About XenClient 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 virtual machines (VMs), policies, which virtual appliances 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 controls, 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 their groups, handles integration with Active Directory, and assigns VMs to users. When contacted by an Engine, it sends down updated VMs, virtual applications, policies and restored user data. It is also responsible for accepting backups and appropriate files and retains 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**

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 policies can be assigned to users, organizational units (OUs) or computers directly.

Synchronizer approaches the deployment of these items in a unique manner. Instead of the traditional deployment of locally executed installation files (.exe, .msi, etc.), Synchronizer employs a different approach. The Administrator is able to use a WYSIWYG (what you see is what you get) approach by creating and manipulating the operating system images directly 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 (also referred to as the golden) 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 of updates to fail. In order to fully understand how this works and how Citrix's solution works with SCCM, a more through discussion about how Synchronizer prepares images for deployment and constructs the guest Windows OS image.

### Synchronizer 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 Xenon Dual Core 2.0 GHz</td>
<td>6 GB RAM (minimum, 8 GB RAM recommended)</td>
<td>200 GB 10K RPM</td>
<td>Single port 1 Gbps Ethernet NIC</td>
</tr>
</tbody>
</table>

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


**Note:** Synchronizer cannot communicate with Hyper-V running on Windows Server 2012 if it is installed on Server 2012 R2. If you are installing in a VM running Windows Server 2012, the Hyper-V host must also be running Windows Server 2012; a 2012 Server 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.

**Note:** 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, it must be configured to use Hyper-V 2012 R2. Otherwise, the 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, Firebox and Chrome are supported.

**Note:** 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.

Once
Testing Synchronizer Connectivity

To verify connectivity to Synchronizer:

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

**Note:** 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 Wired and Wireless control panel (located in the left panel of the interface) select **Test Network Connection**.
4. In the **Test your Network Connection** screen, enter the IP address of the management server.

5. Click **OK** to test the connection.

**Note:** If you cannot establish connectivity, contact your IT Administrator.
Creating 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. The login page appears:

3. In the login screen, enter Synchronizer login credentials.

After logging in, 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 Navigation Panel.
Creating a Local User

**Note:** 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 contains 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 VM
- Virtualized Applications - applications prepared to run a virtual environment
- Engine Updates - updates for XenClient 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 them into the software library.

To add an item to the software library:

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

   **Note:** 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 the Software Library tab in the navigation panel.
3. Click the Import action.
4. Enter a name and description to identify the item.
5. Select the type of software you want to import.
6. Specify where you put the file in step 1:
   - location - select from the drop-down list:
     - import from the local system (where your browser is running), or
     - import from the server (the FileImport folder in the Synchronizer directory)
   - specify the file:
     - from the local file system (browse to the file location and highlight the file)
Adding Items to the Synchronizer Software Library

- 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.
Importing an ISO File

You can attach an ISO file to a VM (virtual machine). An ISO file is a single file image of a CD/DVD installation or data disk. Attaching an ISO file to a VM creates a virtual CD/DVD drive within the VM. Once the ISO has been attached (using the Attach ISO option in the Action panel), 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 then autorun file.

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

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

**Note:** An attached ISO is listed on the VM's summary tab. You can attach one ISO file to a VM at a time.

Installing software from an ISO file is the same as any installation of software to a VM base image.

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

1. Click Virtual Machines in the navigation panel, and select the VM 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** button, or, b). Click the **Software Library ISO** radio button, then select the ISO from the drop-down menu.

**Note:** The drop-down menu displays all ISOs in Synchronizer's Software Library, except Hyper-V Integration Services.

4. Click **Finish**.
Creating a Virtual Machine

A VM (virtual machine) is a container that runs on a computer, and is executed by a XenClient Engine, or by DesktopPlayer. 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 VM must include an OS (operating system). The OS can be installed from an 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.

- **VM image.** A virtual copy of an installed operating system. A VM image is created from an installed operating system, including a (group) license; this is also referred to as a VHD (virtual hard disk).

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

Once you begin creating a VM, 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 VM using Synchronizer:

- Import the VM 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 VM at a later point.

To create a VM:

1. Click **Virtual Machines** in the Navigation Panel.

2. In the Action Panel, click **Create**. This action initiates the Virtual Machine Creation Wizard:
3. Identify the new VM, and select the operating system and its source (ISO or VM image):

![Virtual Machine Actions](image)

4. Specify the VM usage mode:
4. Specify hardware requirements by entering the RAM and storage requirements used by the image; include the network adapter type by selecting from options in the drop down menu. This screen is automatically populated with default values:
5. Select existing policies to assign to the VM. Policies can also be assigned to a VM at a later time:
6. If you want to run this VM immediately after creating it, click Finish.

The VM is created. It appears in Synchronizer’s navigation tree in the list of VMs. The image can be started, which opens the Console and starts the assigned operating system.

For a VM built around an ISO image, the operating system installation starts. If the automatic installation option was selected, 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 VM, either installing the operating system or adding applications, shut it down from within the operating system (using the conventional Windows-based shut down procedure from the Start menu). The VM can be published and then assigned to users.
Publishing a VM (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 one.

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 in the expanded menu tree.

2. In the **Actions** panel, click **Version/Publish**:
The Create New Virtual Machine Version window appears:
3. 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 type to release a version to selected users.

- **deployed** - this is a version for distribution to assigned users (assigned the green bar).

**Note:** 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 the staged users and groups to the current published version. A diagnostics package is created in the event of a failure when a VM is being published. To create a diagnostics package in any event, select the checkbox.

4. Click Finish.
The newly created or modified VM is published. It is downloaded to assigned users when they next contact Synchronizer.
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 has been assigned to each user in that group individually.

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

**Note:** When a user logs into a XenClient Engine, Synchronizer downloads the VM to the machine. The user can select the VM and it starts up. This same process applies to DesktopPlayer.

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 a Group, click the **Groups** tab for that user and select one or more groups to assign:
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 being 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 XenClient Engine or DesktopPlayer client contacts Synchronizer, it downloads any updates to the user's assigned VMs (virtual machines).

If a VM 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. In the workspace, locate the VM you want to assign. To deploy a specific version of the VM, expand it to display a list of all versions.

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

4. Select the checkbox for each Group or User you want to assign the VM. 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 VM is sent to the selected users or all members of a selected group.
Restoring a Virtual Machine from Backup

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

Consider the following:

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

**Note:** Both versions of the restore process are described below.

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

A user's data is stored when the user logs in to a XenClient Engine that does not have that assigned VM (including the user's data) loaded. The VM and the user's data is downloaded from Synchronizer.

To restore a user’s VM from backup:

1. Ensure that the restored data is available as backup. Click Users in the navigation panel. Expand the Users folder.
2. In the Users folder, select the appropriate user.
3. Select the VM and click the Backups tab.
4. If the latest backup (the VM at the top of the list) select it:
   - If a backup from a previous data is needed, set the restore point to the correct backup:
     - Select the Restore point checkbox of the backup to use; any earlier backup dates are also filled in.
     - Click Save.
   - The selected backup will be restored. If there are later backups existing, backup processing will be suspended for this VM.
5. Shutdown the VM.
Important Considerations

The table below illustrates important steps to take when restoring a previous VM backup:

<table>
<thead>
<tr>
<th>If restoring to a different computer..</th>
<th>If restoring to the same computer..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unregister the computer from the user. Once completed, this step effectively severs the relationship between that user and the specified computer.</td>
<td>Unassign the VM from the user. Once completed, the VM is removed from the computer the next time the Engine contacts Synchronizer.</td>
</tr>
<tr>
<td>The user logs into the computer. Synchronizer downloads the user's assigned VMs, including the restored data, which is prepared for use.</td>
<td>Assign the VMs to the user. The VM, including the user's restored data, is downloaded and prepared for use when the Engine next contacts Synchronizer.</td>
</tr>
</tbody>
</table>

If the user wants to continue using this VM 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, the user must copy the recovered files or folders from the VM temporarily, and perform the process again; this time clear any restore points to restore the latest backup.
Retrieving a File from a Virtual Machine

Synchronizer enables the Administrator to retrieve a file from a VM (virtual machine). 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 VM is reset to the state it was in when the file existed. The user then copies the file from the VM. The VM 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 VM be set to an earlier restore point; the user need only provide the VM name, and the date to use as a restore point.

To retrieve a file to a VM:

1. Click Users in the navigation panel. In the Users folder, select the VM and click the Backups tab in the workspace.

2. Select the checkbox corresponding to the restore point of the appropriate backup image.
3. Click **Save**.

The next time the user's computer contacts Synchronizer:

- backup processing is suspended
- updates are suspended
- the VM user disk (and other files included in the backup, including 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. Once the restore point is complete, the user must restart the VM; once restarted, the VM's user disk (and system disk on a custom VM) is returned to its state as of the restore point.

5. Once the user retrieves the file from the restored VM and copies it to another location off the VM (or a network share of other media, including the local disk (L:drive)), the VM must be shut down.
6. Return to the **Backups** screen in the workspace and clears all checkboxes assigned.

7. After clearing the checkboxes, click **Save** in the upper right portion of the workspace.

The next time the user's computer contacts Synchronizer:

- backup processing is re-enabled
- updates are re-enabled
- the VM is set to the state as of the last backup. The differencing disks (backups) between the previous restore point and the current restore point are re-applied.

**Note:** The VM is returned to its current state when the it is restarted after the restoration is complete. 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.

**Note:** This topic provides a limited amount of information related to Synchronizer policies. Refer to the online Help for more comprehensive guidelines for implementing policies with 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 (services 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**.

**Note:** 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 group:

1. Select the **Users** navigation panel.
2. Expand the tree to locate the user or group to which 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.
Synchronizer Roaming enables XenClient (and DesktopPlayer) 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 the local subnet.

**Note:** Network Administrator 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 interface:
1. In the navigation panel, expand the Servers node. 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 checkbox 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 Engine first attempts 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. Alternately, 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** text box, enter the name of the host record.

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

5. In the **IP Address** text box, 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 the 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 alternative if resiliency is a necessity in your environment.