Synchronizer Installation

This document provides instructions for installing Synchronizer. Synchronizer performs all the administrative tasks for XenClient Engines and DesktopPlayer endpoints. It keeps a database of all objects, including:

- 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, and policies)
- 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 (or DesktopPlayer endpoint), it sends down updated VMs, policies and restored user data. It is also responsible for accepting backups and appropriate files and retains them as needed.
Synchronizer Requirements

This document provides information about installing Synchronizer on a server. The host machine must be a stand-alone (physical) server or a virtual 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>6 GB RAM (8 GB 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 Synchronizer in a VM running Windows Server 2012, the Hyper-V host must also be running Windows Server 2012; a 2012 R2 VM with Synchronizer installed must use a 2012 R2 installation as a Hyper-V host to ensure communication.

- Microsoft Hyper-V (6.0.6002.18005 or higher)

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

**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, Synchronizer must be configured to use Hyper-V 2012 R2. Otherwise, Hyper-V 2008 that comes with Windows Server 2008 R2 can be used.

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

**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.

Installing XenClient Synchronizer

This topic provides instructions for installing Synchronizer on a physical server.

Synchronizer relies on a number of components to work successfully. As part of the installation process, the installer sets up the following applications:
Synchronizer Requirements

- Apache Tomcat Server 7.0
- Microsoft SQL Server 2012 Express (unless using a database on another server)
- Microsoft SQL Server Management Studio Express
- Java Runtime Environment (JRE) Version 7 Update 17

Note: Synchronizer requires administrative privileges to install successfully onto the Windows Server operating system.

Start Synchronizer installation using the installation kit. The kit may be local on the server or available over your network.

To install Synchronizer:

1. Run the Installer. Select the installation language:

2. The Welcome screen appears. Click Next to continue:

3. In the License Agreement screen; read the agreement thoroughly and only choose to accept the agreement if you understand and agree with the terms of the license. Select the appropriate radio button and click Next:
4. The Server Type screen appears. Select either the **Central Server** or **Remote Server** radio button. For Central Server installations, you manage your virtual machines (VMs) and assign them to users and groups. For Remote Server types, the server offloads a Central Server from deploying VMs and managing backups for a subset of users and their groups.

**Note:** The installation type chosen in this step (either central or remote server) changes the steps described in this topic. Where applicable, each of the following steps will indicate if it pertains to a central or remote Synchronizer installation.
Note: In the event of a disk failure on a remote server, Citrix recommends that you backup the keystore file to facilitate recovery operations. This keystore file can be found here: C:\Program Files\Apache Software Foundation\Tomcat 7.0\ssl\nxtopcenter_virtualcomputer.com.jks.

Note: The Remote Server must be in the same domain as the Central Server.

5. The Server Information screen appears. Enter the Server Name, and the Server Description then click Next.

Note: If Hyper-V is not detected during the installation process, a dialog appears indicating that Synchronizer will be installed as a virtual appliance; click OK to continue with the installation (the image below illustrates this message).
Note: For a central server installation, provide the name of the server and the location of the database.

6. The installer checks that the host is suitable
   
   - It checks the operating system. If the host runs Windows Server without the Hyper-V role, the installer interprets this as installing into a VM. It displays an information pop-up telling you that it will perform a virtual appliance installation.
Note: This pop-up does not appear if you are installing on a physical server and Hyper-V is configured.

- If the host runs Windows Server 2008 SP2 with a Hyper-V role, the installer displays a pop-up asking you to install Hyper-V before continuing.
- It checks that the server has adequate memory (at least 6GB, preferably 8GB) and storage space (at least 200GB). A warning message is displayed if this is not available.

The Installation directory screen appears:

The default installation folder is displayed:

C:\Program Files\Citrix\Synchronizer

Note: Both Synchronizer and Tomcat have a /bin folder. Do not install them in the same location.

7. Click Next to install in the default directory, or click the folder icon to specify another directory.

8. A warning message appears recommending that you dedicate at least 6GB RAM memory to run Synchronizer. Click OK to close the warning message:
9. The installer collects information used to install the Apache Tomcat server. Most of Synchronizer’s disk space consumption is stored within the Tomcat directory.

Specify the following information:

- Tomcat installation directory; use the default, or click the folder icon and browse to another location.
- The default Tomcat port used by Synchronizer is **8443**.
- The default Tomcat port used for XenClient Engine communication is **443**. This port is used by Synchronizer to send VMs and queries to Engines.
10. Click **Next** to continue.

**Note:** Both Synchronizer and Tomcat have a /bin folder. Do not install them in the same location.

11. The installer collects information for the Server’s SSL certificate:

Enter the following for the SSL certificate:

- Fully qualified domain name; use the IP address if the names are not available.
- Organizational or company name. Do not include punctuation in the name.
- City
- State or Province
- Select Country from the drop-down list

The installer creates a self-signed certificate to enable SSL on Synchronizer.

**Note:** You may install your own certificate obtained from RSA or other certificate authorities as described [here](#).

12. Click **Next** to continue.

13. The installer collects information for the Hyper-V server:
Enter the user name and password for the Hyper-V Administrator account.

**Note:** Specify a user name and password of an account with sufficient privileges to remotely manage Hyper-V. If this server is running inside a VM, you may use the domain Administrator account; if this server is installed onto the base platform, you may use the local system Administrator account.

The installer checks that:

- the account and password exist
- the account has local Administrator rights

If one or both of these validations fails, an appropriate warning message is displayed, indicating that Synchronizer will be installed as a virtual appliance:
Click **OK** and correct any problems with the account before continuing.

Click **Next** to continue after clearing the warning dialog.

14. Select a location for the database. Synchronizer supports two database options: 1) install Microsoft SQL Express, or, 2) use an existing Microsoft SQL Database Server. In the Database Option screen, select the radio button for the database option. Click **Next**.

15. If you are configuring a connection to an existing SQL server host for a newly empty database, the installation prompts you to specify the SQL server host name, the server port number, an instance name, and the database name.
**Note:** The SQL server port number is preferred over the database instance name. The SQL server instance name is only used if the server port field is left blank. This screen appears for central server installations if an existing SQL server host.

16. When configuring the SQL server, you must provide credentials for two Active Directory (AD) users; one set of credentials is used to create the database during installation. The second set of credentials is used to access the database on behalf of Synchronizer at runtime.

**Note:** The two sets of AD credentials can be used by the same user.

17. In the Configure SQL Server Credentials screen, select the checkbox to use a different user for runtime access to the database. Enter an account username and password; these credentials will be used as the service account and will own the new database. This installation screen is applicable to central server installations.

**Note:** When specifying a password, use only alphanumeric characters (a-z, A-Z, 0-9) and _ ! $ *, -.
**Synchronizer Requirements**

Note: When specifying the domain name, keep in mind that the remote server must be in the same domain as the central server.

Note: All object calls in the database should be fully qualified (for example, master.dbo.syslogins).

18. When configuring SQL credentials, specify the domain name and credentials for the AD user that is being used by the Central Server. **This screen only appears if you select the "Check to use a different user for remote access to the database" option described in step 17.**
19. For SQL Express on the host, the installer collects information, including the database Administrator username and password. Enter the database Administrator username and password.

**Note:** This step only applies to SQL Express installations only.

**Note:** The database Administrator password must be **sa**. A warning message appears stating that the password does not have sufficient privileges.
For any type of installation (an existing SQL database or a new SQL database installation), the installer verifies connectivity to the host, and that the host accepted the username and password before continuing. If an issue is reported, correct it before continuing.

After clicking Next, the Summary screen appears:
The Summary screen provides all the information used to load Synchronizer and its supporting components.

Review the information carefully. If you wish to change any of the values entered for configuration, click Back to browse to the appropriate screen, change the values, and then click Next until you return to the Summary screen.

21. Click Next to start the installation; click Cancel to halt the installation.

The components and Synchronizer are then installed on the server. Progress is displayed as each component completes.
The installation progress for the Microsoft SQL server is also displayed:
Note: In the event of a failure during installation, correct the reported error. Then continue the installation from the point where it failed by restarting the installer. Installed components do not need to be reinstalled.

22. When the software is installed, click Finish. The installer window will close.
23. To complete the installation, you must restart the server. The installer displays a pop-up box to restart.

After the server restarts, an icon for the Synchronizer Console appears on the server desktop.

**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)

**Note:** 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 prior to restarting.
Adding Hyper-V to Windows Server

If Microsoft Hyper-V is not found, Synchronizer installation will stop and prompt you to install it. Use the Microsoft instructions to install (add the role of) Hyper-V to the server.

The table below provides additional reference information.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Hyper-V Installation Reference Material</th>
</tr>
</thead>
</table>


When you create a Virtual Network, select a physical network adapter as its connection, and name the virtual network **External Network**.

**Note:** Hyper-V installation will warn you if the required BIOS settings are not enabled.

You can also add a Virtual Network after the initial installation of Hyper-V:

1. Open Server Manager, expand the Roles to show the **Hyper V Manager**, and select it.

![Server Manager](image)

2. On the right panel, select the **Virtual Network Manager**.
3. Select **External** as the type, and click **Add**.

4. Enter as the name of the Virtual network. Select the (physical) controller to connect to; click **OK**.
5. When prompted, complete the Hyper-V installation by rebooting the server.

Note: The name External Network is a requirement.
Disabling Enhanced Internet Explorer Security during Installation

Citrix recommends that you turn off Enhanced Internet Explorer Security during installation of Synchronizer. Turning this feature off prevents messages from being displayed during installation, which greatly slows the installation process.
Disabling Enhanced Internet Explorer Security during Installation

Disable the Enhanced Internet Explorer Security Windows Component by clearing the checkbox:

1. In the Server Manager tree, expand the roles to display options associated with the Hyper-V Manager.
2. In the Server Manager window, select the Configure IE ESC link.
3. Find and clear the checkbox for Enhanced Internet Explorer Security.

When you start Internet Explorer, a warning dialog appears:

**Caution: Internet Explorer Enhanced Security Configuration is not enabled.**

After installation, enable Enhanced Internet Security by following these same steps and filling the checkbox.
Enable RDP ActiveX Control

If the computer running the browser used to connect to Synchronizer uses Windows XP, ensure that the RDP ActiveX control is enabled. Otherwise, it will not function properly. It is disabled by default.

**Note:** Even if the browser is not running Windows XP, the RDP ActiveX control might still be set to disabled. If you experience a "Cannot install RDP ActiveX control" message, the control may be disabled.

To enable ActiveX control:

1. In the browser, click **Tools>Manage Add-ons**.

2. In the dialog box, locate the **Microsoft RDP Client Control** field; ensure it is **Enabled** (located in the Status column).

3. If you cannot find the RDP ActiveX control in the Manage Add-ons dialog, refer to the information provided on the Windows Help website to fix a known issue associated with this control on Windows XP (the information is provided here for convenience):
   a. Click **Start>Run**.
   b. Enter **Regedit.exe**.
   c. Navigate to the following branch **HKEY_CURRENT_USER\Software\Microsoft \Windows\CurrentVersion\Ext\Settings**.
   d. Double-click **Settings** to expand the branch.
   e. Right-click **{7584c670-2274-4efb-b00b-d6aaba6d3850}** and choose **Delete**.
   f. Click **Yes** when prompted for confirmation.

4. If your browser does not have the RDP ActiveX Control, use Windows Update to install it.
Opening Ports on Firewalls

If you are installing on a server with a firewall, ensure that the following ports are available. If not, create a rule manually to open these ports. Synchronizer installer does not create a firewall rule to open the ports used by it.

The following table provides information about the ports used by Synchronizer.

<table>
<thead>
<tr>
<th>Port</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>443</td>
<td>Used by XenClient Engines to communicate with Synchronizer. If the port is not open, Engines (also referred to as clients) cannot register or otherwise communicate with Synchronizer.</td>
</tr>
<tr>
<td>8443</td>
<td>Used by an Administrator to communicate with the Synchronizer UI.</td>
</tr>
<tr>
<td>2179</td>
<td>Used by Hyper-V Management Service Console (RDP)</td>
</tr>
<tr>
<td>1433</td>
<td>SQL database port; this port must be open on the server hosting the database (which may or may not be the Central Server). All servers (central and remote) need access to this port to open connections to the database server.</td>
</tr>
<tr>
<td>389</td>
<td>Non-SSL port for LDAP to Active Directory (AD)</td>
</tr>
<tr>
<td>636</td>
<td>SSL port for LDAP to AD</td>
</tr>
</tbody>
</table>
Removing Existing Applications

The following applications or services must not be installed or have been previously running on the Windows 2008 64bit server:

- Apache Tomcat Server
- Microsoft SQL, MySQL, or SQLEXPRESS Database Server/Services
- Java Runtime Environment (JRE)

If these are installed, the installation includes tools to remove them cleanly.

**Note:** Back up any data within these applications that you want to preserve.
In addition to installing Synchronizer directly on a server, you can install it on a VM. This topic describes the additional steps used for Virtual Appliance installation.

Prerequisites
Use a Windows Server 2008 R2, Windows Server 2012, or Windows Server 2012 R2 system as the host. The Hyper-V host must define an external network named External Network.

Prepare the Virtual Machine
To prepare the virtual machine (VM):
1. Prepare a Windows Server (2008 R2, 2012, or 2012 R2) VM in Hyper-V:
   • provide the VM with 2 CPUs
   • ensure the VM’s disk is sized large enough to contain VMs (several hundred GB)
   • join the VM to the same Windows domain as the Hyper-V host
2. Apply all Microsoft updates to the Windows Server VM.
3. You must manually add the VM computer account to the local Administrator group on the Hyper-V host. This can be done either
   • using the command line:
     net localgroup administrators "DOMAIN\VMhostname$" /add
   • using the “Local Users and Groups” tool in Server Manager

Install as a Virtual Appliance
To install Synchronizer as a virtual appliance:
1. Install Synchronizer into the Windows Server VM using the installer.exe
   The installer detects a Windows Server host without the Hyper-V role installed and enabled, which it interprets as installing into a virtual machine (as a virtual appliance). It displays an information pop-up telling you that it will perform a virtual appliance installation.
2. Once installed, import a license.

Configure Synchronizer
After installing Synchronizer as a virtual appliance, use the following procedure to activate it:
1. In the Synchronizer navigation panel, select **Overview>Synchronizer>Configuration**.

2. Click the Hyper-V tab and check the information:
   - ensure that the Host Hyper-V Server field is correctly set to the Hyper-V host name
   - ensure that the Hyper-V User is a domain user, for example “DOMAIN\Administrator”

3. Click the **Virtual Appliance** tab and check the information.
   - Ensure the 3 UNC paths all contain the computer name of the VM; use the **Modify** action to add any missing values.

4. Click the **Activate Appliance** action.

Synchronizer is installed on the VM and is now ready to operate.

**License Installation**

Once installed and before you use Synchronizer, you must import a license. The license not only allows you to operate Synchronizer, but it also defines how many computers Synchronizer can support. If Synchronizer does not have a valid license, a screen appears indicating that you must first obtain a license.

The license is an XML file delivered by email. Copy it into Synchronizer’s import folder (C:\Program Files\Citrix\Synchronizer\FileImport) or a network location that can be reached by the computer browsing Synchronizer.

1. Log into Synchronizer using the Administrator name and password used on the Hyper-V installation panel.

2. In the Synchronizer UI, click **Overview** in the Navigation panel.

3. Click **Import License** in the Actions panel; the Import License window appears.

4. **Location.** Select from the drop-down list:
   - import from a local system (where your browser is running), or
   - import from the server (in the file import folder in Synchronizer)

5. **Specify the file:**
   - from a local 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.

6. **Click Finish.**

The license is installed. The number of registered computers and the number available by license are listed on the Summary tab of the Overview.

You can add additional licenses to support more computers. Contact Citrix Support for more information about additional or upgraded licenses.
About Active Directory Integration

The management application provides enhancements to the Active Directory (AD) implementation. These changes were designed to simplify AD integration by providing the ability to directly browse the AD hierarchy and integrate the entire domain, selected Organization Units (OU), or individual users. This effectively enables large enterprises to implement stage deployments or manage deployments that are limited to particular groups and their users.

These AD enhancements provide the following benefits:

- Simplify configuration by allowing the Administrator to specify a small set of AD information: the host name, LDAP port number, the username and password.
- The tree-based navigation schema allows the Administrator to interact with AD in a familiar and intuitive way, by enabling you to directly configure users and their groups without importing them from AD.
- Use the search and filtering mechanism to refine what is displayed in the navigation tree and various tables.
- Users and groups are ‘imported’ into Synchronizer only when a computer is registered to a user, or a VM is assigned. This on-demand import is higher performance and more scalable.

**Note:** Upgraded users will not see the tree-based navigation view by default. Instead, these users will see a flat view. Click the hierarchical view icon at the bottom of the tab to switch views. The table below illustrates these icons.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Flat view icon" /></td>
<td>Flat view icon. Click this icon to change between the tree-based view in the navigation panel.</td>
</tr>
<tr>
<td><img src="image" alt="Hierarchical view icon" /></td>
<td>Hierarchical view icon. Click this icon to show a hierarchy of elements in the navigation panel.</td>
</tr>
</tbody>
</table>
Post Installation Steps

After successfully installing Synchronizer, either on a standalone server or as a virtual appliance, you can use it to perform a number of virtualization tasks. The table below describes some of these basic tasks.

<table>
<thead>
<tr>
<th>Step</th>
<th>On the Welcome tab..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create one or more virtual machines (VMs) in Synchronizer</td>
<td>Create a Virtual Machine</td>
</tr>
<tr>
<td>Publish the virtual machine for use</td>
<td>Publish a Virtual Machine</td>
</tr>
<tr>
<td>Create Users (for each computer)</td>
<td>Create Users and Groups</td>
</tr>
<tr>
<td>Install a XenClient Engine on one or more computers</td>
<td></td>
</tr>
<tr>
<td>Assign the virtual machine to users</td>
<td>Assign a Virtual Machine</td>
</tr>
</tbody>
</table>

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