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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 (or Windows 2012) 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.

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

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 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://www.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.

**Check 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 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 [PC Hardware Compatibility List](#) on the Citrix Web site to verify if your existing Windows machine supports the virtualization required to run the Engine.
**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:

   ![Registration Icon](image)

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.

![Registration Wizard](image)

   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:

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.

5. Click **Register**.
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>Control Panel Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power button</td>
<td>Includes the following options:</td>
</tr>
<tr>
<td></td>
<td>- Restart — Restart the machine.</td>
</tr>
<tr>
<td></td>
<td>- Shutdown — Shutdown the machine.</td>
</tr>
<tr>
<td></td>
<td>- Sleep — Set the machine to sleep/suspend.</td>
</tr>
<tr>
<td></td>
<td>- Lock — Lock the machine.</td>
</tr>
</tbody>
</table>

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:
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).

Info: 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.
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 (recommend 8GB)</td>
<td>200 GB 10K RPM</td>
<td>Single Port 1Gbps Ethernet NIC</td>
</tr>
</tbody>
</table>

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

- 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.

Once installed, access Synchronizer through a Web browser; Internet Explorer versions 8/9/10 are recommended, however, other Browsers (Chrome, Firefox, Safari and Opera) also function with Synchronizer. Specific Browser requirements include:

- Windows XP with SP3, Vista, Windows 7 or Windows 2008/2012 Server OS
- Microsoft .NET Framework 2.0 installed
- RDP Active X control enabled

Citrix makes it easy to determine if your computer will work with the Engine. Access the PC Hardware Compatibility List on the Citrix Web site to verify if your existing Windows machine supports the virtualization required to run the Engine.

**BIOS Settings**

For Hyper-V to operate correctly, the server must have the following BIOS settings enabled:

- **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, and then restart.
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
  - 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.

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:
     - Import from local system (where your browser is running), or
     - Import from the server (the File Import folder under the Synchronizer)
   - Specify the file:
     - From the local file system: browse to the file location and highlight the file
     - 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, then 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. Specify installation instructions, including names and associated product keys:
7. 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. Click here for details.
   - **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.

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**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.

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

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** 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**
   6. Unregister the computer from the user.

   The user's relationship with that computer is severed.

   **If restoring to the same computer**
   6. Unassign the VM from the user.

   The virtual machine is removed when the computer next contacts Synchronizer.

7. The user logs into the new computer.

   The Synchronizer downloads the user's assigned virtual machines, including the restored data, which is prepared for use.

   **Assign the virtual machine to the user.**

   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 differing 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.

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.