

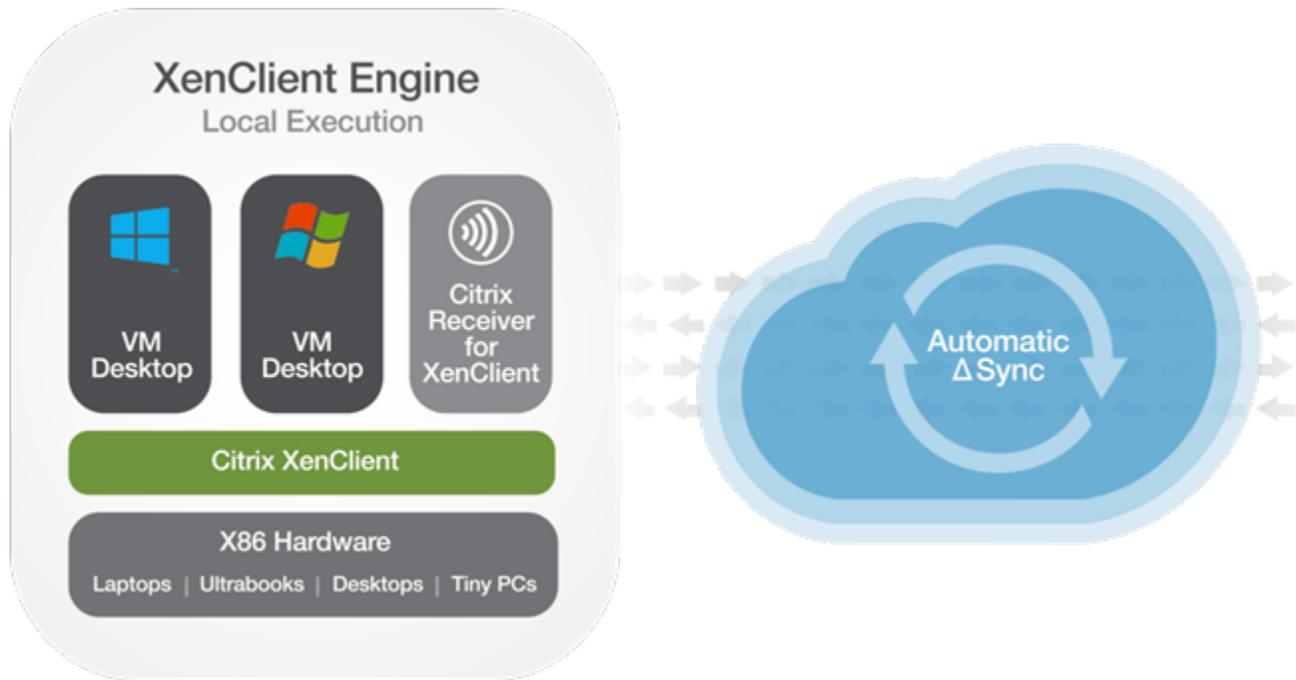


# About the XenClient Enterprise Solution



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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 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; the best of both worlds.



The XenClient Enterprise solution uses two main components to provide end-to-end virtualization: XenClient Engine and XenClient Synchronizer.

## XenClient Engine

The Engine runs on each computer and executes 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 operating system (OS) loaded directly on the computer, however, it does require one or more valid OS license(s) for any VMs loaded on it.

## XenClient Synchronizer

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Synchronizer (often referred to as the management server) runs on a Windows server. It provides the administration to support each Engine. A single Synchronizer can administer hundreds of Engines and laptops or desktops.

## About XenClient 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

**Note:** 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.

## XenClient Enterprise Theory of Operation

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

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

**Note:** 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.

**Note:** 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 session to user data are prepared locally.

**Note:** 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.

**Note:** 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.

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# XenClient 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 (VM). In a virtualized system, a single computer can run more than one guest OS at the same time.

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

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 (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 XenClient Engine Environment

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

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

**Note:** 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.

**Note:** 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 VMs.

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# Checking for 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 (VM) 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 VMs.

## Verify Compatibility

Citrix makes it easy to determine if your computer will work with any 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:

BIOS Setting	State
Virtualization	enabled (checked)
VT	enabled (checked)
Trusted Execution	off (unchecked)
For Lenovo computers: Timer wake with battery	enabled

**Note:** You may 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.

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# XenClient Installation Options

When you install an Engine, there are two decisions the user makes that affect how it operates. 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 operational 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 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. Then 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 functioning at a time.

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# Registering a XenClient 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.

## 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, of, 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:

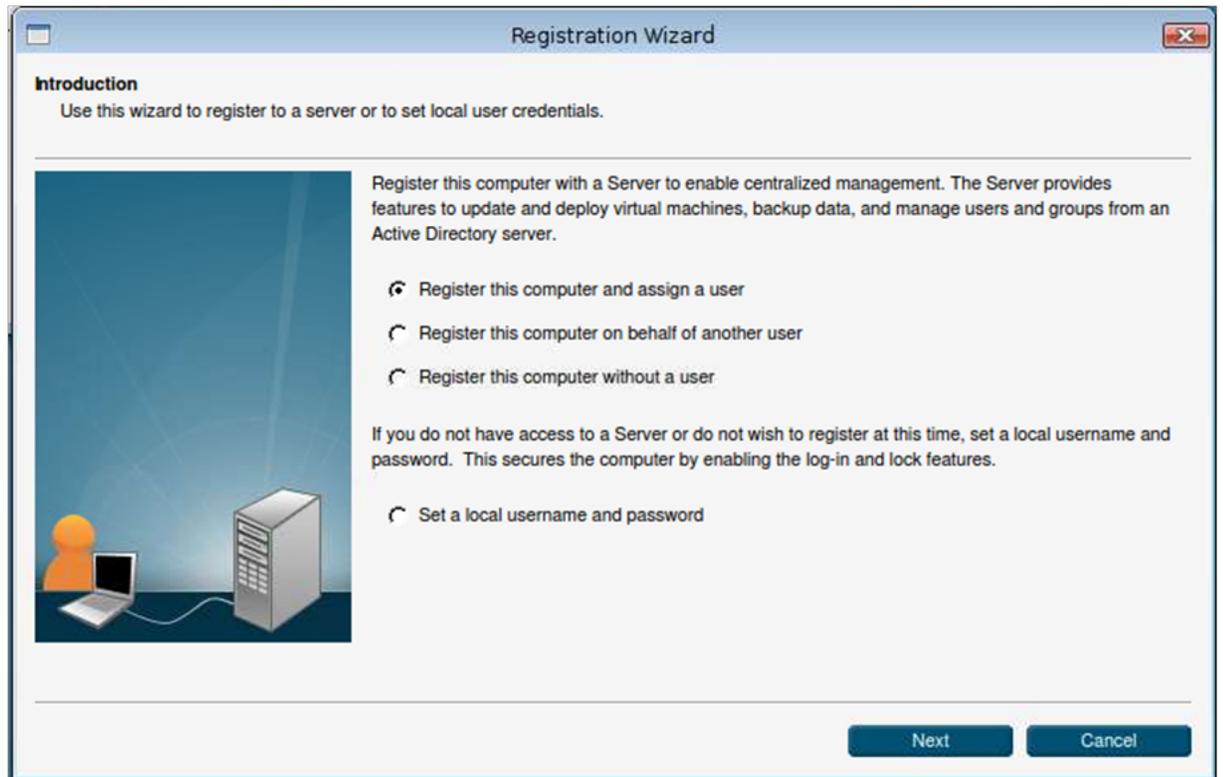
1. From the Launcher screen, click the Registration icon in the lower left portion of the interface:



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

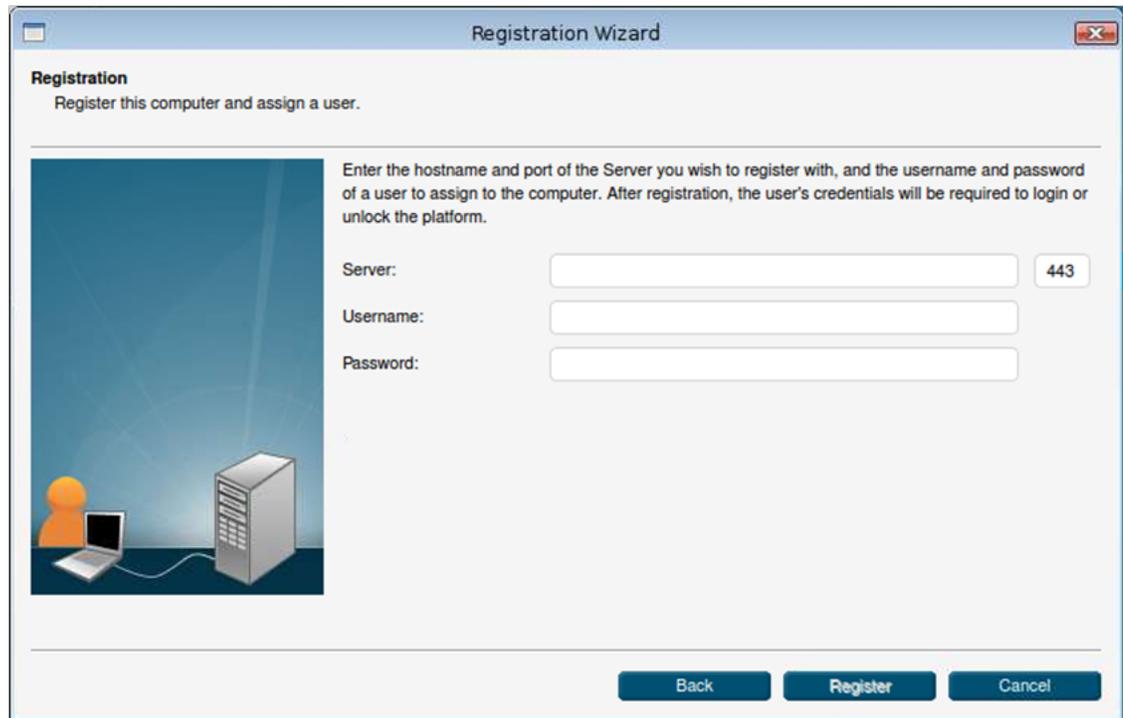
## Registering a XenClient Engine

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3. Click **Next**.

4. Enter the server name and specify a port; enter 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 interface:



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 image shows a 'Registration Wizard' dialog box with a title bar containing a close button. The main content area is titled 'Registration' and contains the instruction: 'Register this computer on behalf of another user.' Below this is a blue-tinted illustration of a person, a laptop, and a server rack. To the right of the illustration, there is explanatory text: 'Registration on behalf of another user allows administrators to register a computer and assign it to a user without needing to know the user's password. Enter the hostname and port of the Server you wish to register with, and the username of the user you want to assign to the computer.' This is followed by three input fields: 'Server:' (with a dropdown menu showing '443'), 'Username:', and 'Account:'. Below these is a 'Password:' field. A note states: 'Server account credentials are required to authenticate with the Server during registration. Note: The credentials you enter here can also be used to login to the platform by entering the account name then the '|' symbol followed by the user's username (Ex: 'Account|Username'). This will be allowed until the user logs in for the first time.' At the bottom right, there are three buttons: '< Back', 'Register', and 'Cancel'.

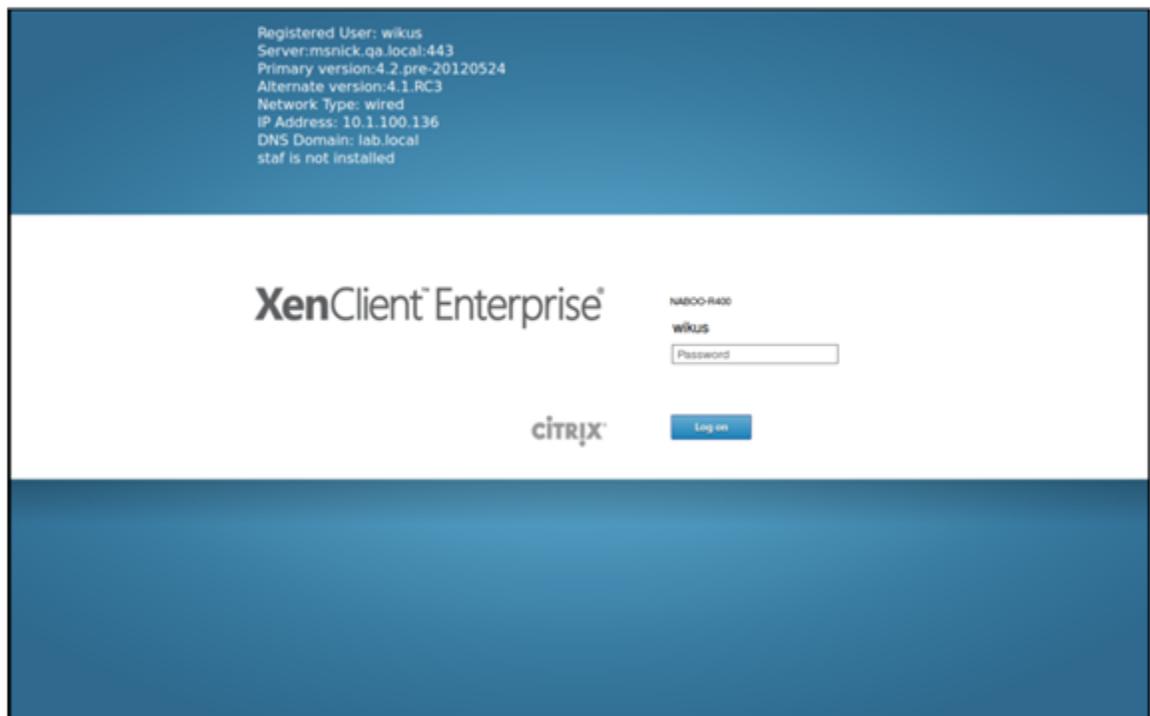
**Note:** The credentials specified can also be used to login to the platform by entering the account name, followed by the | symbol and the user's username (for example, 'Account|Username'). This will be permitted until the user logs in for the first time.

5. Click **Register**.

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# Logging in to an XenClient 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 (VM).

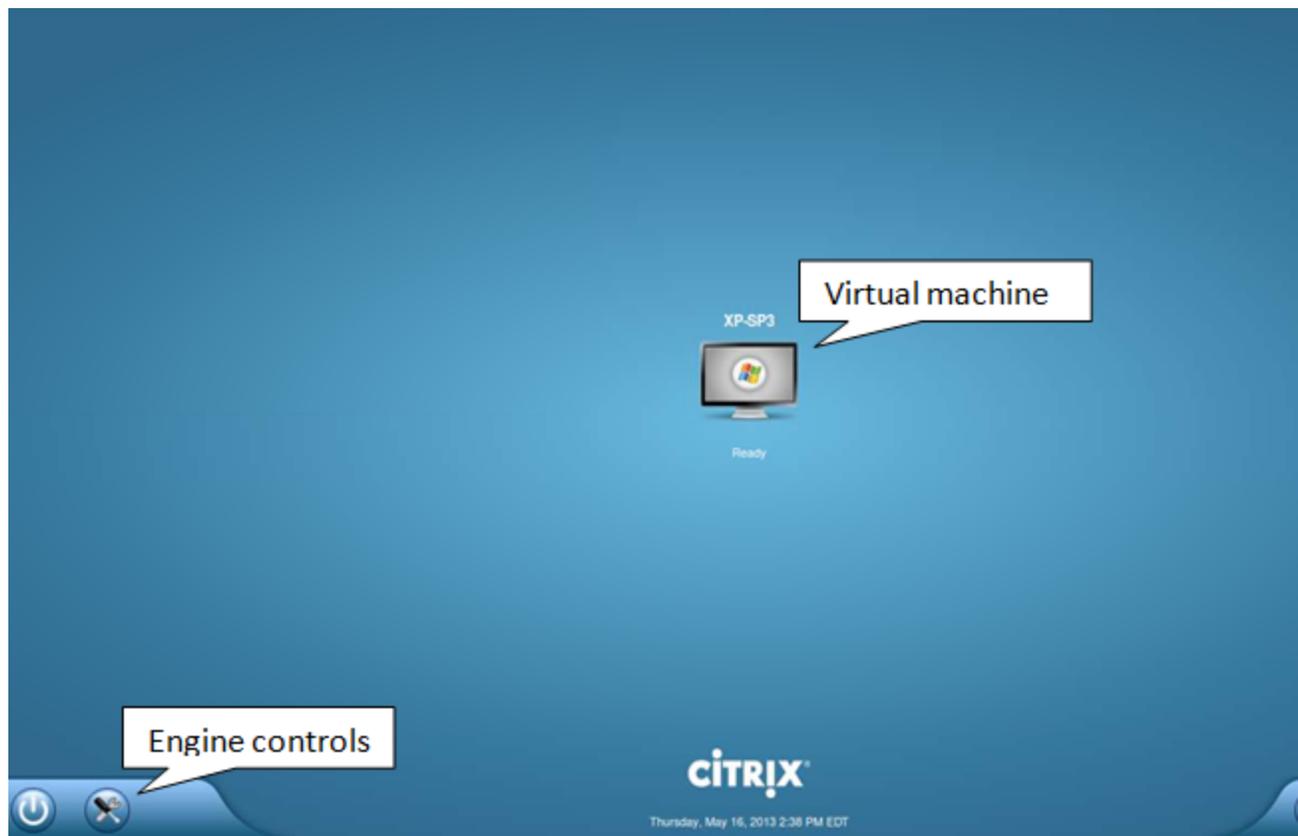
If the Engine Dock appears it provides access to existing VMs; it also includes access to Engine Control Panels that can be used to create new VMs, or manage existing ones. Using the Launcher, you can also access the Dock environment.

# Using the XenClient 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.

**Note:** 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.



## XenClient 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 guests and the devices.

The Launcher includes the following elements for accessing Engine Control Panels:

	<p>The power button in the lower left portion of the Launcher screen includes the following options:</p> <ul style="list-style-type: none"> <li>◆ Restart - Restarts the virtual machine.</li> <li>◆ Shutdown - Shutdown the virtual machine.</li> <li>◆ Sleep - Set the machine to sleep/suspend.</li> <li>◆ Lock - Lock the machine.</li> </ul>
	<p>The Control Panel button in the lower left portion of the Launcher screen provides access to the following:</p> <ul style="list-style-type: none"> <li>◆ 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 Synchronizer. Policies configured in Synchronizer may prevent the Engine from setting the polling interval.</li> <li>◆ Problem Reporting - This control panel enables problem reporting encountered during operation. Use this submission form to report issues directly to Citrix Technical Support.</li> <li>◆ Device Manager - Displays devices connected to the Engine, and allows you to assign these devices to a specific domain.</li> <li>◆ Hot Keys - Set hot key combinations for Engine functions.</li> <li>◆ Memory - Provides a tool for managing memory allocation among virtual machines.</li> <li>◆ Mouse and Touchpad - Use this control panel to configure behavior of the mouse and touchpad.</li> <li>◆ Power - Sets power-related functions for the computer.</li> <li>◆ Startup Options - Allows you to set up options when each configured virtual machine 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.</li> </ul>

	<ul style="list-style-type: none"> <li>◆ System Summary - Provides information about the Engine, the computer and the management server (XenClient Synchronizer).</li> <li>◆ Volume Control - Sets volume characteristics.</li> <li>◆ Wired and Wireless - Configures networking for the Engine.</li> <li>◆ Virtual Machines - Configure aspects of virtual machines.</li> </ul>
	<p>Controls for displaying the current network configuration, the Activity Center, and power Control Panels:</p> <ul style="list-style-type: none"> <li>◆ Network - Displays the Network Configuration control panel for wireless and wired 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 IP address. The icon is color-coded; Green means that the computer is connected, yellow indicates that you are attempting to connect and red indicates that you are disconnected. Clicking the network icon displays the Network Configuration control panel.</li> <li>◆ Activity Center - Displays the message center. This control panel displays messages received from the management server about your Engine, computer, or VMs.</li> <li>◆ Power - Displays the Power Configuration control panel. Use this control panel to set the level of power used by some of the hardware systems on your computer. These settings affect power use across all virtual machines.</li> </ul>

## XenClient 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.



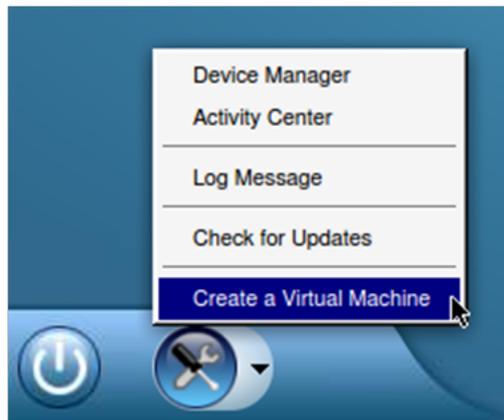
Selecting the Citrix Receiver icon from the Launcher screen displays a workspace that permits connections to corporate applications. At the top of the workspace, a dock provides access to a number of built-in applications, illustrated below:



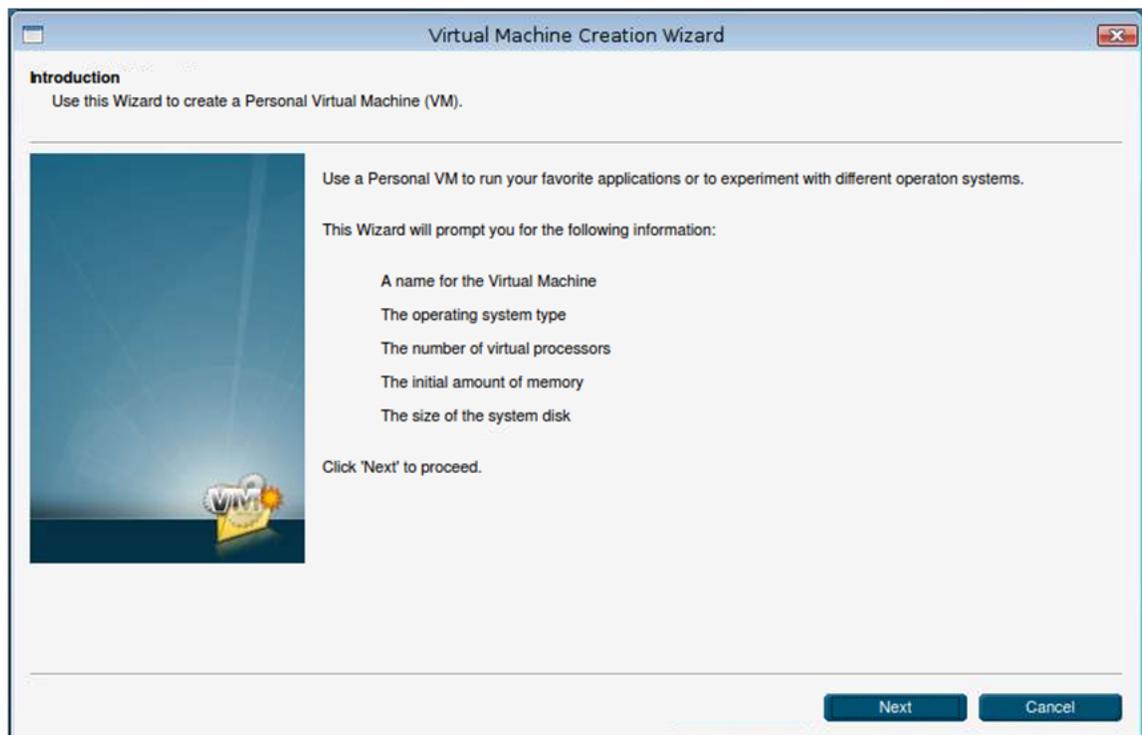
**Note:** You can access the dock from inside a virtual machine anytime, by moving the cursor to the top of the window. The Dock workspace requires a network connection.

# 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:



The Virtual Machine Creation Wizard screen appears:

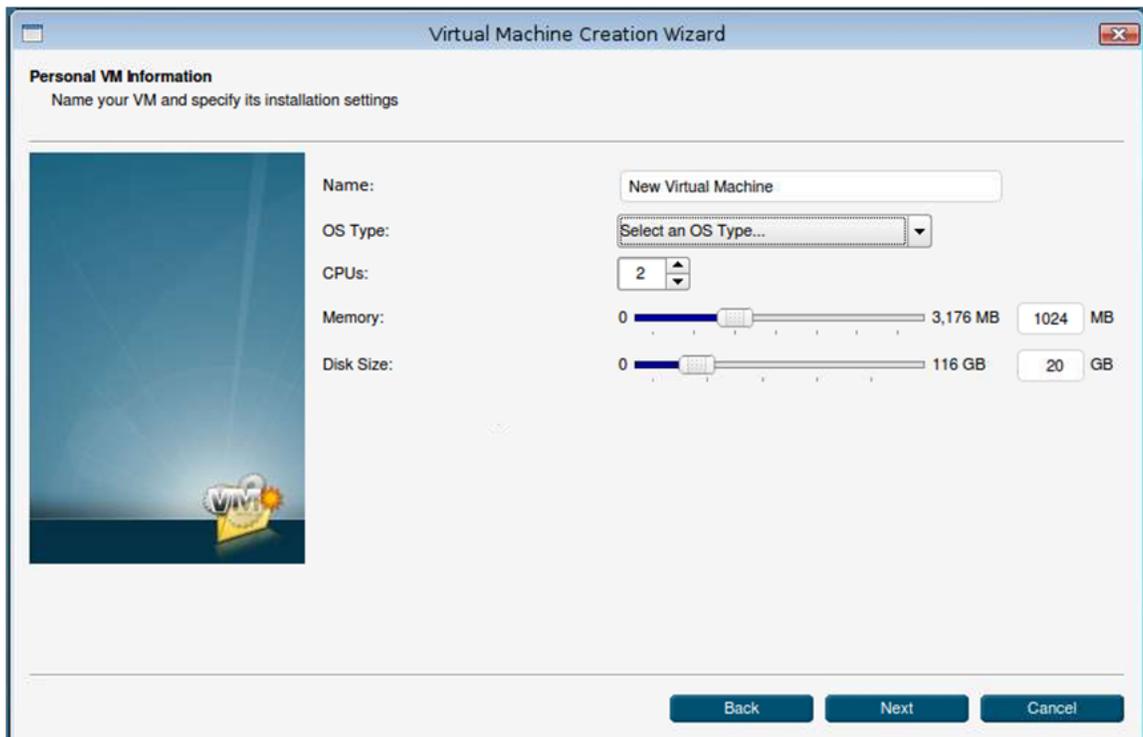


In the Virtual Machine Creation Wizard screen:

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

**Note:** A Windows 7 OS VM requires a minimum of 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 addition of applications to the VM image.

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.



4. Using the slider, set the amount of memory, or manually enter the amount of memory in the text field. By default, the VM 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:

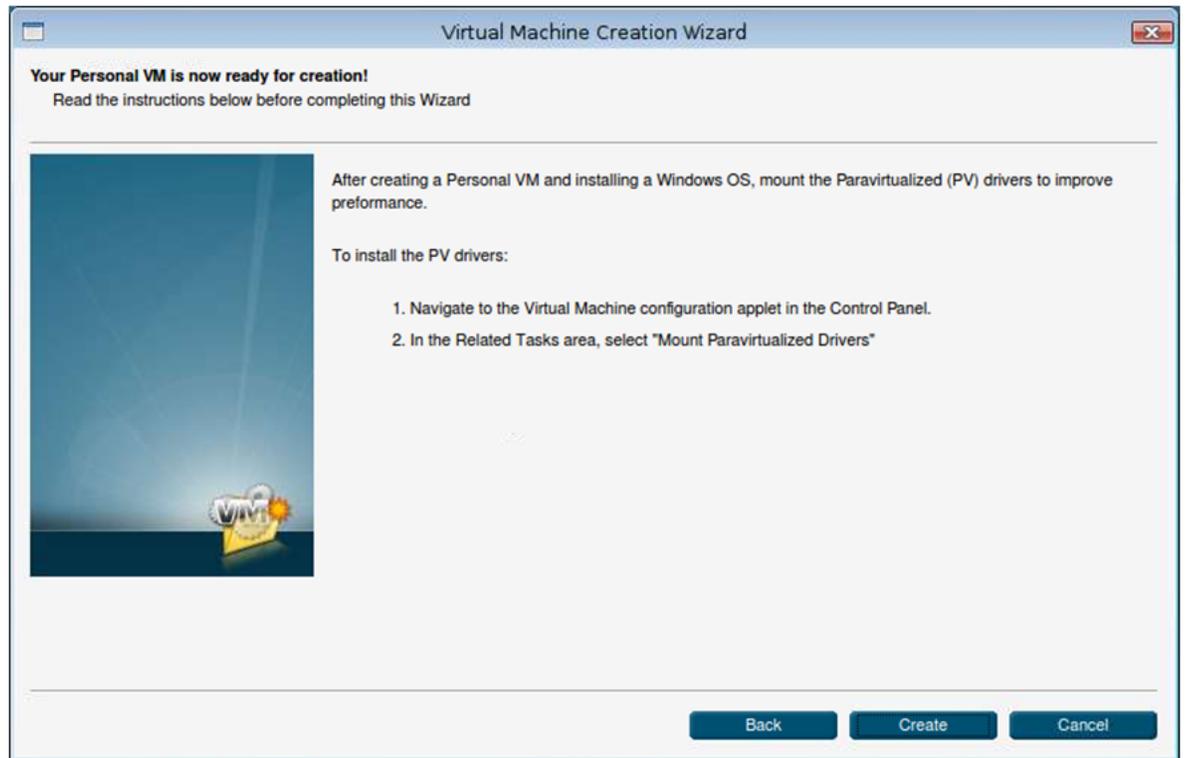
- ♦ The slider cannot be dragged to a value lower than the VM's minimum required value.
- ♦ The current memory field cannot be set to a value lower than the minimum required value for that VM, or to a higher value than the computer's maximum memory. The value you enter is changed to the minimum requirement 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 VM creation process appears:

## Creating a Virtual Machine

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Click **Create** to establish a new VM.

## Deleting a Locally Created Virtual Machine

You can delete a locally create virtual machine (VM) using the control panel. To access this control panel from the Launcher screen, select the tool icon in the controls located below the VM icon:



Once the VM tool control panel appears, click **Delete** to remove the VM. In the confirmation dialog, type delete, then click OK.

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# Mounting PV Drivers

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

To install PV drivers once the Windows installation has completed:

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

**Note:** Hovering the mouse pointer over the VM icon displays an image that provides a list of control options.



2. Select the Tool icon to display the VM control panel.
3. In the lower left portion of the control panel, select **Mount Paravirtualized Drivers** in the **Related Topics** portion of the interface.

**Note:** The VM must be running when mounting PV drivers.

4. Access the Windows VM (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.

**Note:** 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 VM once the installation is complete; from the Launcher screen, select the start option (you have to stop the VM prior to restarting it).