollout (if applicable), and the plan for decommissioning the old farm (if applicable).

Migration Requirements

When migrating to XenApp 5.0, you must upgrade several components.

Upgrading Citrix Licensing. If you are running the license server that came with Presentation Server 4.5 with Feature Pack 1, you must upgrade to the license server included with this release. Your existing license files are compatible with the new license server. For information about upgrading your license server, see the Citrix white paper "Licensing: Migrating, Upgrading, and Renaming" at http://support.citrix.com/.

Migrating Printer Drivers. If you migrate printer drivers to servers running Windows Server 2008, the drivers must be compatible with Windows Server 2008. For example, Windows NT 4.0 Kernel mode drivers are not supported in Windows Server 2008. Ideally, drivers installed on XenApp servers should be Vista certified.

Restrictions When Upgrading the Access Management Console. When you upgrade the Access Management Console from versions supplied with previous releases of XenApp, note that there are restrictions on how the later version of the console recognizes any My Views created with, or items discovered by, the earlier version.

If, after upgrading, you are prompted whether or not you want to upgrade your .msc configuration file, choose to do one of the following:

- **Upgrade.** The file is upgraded; you cannot use the earlier version of the console to open the file or see any My Views created with it. However, you can use the later version.
- **Don't Upgrade**. The file is not upgraded; you can use both versions of the console to see the My Views. However, you can edit and save the My Views only in the earlier version.

Migrating from Release Preview is Not Supported. Release Preview versions of XenApp are not intended for use in production environments. Migrating from Release Preview versions of XenApp 5.0 to the official released version of XenApp 5.0 is not supported.

Important: Citrix does not support upgrading any components from Windows Server 2003 to Windows Server 2008 unless they are specifically noted.

To migrate gradually from the previous release

This topic provides a high-level summary of the tasks for migrating a farm to the latest release of XenApp.

1. Upgrade the Citrix License Server.

   Before you migrate the first server in a farm, upgrade the license server and ensure that you download current licenses.

   For information about upgrading the license server, see the *Licensing: Upgrading, Migrating, and Renaming* white paper in the Citrix Knowledge Center.

2. Migrate your data store to one supported by XenApp 5.0, if necessary. For example, if your data store is based on SQL Server 2005, no changes are required to your data store.

3. Upgrade or perform a new installation of the XenApp Advanced Configuration tool, Access Management Console, and Web Interface.

   To upgrade these components automatically and preserve custom configuration settings, use the default settings in their Setup programs when invoked from Autorun.

   Note: You can use the Upgrade wizard in Setup only to upgrade the Access Management Console and XenApp Advanced Configuration if you are upgrading these components on the same operating system platform (for example, Windows Vista to Windows Vista).

4. Use the procedure “Removing a XenApp Server During the Migration” on page 106 to remove any servers from the farm that you want to reimage.

5. Install XenApp 5.0 on the reimaged or new servers using the Join Farm Setup program. During Setup, specify to join your existing farm. Migrate the servers in this order:

   A. Zone data collectors

   B. Infrastructure servers

   C. Member servers hosting published applications

6. Install and configure a new Secure Gateway, if in use. XenApp 5.0 requires that you install the latest Secure Gateway (Secure Gateway 3.1). For information, see the *Secure Gateway Administrator's Guide*.

To migrate an existing or legacy server farm by creating a new farm

This is a high-level summary of the tasks required to move to the next release of XenApp 5.0 by creating a new farm.

1. Use the Citrix Client Packager to provide the latest plugins to users, repackage the XenApp plugin, and include the URL of your XenApp Services site.

   Some XenApp 5.0 features require new plugins. Citrix recommends upgrading user plugins before migrating so that you can address any issues that arise before migrating the farm. Upgrading plugins before migrating the farm makes it easier to determine if issues are specific to the plugins or the farm servers.

   Instead of the Citrix Client Packager, you can deploy the new package to client desktops using an Active Directory Group policy, Microsoft System Center Configuration Manager (formerly known as Systems Management Server (SMS)), or another third-party deployment product. This deployment method requires no user input.

   For more information, see the *XenApp Plugin for Hosted Apps Administrator's Guide*.

2. Create a new data store if the data store is not hosted on Microsoft Access.
3. Install XenApp 5.0 on a server that is independent of your Presentation Server farm and give it a name that is different from the existing farm. This is the first server for the new farm.
4. Use the Access Management Console and the XenApp Advanced Configuration tool to configure your newly installed server to match the settings of your existing farm. Ensure that you also match the settings for published applications.

   Alternatively, you can create a script to export and import published application information. See the Citrix Developer Network for additional information.

5. Deploy the Web Interface as the primary entry point for your newly installed farm.

   Use DNS CNAME (alias) records for the Web Interface servers. Use a simple mnemonic for the DNS alias, such as *myapps*. For example, Citrix

could have an internal Web Interface deployment with multiple servers that share the DNS alias myapps.citrix.com.

6. Open the new deployment for testing by pilot users.
7. After refining the pilot deployment, switch users to it.

   Instruct users to access your Web Interface server URL. Here is an example based on the previous DNS alias example:

   http://myapps.citrix.com
8. Decommission the farm running the legacy release of XenApp.

Removing a XenApp Server During the Migration

If you want to remove a server from an existing farm, Citrix recommends that you uninstall XenApp by using Control Panel > Programs and Features, check the server was successfully removed from the farm using the Access Management Console, and then reimage it, if desired. This method removes the host information from the farm data store and removes the server from the farm properties displayed in the management tools. While you can remove the server from the farm using only the Access Management Console, Citrix recommends using the method described in this topic since it is safer.

To remove a server from the farm

1. With the server still on the network and online in the farm, uninstall XenApp from the server from Control Panel > Programs and Features by selecting Citrix XenApp 5.0 and selecting **Uninstall**.
2. Open the Access Management Console on a different server, run or rerun Discovery and check the server was removed from the farm successfully.

   If the server from which you uninstalled XenApp still appears in the Access Management Console, do the following:

   A. In the left pane of the Access Management Console, select the server.

   B. From the **Action** menu, select **All Tasks** > **Remove from farm**.
3. After you ensure the server no longer appears in the farm in the Access Management Console, disconnect the server from the network.

   Caution: Do not reconnect the server to the network until you reimage it or remove its XenApp software. If it reconnects to the network, it can corrupt your farm.

   ---

4. Run the **dscheck** command on the data store to repair any consistency errors.

5. Perform a new installation of operating system (that is, a “clean” installation and not an upgrade) and XenApp 5.0 (if you want to reuse the hardware for that server).

Uninstalling XenApp

Before uninstalling XenApp, review these key points:

- **Uninstalling XenApp in Farms Connected Directly and Indirectly to the Data Store**. In farms with direct and indirect connections to the data store, Citrix recommends uninstalling indirectly connected servers before uninstalling the server they connect through (that is, the server connecting directly). If XenApp is uninstalled from a server with a direct connection to the data store, indirectly connected servers cannot access the data store. Information, such as applications or Citrix Administrators, is lost and that server’s indirectly connected servers cannot be uninstalled from the data store.
- **Uninstalling from a Remote Desktop Connection (RDC) session**. Citrix does not recommend uninstalling XenApp from within a Remote Desktop Connection (RDC) session because the uninstall program needs to log off all remote users as it uninstalls XenApp. If you need to uninstall XenApp remotely, use tools such as Microsoft’s Configuration Manager.

Rebuilding and Renaming XenApp Servers

There are specific steps to follow when replacing a server due to hardware failure or renaming a farm server using the operating system. These steps help prevent corruption of the data store records and ensure the server is properly integrated in the farm. Be sure to follow the specific steps in order as documented in the *Citrix XenApp Administrator’s Guide* as part of its farm maintenance documentation.

Working with Mixed Farms

Read these topics only if you have a mixture of servers running XenApp 5.0 and Presentation Server 4.5 with Feature Pack 1 in the same farm. If the farm contains only XenApp 5.0 servers, you do not need to read this information.

These topics contain information about working in a mixed-farm environment. Included is information about administering Resource Manager that although replaced by Resource Manager (powered by EdgeSight technology) in this release, can be administered in a mixed farm.

Introducing Mixed Farms

Citrix recommends that, where possible, you upgrade all of the servers in a farm simultaneously so that you do not have different versions of XenApp and Presentation Server running in the same farm. However, computers running XenApp 5.0 can coexist with computers running Presentation Server 4.5 with Feature Pack 1. Interoperability of this release of XenApp with servers and farms prior to Presentation Server 4.5 with Feature Pack 1 is not supported; Feature Pack 1 is a requirement for a mixed farm.

When determining whether is not to migrate all or part of a farm, consider the features users require. For example, if users sync PDAs, consider keeping one server with Presentation Server 4.5 with Feature Pack 1 in your farm.

Important: To have a mixed farm, you must add XenApp 5.0 servers to the Presentation Server 4.5 with Feature Pack 1 farm. You cannot add computers running Presentation Server 4.5 with Feature Pack 1 to a XenApp 5.0 farm.

To discover a mixed farm, run discovery using the latest Access Management Console against a XenApp 5.0 server. New features might not be available if you do not use the latest Access Management Console.

After discovery is complete, the functionality and display vary depending on the version of the server you select. For example, if you select a server running Presentation Server 4.5 with Feature Pack 1, you see Resource Manager information if installed; if you select a server running XenApp 5.0, you will not see this.

You can also manage multiple farms; for example, one farm composed of computers running XenApp 5.0 and another farm composed of computers running Presentation Server 4.5 with Feature Pack 1. You must use the latest Access Management Console to discover the farms.

When installing XenApp 5.0 in a mixed-farm environment, if you are creating domain accounts for services, make sure that the accounts do not have the same name as the accounts on the servers for the earlier release. If the privileges associated with one of the accounts are higher for one version of XenApp than another, the accounts might conflict.

Important: The Access Management Console included with XenApp 5.0 can manage servers running Presentation Server 4.5 with Feature Pack 1 only when one XenApp 5.0 server is installed in the farm.

Citrix does not recommend running in mixed-mode indefinitely. If it is necessary to retain Presentation Server 4.5 with Feature Pack 1 for specific features, Citrix suggests having two farms and using the Web Interface to integrate them.

The following topics explain what you need to know if you are operating in a mixed-farm environment.

Note: Downgrading a server in your farm from XenApp 5.0 to Presentation Server 4.5 is not supported.

Increasing Graphics Memory Limit in a Mixed Farm

In XenApp 5.0, the default graphics memory limit is 32MB, with a maximum graphics memory limit of 64MB. In a mixed-farm environment, composed of Presentation Server 4.5 with Feature Pack 1 and XenApp 5.0 servers, the default graphics memory limit is 5MB, with a maximum graphics memory limit of 8MB (the Presentation Server 4.5 with Feature Pack 1 defaults).

In a farm consisting of XenApp 5.0 servers only, use the Access Management Console to increase the graphics memory limit for all servers in the farm or for individual servers. However, in a mixed-farm environment, only the XenApp 5.0 servers respect the limits set using the Access Management Console. Therefore, to increase the graphics memory limit on computers running Presentation Server 4.5 with Feature Pack 1 in a mixed-farm, use the procedure documented in "How to Allow More Memory for Session Graphics on Windows Server 2003" at http://support.citrix.com/.

Administering Resource Manager in a Mixed Farm

In XenApp 5.0, Resource Manager has been replaced by Resource Manager (powered by EdgeSight technology). As a result, Dashboard and My Knowledge are no longer available. However, in a mixed-farm environment, you can administer Resource Manager, which is installed on a server running Presentation Server 4.5 with Feature Pack 1.

For your convenience, the Help tasks relating to Resource Manager, Dashboard and My Knowledge are included here, and you can obtain context-sensitive help as usual. You will also find Resource Manager documentation in the Documentation Center on a server running Presentation Server 4.5 with Feature Pack 1 or go to http://support.citrix.com/.

Administering Installation Manager in a Mixed Farm

In XenApp 5.0, Installation Manager has been replaced by a new tool, also called Installation Manager, which is based on Microsoft Windows Task Scheduler 2.0 and Windows PowerShell 1.0. However, in a mixed-farm environment, you can administer the previous version of Installation Manager that is installed on a server running Presentation Server 4.5 with Feature Pack 1. To do this, use the Presentation Server 4.5 with Feature Pack 1 versions of the Access Management Console and the Presentation Server Console.

Administering Isolation Environments in a Mixed Farm

In XenApp 5.0, you use application streaming instead of isolation environments. However, in a mixed-farm environment, you can administer isolation environments on a server running Presentation Server 4.5 with Feature Pack 1 using the Presentation Server 4.5 with Feature Pack 1 version of the Presentation Server Console.

SNMP Considerations in a Mixed Farm

If a Simple Network Management Protocol (SNMP) community on the XenApp computer is configured with Read/Write permissions and the SNMP agent is enabled, users can perform potentially dangerous actions remotely (such as logging off or disconnecting a user, terminating a process, or sending a message).

On Windows 2003 systems, you must first create a new SNMP community, then set the community permissions to Read/Write.

In farms that have computers running previous versions of Presentation Server, Resource Manager was used to enable SNMP alerts to be sent when specific metrics change their alarm status. The following table lists the traps supported by Resource Manager.

Name **OID.trap number**	**Server action that triggers trap**
trapAlert 1.3.6.1.4.1.3845.3.3.1.3	No longer used.
trapServerDown 1.3.6.1.4.1.3845.3.3.1.4	Resource Manager server is down.
trapMetricToGreen 1.3.6.1.4.1.3845.3.3.1.5	Metric on the Resource Manager server changed to green status.
trapMetricGreenToYellow 1.3.6.1.4.1.3845.3.3.1.6	Metric on the Resource Manager server changed from green status to yellow status.

Name **OID.trap number**	**Server action that triggers trap**
trapMetricRedToYellow 1.3.6.1.4.1.3845.3.3.1.7	Metric on the Resource Manager server changed from red status to yellow status.
trapMetricToRed 1.3.6.1.4.1.3845.3.3.1.8	Metric on the Resource Manager server changed to red status.

For details, see the Resource Manager documentation for the appropriate Presentation Server version. To monitor traps that cause icon colors to change, you might be able to use the monitoring colors method; see the documentation for the SNMP network management product for details.

Configuring and Provisioning XenApp

This topic discusses tasks you perform after installing XenApp:

- Methods of deploying XenApp server software to other servers in your farm (*provisioning*)
- Configuration tasks to perform after installing XenApp
- Deploying plugins to users

Provisioning Farm Servers

After you install XenApp on the second server in your farm, you can start to *provision* other servers in your farm. In this context, the term provision refers to the process of distributing XenApp software across a group of servers. In large farms, provisioning farm servers is essential.

The method you choose to provision farm servers depends on a variety of factors, such as existing infrastructure, methods, or tools. This topic suggests general guidance and ideas for provisioning farm servers; it is not meant to be prescriptive.

When provisioning farm servers, consider these methods:

- **Provisioning XenApp using Citrix Provisioning Server.** Citrix sells a product that facilitates provisioning large server farms, known as Citrix Provisioning Server. Citrix Provisioning Server streams operating systems and applications, including XenApp, to farm servers. The streamed data (operating systems or applications) is not persistent, so images for Citrix Provisioning Server need to include everything you want to stream (that is, the operating system, XenApp, published applications).

  To provision using Provisioning Server, install and configure a XenApp server and then image it into a Provisioning Server for Datacenters vDisk (specifically a Provisioning Server Streaming Server). At a high level, the process for configuring Provisioning Server to stream XenApp is similar to server cloning. You can use the instructions for server cloning to prepare images for Provisioning Server with some modifications. Alternatively, you can also use the information in the *Installing Citrix XenApp Inside a Citrix Provisioning Server for Datacenters Virtual Disk* administrator's guide and the "Citrix Provisioning Server PS Integration Utility" in the Citrix Knowledge Center (CTX116063).

- **Deploying Windows Installer Packages using Active Directory**. Active Directory lets you push out Windows Installer packages to multiple servers and workstations simultaneously. You can use XenApp's transforms to select the installation options and enter data. Using Active Directory for imaging can reduce the number of times you need to directly interact with (or "touch") a server during the imaging process. This method lets you install prerequisites, depending on the vendor for the prerequisite's support; run the XenApp installation; and install any applications afterward. Likewise, you do not need to connect to the target server to invoke the installation programs manually.

- **Cloning servers with preconfigured images.** You can use third-party imaging programs, such as Symantec Altiris, to create a copy of the installation and configuration of a server that joined the farm. Then, use this image to create additional servers in the farm. This process is referred to as *cloning*. A few manual steps, which are described in "Cloning XenApp Servers" on page 116, are required for cloning XenApp servers. You can also clone virtual machines with products like XenServer.

- **Creating an administrative installation**. If you anticipate needing to install (or re-image) servers frequently, such as during a migration, or in very large farms, consider creating an administrative installation so that preconfigured patched versions of the installation are always available. Administrative installations are also a good method for customizing the installation.

- **Using the XenApp unattended installation**. Unattended installations let you create an answer file that specifies your desired configuration. You can then run the Setup on any machine using that answer file. This dramatically reduces the installation time. While this method does not let you include prerequisites in the installation and requires more manual interaction, it might be easier for some organizations and it requires a lower time investment since XenApp provides a template (UnattendedInstall.txt) for it.

If your organization needs to install or reimage servers frequently, consider creating a repeatable method, such as using Provisioning Server, performing administrative installations, or provisioning through Active Directory, that requires a minimum amount of manual interaction.

Simultaneous Installations

When you install multiple servers simultaneously, servers write configurations to the same data store indexes. Consequently, the more servers you install simultaneously, the more likely you are to create deadlocks on the database server.

During XenApp Setup, *deadlocks* can occur when one server times out while waiting to write to a piece of data that is locked by another server. Deadlocks can cause installation to fail on some servers or cause them to install much slower than necessary.

When installing servers simultaneously, Citrix recommends:

Server Hosting Data Store	Maximum Number of Servers to Install Simultaneously
Dual processor or greater	30
Older server	10

Do not install multiple servers and create a zone at the same time. Create the zone first and then perform the simultaneous installations. Having the zone in place before running simultaneous installations prevents the new servers from being configured as the data collector.

Cloning XenApp Servers

When you provisioning servers by cloning, you create a generic copy of a XenApp image or *clone* it, and then provision the farm by distributing the cloned image across its servers. Creating cloned copies of XenApp requires creating a generic version of a server that has had any identifying characteristics removed.

All farm servers contain properties that contribute to their unique identity, such as the server's name, domain membership, and Security ID (SID). At a high level, cloning a XenApp server involves the following:

1. Creating a *template* image from a configured farm server, which means removing the image's identity so that the image becomes a template you can reuse.
2. Distributing the image to the targeted farm servers.
3. Recreating the unique identity of each of these servers.

Cloning techniques are used when creating a XenApp farm with provisioning technologies, such as Citrix Provisioning Server or Symantec Altiris. These techniques are also used with virtualization technologies that host XenApp, such as Citrix XenServer, Windows Server 2008's Hyper-V feature, and VMware environments.

Typical candidates for server cloning are servers you need to repeatedly install. In small or medium farms, you might only need to make cloned images of servers that will host published applications. In large farms, you might also want to create cloned images for the Create Farm server and infrastructure servers like data collectors or XML Brokers to quickly rebuild servers in case of failure.

When preparing a server for cloning with Provisioning Server, you might want to include any applications and other settings you want to appear in that image.

Although XenApp is compatible with server cloning, issues resulting from cloning software can cause the operating system or its add-ons to function incorrectly. When cloning XenApp servers, clone one server and test its operation in a test environment before deploying the rest of the farm.

Preparing your Servers for Cloning

Prior to changing the Security ID (SID) on the server used to access the XenApp Advanced Configuration tool, add one of the following as a Citrix Administrator with read-write privileges:

- A domain administrator
- The Local Administrators group
- A local administrator from a server where the SID will remain static

Note: Do not attempt to create an image of a server with an SSL certificate installed because SSL certificates are unique to the hardware.

Configuring Servers after Cloning

Zone settings are not retained when cloning a server. When the Citrix Independent Management Architecture service on the cloned server starts for the first time, the cloned server joins Setup's default zone. When deploying images to servers on multiple zones, assign zone information for each server after the cloning process is complete.

After imaging your servers, join these servers to your farm by using the Change farm command. For information, see "CHFARM" in the *Citrix XenApp Administrator's Guide*.

To clone a server

This task requires a system preparation utility, such as Microsoft Sysprep, and third-party imaging software. This task assumes you want to clone a server for the purpose of hosting published applications and that a relational database (Oracle, SQL Server, or DB2) is hosting the data store.

Important: Citrix strongly recommends that you create your initial images on a test farm and not in a production environment. These instructions are intended only to provide guidance for cloning servers and might vary depending on your environment and imaging software.

1. After creating your farm, install XenApp on a server using XenApp Join Farm Setup and join the farm you created.
2. Configure the server with any settings you want included on all servers.

   For example, you might want to configure policies, set the election preference to **Not Preferred** if this image will be used for servers hosting published applications, or add printer drivers.
3. Prepare the server for imaging by:
   A. Configuring XenApp services — see "To configure XenApp services before cloning" on page 118.
   B. Configuring the registry — see "To configure the registry before cloning" on page 118.
   C. Deleting local persistent caches files for XenApp databases — see "To delete local persistent cache files" on page 119.

D. Editing the DSN file — see "To remove the Workstation Identification from DSN files" on page 119.

E. Deleting legacy files — see "To delete legacy files" on page 120.

Note: If you are using Citrix Provisioning Server, running the PVS PS Integration Utility.msi installer can accelerate the integration process by automating steps these steps. For information about this utility, see "Citrix Provisioning Server PS Integration Utility" in the Citrix Knowledge Center (CTX116063).

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4. Create an image of this installation using third-party imaging software, Citrix Provisioning Server, or Citrix XenServer.
5. Deploy this image to other servers using the tools provided by your imaging software.
6. When starting the image, initialize it as described in "To initialize the cloned image" on page 120.

To configure XenApp services before cloning

1. Stop these services:
   - Citrix MFCOM Service
   - Citrix Independent Management Architecture
   - Citrix WMI Service
2. Set the Startup type for the Citrix Independent Management Architecture and the Citrix MFCOM services to **Manual**.

To configure the registry before cloning

Caution: The procedures in this topic require editing the registry. Using Registry Editor can cause serious problems that can require you to reinstall the operating system. Citrix cannot guarantee that problems resulting from incorrect use of Registry Editor can be solved. Use Registry Editor at your own risk.

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1. In the registry on the server, set HKLM\SOFTWARE\Wow6432Node\Citrix\IMA\RUNTIME\PSRequired to 1. This key is found in HKLM\SOFTWARE\Citrix\IMA\Runtime\PSRequired on XenApp, 32-bit Edition.

   This forces the server to communicate with the data store so that the local host cache is updated with the new information.

2. Delete the value for HKLM\SOFTWARE\Wow6432Node\Citrix\IMA\ServerHost. This key is found in HKLM\SOFTWARE\Citrix\IMA\ServerHost on XenApp, 32-bit Edition.

To delete local persistent cache files

Delete the contents of any database cache files that are present by performing the following steps using the XenApp command, DSMAINT with the appropriate parameter. The syntax for the parameters is explained in the DSMAINT section of the *Citrix XenApp Administrator's Guide*. *C* is the drive on which you installed XenApp.

1. Delete the contents of the Local Host Cache, which is located in *C*:\Program Files (x86)\Citrix\Independent Management Architecture\imalhc.mdb by running `dsmaint recreaterade`. For example,

   ```
   dsmaint recreaterade
   ```

2. Delete the contents of the Application Streaming Offline database cache, which is located in *C*:\Program Files (x86)\Citrix\Independent Management Architecture\RadeOffline.mdb by running `dsmaint recreatelhc`. For example,

   ```
   dsmaint recreatelhc
   ```

   Note: In mixed-farm environments, if you are cloning a Presentation Server 4.5 with Feature Pack 1 server, delete the Resource Manager database cache, which is located in *C*:\Program Files (x86)\Citrix\Citrix Resource Manager\LocalDB\RMLocalDatabase.mdb.

To remove the Workstation Identification from DSN files

Using any text editor, open these DSN files and delete the line that specifies the Workstation Identification (WSID):

- MF20.dsn
- RadeOffline.dsn

These files are located in *C*:\Program Files (x86)\Citrix\Independent Management Architecture, where *C* is the drive on which you installed XenApp.

To delete legacy files

If you are cloning a system which might have had an older XenApp Plugin installed on it at one time, delete the *C*:\WFCName.ini file, where *C* is the drive on which you installed XenApp.

This file was created by previous versions of the XenApp Plugin for Hosted Apps.

To initialize the cloned image

After cloning the image, restart the server and complete the following steps:

1. Using a system preparation utility or your imaging software, assign the cloned image a new computer name.
2. Set HKLM\SOFTWARE\Wow6432Node\Citrix\IMA\Logging\HostName to the new computer name. This key is found in HKLM\SOFTWARE\Citrix\IMA\Logging\HostName on XenApp, 32-bit Edition.
3. Edit the CtxSta.config file to create a unique STA ID using the MAC address of the server, as follows:

   A. Using any text editor, open the CtxSta.config file from *C*:\Program Files (x86)\Citrix\System32, where *C* is the drive on which you installed XenApp.

   B. Use the MAC address of the new server to which you applied the clone to create the STA ID. Remove any colons or spaces from the MAC address and preface it with "STA."

      For example, the MAC address, 02-00-68-55-4D-01 would become STA020068554D01.

   C. Enter the STA ID in the UID field in the CtxSta.config file. For example,

      UID=STA020068554D01

   If you do not change this to a unique STA ID, the Secure Gateway and other components cannot uniquely identify the new server.
4. Perform these steps in the Windows Services panel to restart XenApp services:

   A. Set the **Startup type** for Citrix Independent Management Architecture and the Citrix MFCOM service to **Automatic**.

   B. Start the Citrix Independent Management Architecture service.

   C. Start the Citrix MFCOM service.

   D. Start the Citrix WMI service.

Configuring Infrastructure Servers

This topic includes:

- Configuring Data Collectors after Setup
- Configuring Zones after Setup

Configuring Data Collectors after Setup

After Setup, configure the data collector and any needed back-up data collector.

By default, Setup configures the Create Farm server as the data collector by setting its server election preference to **Most Preferred**. A *server election* is the failover process that selects a new server as the data collector when the data collector is unavailable. All servers that joined the farm are set to **Default Preference**.

To dedicate a server as the data collector, set it to **Most Preferred** and do not use it for any other functions, including hosting published applications.

After configuring the data collector, set the election preferences of servers hosting published applications to **Not Preferred**, the lowest election preference so that the possibility of those servers acting as a data collector is low.

To specify a server as the data collector

1. In the left pane of XenApp Advanced Configuration, select the farm.
2. From the **Actions** menu, select **Properties**.
3. Select **Zones**.
4. In the list of zones and their servers, locate the server, select it, and click **Set Election Preference**.
5. Select one of the following:
    - **Most Preferred**. Specifies this server as the data collector by assigning it the highest election preference. Citrix recommends only one server per zone is assigned this preference.
    - **Preferred**. Specifies this server as a back-up data collector.
    - **Not Preferred**. This is the lowest level of election preference. Citrix recommends using this setting for published application servers.

Configuring Zones after Setup

When configuring zones for a WAN, Citrix recommends that you:

- Do not enable load balancing across zones. The **Do not share load information** option in the Zone Management feature in the Advanced Configuration tool controls this functionality.
- Direct users requests for applications to the nearest geographic location by setting up a preferred zone connection order in the **User Workspace > Connections > Zone preference and failover** policy rule. Routing users to connect to servers in their own zone can reduce traffic across high latency connections. This feature only affects the XenApp plugin and Web Interface.

Configuring XenApp after Installation

After you finish installing XenApp, perform these additional tasks so users can log on to your farm:

1. Configure any required infrastructure servers. See “Configuring Infrastructure Servers” on page 121.
2. Change any essential settings, including the following:

   To allow users to reconnect to sessions consistently, set the **Restrict each user to a single session** option to **No** in the Terminal Services Configuration tool. In Windows Server 2008, this setting is now enabled by default.

   Citrix recommends using the server and farm-wide settings in XenApp to control the number of sessions users can launch.
3. After installing the Web Interface, you must create one or more sites using the Access Management Console before users can connect through the Web Interface or the XenApp plugin.
4. Start the Access Management Console and discover the servers in your farm. See the *Citrix XenApp Administrator’s Guide* for details.
5. Create any administrative accounts you need for your farm. See the *Citrix XenApp Administrator’s Guide* for details.
6. Publish applications. See the *Citrix XenApp Administrator’s Guide* for details.
7. Perform any additional customizations that you require, such as setting policies, configuring printing, changing server election settings, and configuring load balancing. See information throughout this guide and the *Load Manager Administrator’s Guide* for details.

In addition, you also need to create plugin packages to deploy to users. Factors for choosing plugin packages and methods of deploying them are discussed in the the *XenApp Plugin for Hosted Apps Administrator's Guide*.

Configuring Servers after Setup with Scripts

After provisioning servers or deploying cloned images, you might want to run scripts to perform configuration tasks. Configuration tasks that you can script include publishing applications, setting data-collector election preferences, and applying load evaluators. However, using scripts for these configuration options lets you make changes on a per server basis if necessary. For information about scripting usage and languages supported, see the *MFCOM Software Developer's Kit* on the Citrix Developer's Network.

Custom XenApp Installation Reference

This topic provides information about alternatives to installing XenApp from Autorun. This topic also describes support for different installation features, such as installation logs. Subjects covered in this topic include the following:

- Installing XenApp Using an Unattended Installation
- Installing XenApp by Modifying Windows Installer Packages
- Preparing Installations with Prepopulated Responses
- Generating an Installation Log File

Creating Customized Installations

XenApp provides several alternatives to the wizard-based Autorun installation. These methods of installation can be helpful when you want to install XenApp on large numbers of servers simultaneously.

You can configure XenApp Setup by:

- Modifying Windows Installer (.msi) packages through the Windows Msiexec command or transforms.
- Creating an answer file to provide answers to the questions asked during Setup.

If you want to store preconfigured images of XenApp on a network share point, you must install XenApp by applying transforms to the .msi package.

Instructions for performing unattended licensing installations are included in the *Getting Started with Citrix Licensing Guide*. However, the XenApp licensing Setup properties are defined in “XenApp Windows Installer Properties Reference” on page 139.

XenApp installation documentation uses the following installation terminology:

- *Silent installation*. This term refers to installations performed using Windows Installer commands (msiexec /qb) that do not display prompts, messages, or Setup pages during their progress. Silent installations are not synonymous with *unattended installations*.
- *Unattended installation*. This term refers to XenApp installations performed using the unattendedinstall.exe with an answer file. While many types of installations, including scripts using Windows Installer commands, are technically unattended installations, the XenApp installation documentation uses this term specifically to denote XenApp installations that use an answer file.

Related topics:

"Preparing to Install XenApp" on page 61

"Creating a New XenApp Farm" on page 75

"Migrating to XenApp 5.0" on page 95

Additional Tasks for Custom XenApp Installations

If you do not install XenApp using the Autorun-invoked Setup, perform these additional tasks before installation:

- Install all prerequisites. Prerequisites that are automatically installed during the Autorun-invoked Setup are not installed during custom installations. Before installing XenApp, review the system requirements in the *Citrix XenApp Installation Checklist*.
- Install a XenApp Plugin. See "Installing a XenApp Plugin Before Setup" on page 127.
- Create a DSN file if you are using Oracle, SQL Server, or DB2 for the data store. See "Creating a DSN File for XenApp Setup" on page 181.

Note: If you have installed XenApp before, review "What's Changed in XenApp Setup in This Release?" on page 96.

Installing a XenApp Plugin Before Setup

XenApp requires installing a XenApp Plugin before you run Setup. If you invoke Setup from the Autorun, this is done automatically for you by default.

However, if you use another method of Setup, you must install the plugin before you install XenApp or functionality such as pass-through authentication and shadowing might not work correctly. A few key points:

- The XenApp Plugin installation packages, XenAppHosted.msi and XenAppWeb.exe, are located in the Clients\ica32 folder in the installation media.
- You can install Program Neighborhood, the XenApp plugin, the XenApp Web Plugin, or a combination of these plugins. Install the XenApp Web Plugin package if you are configuring the Web Interface on the server.
- Citrix also strongly recommends installing the streaming plugin, which is not installed automatically during non-Autorun installations, on all farm servers. The Citrix XenApp Plugin for Streamed Apps, XenAppStreaming.exe, is located in the Clients\Streaming folder in the installation media.

Note: If you are upgrading clients on the server, uninstall all previous versions of the Citrix clients, including Streaming Clients, and then install only the plugins included with this release.

Related topics:

“Task 4: Configuring Passthrough Client Authentication” on page 80

Installing XenApp by Modifying Windows Installer Packages

XenApp and its components are compiled into a Windows Installer package (.msi) file. Windows Installer technology consists of the Windows Installer Service for the Windows operating systems and the package .msi file format used to hold information regarding the application setup.

XenApp supports two methods of installing XenApp by modifying its .msi files:

- Running Windows Installer (Msiexec) commands
- Applying transforms

You can combine the Windows Installer commands with transforms and administrative installation methods for more powerful Setups that are easier to patch and keep updated. For example, you can deploy XenApp Installer packages using Microsoft Active Directory Services, Systems Management Server, or other third-party products.

The XenApp Windows Installer package, mps.msi, is located in the XenApp Server of the XenApp installation media.

If you encounter problems when running a Windows Installer package, you can check the Windows Event Viewer for a list of the problems. Check the Application Log for any entries in the Source column of the type "MSIInstaller."

Installing by Using Windows Commands

XenApp supports using the Msiexec command for Setup. The Msiexec command lets you install, modify, and perform operations on Windows Installer (.msi) packages from the command line.

Set properties by adding *Property="value"* on the command line after other switches and parameters. For definitions of the properties in the XenApp Windows Installer package, see "XenApp Windows Installer Properties Reference" on page 139.

You also use the Msiexec command to run Setup (administrative installations) from network share points — see "Preparing Installations with Prepopulated Responses" on page 134.

XenApp Installations

The following sample command line installs the XenApp Windows Installer package and creates a log file to capture information about this operation. This example does not include the required properties. You must add the properties you want to set after the switches.

```
msiexec /i mps.msi /L*v c:\output.log
```

Access Management Console and XenApp Advanced Configuration Installations. To perform custom installations of the Access Management Console and the Advanced Configuration tool, use the individual MSI files located in the Administration\Access Management Console\Setup and the Administration\XenApp Advanced Configuration folders in the XenApp installation media. The .msi file referenced by Autorun cannot be used for custom installations.

Common Msiexec Commands

Some common options for the Msiexec command are listed below.

Option	Syntax
Install or configure a product	**msiexec** /i {package|ProductCode}
Uninstall a product	**msiexec** /x {package|ProductCode}
Set a logging level (use with Install or Uninstall option)	msiexec /L [i][w][e][a][r][u][c][m][p][v][+][!] *LogFile* To include the v option in a log file using the wildcard flag, type /L*v at a command prompt. The Windows Installer log file options can also be used with the uninstall process.
Install a transform (use with Install or Uninstall option)	**msiexec** /i package TRANSFORMS=*TransformList* If you are applying multiple transforms, separate each transform file with a semicolon.
Set the user interface level (use with Install or Uninstall option)	**msiexec** /q {n|b|r|f}

For further information about the parameters and switches you can use with the listed options, go to the Microsoft Web site and search for the term *msiexec*.

Installing by Applying Transforms to Setup

XenApp provides Windows Installer *transform* files for XenApp Create Farm, Join Farm, and Citrix Licensing installations. Modifying transforms provides powerful control over XenApp Setup, letting you modify the actual XenApp Setup database. Applying transforms is one method of installing XenApp through Active Directory.

Transforms are files with the .mst extensions that manipulate the elements of the installation database contained in the XenApp installation package (mps.msi). XenApp transform files modify the XenApp installation package during installation and dynamically affects the installation behavior.

The XenApp transforms are *sample* transforms meant as a guide to help you achieve your desired configuration. Edit the XenApp transforms to include your required values using third-party Windows Installer packaging tools, apply them to the mps.msi, and begin installation.

When you modify a transform to apply to the XenApp installation package, set the desired values for properties in the package. When you then apply the transform to the installation package, the questions you would be asked during Setup are answered.

Transforms that you create to customize a XenApp installation package remain cached on your system. The transforms are re-applied to the base installation package (mps.msi) whenever you install hotfixes (whenever the Installer needs to modify mps.msi). However, you can apply transforms only when you initially install XenApp; you cannot apply transforms to XenApp after it is installed.

If a property exists in the .msi file and you want to set it to "Null," delete the property in the transform file.

Editing the Sample Transforms

Four sample transforms, which are associated with mps.msi, are provided in the Support\Install folder of the XenApp installation media and documented in this topic:

- **thirdpartydb_create_direct.mst**. Creates a XenApp farm that uses an enterprise database (SQL Server, Oracle, DB2) for the data store.
- **thirdpartydb_join_direct.mst**. Joins a XenApp farm that uses an enterprise database for the data store and creates a direct connection to the data store.
- **Localdb_access_create.mst**. Creates a XenApp farm that uses Microsoft Access or SQL Express for the data store.
- **Join_Indirect.mst**. Joins a XenApp farm that uses Microsoft Access or SQL Server Express for the data store and creates an indirect connection to the data store.

To install the Citrix License Server through Active Directory, you can use ActiveDirectoryLicensingInstallSupport.mst. This transform is associated with ctx_licensing.msi and is documented in the *Getting Started with Licensing* guide.

To create a customized transform using one of the sample transform files

1. Using your preferred tool for editing Windows Installer packages, open the XenApp installation package, mps.msi, located in the XenApp Server\w2k8x64 and the XenApp Server\w2k8 folders of the XenApp installation media.
2. Apply the transform that includes the properties and values you want to modify.
3. Enter new values for the properties you want to change.
4. Generate the transform file and save it with a new name.

To apply a transform

1. Type the following at a command prompt, where *package* is the name of the XenApp installation package and *TransformList* is the list of the transforms that you want to apply:

   `msiexec` /i `package` TRANSFORMS=`TransformList`

   For further information about the parameters and switches you can use with these options, go to the Microsoft Web site at http://www.microsoft.com/ and search on "msiexec."

2. If you are applying multiple transforms, separate each transform with a semicolon.

Related topics:

"Installing by Applying Transforms to Setup" on page 129

"To create a customized transform using one of the sample transform files" on page 130

"To apply a transform" on page 131

"XenApp Windows Setup Property Names and Values" on page 139

thirdpartydb_create_direct.mst

This sample transform creates a new server farm using a data store on a separate database server. This transform creates a farm that uses a Microsoft SQL Server, Oracle, or IBM DB2 database for the farm data store. The database is stored on a dedicated database server and is configured for direct access by the servers in the farm.

Properties and Sample Values

CTX_MF_NEW_FARM_NAME=Farm-ThirdParty

CTX_MF_CREATE_FARM_DB_CHOICE=ThirdParty

CTX_MF_USER_NAME=Administrator

CTX_MF_DOMAIN_NAME=Domain1

CTX_MF_FARM_SELECTION=Create

CTX_MF_ODBC_USER_NAME=sa

CTX_ODBC_PASSWORD=citrix

CTX_MF_ODBC_RE_ENTERED_PASSWORD=citrix

CTX_MF_LICENSE_SERVER_NAME=License_Server

CTX_MF_SHADOWING_CHOICE=Yes

CTX_MF_XML_PORT_NUMBER=180

CTX_MF_XML_CHOICE=Separate

CTX_MF_SERVER_TYPE=e

CTX_MF_SHADOW_PROHIBIT_NO_LOGGING=No

CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION=Yes

CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA=No

You must add the following row to the transform because it is not available in the default Windows Installer package used for mps.msi.

CTX_MF_SILENT_DSNFILE =\\fileserver\image\TestSQL.DSN

Related topics:

"XenApp Windows Setup Property Names and Values" on page 139

thirdpartydb_join_direct.mst

This sample transform joins an existing server farm that uses a data store on a separate database server. In this transform, the existing server farm uses a Microsoft SQL Server, Oracle, or IBM DB2 database stored on a dedicated database server. The new server joining the farm accesses the data store directly.

Properties and Sample Values

CTX_MF_FARM_SELECTION=Join

CTX_MF_JOIN_FARM_DB_CHOICE=Direct

CTX_MF_ODBC_USER_NAME=sa

CTX_ODBC_PASSWORD=citrix

CTX_MF_ODBC_RE_ENTERED_PASSWORD=citrix

CTX_MF_LICENSE_SERVER_NAME=License_Server

CTX_MF_SHADOWING_CHOICE=Yes

CTX_MF_XML_PORT_NUMBER=180

CTX_MF_XML_CHOICE=Separate

CTX_MF_SERVER_TYPE=e

CTX_MF_SHADOW_PROHIBIT_NO_LOGGING=No

CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION=Yes

CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA=No

You must add the following row to the transform because it is not available in the default Windows Installer package used for mps.msi.

CTX_MF_SILENT_DSNFILE =\\fileserver\image\TestSQL.DSN

Related topics:

"XenApp Windows Setup Property Names and Values" on page 139

Localdb_access_create.mst

This sample transform creates a new server farm using a locally hosted database for the farm data store. The database is stored locally on the first server in the farm on which you installed XenApp.

Properties and Sample Values

CTX_MF_NEW_FARM_NAME=FarmAccess

CTX_MF_USER_NAME=Administrator

CTX_MF_DOMAIN_NAME=Domain1

CTX_MF_FARM_SELECTION=Create

CTX_MF_CREATE_FARM_DB_CHOICE=Local

CTX_MF_LOCAL_DATABASE=SQLEXPRESS

CTX_MF_MSDE_INSTANCE_NAME=CITRIX_METAFRAME

CTX_MF_LICENSE_SERVER_NAME=License_Server

CTX_MF_SHADOWING_CHOICE=Yes

CTX_MF_ENABLE_VIRTUAL_SCRIPTS=Yes

CTX_MF_XML_PORT_NUMBER=80

CTX_MF_XML_CHOICE=Share

CTX_MF_SERVER_TYPE=a

CTX_MF_SHADOW_PROHIBIT_NO_LOGGING=No

CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION=No

CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA=No

Related topics:

“XenApp Windows Setup Property Names and Values” on page 139

Join_Indirect.mst

This sample transform joins an existing server farm that uses a locally hosted data store. In this sample transform, the existing server farm uses a Microsoft SQL Server 2005 Express database stored on one of the servers running XenApp.

Note: This transform does not enable IMA encryption. If you are using this transform and want to enable IMA encryption, you must enable it manually after installation using the CTXKEYTOOL. See “CTXKEYTOOL” in the *Citrix XenApp Administrator’s Guide* for details.

Properties and Sample Values

CTX_MF_FARM_SELECTION=Join

CTX_MF_INDIRECT_JOIN_USER_NAME=Administrator

CTX_MF_INDIRECT_JOIN_DOMAIN_NAME=Domain1

CTX_MF_JOIN_FARM_SERVER_NAME=Server1

CTX_MF_JOIN_FARM_SERVER_PORT=2512

CTX_MF_JOIN_FARM_DB_CHOICE=Indirect

CTX_MF_LICENSE_SERVER_NAME=License_Server

CTX_MF_ENABLE_VIRTUAL_SCRIPTS=Yes

CTX_MF_XML_PORT_NUMBER=80

CTX_MF_XML_CHOICE=share

CTX_MF_SERVER_TYPE=a

CTX_MF_SHADOW_PROHIBIT_NO_LOGGING=Yes

CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION=No

CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA=No

Properties for the database password are not included in the default Windows Installer package used for mps.msi. If the database has a password, specify it by adding this row to the transform:

CTX_INDIRECT_JOIN_PASSWORD=Password

If you have a blank password, do not add the password property.

Related topics:

“XenApp Windows Setup Property Names and Values” on page 139

Preparing Installations with Prepopulated Responses

If you install XenApp frequently and want to reduce the number of steps you must perform, consider creating an administrative installation of XenApp using Windows Installer commands (msiexec /a).

An *administrative installation* is a type of installation that decompresses the installation files and copies prepopulated versions of them to a network share point. Anyone with access to the share point can then run XenApp Setup from that location.

Administrative installations produce a copy of the Windows Installer commands you used to initiate them. However, the parameters you initially provided on the command line (for example, INSTALLDIR="C:*MyFolder*") are stored inside the new copy of the Windows Installer commands.

Consider creating an administrative installation of XenApp when you want to:

- Launch Windows Installer commands that include fixes, such as a Citrix hotfix or Windows update, so that you do not need to install the fixes in a separate step
- Preserve paths from Setup, such as the path to the Web Services site
- Prepare Windows Installer commands with prepopulated responses for Active Directory deployments

After creating the administrative source image, you can apply any Windows Installer patch (.msp) files, such as Citrix hotfixes files, to the image as they are released. Applying patch files to the source image allows you to install the patches when you install the application on a new server; you do not have to install the patches separately after you install the application.

Citrix suggests creating the following two administrative installation source images:

- The installation package and any transforms needed to create the server farm. Run this image on the first server in the server farm.
- The installation package and any transforms needed to join other servers to the server farm. Run this image on all servers joining an existing server farm.

To create an administrative installation

1. Copy the XenApp installation media image to a network location that is accessible to administrators and servers.
2. Create the appropriate transform files to create a new server farm and to join a server farm. For example, if your data store is on a relational database, use thirdpartydb_create_direct.mst and thirdpartydb_join_direct.mst.
3. Run the `msiexec /a` command to create two network images from which XenApp can be installed:

   - The image to use when creating a server farm
   - The image to use when joining a server farm

   The following is an example of the command line to use to accomplish this:

```
msiexec /a <full path to the base mps.msi package> /L*v <full
path to a log file> /qb TARGETDIR=" <full path to the network
location>" TRANSFORMS=<semi-colon delimited list of the
appropriate transform file(s) created from Step 2 (example:
sql_join.mst)>
```

4. Run the administrative installation from the network share points containing the image used to create the first server in the farm. The following is an example of a command line to accomplish this:

```
msiexec /i <full path to my new share point mps.msi> /L <full
path to a log file location> /qb-
```

5. Run the administrative installation containing the image used to join a server to the farm.

Generating an Installation Log File

Installation and uninstallation log files are not created automatically for Windows Installer packages. You can create log files with the following methods:

- Use the logging command to create log files for only the Windows Installer operations
- Turn on automatic logging for all Windows Installer operations by creating a new registry string value

---

Caution: Using Registry Editor incorrectly can cause serious problems that can require you to reinstall the operating system. Citrix cannot guarantee that problems resulting from incorrect use of Registry Editor can be solved. Use Registry Editor at your own risk. Make sure you back up the registry before making changes to it.

Key: HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows\Installer

Type: REG_SZ
Name: Logging
Value data: voicewarmup

A log file is created in the %Tmp% directory for each operation.

- Use Active Directory's Group Policy Editor to configure logging properties for an Active Directory group.

To edit the Logging policy, open Group Policy Editor and select **Computer Configuration > Administrative Templates > Windows Components > Windows Installer**.

Installing XenApp Using an Unattended Installation

You can perform an unattended installation of XenApp by creating an *answer file* to respond to XenApp Setup prompts. A sample answer file, UnattendedTemplate.txt, is located in the XenApp installation media in Support\Install. Instructions are provided in the file for setup options.

You can also use the answer file to generate a Windows Installer command line with the silent option. This command line results from running the XenApp unattended installation.

To perform an unattended installation with an answer file

1. Copy the sample answer file to another location and modify it for your needs.
2. Using a text editor, open UnattendedTemplate.txt from the Support\Install folder of the XenApp installation media.
3. Enter the values for the entries you want to set and save the file.

   The file includes definitions and possible values for each entry.
4. Type the following at a command prompt where *path-to-mps.msi* is the full path to your XenApp installation, and *answer_file.txt* is the name of the text file you created in Step 1:

   ```
   UnattendedInstall.exe <path-to-mps.msi>
   <answer_file.txt> [MSIPROPERTY1="VALUE1"] ...
   [MSIPROPERTYN="VALUEN"]
   ```

   An example of this command that includes the ODBC password is:

   ```
   c:\XenApp\UnattendedInstall.exe "c:\Setup\MPS.msi"
   c:\cps\x32ORCL10-1.txt CTX_ODBC_PASSWORD="password"
   CTX_MF_ADD_LOCAL_ADMIN=Yes
   ```

   An example of this command that includes the indirect join password is:

   ```
   c:\XenApp\UnattendedInstall.exe "c:\Setup\MPS.msi"
   c:\cps\x32Access-2All.txt
   CTX_INDIRECT_JOIN_PASSWORD="password"
   CTX_MF_ADD_LOCAL_ADMIN=Yes
   ```

Note: Passwords are no longer stored in the answer file. Passwords must be provided on the command line when invoking UnattendedInstall.exe. See the unattended template file for the specific password command-line options required for the scenario you use.

XenApp Windows Installer Properties Reference

This topic provides information about the XenApp Setup properties for use with Windows Installer (msiexec) commands:

- Passthrough Client Windows Setup Properties
- XenApp Windows Setup Property Names and Values

XenApp Windows Setup Property Names and Values

XenApp Setup properties let you specify values when installing XenApp using Windows Installer commands and transforms.

A few key points:

- Some values, such as passwords, may be case-sensitive.
- When performing an unattended install (UnattendedInstall.exe), use Setup properties in the command line to specify user credentials; these are no longer included in the XenApp answer file. You can also use the command line to specify other Setup properties, such as installation directories.
- When using Setup properties in a command line as part of an unattended installation, enclose values that include spaces in quotation marks (""). If you use quotation marks when running Setup properties in the command line, set them explicitly by prefacing them with the escape character (\). For example, use `INSTALLDIR=\"C:\Program Files\Citrix\"` instead of `INSTALLDIR="C:\Program Files\Citrix"`.
- Setup properties for Platinum components, such as Password Manager and SmartAuditor, are included, when available, in their respective installation and administrator's guides.
- The Windows Installer (msiexec) commands for Citrix Licensing are available in the *Getting Started with Citrix Licensing* guide.

Each Setup property corresponds with a different stage of the installation process. The stages of the installation process are explained in “Creating a New XenApp Farm” on page 75.

Stage of Wizard-based Setup	Corresponding Setup Property
Create Farm	
Task 1: Choosing the Edition (Initial Autorun Page)	
Task 2: Choosing an Installation Category	
Task 4: Configuring Passthrough Client Authentication	CLIENT_UPGRADE INSTALLDIR PROGRAM_FOLDER_NAME SERVER_LOCATION DEFAULT_NDSCONTEXT ENABLE_SSON
Task 5: Installing the License Server	CTX_MF_LICENSE_SERVER_NAME CTX_MF_LICENSE_SERVER_PORT CTX_MF_LICENSE_SERVER_PORT_DEFAULT
Task 6: Installing the Access Management Console	CTX_ADDLOCAL
Task 7: Installing XenApp and its Components	CTX_ADDLOCAL
Task 8: Installing XenApp Advanced Configuration	CTX_ADDLOCAL
Join Farm	
Task 1: Initial Setup When Joining a Farm	CTX_MF_FARM_SELECTION
Task 2: Joining a Server Farm	CTX_MF_JOIN_FARM_DB_CHOICE CTX_MF_INDIRECT_JOIN_DOMAIN_NAME CTX_MF_INDIRECT_JOIN_PASSWORD CTX_MF_JOIN_FARM_SERVER_NAME CTX_MF_JOIN_FARM_SERVER_PORT
Task 3: Specifying the Location of the IMA Encryption Key File	CTX_PROTECT_KEY_PATH
Task 4: Using Farm Licensing Settings	CTX_MF_JOIN_FARM_SERVER_NAME CTX_MF_JOIN_FARM_SERVER_PORT CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE

Summaries of XenApp Setup Properties

The following topics provide a summary of the Setup properties for Windows Installer (msiexec) commands associated with the different installation types (Join Farm and Create Farm).

"Windows Setup Properties and Answer File Parameters" on page 144 lists XenApp's Windows Setup properties and the equivalent parameter in the XenApp Unattended Installation.

Summary of Join Farms Setup Properties

The following properties apply only when you are installing XenApp on servers that are joining a farm.

- CTX_MF_SILENT_DSNFILE
- CTX_MF_JOIN_FARM_DB_CHOICE
- CTX_MF_INDIRECT_JOIN_DOMAIN_NAME
- CTX_MF_INDIRECT_JOIN_USER_NAME
- CTX_MF_INDIRECT_JOIN_PASSWORD
- CTX_MF_JOIN_FARM_SERVER_NAME
- CTX_MF_JOIN_FARM_SERVER_PORT
- CTX_PROTECT_KEY_PATH
- CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE

Summary of Create Farm Setup Properties

The following properties apply only when you are installing XenApp on the first server in the farm.

- CTX_MF_NEW_FARM_NAME
- CTX_MF_USER_NAME
- CTX_MF_DOMAIN_NAME
- CTX_PROTECT_NEW_KEY_PATH
- CTX_MF_SHADOWING_CHOICE
- CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION
- CTX_MF_SHADOW_PROHIBIT_NO_LOGGING
- CTX_MF_XML_CHOICE
- CTX_MF_XML_PORT_NUMBER
- CTX_MF_SERVER_TYPE
- CTX_MF_ADD_LOCAL_ADMIN
- CTX_RDP_DISABLE_PROMPT_FOR_PASSWORD
- CTX_MF_LIC_CHOICE_FOR_CREATE

Summary of Create Farm and Join Farm Setup Properties

The following properties apply when you are installing XenApp on the first server in the farm and when you are joining a farm. Typically, the values used with these properties vary depending on whether you are creating or joining a farm.

- CTX_MF_FARM_SELECTION
- CTX_MF_CREATE_FARM_DB_CHOICE
- CTX_MF_LOCAL_DATABASE
- CTX_MF_MSDE_INSTANCE_NAME
- CTX_MF_ODBC_USER_NAME
- CTX_MF_ODBC_PASSWORD
- CTX_MF_ODBC_DRIVER
- CTX_MF_ZONE_NAME

- CTX_MF_ENABLE_VIRTUAL_SCRIPTS
- CTX_IMA_PROTECTION_ENABLE
- CTX_PROTECT_KEY_TYPE
- CTX_ADDLOCAL
- CTX_MF_LICENSE_SERVER_NAME
- CTX_MF_LICENSE_SERVER_PORT
- CTX_MF_LICENSE_SERVER_PORT_DEFAULT
- CTX_MF_ONLY_LAUNCH_PUBLISHED_APPS
- CTX_MF_ADD_ANON_USERS
- CTX_MF_CREATE_REMOTE_DESKTOP_USERS
- CTX_CONFIGMGR_USER
- CTX_CONFIGMGR_USER_PASSWORD
- CTX_CPSVC_SERVICE_USER_NAME
- CTX_CPSVC_SERVICE_USER_PASSWORD
- CTX_MALOO_SERVICE_USER
- CTX_MALOO_SERVICE_USER_PASSWORD
- INSTALLDIR
- REBOOT
- REINSTALLMODE

Windows Setup Properties and Answer File Parameters

When you perform a XenApp Unattended Installation, you provide values using a different syntax than you use with the Windows Installer Commands. The following table lists the XenApp Setup properties and their equivalent parameters for unattended installations.

Windows Installer Setup Property	Unattended Installation Parameter
CTX_MF_FARM_SELECTION	CreateFarm
CTX_MF_NEW_FARM_NAME	FarmName
CTX_MF_USER_NAME	FarmAdministratorUsername
CTX_MF_DOMAIN_NAME	FarmAdministratorDomain
CTX_MF_CREATE_FARM_DB_CHOICE	DirectConnect
CTX_MF_LOCAL_DATABASE	LocalDBType
CTX_MF_MSDE_INSTANCE_NAME	InstanceName
CTX_MF_ODBC_USER_NAME	UserName
CTX_ODBC_PASSWORD	
CTX_MF_SILENT_DSNFILE	DSNFilePath
CTX_MF_JOIN_FARM_DB_CHOICE	DirectConnect
CTX_MF_INDIRECT_JOIN_DOMAIN_NAME	DomainName
CTX_MF_INDIRECT_JOIN_USER_NAME	UserName
CTX_INDIRECT_JOIN_PASSWORD	
CTX_MF_JOIN_FARM_SERVER_NAME	IndirectServerName
CTX_MF_JOIN_FARM_SERVER_PORT	IndirectServerPort
CTX_MF_ZONE_NAME	ZoneName
CTX_MF_ADD_ANON_USERS	
CTX_CREATE_REMOTE_DESKTOP_USERS	
CTX_MF_SHADOWING_CHOICE	AllowShadowing
CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA	ProhibitRemoteControl
CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION	ProhibitNotificationOff
CTX_MF_SHADOW_PROHIBIT_NO_LOGGING	ProhibitLoggingOff
CTX_MF_XML_CHOICE	ExtendIIS
CTX_MF_XML_PORT_NUMBER	DedicatedPortNumber
CTX_MF_ENABLE_VIRTUAL_SCRIPTS	EnableVirtualScripts
CTX_MF_SERVER_TYPE	ServerType

Windows Installer Setup Property	Unattended Installation Parameter
CTX_IMA_PROTECTION_ENABLE	EncryptionEnable
CTX_PROTECT_KEY_TYPE	KeyType
CTX_PROTECT_NEW_KEY_PATH	NewKeyPath
CTX_PROTECT_KEY_PATH	KeyPath
CTX_MF_ADD_LOCAL_ADMIN	
CTX_ADDLOCAL	
CTX_RDP_DISABLE_PROMPT_FOR_PASSWORD	DisableRDPPromptForPassword
CTX_MF_LIC_CHOICE_FOR_CREATE	LicenseServerChoice
CTX_MF_LICENSE_SERVER_NAME	LicenseServerName
CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE	LicenseServerChoice
CTX_MF_LICENSE_SERVER_PORT	LicenseServerPort
CTX_MF_LICENSE_SERVER_PORT_DEFAULT	LicenseServerPortDefault
INSTALLDIR	

Passthrough Client Windows Setup Properties

Citrix XenApp Plugin for Hosted Apps must be installed before installing XenApp. These properties affect the XenAppHosted.msi; the client installation is no longer part of mps.msi. For more information about pass-through clients, see “Task 4: Configuring Passthrough Client Authentication” on page 80.

Use the following Setup properties when you are installing the Pass-through Client.

ADDLOCAL

- **Definition:** Install one or more of the specified features. When specifying multiple feature parameters, separate each parameter with a comma. Do not use spaces. The names are case sensitive.
- **Possible values:**
  - “ICA_Client” — Plugin engine component (always installs and is required to set other values)
  - “PN_AGENT” — installs Citrix XenApp plugin
  - “PN” — installs Program Neighborhood (not installed by default)
  - “WEB_CLIENT” — installs Citrix Xenapp Web Plugin
  - “SSON” — installs the files for pass-through authentication
- **Default value:** Blank

CLIENT_UPGRADE

- **Definition:** Upgrades the client to the most recent version.
- **Possible values:** “Yes” or “No”
- **Default value:** “Yes”
- **Installation type:** Citrix XenApp Plugin for Hosted Apps

ENABLE_DYNAMIC_CLIENT_NAME

- **Definition:** When using the Pass-through Client, turn on or off the capability to use the computer name as the client device name and recognize changes to the client name.
- **Possible values:** "Yes" or "No"
- **Default value:** "Yes"
- **Installation type:** Citrix XenApp Plugin for Hosted Apps

INSTALLDIR

- **Definition:** *Installation directory*, where *Installation directory* is the location where the plugin software is installed.
- **Possible values:**
- **Default value:** C:\Program Files\Citrix\ICA Client.
- **Installation type:** Citrix XenApp Plugin for Hosted Apps

PROGRAM_FOLDER_NAME

- **Definition:** *Start Menu Program Folder Name*, where *Start Menu Program Folder Name* is the name of the Programs folder on the Start menu containing the shortcut to the XenApp plugin or Program Neighborhood.
- **Possible values:** User defined
- **Default value:** "Citrix\"
- **Installation type:** Citrix XenApp Plugin for Hosted Apps
- **Remarks**: This function is not supported during plugin upgrades.

SERVER_LOCATION

- **Definition:** The URL of the server running the Web Interface. This server hosts the configuration file for the XenApp plugin. You must enter the server address if you want to use the XenApp plugin as the Pass-through Client. The server address can use HTTP or HTTPS.
- **Possible values:** User defined
- **Default value:** “localhost”
- **Installation type:** Citrix XenApp Plugin for Hosted Apps

DEFAULT_NDSCONTEXT

- **Definition:** Include this parameter if you want to set a default context for NDS. If you are including more than one context, place the entire value in quotation marks and separate the contexts by a comma.

  Examples of correct parameters:

  ```
  DEFAULT_NDSCONTEXT=Context1
  ```

  ```
  DEFAULT_NDSCONTEXT=”Context1,Context2”
  ```

  Example of an incorrect parameter:

  ```
  DEFAULT_NDSCONTEXT=Context1,Context2
  ```

- **Installation type:** Citrix XenApp Plugin for Hosted Apps

ENABLE_SSON

- **Definition:** Set to “Yes” to enable pass-through authentication. Set to “No” to disable pass-through authentication.
- **Possible values:** “Yes” or “No”
- **Default value:** “Yes”
- **Installation type:** Citrix XenApp Plugin for Hosted Apps

Management Tools Windows Installer Commands

Because the Access Management Console and XenApp Advanced Configuration tool have their own .msi files, they are not specified using Windows Setup properties as part of XenApp installation. Instead, the installation commands for these tools are specified on their own command lines:

- To install the Access Management Console, Citrix strongly recommends running CtxInstall.exe, which installs all of the extensions. If you install the Access Management Console using another method, the extensions must be installed in a specific sequence or installation fails.

  To install the Access Management Console silently, run the following command: CtxInstall.exe /silent.

- To install the Advanced Configuration tool, run cmc.msi.

XenApp Windows Setup Properties

This topic provides the syntax for the XenApp Setup properties that modify Windows Installer (msiexec) commands. This topic also provides code samples for XenApp Setup, which use a local database and an enterprise database, Citrix Licensing, and the Web Interface.

Create Farm Sample Windows Installer Command Script

This sample script creates a farm using a local database (Microsoft Access) with port sharing, IMA encryption, and shadowing enabled.

```
msiexec.exe /i MPS.msi /qb- /l*v C:\mps.log CTX_MF_SERVER_TYPE="P"
INSTALLDIR="C:\XenApp\" CTX_MF_FARM_SELECTION="Create"
CTX_MF_CREATE_FARM_DB_CHOICE="Local" CTX_LOCAL_DATABASE="Access"
CTX_MF_NEW_FARM_NAME="NewFarmName" CTX_MF_XML_CHOICE="Share"
CTX_MF_USER_NAME="Administrator" CTX_MF_DOMAIN_NAME="DomainName"
CTX_MF_LIC_CHOICE_FOR_CREATE="Point"
CTX_MF_LICENSE_SERVER_NAME="LicenseServerName"
CTX_MF_LICENSE_SERVER_PORT_DEFAULT="1"
CTX_MF_LICENSE_SERVER_PORT="27000" CTX_IMA_PROTECTION_ENABLE="1"
CTX_PROTECT_KEY_TYPE="generate"
CTX_PROTECT_NEW_KEY_PATH="C:\KeyFile.key"
CTX_MF_SHADOWING_CHOICE="Yes"
CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION="No"
CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA="No"
CTX_MF_CREATE_REMOTE_DESKTOP_USERS="AddEveryone"
CTX_MF_ADD_ANON_USERS="Yes" CTX_MF_ENABLE_VIRTUAL_SCRIPTS="Yes"
CTX_MF_ADD_LOCAL_ADMIN="Yes" CTX_MF_ONLY_LAUNCH_PUBLISHED_APPS="No"
```

Join Farm Sample Windows Installer Command Script

This sample script joins a farm whose data store is hosted on a third-party, or enterprise, database (SQL Server). The farm has IMA encryption and shadowing enabled.

```
msiexec /i MPS.msi /qb- /l*v C:\mps.log CTX_MF_SERVER_TYPE="E"
INSTALLDIR="C:\XenApp\" CTX_MF_FARM_SELECTION="Join"
CTX_MF_CREATE_FARM_DB_CHOICE="Thirdparty"
CTX_MF_JOIN_FARM_DB_CHOICE="Direct"
CTX_MF_ODBC_USER_NAME="DomainName\UserName"
CTX_ODBC_PASSWORD="****" CTX_MF_ODBC_RE_ENTERED_PASSWORD="****"
CTX_MF_SILENT_DSNFILE="C:\SQLWin.dsn"
CTX_MF_SELECTED_DRIVER_NAME="SQL Server"
CTX_MF_XML_CHOICE="Separate" CTX_MF_XML_PORT_NUMBER="8080"
CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE="UseFarmSettings"
CTX_IMA_PROTECTION_ENABLE="1" CTX_PROTECT_KEY_TYPE="file"
CTX_PROTECT_KEY_PATH="C:\KeyFile.key" CTX_MF_SHADOWING_CHOICE="Yes"
CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION="No"
CTX_MF_SHADOW_PROHIBIT_NO_LOGGING="No"
CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA="No"
CTX_MF_CREATE_REMOTE_DESKTOP_USERS="CopyUsers"
```

Citrix Licensing Sample Windows Installer Command Script

This sample script installs Citrix Licensing. For more information about licensing Setup properties, see the *Getting Started with Citrix Licensing* guide.

```
msiexec.exe /i ctx_licensing.msi
CTX_LICENSING_INSTALLDIR="C:\program files\citrix\"
CTX_LIC_FILE_PATH="C:\program files\citrix\licensing\my files\"
CTX_WEB_SERVER="IIS" CTX_LICENSE_SERVER_PORT="23456"
CTX_VENDOR_DAEMON_PORT="65432" /l*v "C:\Lic.log" /qb-
```

Web Interface Sample Windows Installer Command Script

This sample script installs the Web Interface. For more information about Web Interface Setup properties, see the *Citrix Web Interface Administrator's Guide*.

```
WebInterface.exe -q -v %systemdrive%\WI.log
```

CTX_ADDLOCAL

- **Definition:** Specifies one or more XenApp features to install. The values of CTX_ADDLOCAL are XenApp features and components. The values are comma delimited and must be installed locally. CTX_ADDLOCAL=ALL installs all features. (This property is similar to the Windows Installer ADDLOCAL property.)
- **Possible values:**
  - All — installs all XenApp features and components
  - CTX_MF_MetaFrame_Core — installs the core server software for XenApp only
  - CTX_MF_LM — installs the Load Manager component, which load balances user connections across servers to utilize server resources more effectively
  - WMI — installs the XenApp Provider, which is the WMI provider XenApp and Citrix Licensing and provides support for MOM 2005 and 2007
  - CTX_MF_IMA_Core — installs the Citrix Independent Management Architecture service
  - CTX_MF_CTXCPU — installs the Citrix CPU Utilization Management feature, which lets you control CPU utilization on a farm server
  - CTX_MF_CTXSFO — installs the Memory Optimization Management feature
  - CSS_SS — installs support for application streaming. This only applies to enterprise and Platinum Edition

    Caution: Do not specify CSS_SS value for the CTX_ADDLOCAL property if you have an Advanced Edition license. Specifying this property can cause issues after Setup when applying hotfixes.
- **Default value:** Blank
- **Installation type:** Create Farm, Join Farm
- **Remarks**:
  - Separate entries by commas.

- CTX_ADDLOCAL does not provide values for installing the Access Management Console or the XenApp Advanced Configuration tool. See “Management Tools Windows Installer Commands” on page 149.

CTX_CPSVC_SERVICE_USER_NAME

- **Definition:** Specifies a different user account for the Citrix Print Manager Service. If this property is not specified, the service is installed under the account ctx_cpsvcuser. If you want to change the account, specify CTX_CPSVC_SERVICE_USER_NAME with a value representing the account you already created and use CTX_CPSVC_SERVICE_USER_PASSWORD to specify the password.
- **Possible values:** User defined
- **Default value:** “ctx_cpsvcuser”
- **Format:** Domain\Username
- **Installation type:** Create Farm, Join Farm
- **Remarks**:
  - To specify a domain account for a service, you must log on to the server on which you are running Setup as a domain administrator of the domain on which you want to run the server.
  - If you want to specify another account to use for the Setup, you must specify the following privileges when you create the account: **Log on as a service** (SeServiceLogonRight) and **Log on as a batch job** (LogonAsBatch). Without these privileges, the Citrix Print Manager Service does not start.

Note: The Citrix Print Manager Service now uses the ctx_cpsvcuser account instead of the Ctx_SmaUser account, which the service used in Presentation Server 4.0.

CTX_CPSVC_SERVICE_USER_PASSWORD

- **Definition:** Specifies the password for the Citrix Print Manager Service. Specifying CTX_CPSVC_SERVICE_USER_PASSWORD without specifying CTX_CPSVC_SERVICE_USER_NAME installs the service under the default account (ctx_cpsvcuser) and lets you change the password. Specifying CTX_CPSVC_SERVICE_USER_PASSWORD with CTX_CPSVC_SERVICE_USER_NAME lets you change both the user name and password for this account.
- **Possible values:** User defined
- **Installation type:** Create Farm, Join Farm

CTX_IMA_PROTECTION_ENABLE

- **Definition:** Use this property to enable or disable IMA encryption during Create Farm Setup.
- **Possible values:**
  - "1" — enables IMA encryption. Use with CTX_PROTECT_KEY_TYPE.
  - "0" — disables IMA encryption.
- **Default value:** "0"
- **Installation type:** Create Farm, Join Farm

CTX_MALOO_SERVICE_USER

- **Definition:** Specifies a different user account for the CPU Utilization Mgmt/CPU Rebalancer service, which is one of the services for the CPU Utilization Management feature. If this property is not specified, the service is installed under the ctx_cpuuser account. If you want to change the account, specify CTX_MALOO_SERVICE_USER with a value representing the account you already created and use CTX_MALOO_SERVICE_USER_PASSWORD to specify the password.
- **Possible values:** User defined
- **Default value:** "ctx_cpuuser"
- **Format:** Domain\Username
- **Installation type:** Create Farm, Join Farm

- **Remarks**:
  - This service is only installed on servers with multiple processors.
  - To specify a domain account for a service, you must log on to the server on which you are running Setup as a domain administrator of the domain on which you want to run the server.
  - If you want to specify another account to use for the Setup, you must specify the following privileges when you create the account: **Log on as a service** (SeServiceLogonRight), **Log on as a batch job** (LogonAsBatch), **Debug programs** (SeDebugPrivilege), and **Increase scheduling priority** (SeIncrementBasePriorityPrivilege). Without these privileges, the CPU Utilization Mgmt/CPU Rebalancer service does not start.

CTX_MALOO_SERVICE_USER_PASSWORD

- **Definition:** Specifies the password for the Citrix CPU Utilization Mgmt/ CPU Rebalancer service. Specifying CTX_MALOO_SERVICE_USER_PASSWORD without specifying CTX_MALOO_SERVICE_USER installs the service using the default value (ctx_cpuuser) for the CTX_MALOO_SERVICE_USER property as the user name and lets you change the password. Specifying CTX_MALOO_SERVICE_USER_PASSWORD with CTX_MALOO_SERVICE_USER lets you change both the user name and password for this account.
- **Possible values:** User defined
- **Installation type:** Create Farm, Join Farm

CTX_MF_ADD_ANON_USERS

- **Definition:** Determines whether or not anonymous users can connect remotely. This property adds anonymous users to the Remote Desktop Users group in Windows Server 2008.

  If set to “Yes” and if CTX_MF_CREATE_REMOTE_DESKTOP_USERS is set to “CopyUsers” or “DoNothing”, the anonymous users are added to the Remote Desktop Users group.

  If CTX_MF_CREATE_REMOTE_DESKTOP_USERS is set to “AddEveryone,” this property is ignored because the Remote Desktop

Users group is configured so that every user in the Users group is also a remote desktop user.

If this property is set to “No”, it prohibits anonymous connections to XenApp.

- **Possible values:** “Yes” or “No”
- **Default value:** “Yes”
- **Installation type:** Create Farm, Join Farm

CTX_MF_ADD_LOCAL_ADMIN

- **Definition:** If enabled, creates Citrix administrator accounts for all user accounts in the local Administrators group.
- **Possible values:** “Yes” or “No”
- **Default value:** “No”
- **Installation type:** Create Farm

CTX_MF_CREATE_REMOTE_DESKTOP_USERS

- **Definition:** Determines whether or not to add users to the Windows Remote Desktop Users group if the accounts are already created on the system. Users must be members of the Remote Desktop Users group to log on remotely to a Windows Server 2008 system.

  Setting this property has no effect if the Remote Desktop Users group already has members.

Note: CTX_MF_CREATE_REMOTE_DESKTOP_USERS takes precedence over CTX_MF_ADD_ANON_USERS. Therefore, if CTX_MF_CREATE_REMOTE_DESKTOP_USERS is set to “AddEveryone” and CTX_MF_ADD_ANON_USERS is set to “No” anonymous connections to XenApp are enabled on this server.

- **Possible values:**
  - “AddEveryone” — Adds the Authenticated Users group to the Remote Desktop Users group. This option allows all current members of the Users group to log on remotely to the server. If selected, whenever you add a user to the Users group, XenApp automatically adds the user to Remote Desktop Users group.

  - "CopyUsers" — Copies all current users from the Users group to the Remote Desktop Users group. After Setup, if you add any user accounts for which you want to enable rewrite access to the server, you must add the accounts to the Remote Desktop Users group manually.
  - "DoNothing" — Does not add any users to the Remote Desktop Users group. Choosing this option means that no users will be allowed to log on remotely to the server until you add users to the Remote Desktop Users group in Windows Server 2008.
- **Default value:** "CopyUsers"
- **Installation type:** Create Farm, Join Farm

CTX_CONFIGMGR_USER

- **Definition:** Defines the account for Configuration Manager for the Web Interface Service. If this property is not specified, the service is installed with the default local user account (Ctx_ConfigMgr). You can change this to run under a different account by using this Setup property with CTX_CONFIGMGR_USER_PASSWORD .
- **Possible values:** User defined
- **Default value:** "ctx_cpuuser"
- **Format:** Domain\Username
- **Installation type:** Create Farm, Join Farm
- **Remarks**:
  - To specify a domain account for a service, you must log on to the server on which you are running Setup as a domain administrator of the domain on which you want to run the server.
  - If you want to specify another account to use for the Setup, you must specify the following privileges when you create the account: **Log on as a service** (SeServiceLogonRight) and **Log on as a batch job** (LogonAsBatch). Without these privileges, the Configuration Manager for the Web Interface Service does not start.

CTX_CONFIGMGR_USER_PASSWORD

- **Definition:** Specifies the password for the Configuration Manager for the Web Interface Service. Use with CTX_CONFIGMGR_USER.
- **Possible values:** User defined
- **Installation type:** Create Farm, Join Farm

CTX_MF_CREATE_FARM_DB_CHOICE

- **Definition:** Specifies whether the database is a local database stored on the first server in the farm or an enterprise (third-party) database stored on a separate server.
- **Possible values:**
  - "Local" — Access or SQL Server Express. Use with CTX_MF_LOCAL_DATABASE and, if using SQL Server Express, CTX_MF_MSDE_INSTANCE_NAME.
  - "Third Party" — SQL, Oracle, or IBM DB2. Use with CTX_MF_ODBC_USER_NAME and CTX_MF_ODBC_PASSWORD.
- **Default value:** "Local"
- **Installation type:** Create Farm, Join Farm

CTX_MF_DOMAIN_NAME

- **Definition:** Specifies the domain name for the first Citrix administrator account you are creating in the farm.
- **Possible values:** User defined
- **Default value:** "DomainName"
- **Installation type:** Create Farm

CTX_MF_ENABLE_VIRTUAL_SCRIPTS

- **Definition:** Specify this property to enable port sharing with IIS during Setup. This property directs XenApp Setup to create the virtual scripts directory, which is required for IIS. If the value is set to "Yes" or "1", Setup does not prompt you to create the virtual scripts directory, even if you are running Setup in wizard-based mode.

  If you are running a silent installation and this property is not set to "Yes" or "1" and the XML port on the server is shared with IIS (for example, if you are installing the Web Interface on the same server as XenApp), Setup aborts and the following error message is added to the installation log file:

  "ERROR: SetIISScriptsDir - Could not get the scripts path because the Virtual Scripts directory in not enabled in IIS or the property CTX_MF_ENABLE_VIRTUAL_SCRIPTS is not set to Yes."

  If the property is defined, the silent installation continues with no error.

- **Possible values:**
  - "Yes" or "1" — Creates the virtual scripts directory if it does not already exist.
  - Not defined, "0" or "No" — Do not create the virtual scripts directory if it does not already exist. You are prompted during Setup to create the virtual scripts directory.
- **Default value:** Not defined
- **Installation type:** Create Farm, Join Farm

CTX_MF_FARM_SELECTION

- **Definition:** Defines whether you are creating a new server farm or joining an existing farm. If this server is joining an existing farm, you must also set CTX_MF_JOIN_FARM_DB_CHOICE.
- **Possible values:** "Create" or "Join"
- **Default value:** "Create"
- **Installation type:** Create Farm, Join Farm

CTX_MF_LICENSE_SERVER_NAME

- **Description:** Specifies the license server the XenApp server uses. Only applies:
  - When performing a new installation when joining an existing server farm and CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE is set to “Point”
  - When performing a new installation while creating a new server farm and CTX_MF_LIC_CHOICE_FOR_CREATE is set to “Point”
- **Possible values:** User defined
- **Default value:** “localhost”
- **Installation type:** Create Farm, Join Farm

CTX_MF_LICENSE_SERVER_PORT_DEFAULT

- **Definition:** Controls whether XenApp communicates with the license server through the license server’s default port number of 27000.
- **Possible value:**
  - “1” — XenApp uses the default port number, 27000.
  - “” (null) — Specifies to use the value of CTX_MF_LICENSE_SERVER_PORT as the port number to use when communicating with the Citrix License Server.
- **Default value:** “1”
- **Installation type:** Create Farm, Join Farm

CTX_MF_LICENSE_SERVER_PORT

- **Definition:** CTX_MF_LICENSE_SERVER_PORT lets you specify a value for a different port number (other than the default of 27000) to use when communicating with the Citrix License Server. The value must match the port number configured on the license server. Use with CTX_MF_LICENSE_SEVER_PORT_DEFAULT set to “” (null).
- **Possible values:** An integer representing the number of the port through which the license server listens for requests.
- **Default value:** “27000”
- **Installation type:** Create Farm, Join Farm

CTX_MF_LOCAL_DATABASE

- **Definition:** Specifies the type of local database for the farm data store.
- **Possible values:**
  - "Access"
  - "SQL" — "SQL" for SQL Server 2005 Express
- **Default value:** "Access"
- **Installation type:** Create Farm, Join Farm

CTX_MF_INDIRECT_JOIN_DOMAIN_NAME

- **Definition:** Specifies the domain name of a user account that has full administrative rights in XenApp. Use if you are joining a farm that uses a Microsoft Access or SQL Server 2005 Express database stored locally on the first server in the farm (indirect connection).
- **Possible values:** Any domain in which the user account has full administrative rights on the XenApp farm.
- **Default value:** "DomainName"
- **Installation type:** Join Farm

CTX_MF_INDIRECT_JOIN_USER_NAME

- **Definition:** Specifies the user name for an account that has full administrative rights in XenApp. Use if you are joining a farm that uses a Microsoft Access or SQL Server 2005 Express database stored locally on the first server in the farm (indirect connection).
- **Possible values:** Any user account that has full administrative rights on the XenApp farm; ideally, the same account used to create the farm.
- **Default value:** "Administrator"
- **Installation type:** Join Farm

CTX_MF_INDIRECT_JOIN_PASSWORD

- **Definition:** Specifies the password for a user account that has full administrative rights in XenApp. Use if you are joining a farm that uses a Microsoft Access or SQL Server 2005 Express database stored locally on the first server in the farm (indirect access).
- **Possible values:** The password for the user name entered in CTX_MF_INDIRECT_JOIN_USER_NAME.
- **Default value:** "" (null)
- **Installation type:** Join Farm

CTX_MF_JOIN_FARM_DB_CHOICE

Definition: Use when joining a farm to specify whether the existing farm connects directly or indirectly to the data store.

- **Possible values:** "Direct", "Indirect"

  Set this property's value to "indirect" if you are using a Microsoft Access or SQL Server 2005 Express database stored locally on the first server in the farm on which you installed XenApp.

  Set this property's value to "direct" if you are using a Microsoft SQL, Oracle, or IBM DB2 database stored on a separate, dedicated database server.
- **Default value:** "Direct"
- **Installation type:** Join Farm

CTX_MF_JOIN_FARM_SERVER_NAME

- **Definition:** Specifies the name of the first server in the farm that you want to join.
- **Possible values:** The name of a server hosting the Access or SQL Server 2005 Express data store.
- **Default value:** "ServerName"
- **Installation type:** Join Farm

CTX_MF_JOIN_FARM_SERVER_PORT

- **Definition:** Specifies the IMA communication port number used to communicate with the locally stored farm data store. (This applies if you are using a Microsoft Access or SQL Server 2005 Express database stored locally on the first server in the farm on which you installed XenApp.)
- **Possible values:** User defined
- **Default value:** "2512"
- **Installation type:** Join Farm

CTX_MF_ONLY_LAUNCH_PUBLISHED_APPS

- **Definition:** By default, XenApp prohibits non-administrative users from connecting to the published desktops and the desktop of the servers hosting XenApp. When this property is set to either "Yes" or "" (null), users can only connect to published applications. This setting is a server setting and not farm wide. If you want to let users connect to some server desktops but not all, change this property's value for those servers.
- **Possible values:** "" (null), "Yes," or "No"
  - "Yes" — users cannot connect to published desktops or server desktops with clients
  - "No" — users can connect to published desktops or server desktops with clients
  - "" (null) — users cannot connect to published desktops or server desktops with clients
- **Default value:** "" (null)

Note: If set to a value other than "Yes" or "No," this security enhancement is enabled during Setup.

- **Installation type:** Create Farm, Join Farm

CTX_MF_LIC_CHOICE_FOR_CREATE

- **Definition:** Configures the server to point to an existing Citrix License Server when creating a farm. If set to "Point," ensure that CTX_MF_LICENSE_SERVER_NAME names a valid license server. If you install the license server after installing XenApp, set CTX_MF_LIC_CHOICE_FOR_CREATE to "DontKnow."
- **Possible values:** "Point" or "DontKnow"
- **Default value:** "Point"

Note: You can also use the Access Management Console to configure the server to point to the license server after running Setup.

- **Installation type:** Create Farm

CTX_MF_MSDE_INSTANCE_NAME

- **Definition:** If you install SQL Server Express using the batch file, SetupSqlExpressForCPS.cmd, the default instance name is CITRIX_METAFRAME. However, if you defined a different instance name, use this property to specify that name. That is, use this property if you modified the instance name in the batch file or did not install SQL Server Express using the batch file.
- **Possible values:** User defined
- **Default value:** "CITRIX_METAFRAME"
- **Installation type:** Create Farm, Join Farm

CTX_MF_NEW_FARM_NAME

- **Definition:** Specifies the name of the new farm. If you are joining a farm, use CTX_MF_JOIN.
- **Possible values:** User defined
- **Default value:** "NewFarmName"
- **Installation type:** Create Farm

CTX_MF_ODBC_DRIVER

- **Definition:** Specifies the ODBC driver name for the database hosting the farm data store. Use when joining a farm directly.
- **Possible values:** The ODBC driver name such as “SQL Server”, “Oracle in OraClient11g_home1”, or “IBM DB2 ODBC DRIVER - DB2COPY1”.
- **Default value:** “” (null)
- **Installation type:** Create Farm, Join Farm

CTX_MF_ODBC_PASSWORD

- **Definition:** Specifies the password for a directly connected database that stores the farm data store.
- **Possible values:** User defined
- **Default value:** “Password”
- **Installation type:** Create Farm, Join Farm

CTX_MF_ODBC_USER_NAME

- **Definition:** Specifies the user name for a directly connected database that stores the farm data store. Typically, you specify this property when the data store is hosted on Oracle, SQL, or DB2. Use with CTX_MF_ODBC_PASSWORD.
- **Possible values:** User defined
- **Default value:** “UserName”

CTX_PROTECT_KEY_PATH

- **Definition:** Use when joining a farm to indicate the complete path to where a valid encryption key file is stored. This property should be used in conjunction with CTX_PROTECT_KEY_TYPE with a value of “file.” Failure to set both keys correctly will cause XenApp Setup to not activate the encryption settings for the current server.
- **Possible values:** The full path where an encryption key file is stored.
- **Default value:** “” (null)
- **Installation type:** Join Farm

CTX_PROTECT_KEY_TYPE

- **Definition:** Use this property to indicate how the IMA encryption key is provided.
- **Possible values:**
  - "file" — Provides a path to the location where the key file resides. Use with the CTX_PROTECT_KEY_PATH property.
  - "generate" — Provides a writable location where the key file is stored after Setup generates a new encryption key. Use with the CTX_PROTECT_NEW_KEY property.
  - "existing" — Indicates a key is already loaded on the computer; Setup will not attempt to replace the existing key with a new key from the file. This property requires either CTX_PROTECT_KEY_PATH or the CTX_PROTECT_NEW_KEY_PATH.
- **Default value:** "file"
- **Installation type:** Create Farm, Join Farm

CTX_PROTECT_NEW_KEY_PATH

- **Definition:** Specifies the complete path to the writable folder where you want the IMA encryption key file created. If the folder is not writable, Setup fails. Use with CTX_PROTECT_KEY_TYPE and set its value to "generate." Failure to set both properties correctly causes XenApp Setup not to activate the encryption settings for the current server.
- **Possible values:** The full path where an encryption key file will be created
- **Default value:** "" (null)
- **Installation type:** Create Farm

CTX_RDP_DISABLE_PROMPT_FOR_PASSWORD

- **Definition:** Setting this property to "Yes" changes the security setting on the server so that passwords from users of Microsoft Remote Desktop Web Connection software are not required. Users must still enter credentials when logging on to the Web Interface, but can launch applications without further prompts for credentials by the server.
- **Possible values:** "Yes" or "No"
- **Default value:** "No"
- **Installation type:** Create Farm

CTX_MF_SERVER_TYPE

- **Definition:** Specifies the edition of XenApp to be installed.

  Important: Because there is no installation type set as the default, Setup fails if you do not set this property or leave it as "" (null).

- **Possible values:**
  - "P" — Platinum Edition
  - "E" — Enterprise Edition
  - "A" — Advanced Edition
- **Default value:** "" (null)
- **Installation type:** Create Farm

CTX_MF_SHADOWING_CHOICE

- **Definition:** Turns session shadowing on or off.

  Important: If you turn session shadowing off when you install XenApp, you cannot enable shadowing at a later time through user policies or connection configuration.

- **Possible values:**
  - "Yes" — turn it on
  - "No" — turn it off
- **Default value:** "Yes"
- **Installation type:** Create Farm

CTX_MF_SHADOW_PROHIBIT_REMOTE_ICA

- **Definition:** Prohibits or allows remote control of mouse and keyboard in shadowed sessions.
- **Possible values:**
  - "Yes" — prohibit
  - "No" — allow
- **Default value:** "No"
- **Installation type:** Create Farm

CTX_MF_SHADOW_PROHIBIT_NO_NOTIFICATION

- **Definition:** Prohibits or allows shadowing connections without user notification.
- **Possible values:**
  - "Yes" — prohibit
  - "No" — allow
- **Default value:** "No"
- **Installation type:** Create Farm

CTX_MF_SHADOW_PROHIBIT_NO_LOGGING

- **Definition:** Prohibits or allows shadow connections without logging.
- **Possible values:**
  - "Yes" — prohibit
  - "No" — allow
- **Default value:** "No"
- **Installation type:** Create Farm

CTX_MF_SILENT_DSNFILE

Definition: During a Join Farm Setup, specifies the path to the Data Source Name (DSN) file used to connect to the data store when the database is Oracle, SQL, or DB2. When you run Setup from Autorun, Setup creates the DSN file for you. When you start installation from anywhere but the Autorun, you must create the DSN file and use the CTX_MF_SILENT_DSNFILE Setup property to specify its location.

- **Possible values:** Complete path to the DSN file
- **Default value:** "" (null)
- **Installation type:** Join Farm

CTX_MF_USER_NAME

- **Definition:** Specifies the user name for the first Citrix administrator account you are creating in the farm.
- **Possible values:** User defined
- **Default value:** "UserName"
- **Installation type:** Create Farm

CTX_MF_XML_CHOICE

- **Definition:** Determines whether Microsoft Internet Information Services (IIS) and the Citrix XML Service share the same port on this server or use separate ports. If you do not want IIS and the Citrix XML Service to share the same port, you must set the Citrix XML Service port number using CTX_MF_XML_PORT_NUMBER.
- **Possible values:** or
  - "Share" — share with IIS
  - "Separate" — use separate port, set in CTX_MF_XML_PORT_NUMBER
- **Default value:** "Share"
- **Installation type:** Create Farm

CTX_MF_XML_PORT_NUMBER

- **Definition:** Port number you want the Citrix XML Service to use when you do not want the Citrix XML Service and IIS to share ports.
- **Possible values:** User defined
- **Default value:** "80"
- **Installation type:** Create Farm

CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE

- **Definition:** Used when joining a farm to configure XenApp to point to an existing Citrix License Server. If set to "Point", ensure that CTX_MF_LICENSE_SERVER_NAME points to a valid license server. If set to "UseFarmSettings," ensure that the existing server farm is configured to use a license server. If you are going to install the license server after installing XenApp, set CTX_MF_LIC_CHOICE_FOR_JOIN_OR_UPGRADE to "DontKnow."

Note: You can also use the Access Management Console to configure XenApp to point to the license server after running Setup.

- **Possible values:**
  - "Point"
  - "UseFarmSettings"
  - "DontKnow"
- **Default value:** "UseFarmSettings"
- **Installation type:** Join Farm

CTX_MF_ZONE_NAME

- **Definition:** Specifies the name of the zone to which the server belongs. During a Create Farm, this specifies the name of the first zone in the farm. During a Join Farm, this specifies the name of the zone to which you want to add the server you are installing.
- **Possible values:** Not applicable
- **Default value:** None. The default value for the zone name is "Default Zone".
- **Installation type:** Create Farm, Join Farm

INSTALLDIR

- **Definition:** The target location for the installation.
- **Possible values:** User defined
- **Default value:** %Program Files%\Citrix
- **Installation type:** Create Farm, Join Farm

REBOOT

- **Definition:** Standard Windows Installer property that controls whether you restart a server manually or are prompted for the server to be restarted.

Note: XenApp requires that you reboot the server after running Setup.

- **Possible values:**
  - "Force" — forces restart to occur; no further prompts are displayed
  - "Suppress" — forces restart to *not* occur by default; a prompt occurs if action is necessary
  - "ReallySuppress" — forces restart to *not* occur; no prompts appear
- **Default value:** "Force"
- **Installation type:** Create Farm, Join Farm

REINSTALLMODE

- **Definition:** This is a standard Windows Installer property that performs the same function as the Repair function in **Control Panel > Programs and Features**. Specifies the type of reinstall to perform. Options are case-insensitive and order-independent.

  Important: Citrix recommends that you do not modify this property.

- **Possible values:**
  - p — install missing files
  - o — replace files with older versions or replace missing files
  - c — replace corrupt files (checksum validation)
  - e — replace files with the same version or replace missing files
  - d — replace files of differing versions
  - a — replace all files regardless of version
  - u — replace user registry settings
  - m — replace registry settings on the server
  - s — replace shortcuts
  - v — replace the cached .msi package with the package currently being installed
- **Default value:** "oums"
- **Installation type:** Create Farm, Join Farm

Data Store Database Reference

This topic contains reference information about the supported databases for the Citrix XenApp farm data store.

- "Planning the XenApp Data Store" on page 173
- "Preparing the Database Before XenApp Setup" on page 179
- "Microsoft SQL Server Database" on page 183
- "Oracle Database" on page 186
- "IBM DB2 Database" on page 188
- "Microsoft SQL Server Express" on page 189
- "Microsoft Access Database" on page 191

For information about database prerequisites, see the Installation Checklist. For a list of supported databases, including those available after the release of XenApp 5.0, see http://support.citrix.com/article/CTX114501.

See the database vendor's documentation before installing, configuring, and using the product.

Planning the XenApp Data Store

When you deploy your server farm, it must have an associated *data store*. When servers in a farm come online, they query the data store for configuration information. The data store provides a repository of persistent information about the farm that each server can reference, including the following:

- Farm configuration information
- Published application configurations
- Server configurations
- Citrix administrator accounts
- Printer configurations

The following topics discuss the considerations for planning your data store implementation, including how to configure it. For more information about supported database and driver versions and also minimum requirements, authentication, and migration information for each supported database, see "Data Store Database Reference" on page 173 and the *Citrix XenApp Installation Checklist*.

Before you set up and configure connections to the database that will serve as your data store, you need to consider issues such as: which database product you will use, how your system will be sized, what hardware configuration is best for your environment, and other configuration options.

Choosing a Database

As an initial planning step, you must decide which database product to use for your farm's data store. You can use the following database software for the farm data store:

- **Microsoft SQL Server, Oracle, and IBM DB2.** These are all true client/server databases that offer robust and scalable support for multiple-server data access. They are suited for use in farms of any size.
- **Microsoft SQL Server 2005 Express Edition.** This type of database is most appropriate for small to medium-sized farms and can be administered using standard Microsoft SQL Server tools.
- **Microsoft Access.** Microsoft Access is the default database type. If you leave this at the default, Setup creates the data store on the first server in the farm using Microsoft Access. It is generally appropriate for very small farms or test farms.

You should consider many factors before deciding which database product to use for the data store, including but not limited to:

- The number of servers you currently plan to have in the farm and whether or not you plan to expand that number
- Whether or not you have a database administrator on staff with the expertise to configure and manage a data store running on SQL Server, Oracle, or DB2
- Whether or not you foresee the enterprise expanding; therefore, expanding the size and maintenance of the database
- Whether a server has the appropriate hardware configuration to also run an Access or SQL Server Express database or whether you require that the database be located on a server that is not also running XenApp

- Any database maintenance requirements you may have, such as backup, redundancy, and replication

See your database product's documentation for specific hardware requirements for the database server.

Connecting to the Data Store

Another factor in planning your data store is deciding if you want to the servers in the farm to communicate directly or indirectly (that is, through an intermediary server) with the data store. This choice is determined by the type of database you choose for the data store and the size of your environment:

- If you are in an large-farm environment, have a mission-critical farm, or are using Oracle, SQL Server, or DB2 as the database for your data store, Citrix recommends accessing the data store *directly*.
- If you are in small to medium-sized environment and you are using SQL Server Express or Microsoft Access as the database for your data store, each server in the farm, apart from the Create Farm server, must access the data store *indirectly*.

You specify whether you want servers to communicate directly or indirectly with the data store when you run Setup to install XenApp on the subsequent servers in your farm.

Direct access. To make a *direct access* to the data store, a server must have the appropriate ODBC drivers installed and configured correctly. The server then connects directly to the server on which the database is running. If you are in an large farm environment, Citrix recommends accessing the data store directly. However, during Setup joining the farm directly is only possible if your data store is on a robust database, such as Oracle or SQL.

Indirect access. For *indirect access,* a server connects to an intermediary server running Citrix XenApp that connects to the data store directly.

If you are using SQL Server 2005 Express and Microsoft Access as the database for your data store, during Setup select to join the farm indirectly. SQL Server Express and Microsoft Access can only access the data store indirectly.

Citrix does not recommend that you use indirect access for mission-critical farms because the intermediary server is a single point of failure.

By default, indirect access uses TCP port 2512 for communication between servers in the farm and the intermediary server that connects to the data store. If the servers are in different subnets divided by a firewall, be sure this port is open on the firewall.

Securing the Data Store Before Setup

One of the most important aspects of securing your server farm is protecting the data store. This involves not only protecting the data in the data store database but also restricting who can access it.

When the data store connection is a direct one, all farm servers share a single user account and password for accessing the data store. Select a password that is not easy to deduce. Keep the user name and password secure and provide it to administrators only for the purposes of installing XenApp.

More specific Citrix recommendations for securing the data store vary depending on the data store's database. For more information, see the security chapter in the *Citrix XenApp Administrator's Guide*.

System Sizing for the Data Store

The choice of which database to use for the data store depends on your implementation and environment.

Use the chart below as a guideline to determine which scenario most closely matches your environment.

	Small	**Medium**	**Large**	**Enterprise**
Servers	1-50	25-100	50-100	100 or more
Named Users	< 150	< 3000	< 5000	> 3000
Applications	< 100	< 100	< 500	< 2000

The following are general recommendations for the farm's data store database:

- Microsoft SQL, Oracle, and IBM DB2 are suitable for any size environment and are recommended for all large and enterprise environments.
- Microsoft Access and SQL Server Express are suitable for all small and many medium-sized environments located in one physical location (that is, do not have branch offices across a WAN).

When deploying large farms across a WAN, you can obtain considerable performance advantage by replicating the data store and distributing the load over multiple database servers. SQL Server, Oracle, and IBM DB2 are suitable for large farms and support replication.

Related topics:

"Replicating Data Store Database Considerations" on page 179

Suggested Data Store Hardware Configurations

This topic outlines suggested hardware configurations. Increasing the CPU power and speed of the database server can improve the response time of queries made to the data store in the following areas:

- Starting the Citrix IMA Service on multiple servers simultaneously
- Adding a server to the farm
- Removing a server from the farm

The response time of other events occurring in the farm—such as starting the IMA Service on a single server, recreating the local host cache, or replicating printer drivers to all servers in the farm—is affected more by the size of the farm than by the response time of the data store.

Adding processors to the server hosting the data store can dramatically improve response time when multiple simultaneous queries are executed. If your environment includes large numbers of servers coming online simultaneously and at frequent intervals, the additional processors can service requests faster.

The capabilities of the processor on the database server affect Access Management Console and Advanced Configuration tool performance, how long it takes to add (install) and remove a server from the farm, and how long it takes to start multiple servers simultaneously.

The actual performance of a farm's data store can vary depending upon the database engine and the level of performance tuning achieved.

In the chart below, five sample farm configurations are displayed and referred to as scenarios A through E. Each scenario provides measurements of various metrics in the farm.

Scenario	A	B	C	D	E
Number of servers in farm	50	100	250	500	1000
Number of applications published to all servers	50	50	50	50	50
Number of user policies	25	25	25	25	25
Printers per server	5	5	5	5	5
Printer drivers installed per server	25	25	25	25	25
Network print servers with printers	5	5	5	5	5
Number of Load Manager load evaluators	10	10	10	10	10
Number of application folders in Access Management Console	10	10	10	10	10
Number of server folders in Access Management Console	8	16	25	50	50
Number of Application Isolation Environments	10	10	10	10	10
Number of Citrix administrators	10	10	10	10	10
Size of data store database in megabytes	32	51	76	125	211

This chart provides, for each corresponding scenario described in the table above, suggested hardware configurations for the server hosting the data store.

Scenario	A	B	C	D	E
Dual Pentium 4/1.6GHz with 2GB RAM	X	X	X		
Dual Pentium 4/3.0GHz with 4GB RAM	X	X	X	X	
Quad Pentium 4/3.0GHz with 4GB RAM	X	X	X	X	X

Enhancing Farm and Data Store Performance

After you plan your data store, consider configuration options to enhance performance, such as whether or not to use RAID and replicated databases.

Replicating Data Store Database Considerations

A significant amount of network traffic for XenApp farms consists of reads from the data store; writes are infrequent. The amount of bandwidth required increases as farm size increases. Actions, such as data store reads and restarting multiple servers simultaneously, use disproportionately more bandwidth on larger farms.

Citrix recommends using a single data store for most deployments but in some situations, placing a replicated data store at remote sites can improve farm performance. Citrix recommends replicating the data store across all high-latency or low-bandwidth WAN links. A replicated data store ensures all data-store reads occur on the network local to the XenApp server, which improves farm performance. When servers perform more reads than writes to the data store, replicating databases increases performance.

In a WAN environment, place replicas of the data store at sites with a considerable number of servers. This practice minimizes reads across the WAN link. Database replication consumes bandwidth. Limit the use of replicated databases to situations where the remote site has enough servers to justify the bandwidth cost of placing a replicated copy of the database at the site. For SQL Server, you must use immediate updating transactional replication.

High Latency WAN Concerns. Crossing high latency links without the use of replicated databases can create situations where the data store is locked for extended periods of time when performing farm maintenance from remote sites. Data store reads do not adversely affect local connections but remote sites can experience slower performance. This means that the Citrix IMA Service may start after extended periods of time and some normal operations may fail when performed from the remote site.

Note: You might experience poor performance if you use a local Access Management Console to perform farm maintenance on a remote site that has high latency. Such a situation requires communication between the console and the data store to cross the high latency link. You can resolve this issue by publishing the Access Management Console and the Advanced Configuration tool as applications on a server at the remote site and use a Citrix XenApp Plugin to access the published management tools.

Preparing the Database Before XenApp Setup

After you choose the product to host the data store, create the database that will host your data store.

Caution: Do not directly edit data in the data store database with utilities or tools other than those provided by Citrix. For example, do not use IBM DB2, Microsoft SQL Server, or Oracle utilities to edit the data store. Doing so corrupts the data store database.

Microsoft SQL Server, IBM DB2, and Oracle Databases

When using Microsoft SQL Server, Oracle, or IBM DB2, typically, the database is on one or more servers dedicated to running the database product. If the database is not already up and running, set it up prior to creating the farm. During Setup you need to configure an ODBC connection to the database server. XenApp servers must also have the appropriate database client software installed on them.

Note: Do not install Citrix XenApp on the server for Microsoft SQL, Oracle, or IBM DB2 databases.

Microsoft SQL Server Express

When using SQL Server Express, first install it and then create an instance. Then run the Citrix XenApp Setup. The database is stored on the first server in the farm.

Note: If SQL Server Express is used, you must install it and reboot the system before installing Citrix XenApp.

Microsoft Access

When you select Microsoft Access, XenApp Setup configures the data store during Setup on the first server in your farm.

Creating the Data Store Database

Using a Microsoft Access or SQL Server Express database involves creating a database locally as you install XenApp on the first server in the farm. If you are using a SQL Server, Oracle, or IBM DB2 database for the data store, the creation of the data store is not part of the XenApp installation. Therefore, create the database before XenApp installation.

When creating your data store database, Citrix suggests these settings:

- SQL Server
    - The default settings and database sizes usually suffice for the XenApp data store.

- Oracle
    - Minimum tablespace size = 20MB
    - User role permissions should have a minimum of connect and resource
- IBM DB2
    - Prefetch Size = 32
    - Overhead = 8.3
    - Transfer = 0.18
    - Use the *grant all* option for the selected tablespace
    - User privileges should be *grant all* to the public group

For more information, see the documentation for the database you selected.

Important: Citrix does not support case-sensitive databases.

Creating a DSN File for XenApp Setup

If you do not install XenApp using wizard-based Setup and your data store is on an Oracle, SQL Server, SQL Server Express, or DB2 database, before running Setup, create a Data Source Name (DSN) file to configure the XenApp connection to the data store.

The DSN file must be on each server in the farm. You can create the file once and copy it to subsequent servers (or put it on a network share), provided you remove the value for any workstation-specific information, such as the Oracle WSID.

Use the CTX_MF_SILENT_DSNFILE Setup property to specify the file's location during Setup.

You can use DSN files during wizard-based Setup if you specify them when you configure the ODBC driver. ODBC driver configuration occurs after completing the **Create a Server Farm** or **Join a Server Farm** pages in Setup.

Related topics:

"CTX_MF_SILENT_DSNFILE" on page 168

"To create a SQL Server data source connection" on page 184

Maintaining and Recovering a XenApp Data Store

Most database maintenance requires running the DSMAINT and DSCHECK commands. For example, use DSMAINT to:

- Upgrade the XenApp data store
- Move the data in the data store to a different database server
- Migrate the data store from a Microsoft Access database to a Microsoft SQL Server database
- Change the name of the DSN file

With the exception of Microsoft Access, DSMAINT is run on farm servers and not the database server. Many DSMAINT parameters affect how XenApp connects to the data store, although some affect the data store itself.

Citrix strongly recommends creating a backup copy of the data store (**dsmaint backup**). Without a backup, you must manually recreate all of the farm's policies, settings, accounts, and other persistent data in the data store.

If the data store fails, each farm server can run off the data in its Local Host Cache indefinitely (provided it can contact the license server). However, you cannot make any modifications to the farm or use the Access Management Console or the XenApp Advanced Configuration tool.

To restore a backup database or migrate to a new server, follow the instructions in the *Citrix XenApp Administrator's Guide* for the **dsmaint migrate** command. Without a backup, prepare a new data store the way you did before running XenApp Setup and run CHFARM from any farm server. Using CHFARM is equivalent to running XenApp Setup to configure the data store. After running CHFARM, manually reenter the lost settings. If you use the same name as the previous data store, you do not need to reconfigure the farm servers.

DSMAINT and DSCHECK are documented in the *Citrix XenApp Administrator's Guide*. You can also display their syntax and usage from the command prompt by typing the command name and `/?`.

Database Specific Information

The following topics provide information specific to a type of databases (for example, Oracle or Microsoft SQL Server Express) and covers subjects such as migrating the data store to a specific database, using sockets to connect to a data store, and using distributed database servers.

The majority of information about database installation, maintenances, and recovery is contained in “Planning the XenApp Data Store” on page 173, “Preparing the Database Before XenApp Setup” on page 179, and “Maintaining and Recovering a XenApp Data Store” on page 182. The following database-specific documentation supplements this information:

- “Microsoft SQL Server Database” on page 183
- “Oracle Database” on page 186
- “IBM DB2 Database” on page 188
- “Microsoft SQL Server Express” on page 189
- “Microsoft Access Database” on page 191

Microsoft SQL Server Database

Microsoft SQL Server supports Windows and Microsoft SQL Server authentication. For high-security environments, Citrix recommends using Windows authentication only.

The user account you use for installing, upgrading, or applying hotfixes to the data store must have database owner (db_owner) rights to the database. When you finish installing the database with database owner rights, set the user permissions to read/write only. This increases the security of the database.

If you change the rights from database owner to read/write, change the rights back to database owner before installing service packs or feature releases. Installation of service packs or feature releases can fail if the user account you use to authenticate to the data store during Setup does not have database owner rights.

When using Microsoft SQL Server in a replicated environment, use the same user account for the data store on each Microsoft SQL Server.

Each farm requires a dedicated database. However, multiple databases can be running on a single server running Microsoft SQL Server. Do not configure the farm to use a database that is shared with any other client/server applications.

Back up the database regularly and follow Microsoft recommendations for configuring database and transaction logs for recovery. For example, setting the **Truncate log on Checkpoint** option in your database to control log space.

Using Sockets to Connect to a Microsoft SQL Server Database

Two common protocols used to connect to a database are TCP/IP sockets and named pipes. Named pipes is an authenticated communication protocol, so any time you attempt to open a connection to the SQL Server database using this protocol, the Windows authentication process occurs. TCP/IP sockets do not rely on Windows authentication to establish a connection, but do provide user/password authentication to the database after the connection is established. Windows authentication reduces the possibility of an error occurring when the server running SQL Server and the server running XenApp do not have the correct domain or Active Directory trust relationship. Therefore, Citrix recommends that you use TCP/IP sockets to connect servers running XenApp to a server hosting Microsoft SQL Server.

If you are running SQL Server 2005 and configure named pipes to establish a connection to the database, manually enable the named pipes option on the database server. To enable named pipes, use the Surface Area Configuration tool packaged with SQL Server 2005. For additional information about how to use named pipes to connect to a SQL Server 2005 database, see your SQL Server 2005 documentation.

To create a SQL Server data source connection

1. On the **Create a New Data Source to SQL Server** screen, enter the data source description and select the SQL Server to which to connect.
2. Select Windows NT authentication or SQL Server authentication.
3. Click **Client Configuration**.
4. Select **TCP/IP** from the available network libraries.
5. After installing XenApp, modify the Data Source Name (DSN) you created during installation and change its client configuration to use TCP/IP.

To modify a DSN, use the Windows ODBC Data Source Administrator utility to open the File DSN, which is located by default in the %ProgramFiles(x86)%\Citrix\Independent Management Architecture folder, and select TCP/IP as the connection protocol for the client configuration.

Using Failover with Microsoft SQL Server

For fault tolerance with Microsoft SQL Server, use Microsoft clustering, which provides failover and failback for clustered systems. Failover of the SQL Server database in a clustered environment is transparent to XenApp.

A Microsoft Cluster Services cluster group is a collection of resources such as disk drives, that are owned by one of the failover cluster nodes. You can transfer the ownership of the group from one node to another, but each group can be owned by only one node at a time.

The database files for an instance of Microsoft SQL Server are placed in a single cluster group owned by the node on which the instance is installed. If a node running an instance of Microsoft SQL Server fails, the cluster group containing the data files for that instance is switched to another node. Because the new node already has the executable files and registry information for that instance of Microsoft SQL Server on its local disk drive, it can start up an instance of Microsoft SQL Server and start accepting connection requests for that instance.

Note: Microsoft Cluster Services clustering does not support load balancing among clustered servers because it functions in active/passive mode only.

Using Distributed Databases with Microsoft SQL Server

XenApp supports distributed (replicated) databases. Replicated databases are useful when too many read requests to the data store create a processing bottleneck. Microsoft SQL Server uses replication to create the distributed database environment.

XenApp requires data coherency across multiple databases. Therefore, a two-phase commit algorithm is required for storing data in the database.

When configuring Microsoft SQL Server for a two-phase commit, use the Immediate Updating Subscriber model. See the Microsoft SQL Server documentation for additional information.

Caution: Do not use merged replication. Using merged replication corrupts the data store.

To set up a distributed environment for an existing farm

1. Configure a Publisher (the Microsoft SQL Server currently hosting the data store) and Subscribers (remote sites) using Microsoft SQL Server Enterprise Manager.
2. Execute the **dsmaint publishsqlds** command on a server in the farm. This executes the necessary SQL statements to create the published articles on the current Microsoft SQL Server (Publisher).
3. Configure the remote sites (Subscribers) to subscribe to the published articles created in Step 2.

Migrating a Farm Data Store to SQL Server

Migration of a farm data store to Microsoft SQL Server is supported for the database versions listed in the following table.

Original database	Supported target database
Microsoft Access Oracle 9.2.0.1 Oracle 10.2.0.1.0 IBM DB2 version 8.2	SQL Server 2000 with Service Pack 3a SQL Server 2005
SQL Server 2005 Express Edition SQL Server 2000 with Service Pack 3a	SQL Server 2005

Oracle Database

Oracle supports both Windows and Oracle authentication. See the Oracle documentation for information about configuring Windows authentication.

Oracle for Solaris supports Oracle authentication only; it does not support Windows authentication.

In the Oracle sqlnet.ora file, set SQLNET.AUTHENTICATION_SERVICES= (NONE). The default setting (NTS) will cause connection failures.

Install the Oracle client on the server and then reboot the server before you install XenApp.

The Oracle user account must be the same for every server in the farm because all servers running XenApp share a common schema.

If you are using one database to hold information for multiple farms, each farm represented in the database must have a different user account because the data store information is stored in the Oracle user account.

The account used to connect to the data store database has the following Oracle permissions:

- Connect
- Resource
- Unlimited Tablespace (optional)

Consider the following guidelines when configuring an Oracle server to host the farm data store.

- Use Shared/Multi-Threaded Server mode to reduce the number of processes in farms with more than 100 servers. However, performance may be affected during periods of high data store load.
- If you are using Multi-Threaded Server mode, verify that values in the Init.ora file are greater than or equal to the values shown here. If you are running multiple farms on the same Oracle database, include all servers running XenApp in the calculations. Round up fractional values.

  shared_servers = *Number of servers* / 10

max_shared_servers = *Number of servers* / 5

Where *Number of servers* is the total number of servers running XenApp.

- When using an Oracle server in dedicated mode, add one additional process for each server connected directly to the Oracle database. For example, if the Oracle server uses 100 processes before installing XenApp, and the farm has 50 servers, set the processes value to at least 150 in the Init.ora file on the Oracle server.
- Create online backups using Archivelog mode, which reduces the recovery time of an unresponsive database.
- If you are using the same Oracle database for multiple server farms, create a unique tablespace with its own user name and password for added security for each farm. Do not use the default system account within Oracle.

Migrating a Farm Data Store to Oracle

Migration of a farm data store from another database to an Oracle database is supported for the database versions listed in the following table.

Original database	Supported target database
Microsoft Access SQL Server 2005 Express Edition IBM DB2 version 8.2 SQL Server 2000 with Service Pack 3a SQL Server 2005	Oracle 9.2.0.1 Oracle 10.2.0.1.0 Oracle x.x.x

For more information about the **dsmaint** command line utility, see the *Citrix XenApp Administrator's Guide*.

Using Failover with Oracle

Maintain a standby database for quick disaster recovery. A standby database maintains a copy of the production database in a permanent state of recovery. See the Oracle documentation for setup instructions.

Using Distributed Databases with Oracle

XenApp supports distributed databases. Distributed databases are useful when too many read requests to the data store create a processing bottleneck. Oracle uses replication to create the distributed database environment.

To reduce the load on a single database server, install read/write replicas and distribute the farm servers evenly across the master and replicas.

XenApp requires data coherency across multiple databases. Therefore, a two-phase commit algorithm is required for writes to the database.

Using Oracle as a distributed database solution requires the following:

- All participating databases must be running Oracle.
- All participating databases must be running in Multi-Threaded Server/ Shared mode (rather than Dedicated mode).
- All Oracle clients (servers running XenApp that connect directly to the Oracle database) must be SQL*Net Version 2 or Net8.
- Install the farm data store database first on the master site, then configure replication at the sites used for database replication snapshots.
- Replicate all objects contained in the data store user schema (tables, indexes, and stored procedures).

If the performance at the replicated database site is significantly slower, verify that all the indexes for the user's schema are successfully replicated.

When configuring Oracle for a two-phase commit:

- Use synchronous snapshots that can be updated with a single master site. XenApp requires write access to snapshot.
- Use the Oracle Fast Refresh feature where possible (this requires snapshot logs).
- When setting up the replication environment, do not configure conflict resolution.
- Set the replication link interval to be as frequent as the network environment allows. With Oracle replication, if no changes are made, data is not sent over the link.
- When Oracle is configured in Multi-Threaded Server mode and remote data transfers are initiated from the remote site, they can block local data transfers (because all connections share a set of worker threads). To remedy this, increase the value of the Max_Mts_Servers parameter in the Init.ora file.

IBM DB2 Database

Install the IBM DB2 Run-Time Client on each server accessing the database server. If you have multiple farms, create a separate database/tablespace for each farm data store.

Restart the server after you install the IBM DB2 Run-Time client and before you install XenApp.

If you create a data source name (DSN) for use with an unattended installation of IBM DB2, create the DSN using the Microsoft ODBC Data Source Administration page. Doing so ensures that the DSN is populated according to server requirements for proper connectivity to the DB2 database or tablespace.

Give the DB2 user account that is used for the farm the following permissions:

- Connect database
- Create tables
- Register functions to execute to database manager's process
- Create schemas implicitly

System administrator (DB2Admin) account permissions are not needed for data store access.

Using Distributed Databases with IBM DB2

XenApp supports distributed databases. Distributed databases are useful when too many read requests to the data store create a processing bottleneck. IBM DB2 uses replication to create the distributed database environment.

XenApp uses the data type of binary large object (BLOB) to store information in an IBM DB2 database. IBM DB2 does not support the use of BLOB data types in a replication scenario that can be updated. Therefore, if your farm requires replicas that can be updated, use Microsoft SQL Server or Oracle for the farm data store instead of IBM DB2.

Migrating a Farm Data Store to IBM DB2

Migration of a farm data store from another database to an IBM DB2 database is supported for the database versions listed in the following table.

Original database	Target database
Microsoft Access SQL Server 2005 Express Edition Oracle 9.2.0.1 Oracle 10.2.0.1.0 SQL Server 2000 with Service Pack 3a SQL Server 2005	IBM DB2 Version 8.2 IBM DB2 Version x.x

The migration of an existing farm data store to IBM DB2 is completed as a single transaction for roll-back purposes. Before migrating the database to DB2, verify that enough log space exists on the target DB2 server to support the migration. If the DB2 server runs out of log space, the migration fails and rolls back.

For more information about the **dsmaint** command line utility, see the *Citrix XenApp Administrator's Guide*.

Microsoft SQL Server Express

Install SQL Server 2005 Express Edition Service Pack 2 on the server before you run XenApp Autorun.

Important: Do not use double-byte characters in the name of the server on which the database is installed.

Windows authentication is supported for the SQL Server Express database. For security reasons, Microsoft SQL Server authentication is not supported.

Installing Microsoft SQL Server Express

There are two methods for installing SQL Server Express. The method you use depends on whether or not you want to use the default instance name and administrator password.

- If you do not have an instance of SQL Server Express already installed on the database server and you want to use the default instance name (CITRIX_METAFRAME) and system administrator password (CITRIX), run the SetupSqlExpressForCPS.cmd batch file. The batch file is located on the XenApp installation media in the \Support\SqlExpress_2005_SP2 directory.
- If you cannot or do not want to use the default instance name and administrator password, launch SQL Server 2005 Express Edition Service Pack 2 Setup from a command line.

If you install SQL Server Express and specify an instance name other than the default "CITRIX_METAFRAME," you must install XenApp using a manual installation method so that you can set the XenApp Setup property CTX_MF_MSDE_INSTANCE_NAME to the new instance name.

Related topics:

"CTX_MF_MSDE_INSTANCE_NAME" on page 163

To install SQL Server Express with the default instance name

Run the SetupSqlExpressForCPS.cmd batch file, which is located on the XenApp installation media in the \Support\SqlExpress_2005_SP2 directory.

SetupSqlExpressForCPS.cmd creates the required files and directories for SQL Server Express support in the %ProgramFiles(x86)%\Microsoft SQL Server directory and the named instance directory MSSQL$CITRIX_METAFRAME.

To install SQL Server Express with a custom instance name

1. At a command prompt, change to the \Support\SqlExpress_2005_SP2 directory on the XenApp installation media. For example, if your media drive is E, type:

   E:

   cd \Support\SqlExpress_2005_SP2

2. Change to installation mode by typing:

   change user /INSTALL

3. Launch the SQL Server 2005 Express Edition Service Pack 2 installer, specifying the instance name and SA password.

   setup.exe INSTANCENAME=*name* **SAPWD=***password*

4. After you install SQL Server 2005 Express Edition Service Pack 2, choose **Use a local database on this server** and select **SQL Server Express Database** from the list of possible databases during XenApp Setup.

Backing Up and Restoring a SQL Server Express Database

Use **dsmaint backup** to back up a data store hosted on SQL Server Express. Specify a local path for the location of the database backup files. Use **dsmaint recover** to restore a back up copy of a SQL Server Express data store.

Note: If you are moving a SQL Server Express data store to a different server in the farm, perform **dsmaint failover** on all indirect servers to point them to the new database server.

Migrating a Farm Data Store from Access to SQL Server Express

To migrate a data store from Microsoft Access to SQL Server 2005 Express Edition Service Pack 2, run the **MigrateToSqlExpress** command line utility, which is located on the XenApp installation media in the \Support\SqlExpress_2005_SP2 directory.

For more information about the **migratetosqlexpress** command line utility, see the *Citrix XenApp Administrator's Guide*.

Microsoft Access Database

The Microsoft Access database engine and ODBC drivers are default components of Windows servers. The ODBC connection to Access uses the Microsoft Jet Engine. To use this database engine, you do not have to install any drivers or perform any database configuration before installing XenApp.

Changing the Password to an Access Database File

When you create a local Microsoft Access database for the data store, Setup creates a database file named Mf20.mdb. The default user name and password for this database file are both "citrix."

The Mf20.mdb file and all automatic backup files are located by default in the %ProgramFiles(x86)%\Citrix\Independent Management Architecture folder.

To change the password for the database file, use the **dsmaint** command (dsmaint config /pwd:newpassword). The Citrix IMA Service can be running when you use the command.

Important: Back up the Access database using the **dsmaint** command (dsmaint backup) before changing the password used to access the database.

For more information about the **dsmaint** command line utility, see the *Citrix XenApp Administrator's Guide*.

Backing Up and Restoring an Access Database

Use the **dsmaint** command to back up or recover a Microsoft Access data store. Back up the data store regularly with a batch file script and before activities such as changing the configuration.

Automatic backups occur each time the Citrix IMA Service is stopped or a server is restarted. During an automatic backup, the existing Mf20.mdb file is backed up, compacted, and copied as Mf20.bak. Each time the IMA Service starts, it deletes Mf20.bak if it exists and renames the Mf20.unk file to Mf20.bak. This process ensures that the Mf20.bak file is a valid farm database.

If the server runs out of disk space on the drive where the Mf20.mdb file is stored, automatic backups stop. Ensure that the amount of free disk space is at least three times the size of the Mf20.mdb file.

Caution: The dsmaint recover command removes the existing Mf20.mdb file from the server. Therefore, do not try to recover the data store with this command without first verifying that the Mf20.bak file exists. If the Mf20.bak file does not exist, run **dsmaint backup** prior to recovering the data store.

For more information about the **dsmaint** command line utility, see the *Citrix XenApp Administrator's Guide*.