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Citrix, Inc.
851 West Cypress Creek Road
Fort Lauderdale, FL 33309
United States of America

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About the XenClient Enterprise Solution

XenClient Enterprise is a distributed desktop virtualization solution that makes managing thousands of desktops and laptops as easy as managing one. The first product in the industry to combine centralized desktop management with distributed execution on a bare-metal (Type 1) client hypervisor, XenClient Enterprise offers IT professionals and desktop consumers a single, unified product that extends the benefits and convenience of local desktop virtualization with the efficiency and control of central, policy-driven management; the best of both worlds.

This document provides information about Citrix’s XenClient Enterprise solution. This solution uses two main components to provide end-to-end virtualization, **XenClient Enterprise Engine** and **XenClient Enterprise Synchronizer**:

- **XenClient Enterprise Engine** – runs on each computer and runs virtual machine (VM) images. It includes a bare-metal hypervisor, allowing the VMs to operate the computer’s hardware; the Engine does not require an OS loaded directly on the computer, however, it does require one or more valid OS license for any VMs loaded on it. For more detailed information, refer to the **XenClient Enterprise Engine Overview** later in this chapter.

- **XenClient Enterprise Synchronizer** – runs on a Windows (2008 R2, 2012, or 2012 R2) server, providing the administration to support each Engine. A single Synchronizer can administer hundreds of Engines and laptops or desktops. For more detailed information, refer to the **Synchronizer Overview** later in this chapter.

This document also provides information about DesktopPlayer for Mac, which extends the benefits of desktop virtualization to mobile MacBook users, enabling you to work on your Windows business apps in virtual machines (VMs) whether you are online, offline, or on an intermittent network connection. See **About DesktopPlayer** for more information.
About the Engine

An Engine is installed on individual computers, and provides a virtual platform to run each VM image. An image contains a Virtual Machine (VM) of an operating system plus any included applications. The Engine may have more than one image on a computer. The image definition includes its RAM and storage requirements. Memory management is performed by the Engine.

More than one VM can be running at once, and the user can switch between VM images, or between an image and the Engine using hot key combinations defined by the Engine.

The Engine also performs the security and management tasks on the computer:

- Checks that the user password is correct.
- Provides optional disk encryption services.
- Establishes network connections (wireless and/or wired, including built-in and USB-based 3G modems).
- Communicates securely (through SSL) with Synchronizer and checks for updated VMs, changes to Policies or Virtual Applications, and Engine updates.
- Downloads and prepares new versions of VMs and the Engine as a background task.
- Uploads (and tracks) backups to Synchronizer.

While the Engine does communicate securely with Synchronizer, that communication is not a requirement for operating. The Engine runs independently on an individual computer to run one or more loaded VM image. Citrix recommends pairing the Engine with the centralized management paradigm provided by Synchronizer to experience all the benefits afforded by the XenClient Enterprise Solution.

About Synchronizer

Synchronizer performs all the administrative tasks for the XenClient Enterprise solution.

It keeps a database of all objects:

- Users (which computer is assigned to each, which VMs, Policies, which Virtual Applications are assigned, and the backups for each VM )
- Groups (which users belong to which groups, and group assignments)
- VMs (which OS and version, which Groups and Users, policies, and virtual applications are assigned)
- Policies (backup frequency, USB and other device control, VM and computer access control, and more)
- Software (what is available in the software library, and which VM has it been assigned to)
- Computers (which users are supposed to use them)
- Events (detailed audit trail of actions for each object in Synchronizer).
Synchronizer builds the VMs, manages users and groups, handles integration with Active Directory, and assigns VMs to users. When contacted by an Engine, it sends down (updated VMs, virtual applications, or policies, and restored user data) or accepts (backups) appropriate files and holds them as needed.

Synchronizer can restore a user's data from backup onto the same or a new computer. It can be backed up and restored using conventional backup tools.

Using Synchronizer, the Administrator can request information about the computer running a VM (disk use, hardware available, and diagnostics).

**Theory of Operation between the Engine and Synchronizer**

The steps listed below illustrate the interaction between the Engine and Synchronizer:

1. User turns on computer, starting the Engine (or DesktopPlayer).
2. User logs in. The Engine checks credentials and (if accepted) opens the Launcher screen on computer.

   The Engine does not require a network connection for credential verification.

3. If connected to a network, either by wire or wireless, the Engine checks with Synchronizer for changes to application or policy assignments, or the presence of an updated VM. If it finds them, it begins any download as a background task.

   Once downloaded, the Engine will update the VM image, and then use the updated version next time that image is started.

4. User chooses which VM to run. If there is only one VM on the computer, the Engine can be configured to start automatically. The OS boots up as if it was natively installed; the user may also specify, which, if any VMs should start automatically.

5. The user uses the computer normally, switching between VMs if desired. The Engine tracks changes made during the user session.

6. If the VM is configured for automatic backup, a backup is created by the Engine based on the defined backup schedule. If the computer is currently on the network, it will be uploaded. Otherwise, the backup will be stored by the Engine until such time as a network connection is available; each VM on a computer is backed up individually.

7. When finished, the user shuts the VM down. Changes made during the user session to user data are preserved locally.
In general, laptop users typically do not shutdown the VM, rather, the platform is suspended; a computer can be suspended with one or more VMs running, they do not need to be stopped first.

8. The user can either suspend the computer or power it down. If the user tries to power down the computer without shutting down the VMs, the Engine first shuts down the VMs to prevent loss of data.

From a suspended state, the user can restart the computer by raising the cover of the laptop, without needing to wait for the Engine to restart. If battery power runs low, the Engine will shut down any open VMs and power down the computer.

**Engine Overview**

The Engine is comprised of a thin layer of abstraction software, known as a Type 1 Hypervisor, which is able to assign and share hardware resources (CPU, RAM, Hard drive, devices, etc.) between locally executing, guest operating systems; a guest operating system runs in a virtual machine. In a virtualized system, a single computer can run more than one guest OS at the same time.

The operating system (Windows, or Windows 7 for example) installed in a VM image is an example of a guest OS.

Linux VMs are primarily for experimental use. In limited configurations, these VMs may contain performance limitations; reliability may not be equivalent to Windows VMs. Download the latest Ubuntu release on the [Ubuntu website](https://ubuntu.com); follow the installation instructions for best results.

The Engine provides functionality similar to server-based Virtual Desktop Infrastructure (VDI) products, such as VMware ESX/vSphere, and Microsoft Hyper-V. However, unlike server-based products, Engine user sessions are executed locally, on the user’s computer (fixed or mobile device).

*The XenClient Enterprise solution is specifically tailored to the needs of an end-point, user-focused computing device (laptop monitor, countless USB devices, graphics performance, power management, and wireless connectivity).*

This abstraction capability allows the Engine to not only run one or more operating systems concurrently, but also control or isolate the interaction between the guests and the devices. As part of this system, Citrix has added a lightweight management layer that not only controls all activity on the computer but also communicates with Synchronizer (commonly referred to as the management server).

The Engine offers features that simplify IT Administration by including **Snap Back**, which instantly rolls the OS back to a known good configuration without removing applications, or drivers; this functionality can be disabled, which effectively retains locally installed applications and re-presents them to the user.

Functionality for Remote KVM is also included, where the Administrator can remotely control the PC regardless if Windows is present, or in a healthy state. Essentially, the Engine allows an IT Administrator to control the PC itself, not just the operating system that sits on top of it.
About the Engine Environment

An Engine is installed on individual computers, and provides a virtual platform to run each virtual machine image. A VM represents an operating system plus any included applications, drivers, and standard company configuration settings.

An Engine may have more than one virtual machine image on a computer. Managing memory use is performed by the Engine. More than one virtual machine can be running at once, and the user can switch between them, or between a virtual machine and the Engine in a single key press.

The Engine also performs the security and management tasks on the computer, including:

- Management of external devices. For example, controlling USB or storage device usage.
- Provisions for guest access and complete remote machine kill.
- Protection against rootkits and Trojans.
- Checking that the user password is correct, thereby controlling access to the computer.
- Disk encryption services.
- Establishing network connections, both wireless and wired.

WAN and WWAN/3G is also supported.

- Communicating securely (through SSL) with Synchronizer.
- Downloading and preparing new versions of an Engine as a background task.
- Uploading (and tracking) backups to Synchronizer.
- Maintaining a local backup.

While the Engine does communicate securely with Synchronizer, that communication is not a requirement for operating. The Engine runs independently on an individual computer to run one or more loaded virtual machines.

About the Citrix DesktopPlayer for Mac Solution

Citrix DesktopPlayer for Mac extends the benefits of desktop virtualization to mobile MacBook users, enabling you to work on your Windows business apps in virtual machines (VMs) whether you are online, offline, or on an intermittent network connection. DesktopPlayer end users gain freedom while IT Administrators gain control and centrally manage Windows VMs deployed to corporate and BYO MacBooks.

Refer to the DesktopPlayer online Help for installation information.

Sharing the same backend Synchronizer management infrastructure with XenClient Enterprise, DesktopPlayer is a distributed solution that makes managing Windows VMs on thousands of Mac laptops as easy as managing one.

DesktopPlayer for Mac combines centralized VM management with distributed execution of managed Windows VMs on a client endpoint. DesktopPlayer offers IT professionals and Mac end users with a
single, unified product that extends the benefits and convenience of local desktop virtualization with the efficiency and control of central, policy-driven management – providing the best of both worlds.

**About system memory usage**

System memory is shared between the host operating system (Mac OS X) and the guest operating system in the virtual machine (Windows). Operating a virtual machine on a Mac with 4 GB of memory limits memory allocation to the Windows OS (guest). When using DesktopPlayer, consider that Mac OS X requires approximately 2-2.5 GB of memory for normal operation; a Windows 7 32-bit guest virtual machine requires approximately 1.5 GB of memory to perform reasonably. Running a 64-bit Windows OS will require additional memory (8 GB RAM or higher) and is not feasible on a Mac with 4 GB RAM.

⚠️ Citrix recommends MacBooks with 8 GB RAM or higher, with a minimum of 4 GB RAM.

**DesktopPlayer Components**

The DesktopPlayer for Mac solution uses two key components to provide Windows VMs on Macs:

- DesktopPlayer for Mac, a virtualization-based client application that enables Windows VMs to run on top of the Mac host computer and communicates with a management server
- Synchronizer, a centralized management server that controls multiple DesktopPlayer machines

The image below illustrates these components:

**The Power of VDI Locally on Your MacBook**
**About DesktopPlayer**

DesktopPlayer is installed on individual Mac computers, and provides a virtualized platform to run each Windows VM image. An image contains a virtualized representation of an operating system plus any included applications. DesktopPlayer may have more than one virtual machine image running on top of a Mac computer, and is dependent on the available hardware resources (i.e., CPU, storage, memory) to support the multiple images.

The image definition includes its own specific RAM and storage requirements; memory management is performed by DesktopPlayer.

DesktopPlayer is comprised of a client endpoint, plus value-added functionalities wrapped around the endpoint, including:

- a single installer for quick and simple installation
- in-guest tools for the virtual machine OS
- the management engine that facilitates communication with Synchronizer for VM/Engine provisioning, updates and policy management

DesktopPlayer also performs the management tasks on the computer:

- Establishes network connections for the VM via the Mac platform (wireless and/or wired).
- Communicates securely (through SSL) with Synchronizer and checks for updates to VMs.
- Downloads and prepares updates and new versions of VMs.

**About Synchronizer**

Synchronizer builds the VMs, manages users and groups, and assigns them to computers/users. When contacted by DesktopPlayer, Synchronizer sends down updated VMs, installed applications, or policies.

Synchronizer version 5.0.4 is required to manage DesktopPlayer endpoints.

Using Synchronizer, an Administrator can request information about the computer running a VM (disk use, hardware available, and diagnostics). Synchronizer additionally provides:

- Single, unified management for multiple DesktopPlayer (Macs) and XenClient Enterprise (PCs)
- Single, unified Windows VM image that can be deployed on both Macs and PCs
- Common management policies and licensing across corporate endpoints
**System Requirements**

Prior to installing DesktopPlayer for Mac, check and ensure that your machine can support the system requirements, as outlined below. You can find information about your Mac by clicking the Apple icon and then selecting *About This Mac*:

![About This Mac](image)

If you’re running the latest version of Mac OS X, the screen resembles:

![About This Mac](image)
Platform and Hardware Requirements

DesktopPlayer supports the following Mac platforms:

- MacBook Pro (Intel-based Macs), with or without Retina display
- MacBook Air (Intel-based Macs)

Hardware requirements include:

- CPU: Intel Core i5 processor, or better. (Second, Third or Fourth generation)
- Physical memory: 8 GB RAM or higher recommended (4 GB minimum required)
- Storage: Drive with 128 GB or larger; ensure sufficient space to accommodate the size of the guest VM

The storage space requirement is highly dependent on the size of the guest VM and any associated applications installed. Review the general guidelines on the Support site for information about appropriate disk space when incorporating VMs.

Software requirements include:

- Host OS: Mac OS X 10.8, 10.9
- Guest OS: Windows 7 (for use as a VM in the Mac host)
  Windows XP and Windows 8 are not currently supported VM operating systems.

Hardware and software not currently on the support list will be evaluated for future support. Please contact your Citrix representative for support requests.

- Language: English
Activating the DesktopPlayer License

A DesktopPlayer license must be activated by an Administrator using Synchronizer. Administrators can use the information in this section to activate a license.

⚠️ Synchronizer version 5.0.4 is required to manage DesktopPlayer endpoints.

To activate a license:

1. Log into Synchronizer as an Administrator.
2. In the Synchronizer Actions panel, click **Import License**:

   ![Import License Screen](image)

   The installation process places a license file (for example, `DesktopPlayer_license.xml`) in the `Synchronizer\conf` directory.

3. In the **Import License** screen, browse to the location of the license file and enter the license filename:

   ![Import License Dialog](image)

   Consider the following when using a trial license:

   - Once Synchronizer imports a trial license, any and all DesktopPlayer users (up to the supported number of trial licenses, currently 10) can register to Synchronizer without having to perform a license-related action.
   - A trial license is valid for a 90 day evaluation period.
   - Do not import the license file until you are ready to register to Synchronizer.
Check for Engine Compatibility

The Engine runs on a wide variety of personal computers. Hardware requirements include:

- Intel or AMD dual-core processor with Intel-VT (VT-x) or AMD-V hardware virtualization technology.
- 2 GB RAM; Citrix strongly recommends 4 GB to facilitate running multiple virtual machines simultaneously.
- 60 GB free disk space; running multiple operating systems may require significantly more disk space.

If you install onto the whole disk, the Engine uses the full hard drive, replacing any natively installed operating systems and files. The whole disk is available for the Engine and any virtual machines.

Verify Compatibility

Citrix makes it easy to determine if your computer will work with an Engine. Access the XenClient specifications page on the Citrix Web site to verify if your existing Windows machine supports the virtualization required to run the Engine. Click here for the hardware compatibility list.

BIOS Settings

To support the Engine, the system must support virtualization. BIOS settings must also be configured to match the following criteria:

Virtualization: enabled (checked)
VT: enabled (checked)
Trusted Execution: off (unchecked)

For Lenovo computers:

Timer wake with battery: enabled

You need to restart the computer for changes to the BIOS to take effect. On some systems, it may be necessary to power-down the computer for a few minutes, then restart.

Installation Selections

When you install an Engine, there are two decisions the user makes that affect how it operates. This section will explain those choices and their effects. If you are not sure which option to select, check with your Administrator. These options include encrypted disk, and installations using a whole disk, or unallocated space.
Encrypted Disk

You can encrypt the hard drive. This will encrypt all data on the hard drive so that the computer cannot be accessed unless the registered owner’s password is entered. The user’s password needs to be entered before the Engine can start. Once the user logs in, the hard drive is accessible and the user experiences no difference due to the encryption.

This is a strong security measure – the encrypted disk cannot be accessed without the proper authentication. The only cost is a very slight (few percent) increase in CPU use.

Install Using Whole Disk or Unallocated Space

You can install the Engine onto the whole disk, or into unallocated space on a partitioned disk. When using these methods, consider the following:

- If you install onto the whole disk, the Engine uses the full hard drive, replacing any natively installed operating systems and files. The whole disk is available for the Engine and any virtual machines.

- If you install into unallocated space on a partitioned disk, you may need to use a disk partitioning tool to remove space from existing partitions. The Engine is then installed into that unallocated space. The unallocated space must include enough space for the Engine and any expected virtual machines. The Engine co-exists with an existing operating system, instead of replacing it; however, only one operating system can be operational at a time.

Registering an Engine

An Engine can be registered to Synchronizer, or used locally in a stand-alone fashion. Registration with a server enables centralized management of an Engine, which provides features for backing up data, updating and deploying multiple virtual machines, and management for users and groups from an Active Directory server.

The information in this section assumes that an Engine is installed. For more information on installing it, refer to the XenClient Enterprise Engine Installation Guide. The registration option is only available when first registering the Engine; once registered, use Synchronizer to clear the registration.

Registration Models

The Engine supports the following registration models:

- Register this computer and assign a user
- Register this computer on behalf of another user
- Register this computer without a user
Set a local username and password - If the Engine will not have access to a server, or, if registration is not desirable, one can take ownership by creating a local username and password to enable login and lock features.

Registering the Computer and Assigning a User

To take ownership of the Engine by registering the computer and assigning a user:

1. From the Launcher screen, click the Registration icon in the lower left portion of the UI:

2. In the Registration Wizard screen, select the **Register this computer and assign a user** radio button.

3. Click **Next**.

4. Enter the server name and specify a port; specify the username and associate a password.
5. Click **Register**.

The next time you log into the Engine, you will be prompted for the username and password combination.

---

**Registering the Computer on Behalf of Another User**

To register the Engine on behalf of another user:

1. From the Launcher screen, click the Registration icon in the lower left portion of the UI:

2. In the Registration Wizard screen, select the **Register this computer on behalf of another user** radio button.

3. Click **Next**.

4. Enter the server name and specify a port; specify the username. To authenticate server credentials, specify the account and password.
The credentials specified can also be used to login to the platform by entering the account name, followed by the | symbol and the user's username (for example, 'Account|Username). This will be permitted until the user logs in for the first time.

5. Click **Register**.

**Registering the Computer without a User**

To register the Engine without a user:

1. From the Launcher screen, click the Registration icon in the lower left portion of the UI:

   ![Registration Wizard](image)

2. In the Registration Wizard screen, select the **Register this computer without a user** radio button.
3. Click **Next**.
4. Enter the server name and specify a port; specify the username and associate a password. Enter server account credentials.
Setting a Local User Password

The Engine allows you to create a local user account. This process secures the computer by enabling the login and lock features. When the computer starts, users will be required to enter the username and password.

To register the Engine by setting a local user and password:

1. From the Launcher screen, click the Registration icon in the lower left portion of the UI:

2. In the Registration Wizard screen, select the **Set a local username and password** radio button.
3. Click **Next**.
4. Enter the username and a password; confirm the password.
5. Click **Create**.

**Logging in to an Engine**

After installing an Engine, you can login; login credentials include a username and password. The image below illustrates the login screen.

After logging in, you may see the Engine Dock screen depending on the policies set by the Synchronizer Administrator; if such a policy is intact, you will be presented with your virtual machine.
If the Engine Dock appears it provides access to existing virtual machines (VMs); it also includes access to Engine Control Panels that can be used to create new VMs, or manage existing ones. Using the Launcher, you can also access the Dock environment.

**Using the Engine Launcher**

The Engine Dock is the screen that appears after logging into the Engine. From this screen you can access controls that allow you to start, stop, or pause virtual machines.

This screen provides access to individual virtual machines and the Dock workspace, Citrix’s Linux OS Guest.

Use this screen to configure the Engine by accessing Control Panels. These controls are similar to those found in native Windows operating systems; you can use these controls to configure all aspects of the virtual machine environment, including networking, screen behavior and device management.

**Engine Dock**

The Dock is a lightweight Linux guest OS that comes with the Engine. It provides a secure client endpoint with VDI-like capabilities along with Web-based applications, such as Google Chrome browser, and access to Citrix Receiver, which allows you to gain immediate access to corporate applications over the network.
Selecting the Citrix Receiver icon from the Launcher screen displays a workspace that permits connections to corporate applications. At the top of the workspace, a dock provides access to a number of built-in applications, illustrated below:

You can access the dock from inside a virtual machine anytime, by moving the cursor to the top of the window. The Dock workspace requires a network connection.

**Engine Controls**

The Engine Control Panel contains applets which allow you to configure aspects of the virtual desktop. The settings made in the Control Panel carry over to the Windows environment, which effectively creates a level of abstraction that allows the Engine to run operating systems concurrently, while also controlling or isolating the interaction between the guests and the devices.

The table below illustrates controls available from the Launcher:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td></td>
</tr>
<tr>
<td>Restart</td>
<td>Restart the machine</td>
</tr>
<tr>
<td>Shutdown</td>
<td>Shutdown the machine</td>
</tr>
<tr>
<td>Sleep</td>
<td>Set the machine to sleep/suspend</td>
</tr>
<tr>
<td>Lock</td>
<td>Lock the machine</td>
</tr>
</tbody>
</table>

The Power button in the lower left portion of the Launcher screen includes the following options:

- Restart — Restart the machine.
- Shutdown — Shutdown the machine.
- Sleep — Set the machine to sleep/suspend.
- Lock — Lock the machine.

The Control Panel button in the lower left portion of the Launcher screen provides access to the following:

- Activity Center — Displays information about the server, the user,
and updates. Using this control panel, you can set up a polling interval for when the Engine contacts XenClient Enterprise Synchronizer. Policies configured in Synchronizer may prevent the Engine from setting the polling interval.

- Problem Reporting—Enables reporting of problems encountered during operation. Use this submission form to report issues directly to Citrix Technical Support.
- Device Manager—Displays devices connected to the Engine, and allows you to assign these devices to a specific domain.
- Hot Keys—Set hot key combinations for Engine functions.
- Memory—Provides a tool for managing memory allocation among virtual machines.
- Mouse and Touchpad—Use this Control Panel to configure behavior of the mouse and the trackpad.
- Power—Sets power-related functions for the computer.
- Startup Options—Allows you to set up options when each configured VM initializes. This control panel displays each configured VM, and for each one, allows you to set attributes that will automatically start it, or configure it to stay in front during startup.
- System Summary—Provides information about the Engine, the computer and the management server.
- Volume Control—Sets volume characteristics.
- Wired and Wireless—Configures networking for the Engine.
- Virtual Machines—Configure aspects of virtual machines.

Controls for displaying the current network configuration, the Activity Center, and power Control Panels:

- Network—Displays the Network Configuration Control Panel for wired and wireless networks. The Network icon displays the status of your network connection; moving the mouse over the icon displays a popup which provides information about the type of connection, the DNS and the IP address. The icon is color-coded: Green means that you are connected, yellow indicates you are attempting to connect and red indicates that you are disconnected. Clicking the network icon displays the Network Configuration control panel.
- Activity Center—Display the message center. The message center displays messages received from the management server about your Engine, computer, or VMs.
- Power—Displays the Power Configuration Control Panel. Use this icon to display the Power Configuration Control Panel; this control panel allows you to set the level of power used by some of the hardware systems on your computer. These settings affect power use across VMs.
Creating a Virtual Machine

Use the Virtual Machine Wizard to quickly create a VM (virtual machine). To launch the wizard, click Create a Virtual Machine in the Engine UI:

![Create a Virtual Machine](image)

The Virtual Machine Creation Wizard screen appears:

![Virtual Machine Creation Wizard](image)

In the Virtual Machine Creation Wizard screen:

1. Enter a name for the VM. Each virtual machine should have a unique name.
2. In the drop-down menu, select the OS (operating system).

A Windows 7 OS-based virtual machine requires a minimum 1024 MB of memory, and at least 20GB of disk space; more disk space should be allocated to prevent problems with user activities.
after installation, like the installation of additional applications.

3. In the drop-down menu, select the number of CPUs used by the VM. By default, the number of CPUs is set to 2.

![Virtual Machine Creation Wizard](image)

4. Using the slider, set the amount of memory, or manually enter the amount of memory in the text field. By default, the virtual machine uses 256 MB of memory. The slider’s initial position represents the minimum required memory for the specified VM; the high end of this slider represents the maximum amount of memory available. When configuring memory, consider:
   - The slide cannot be dragged to a value lower than the VMs minimum required value.
   - The current memory field cannot be set to a value lower than the minimum required value for that VM, or to a one higher than the computer’s maximum memory. The value you enter is changed to the minimum requirement for that VM, or maximum available in the computer.

5. Set the disk size for the VM. By default, this value is set to 20 GB.

After entering the information, click **Next**. The final step in the virtual machine creation process appears:
Click **Create** to establish a new virtual machine.

**Mounting PV Drivers**

Paravirtualized (PV) drivers are used to accelerate the audio, USB device handling, keyboard, mouse, and graphics for Windows-based virtual machines.

To install PV drivers once the Windows installation has completed:

1. In the Launcher screen, select the virtual machine icon to display configuration options.

   Placing the cursor on a virtual machine icon displays a list of control options.
2. Select the Tool icon to display the virtual machine control panel.

3. In the lower left portion of the control panel, select Mount Paravirtualized Drivers in the Related Tasks portion of the interface.

   The virtual machine must be running when mounting PV drivers.

4. Access the Windows virtual machine (click the VM icon, or use hot keys Ctrl+Up arrow).

5. In the Windows VM, click Computer from the Start menu where a new CD drive will appear, labeled XenClient Drivers.

   It may take a few seconds to display the XenClient Drivers label.

6. Double click the XenClient Drivers CD drive icon; select the PV drivers executable file (.exe file) to start the XenClient_PV_Drivers installation.

7. Follow the steps in the installation wizard to install the PV drivers.

8. Restart the virtual machine once the installation is complete; from the Launcher screen, select the start option (you may have to stop the VM prior to restarting it).

### Deleting a Locally Created Virtual Machine

You can delete a locally created virtual machine using the control panel. To access this control panel, select the Tool icon.

Click Delete to remove the virtual machine. In the confirmation dialog, type delete, then click OK.

### Synchronizer

Centralized management is performed through Synchronizer. This component is responsible for guest image and application deployment, policy, updates and simplified backups. Synchronizer also integrates with Microsoft Active Directory so images and policy can be assigned to users, OUs or computers directly.

Synchronizer approaches the deployment of these items in quite a unique manner. Instead of the traditional deployment of locally executed installation files (.exe, .msi, etc.), Synchronizer employs a unique approach. The Administrator is able to use a WYSIWIG (What You See is What You Get) approach by creating and manipulating the OS images centrally through integration with Microsoft Hyper-V that presents a running version of the OS image for the Administrator to manipulate.

The Administrator is able to add updates directly to the central image and only the delta differences are deployed to the clients where they are added with the base images to create the updated image. Essentially, the system is simply copying updates as an image instead of relying on imperfect installation logic trees which leads to unforeseen edge cases that can cause deployments or updates to fail. In order to fully understand how this works and how Citrix’s solution works with SSCM, we need to dive deeper into how Synchronizer prepares images for deployment and constructs the guest Windows OS image.
Synchronizer Hardware, Software and Browser Requirements

The host must be a stand-alone (physical) server or a virtualized machine.

<table>
<thead>
<tr>
<th>Processor</th>
<th>Memory</th>
<th>Hard-drive</th>
<th>Networking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Xeon Dual Core 2.0 GHz</td>
<td>6GB RAM</td>
<td>200 GB 10K RPM</td>
<td>Single Port 1Gbps Ethernet NIC</td>
</tr>
</tbody>
</table>

The Synchronizer server must have the following operating system and supporting software installed before installation:

- **Windows Server 2008 R2, Windows Server 2012, or Windows Server 2012 R2**

  Synchronizer cannot communicate with Hyper-V running on Windows Server 2012 if Synchronizer is installed on Server 2012 R2.

  If you are installing Synchronizer in a VM running Windows Server 2012, the Hyper-V host must also be running Windows Server 2012; a 2012 R2 VM with Synchronizer installed must use a 2012 R2 installation as a Hyper-V host to ensure communication.

- **Microsoft Hyper-V (6.0.6002.18005 or higher)**

  If Microsoft Hyper-V is not found, installation will halt and prompt you to install it. The required version is bundled with the operating system.

  If you are installing Synchronizer into a VM (referred to as a virtual appliance), and the VM is using Windows Server 2012, Synchronizer must be configured to use Hyper-V 2012. Similarly, if Synchronizer is installed as a virtual appliance on a 2012 R2 installation, Synchronizer must be configured to use Hyper-V 2012 R2. Otherwise, Hyper-V 2008 that comes with Windows Server 2008 R2 can be used.

Once installed, access Synchronizer through a Web browser; Internet Explorer 9/10 Firefox and Chrome are supported.

The VM Console (used for authoring) only works with Internet Explorer; if the VM Console is used, Microsoft .NET Framework 4.0 must be installed.

### Getting Started with Synchronizer

After installing Synchronizer, use the information in the following pages to perform common tasks, including:

- Testing Connectivity
- Creating a Local User
- Creating a virtual machine
- Publishing a virtual machine
Creating groups and users
Assigning a virtual machine
Restoring a virtual machine from backup
Retrieving a file from a virtual machine
Creating a wireless network policy
  o Assigning a wireless policy

When a user logs into the Engine, Synchronizer downloads the virtual machine to the computer. The user selects the virtual machine and it starts up.

Testing Connectivity
Before beginning with the procedures described in this section, you must first verify connectivity with Synchronizer and the Engine (the virtual platform used to run VMs).

Verify Synchronizer Access
To verify connectivity to Synchronizer:

1. Open a Web browser.
2. Browse to Synchronizer: https://servername:8443/MgmtConsole

If you cannot establish connectivity, consult your IT Administrator.

Verify Engine Access
To verify connectivity to the Engine:

1. Open the Engine Control Panel.
2. Locate the Wired and Wireless networking Control Panel.
3. In the Related Tasks section of the Control Panel (located in the left panel of the interface), select Test.
4. In the **Test Your Network Connection** screen, enter the IP address of the management server.
5. Click **OK** to test the connection.

   If you cannot establish connectivity, consult your IT Administrator.

### Create a Local User

To begin you must first create a test user using Synchronizer:

1. Open a Web browser.
2. Browse to Synchronizer: [https://servername:8443/MgmtConsole](https://servername:8443/MgmtConsole). The logon page appears:
3. In the login screen, enter Synchronizer login credentials.

After logging into, you must create a local user:

1. In Synchronizer, select **Users** in the navigation panel:

2. Click **Create Local User** in the Actions Panel; the Create a New user screen appears:
3. Enter the user information.
4. Click **Finish**; the user appears in the Users section of the tree.

**After creating a new user, use Synchronizer to import an ISO file, create a VM and assign it to a user.**

### Adding Items to the Synchronizer Software Library

Synchronizer includes a software library that can contain the following types of items:

- ISO images - installation files used to install operating systems and other software on a virtual machine
- Virtual Machines (VMs) - containing VHD (virtual hard drive) files containing pre-installed operating systems used to create a virtual machine
- Virtualized Applications - applications prepared to run in a virtual environment
- Engine Updates - updates for the Engine

Synchronizer does not include the tools required to create ISO files or Virtualized Applications. Your organization should select the tools you prefer, and create the files to import into the Software Library as described below.

To add an item to the Software Library:

1. Copy the item into:
   - the import folder of Synchronizer (C: \Program Files\Citrix\Synchronizer\File Import), or
   - the computer whose browser is connected to the server running Synchronizer

   If the file is larger than 1.4 GB, copy it to the Synchronizer import folder to avoid Browser timeout issues.
2. Log into Synchronizer using a Web browser, and click **Software Library** in the navigation panel.
3. Click the **Import** action.

   From the drop-down menu, select the type of file you want to import.
4. Enter a Name and description to identify the item.
5. Select the type of Software you will import.

6. Specify where you put the file in step 1:
   - Location – select from the dropdown list:
     o Import from local system (where your browser is running), or
     o Import from the server (the File Import folder under the Synchronizer)
   - Specify the file:
     o From the local file system: browse to the file location and highlight the file
     o From the server: select from the drop-down list of files in the import folder

7. Click Finish.

The Software is copied to the Library, and appears in the list of items of that type. Once the file is in the library, it can be imported to create or use with a VM.

**Import ISO File Virtual Machine Creation**

You can attach an ISO file to a virtual machine. An ISO file is a single-file image of a CD/DVD installation or data disk. Attaching an ISO file to a virtual machine creates a virtual CD/DVD drive within the virtual machine. Once the Attach ISO action has taken place, proceed with accessing the virtual CD/DVD drive as you would normally.

The VM does not have to be running when you attach an ISO file. However, if the ISO includes an autorun file, the VM needs to be running with a user logged on to automatically start the autorun file.

**Quick Installation of Hyper-V Integration Services**

To provide a (virtual) mouse for virtual machines running in the Console, install Hyper-V Integration Services (HIS) on the virtual machine. To simplify this task, Synchronizer offers the ISO for Hyper-V Integration Services.

This functionality is specific to Windows XP and Vista VMs only.

An attached ISO is listed on the virtual machine’s Summary tab. You can only attach one ISO file to a virtual machine at a time.

Installing software from an ISO file is the same as any installation of software to a VM base image. See Adding Applications to a Virtual Machine for more information.

To attach the Hyper-V Integration Services ISO to a virtual machine:

1. Click Virtual Machines in the navigation panel, and select the virtual machine you want to attach an ISO file to.
2. In the Actions Panel, click the Attach ISO action.

The Attach ISO Wizard screen appears:
3. Select the ISO to attach:
   a. Click the Hyper-V Integration Services radio button, or
   b. Click Software Library ISO, then select the ISO from the drop-down list.

The drop-down list displays all ISOs in the Software Library except Hyper-V Integration Services.

4. Click Finish.

Creating a Virtual Machine

A virtual machine (VM) is a container that runs on a computer by the Engine. In addition to the operating system and any installed applications, the VM may include virtualized applications and policies that control aspects of its operation, like backup, access, and USB use. When you create a VM, you are selecting and preparing the components for use.

A virtual machine must include an operating system (OS). The operating system can be installed from an OS ISO file or from a VM image:

- **OS ISO File**: An OS ISO file is a disk image of an operating system installation kit. When run or opened, it installs the operating system just as if installing from a CD.
- **Virtual Machine Image**: A virtual copy of an installed operating system. A Virtual Machine image is created from an installed operating system, including a (group) license. Also called a Virtual Hard Disk (VHD).

The steps below include creating a virtual machine, but do not include the steps required to assign a VM to users or groups, or to make a VM available to users.

Once you begin to create a virtual machine, you can add, modify, or remove its components as needed without affecting users until the VM is published.
Before you begin...

Consider the following before creating a virtual machine using the Synchronizer:

- Import the virtual machine components into the Software Library. The components must include either an OS ISO or a VM image.
- Define the operating policies. Policies are good practice, but are optional. Policies can be assigned to a virtual machine at a later point.

To create a virtual machine:

1. Click the **Virtual Machines** navigation bar in the navigation panel; click **Create** in the Virtual Machines Actions panel.

2. Identify the new virtual machine, and select the operating system and its source (ISO or VM image)
3. Specify the usage mode.

4. For all virtual machines, enter the RAM and storage requirements to be used by the image. This screen is automatically populated with default values.
5. Select existing policies to assign to the virtual machine. Policies can also be assigned to a virtual machine later.

6. If you want to run this virtual machine immediately after creation, fill the check box and click **Finish**.
The virtual machine is created. It appears in the Navigation tree in the list of virtual machines. The Image can be started, which opens the Console and starts the operating system.

For a VM built around an ISO, the operating system installation starts. If the automatic installation option was not selected (see step 5), you must perform the installation manually.

Use the **Attach ISO** action to add Hyper-V Integration Services (HIS) to the VM. HIS provides services when running the VM in the Console window.

When you are finished with the virtual machine, either installing the operating system or adding applications, shut it down from within the operating system (system Shut down). The virtual machine can be published and then assigned to users.

**Publishing a Virtual Machine**

Publishing a virtual machine makes it available to users that have been assigned that VM. Publishing makes a VM – a virtual ready-to-run desktop. You can publish a new VM or republish an updated existing VM.

When you first publish a new VM, it has no assigned users, and it must be created and published before you can assign users to it.

When you update an existing VM, publish it to make the new version available to assigned users. When the user’s computer next contacts Synchronizer, it downloads the updated VM. When that VM is next started, the updated version is used.
To publish a VM:

1. Click **Virtual Machines** in the navigation panel and select the VM to publish.

2. In the Actions panel, click **Version/Publish**.

The Create New Virtual Machine Version window appears.

3. Enter a reason for this version of the virtual machine; the reason is displayed in the list of versions for the VM. Select a reason to remind or explain why the version was made.
4. Select the type of publish or version:

- **non-deployable** - use this to save an interim check point while working. The VM can be returned to this point if later changes are not satisfactory.
- **deployable** (but not deployed) - this is a version that is ready for use, but is not automatically distributed to assigned users. Use this to test a version before releasing it to users. It can be later deployed using the Deploy action on the version of the VM.
- **staged** - this is a version that is deployed to selected users. Use this to release a version to selected users.
- **deployed** - this is the version to be distributed to assigned users (assigned the green bar)

5. If this VM has a staged version, Synchronizer asks what to do with the users currently using the staged version:
   - Fill the first checkbox to move staged users and groups to the current published version.

6. A diagnostics package is created in the event of a failure during publish. To create a diagnostics package in any event, fill the checkbox.

7. Click **Finish**.

   The newly created or modified VM is published. It is downloaded to assigned users when they next contact Synchronizer.

---

### Creating groups and users

Individual users can be organized into Groups to ease the handling of large numbers of users. If a VM, policy or virtualized application is assigned to the group, it is assigned to each member of the group as if it had been assigned to each user in that group individually.

If your organization uses an Active Directory (AD) for user identification, the AD organization can be imported into the Synchronizer and used to recognize your existing users in their organizational units.

When a user logs into an Engine, the Synchronizer downloads the virtual machine to the machine. The user can select the virtual machine and it starts up.

Users are identified by color coded icons displayed in the navigation panel:

- Local users and groups have an orange icon
- Active directory users and groups have a blue icon

To create users and groups:

1. Click **Users** in the navigation panel.
2. Click the **Create Local User** action.
3. In the Create a New User screen, enter the required information: the account and user name, and the password (including confirmation).

4. To assign the user to Group, click on the Groups tab for that user and select one or more groups to assign to the user.
Create a local group (an organizational grouping available on the server). A group will allow users to be managed more efficiently than as individuals. A VM assigned to a group is assigned to all members of that group, rather than needing to be assigned to each member one at a time.

5. To create a local group, click Users in the navigation panel.
6. Click the Create Local Group action.

![User and Group Actions](image)

7. In the Create a New Group screen, enter the name and description of the group, click Finish.

![Create a New User Group](image)

8. Click Save in the upper right portion of the workspace to apply the changes.

**Assigning a Virtual Machine**

Once a virtual machine has been published in a deployable version, it is ready to be assigned to one or more users. Once assigned, when the user’s Engine contacts Synchronizer, it downloads any updates to the user’s assigned virtual machines.

If a virtual machine is assigned to a group, it is assigned to all users in that group.
To assign a VM to users:

1. Click **All Virtual Machines** in the navigation panel.

2. Find the virtual machine to assign. To deploy a specific version of the virtual machine, expand the VM to show a list of versions.

3. Fill the checkbox of each Group or User you want to assign the virtual machine. Users or groups already assigned to that VM already have a checkbox.

4. Fill the checkbox of each Group or User you want to assign the virtual machine. Users or groups already assigned to that VM already have a checkbox.

5. After you make your changes, click **Save**.

The current published and deployable version of that virtual machine is sent to the selected users or all members of a selected group.

**Restoring a Virtual Machine from Backup**

The user data from a virtual machine can be restored from the latest backup on Synchronizer. Restoration restores the whole user disk and replaces the virtual machine. A user disk can be restored either onto the same computer or onto a different computer.

- If a user’s computer is lost or stops working properly, restore the user to a new computer.
- If all or some of a user’s data becomes corrupt or accidentally lost, restore their virtual machine on the same computer.

Both versions of the restore process are described below.

**Notes:**

- A virtual machine backup contains data from the user disk (U:) only.
- The default restore point is the latest backup, but can be set to a previous backup.
• Unregister a user from a computer before attempting to restore that user on a different computer.
• Virtual machine restoration cannot restore a specific folder or file.

A user’s data is restored when the user logs in to an Engine that does not have that assigned virtual machine (including the user’s data) loaded. The virtual machine and the user’s data is then downloaded from Synchronizer.

To restore a user virtual machine from backup:

1. Ensure that the data to be restored is available as backup.

2. Ensure that the data to be restored is available as backup.

   Open the Users> Users navigation bar in the navigation panel and select the user.

3. Select the virtual machine and click the Backups tab.

4. If the latest backup (top one on the list) will be restored, continue with the next step.

   If a backup from a previous date is needed, set the restore point to the correct backup:

   a. Fill the Restore point checkbox of the backup to use; any earlier backup dates are also filled in.
   b. Click Save.

   The selected backup will be restored. If there are later backups existing, backup processing will be suspended for this virtual machine.

5. Shutdown the virtual machine.

   | If restoring to a different computer | If restoring to the same computer |

6. Unregister the computer from the user.  
   Unassign the VM from the user.

   The user's relationship with that computer is severed.  
   The virtual machine is removed when the computer next contacts Synchronizer.

7. The user logs into the new computer.  
   Assign the virtual machine to the user.

   The Synchronizer downloads the user's assigned virtual machines, including the restored data, which is prepared for use.  
   The virtual machine, including the user's restored data is downloaded and prepared for use when the Engine next contacts the Synchronizer.

If the user wants to continue using this virtual machine from this restore point going forward, use the Commit Restore Point action to set this as the starting point for continued processing.
If the user wants to keep the later backups, have them copy the recovered files or folders off of the virtual machine temporarily, and perform the process again, this time clearing any restore point check boxes to restore the latest backup.

**Retrieving a File from a Virtual Machine**

This topic describes how to retrieve a file from a stored backup. Restoration is holistic - the full user disk is restored, the base disk is merged with the differencing disks (in order) by age up to the selected restore point. To restore a file, the virtual machine is reset to the state it was in when the file existed. The user then copies the file from the VM. The virtual machine is returned to its current state, and then the file is copied back to the up-to-date version.

The user contacts the Administrator, requesting that the virtual machine be set to an earlier restore point. The user needs to provide the VM name, and the date to use as a restore point.

To retrieve a file to a virtual machine:

1. Select the Users navigation panel; select the virtual machine under the user, and click the **Backups** tab in the main panel.
2. Click the restore point checkbox that corresponds to the appropriate backup image.
3. Click **Save**.

The next time the user's computer contacts Synchronizer:

- Backup processing is suspended
- Updates are suspended
• The virtual machine user disk (and other files included in the backup, and the system disk for custom VMs) is set back to its state as of the restore point. Changes dated after that restore point are ignored.

4 The user sees that a restore point has been set on the virtual machine, and restarts its.
   The VM's user disk (and system disk on a custom VM) is restored to its state as of the restore point.

5 The User finds the file(s) from the earlier restore point that they want to keep, and copies these files to another location off of the virtual machine user disk (a network share or other media, or even the local disk (L: drive).
   The User shuts down the VM.

6 The Administrator selects the user's VM again (see step 2) then selects any filled checkbox, clearing all the checkboxes.
7 The Administrator clicks Save, clearing the restore point.
   The next time the user’s computer contacts Synchronizer,
   • Backup processing is re-enabled
   • Updates are re-enabled
   • The virtual machine is set to its state as of the last backup. The differencing disks (backups) between the previous restore point and the current restore point as re-applied.

The virtual machine is returned to its current state when the VM is restarted after the restoration is received. The file can then be copied back to the VM user disk.

Creating a Wireless Network Policy

Using Synchronizer, you can create a centrally managed wireless network policy and assign it to individual users, or groups of users.

This section provides a limited amount of information related to Synchronizer policies. Refer to the online Help for more comprehensive guidelines for implementing policies within XenClient Enterprise.

To use Synchronizer to create a wireless network policy:

1. Select the Policies navigation panel; expand the Engine node and select the Default policy. The interface changes to display the Engine Policy default configuration panel.
2. Select the Network tab in the Settings panel.
3. Click the Add button. The Wireless Network screen appears:
4. Enter the following information:
   - SSID – Enter the SSID (service set identifier) used to identify the wireless network.
   - Security Type – Use the drop-down menu to specify the security type. Options include:
     - WEP
     - WPA
     - WPA2
     - WPA Enterprise
     - WPA2 Enterprise

5. Click OK.

Once the wireless policy is created, you can assign the policy to individual users or groups.

Assigning a Wireless Policy

To assign a policy to an individual user or a group:

1. Select the Users navigation panel.
2. Expand the tree to locate the user or the group you want to apply the wireless policy.
3. After selecting the user or the group, select the Policies tab.
4. In the Policies panel, select the policy you want to implement from the Policy Group drop-down menu.
5. After applying the policy, click Save in the upper right portion of the workspace.
**About DesktopPlayer Policies**

Use Synchronizer to apply policies to DesktopPlayer VMs (virtual machines). Policies control various aspects of how a VM performs. Policies are defined in the XenClient Enterprise Synchronizer management application, and then assigned to VMs. An individual VM can only be assigned one of each policy type at a time. If you modify a policy that is in use, the updated policy goes into effect immediately. The individual computers with a VM that uses that policy receive the update and change their behavior to conform with the policy the next time they contact Synchronizer.

Synchronizer version 5.0.4 is required to manage DesktopPlayer endpoints.

For some configuration options in the tabbed display, Synchronizer provides the added flexibility of allowing you to control how access to a policy is determined. Use a drop down menu to select from the following options:

- **Yes, and lock** — this value stipulates that the policy will be changed, and a lock applied so only the Administrator can change it
- **No, use Engine default** — this value indicates that Synchronizer will not alter the policy set by the default DesktopPlayer policy configuration
- **Yes, and allow change** — specifies that the Administrator can change this policy, but that the user can also change the specified policy at the DesktopPlayer level.

**Server update interval policy**

Use the Activity Center tab to set the server update interval; this interval allows you to control the frequency (time) between updates between DesktopPlayer and Synchronizer. The image below illustrates policies associated with Activity Center:

To change the server update interval:

1. In the Server Update Interval field, specify the amount of time between updates to the management server. Enter a numerical value in the text field; use the drop-down menu to specify minutes, hours or days. By default, this value is set to 1 hour.
2. Click Save in the upper right portion of the main panel to apply the change.
Upload/download bandwidth policy

Use the Network tab to set bandwidth policies for DesktopPlayer; these policies allow you to set upload and download speeds (in kbps) for DesktopPlayer VMs. The image below illustrates policies associated with networking bandwidth:

To configure network related policies on the Engine:

1. Set the Upload Bandwidth value. This text field represents the maximum upload speed (in kbps) for the client. By default, this field is empty, effectively setting the upload bandwidth to unlimited.

2. Set the Download Bandwidth value. This text field represents the maximum download speed (in kbps) for the client. By default, this field is empty, effectively setting the download bandwidth to unlimited.

3. Click Save in the upper right portion of the main panel to apply the changes.

Synchronizer Roaming

Synchronizer Roaming enables XenClient devices to communicate with any Synchronizer for central management, enabling greater scalability, seamless deployments and faster updates for users. This functionality allows you to create a list of universally resolvable hostnames used to identify Synchronizer servers. This list comprises universally known DNS names or IP addresses that resolve to the Synchronizer server residing on the LAN, or even local subnet.

Note: Network administration support is required when modifying the server roaming aspects of Synchronizer; DNS information must be modified to accommodate this feature.

General Use Case

Use the information in this section to understand the DNS-related functionality associated with Synchronizer Roaming. In this general use case, there are two servers at two different sites:

- one central server (sync.massachusetts.example.com), and
- one remote server (sync.california.example.com)
On each site’s DNS server, add an alias; for example, sync.example.com. This alias must point to the local server. This means that sync.example.com points to:

- sync.massachusetts.example.com at the massachusetts.example.com site
- and points to sync.california.example.com at the california.example.com site

In the Synchronizer management console, enable roaming and add the alias sync.example.com in the Roaming tab of the user interface:

1. In the navigation panel, expand the Servers tree. The workspace changes to display configuration options for the selected server.
2. Select the Roaming tab in the workspace.
3. In the Roaming screen, select the check box to enable Synchronizer roaming.
4. To add to the list of universally resolvable hostnames used to identify Synchronizer servers, click the + icon. For example, add sync.example.com.

What happens next?
XenClient Enterprise Engines first attempt to connect to sync.example.com which will resolve to the local server; updates and downloads will be received from the local server in question.

Backups are now uploaded to whichever server the Engine is registered to. Users can register to either of the local servers (sync.massachusetts.example.com or sync.california.example.com) in which case backups will be stored on that explicit server. Alternatively, users can register to the alias (sync.example.com), in which case backups will be routed to the server corresponding to the resolution of the first DNS lookup for that alias.

Configuring DNS Round Robin

To configure DNS round robin, you must create DNS host records for all servers (central and remote).
On the Windows Server:

1. Click **Start -> All Programs -> Administrative Tools -> DNS.**
2. In **DNS manager**, select the DNS server that manages records.
3. Expand **Forward Lookup Zones** and right click the DNS domain to which you are adding records.
   In the context menu, select **New Host**.
4. In the **Name** textbox, enter the name of the host record.

**Note:** The domain name is added automatically.

5. In the **IP Address** textbox, enter the IP address of the individual server and select **Create associated pointer (PTR) record** or **Allow any authenticated user to update DNS records with the same owner name.**
6. Continue creating these records for all servers that will be load balanced by DNS round robin.

After creating additional records, enable DNS round robin:

7. Click **Start -> All Programs -> Administrative Tools -> DNS.**
8. In **DNS manager**, expand **DNS** and right-click the server you want to configure, then click **Properties** from the context menu.
9. In the **Advanced** tab, select **Enable round robin** and **Enable netmask ordering.**
10. Click **Ok.**

After setting up DNS round robin, refer to steps outlined in the General Use section to set up Synchronizer roaming.

**Note:** DNS round robin does not provide resiliency; the Citrix NetScaler load balancing option may be a better option if resiliency is a necessity in your environment.