Deploy Cisco Directory Connector

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Cisco Directory Connector Deployment Task Flow

Before you begin
Prepare Your Environment

Procedure

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Install Cisco Directory Connector, on page 3</td>
<td>Cisco Webex Control Hub initially shows directory synchronization as disabled. To turn on directory synchronization for your organization, you must install and configure Cisco Directory Connector, and then successfully perform a full synchronization. For a new installation of Cisco Directory Connector, always go to Cisco Webex Control Hub (<a href="https://admin.webex.com">https://admin.webex.com</a>) to get the latest version of the software so that you're using the latest features and bug fixes. After you install the software, upgrades are reported through the software and automatically install when available.</td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Sign In To Cisco Directory Connector, on page 4</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Sign in with your Cisco Webex administrator credentials and perform the initial setup.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Set Automatic Upgrades for Cisco Directory Connector, on page 8</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>It's always important to keep your Cisco Directory Connector software up to date to the latest version. We recommend that you use this procedure to allow automatic upgrades to the software to be installed silently when they're available.</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Map User Attributes, on page 8</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>You can map attributes from your local Active Directory to corresponding attributes in the cloud. The only required field is the <em>uid.</em></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>Synchronize directory avatars by using one of the following procedures:</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>You can synchronize your users' avatars to the cloud so that each user's avatar appears when they sign in to the application. You can synchronize avatars from an Active Directory attribute or a resource server.</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>Synchronize On-Premises Room Information to the Cisco Webex Cloud, on page 15</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Use this procedure to synchronize on-premises room information from Active Directory into the Cisco Webex cloud. After you synchronize the room information, the on-premises room devices with a configured, mapped SIP address show up as searchable entries on cloud-registered room devices, such as a Cisco Webex Room Device or Cisco Webex Board.</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>To Provision Users with Cisco Directory Connector, on page 18, perform these steps:</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Follow this sequence to provision Active Directory users for Cisco Webex accounts. You can provision users from a multiple forest or multiple domain Active Directory deployment after you install Cisco Directory Connector 3.0. During the process to onboard users from different domains, you must decide whether to retain or delete the user objects which might already exist in the Cisco Webex cloud—for example, test accounts from a trial. The goal is to have an exact match between your Active Directories and the Cisco Webex cloud.</td>
</tr>
<tr>
<td>- Do a Dry Run Synchronization on Your Active Directory Users, on page 18</td>
<td></td>
</tr>
<tr>
<td>- Do a Full Synchronization of Active Directory Users Into the Cloud, on page 22</td>
<td></td>
</tr>
<tr>
<td>- Assign Cisco Webex Services to Directory Synchronized Users in Cisco Webex Control Hub, on page 24</td>
<td></td>
</tr>
</tbody>
</table>
Install Cisco Directory Connector

Cisco Webex Control Hub initially shows directory synchronization as disabled. To turn on directory synchronization for your organization, you must install and configure Cisco Directory Connector, and then successfully perform a full synchronization.

You must install one connector for each Active Directory domain that you want to synchronize. A single Cisco Directory Connector instance can only serve a single domain. See the following diagram to understand the flow for multiple domain synchronization:

Figure 1: Multiple Domain Flow for Cisco Directory Connector

Before you begin

If you authenticate through a proxy server, ensure that you have your proxy credentials:

- For proxy basic-auth, you'll enter the username and password after you install an instance of the Cisco Directory Connector. Internet Explorer proxy configuration is also required for basic-auth; see Use a Web Proxy Through The Browser
- For proxy NTLM, you may see an error when you open the Cisco Directory Connector for the first time. See Use a Web Proxy Through The Browser.

Procedure

Step 1
From the customer view in https://admin.webex.com, go to Users, click Manage Users, click Enable Directory Synchronization, and then choose Next.

Step 2
Click the Download and Install link to save the latest version of the Cisco Directory Connector installation .zip file to your VMware or Windows server.
For a new installation of Cisco Directory Connector, always go to Cisco Webex Control Hub (https://admin.webex.com) to get the latest version of the software so that you're using the latest features and bug fixes. After you install the software, upgrades are reported through the software and automatically install when available.

**Tip**
For a new installation of Cisco Directory Connector, always go to Cisco Webex Control Hub (https://admin.webex.com) to get the latest version of the software so that you're using the latest features and bug fixes. After you install the software, upgrades are reported through the software and automatically install when available.

**Step 3**
On the VMware or Windows server, unzip and run the .msi file in the setup folder to launch the **Cisco Directory Connector Setup Wizard**.

**Step 4**
Click **Next**, check the box to accept the license agreement, and then click **Next** until you see the account type screen.

**Step 5**
Choose the type of service account that you want to use and perform the installation with an admin account:

- **Local System**—The default option. You can use this option if you have a proxy configured through Internet Explorer.
- **Domain Account**—Use this option if the computer is part of the domain. Directory Connector must interact with network services to access domain resources. You can enter the account information and click **OK**. When entering the **Username**, use the format `{domain}\{user_name}`

**Note**
For a proxy that integrates with AD (NTLMv2 or Kerberos), you must use the domain account option. The account used to run Directory Connector Service must have enough privilege to pass proxy and access AD.

To avoid errors, make sure the following privileges are in place:

- The server is part of the domain
- The domain account can access the on-premises AD data and avatars data. The account must also have the local Administrator Role, because it must access access files under `C:\Program Files`.
- For a Virtual Machine login, the admin account privilege must at least be able to read domain information.

**Step 6**
Click **Install**. After the network test runs and if prompted, enter your proxy basic credentials, click **OK**, and then click **Finish**.

---

**What to do next**
We recommend that you reboot the server after installation. The dry run report cannot show the correct result when the data was not released. While rebooting the machine, all data is be refreshed to show an exact result in the report.

If you're synchronizing multiple domains, repeat these steps on a different Windows machine and install one connector per domain.

---

## Sign In To Cisco Directory Connector

### Before you begin
Ensure that you have your proxy credentials.

- For proxy basic-auth, you'll enter the username and password after you open the Cisco Directory Connector for the first time.
• For proxy NTLM, open Internet Explorer, click the gear icon, go to **Internet options > Connections > LAN settings**, ensure the proxy server information is added, and then click **OK**. See [Use a Web Proxy Through The Browser](#).

## Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Open the Cisco Directory Connector, and then add <a href="https://idbroker.webex.com">https://idbroker.webex.com</a> to your list of trusted sites if you see a prompt.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>If prompted, sign in with your proxy authentication credentials, and then sign in to Cisco Webex using your admin account and click <strong>Next</strong>.</td>
</tr>
</tbody>
</table>
| **Step 3** | Confirm your organization and domain.  
  • If you choose **AD DS**, check **LDAP over SSL** to use the secure LDAP (LDAPS) as the connection protocol, choose the domain that you want to synchronize from, and then click **Confirm**.  
  **Note** If you don't check **LDAP over SSL**, DirSync will continue to use the LDAP connection protocol.  
  LDAP (Lightweight Directory Application Protocol) and Secure LDAP (LDAPS) are the connection protocols used between an application and the Domain Controller within the infrastructure. LDAPS communication is encrypted and secure.  
  • If you choose **AD LDS**, enter the host, domain, and port and then click **Refresh** to load all application partitions. Then select the partition from the drop-down list and click **Confirm**. See the **AD LDS** section for more information. |
| **Step 4** | After the Cisco Directory Connector **Confirm Organization** screen appears, click **Confirm**.  
If you already bound AD DS/AD LDS, the **Confirm Organization** screen appears. |
| **Step 5** | Click **Confirm**. |
| **Step 6** | Choose one, depending on the number of Active Directory domains you want to bind to Directory Connector:  
  • If you have a single domain that is **AD LDS**, bind to the existing AD LDS source, and then click **Confirm**.  
  • If you have a single domain that is **AD DS**, either bind to the existing domain or to a new domain. If you choose **Bind to a new domain**, click **Next**.  
  Because the existing source type is AD DS, you cannot select **AD LDS** for the new binding.  
  • If you have more than one domain, choose an existing domain from the list or **Bind to a new domain** and then click **Next**.  
  Because you have more than one domain, the existing source type must be **AD DS**. If you choose **Bind to a new domain** and click **Next**, you cannot select **AD LDS** for the new binding. |

### What to do next

After you sign in, you're prompted to perform a dry run synchronization. See the links below for synchronization steps.
Related Topics
   Do a Dry Run Synchronization on Your Active Directory Users, on page 18
   Do a Full Synchronization of Active Directory Users Into the Cloud, on page 22

Directory Connector Dashboard

When you first sign in to Directory Connector, the Dashboard appears. Here you can view a summary of all synchronization activities, view cloud statistics, perform a dry run synchronization, start a full or incremental synchronization and launch the event view to see error information.

Note
If your session times out, sign back in.

You can easily run these tasks from the Actions Toolbar or Actions Menu.

Table 1: Dashboard Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Synchronization</td>
<td>Displays the status information about the synchronization that is currently underway. When no synchronization is being run, the status display is idle.</td>
</tr>
<tr>
<td>Next Synchronization</td>
<td>Displays the next scheduled full and incremental synchronizations. If no schedule is set, Not Scheduled is displayed.</td>
</tr>
<tr>
<td>Last Synchronization</td>
<td>Displays the status of the last two synchronizations performed.</td>
</tr>
<tr>
<td>Current Synchronization Status</td>
<td>Displays the overall status of the synchronization.</td>
</tr>
<tr>
<td>Connectors</td>
<td>Displays the current on-premises connectors that are available to the Cloud.</td>
</tr>
<tr>
<td>Cloud Statistics</td>
<td>Displays the overall status of the synchronization.</td>
</tr>
<tr>
<td>Synchronization Schedule</td>
<td>Displays the synchronization schedule for incremental and full synchronization.</td>
</tr>
<tr>
<td>Configuration Summary</td>
<td>Lists the settings that you changed in the configuration. For example, the summary might include the following:</td>
</tr>
<tr>
<td></td>
<td>• All objects will be synchronized</td>
</tr>
<tr>
<td></td>
<td>• All users will be synchronized</td>
</tr>
<tr>
<td></td>
<td>• Deleted threshold has been disabled.</td>
</tr>
</tbody>
</table>

Table 2: Actions Toolbar

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Incremental Sync</td>
<td>Manually start an incremental synchronization (disabled when you pause or disable synchronization, if a full synchronization was not completed, or if synchronization is in progress)</td>
</tr>
<tr>
<td>Sync Dry Run</td>
<td>Perform a dry run synchronization.</td>
</tr>
</tbody>
</table>
Start Incremental Sync | Manually start an incremental synchronization (disabled when you pause or disable synchronization, if a full synchronization was not completed, or if synchronization is in progress)
---|---
Launch Event Viewer | Launch the Microsoft Event Viewer.
Refresh | Refresh the Cisco Directory Connector dashboard

Table 3: Actions Menubar

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sync Now</td>
<td>Start a full synchronization instantly.</td>
</tr>
<tr>
<td>Synchronization Mode</td>
<td>Select either incremental or full synchronization mode.</td>
</tr>
<tr>
<td>Reset Connector Secret</td>
<td>Establish a conversation between Cisco Directory Connector and the connector service. Selecting this action will reset the secret in the cloud and then saves the secret locally.</td>
</tr>
<tr>
<td>Dry Run</td>
<td>Perform a test of the synchronization process. You must do a dry run before you do a full synchronization.</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>Turn on/off troubleshooting.</td>
</tr>
<tr>
<td>Refresh</td>
<td>Refresh the Cisco Directory Connector main screen.</td>
</tr>
<tr>
<td>Exit</td>
<td>Exit Cisco Directory Connector.</td>
</tr>
</tbody>
</table>

Table 4: Key Combinations

<table>
<thead>
<tr>
<th>Key Combination</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt +A</td>
<td>Show the Actions menu</td>
</tr>
<tr>
<td>Alt +A + S</td>
<td>Synchronization now</td>
</tr>
<tr>
<td>Alt +A + R</td>
<td>Reset Connector Secret</td>
</tr>
<tr>
<td>Alt +A + D</td>
<td>Dry run</td>
</tr>
<tr>
<td>Alt +A + S + I</td>
<td>Incremental synchronization</td>
</tr>
<tr>
<td>Alt +A + S + F</td>
<td>Full synchronization</td>
</tr>
<tr>
<td>Alt + H</td>
<td>Show Help menu</td>
</tr>
<tr>
<td>Alt + H + H</td>
<td>Help</td>
</tr>
<tr>
<td>Alt + H + A</td>
<td>About</td>
</tr>
<tr>
<td>Alt + H + F</td>
<td>FAQ</td>
</tr>
</tbody>
</table>
Set Automatic Upgrades for Cisco Directory Connector

It's always important to keep your Cisco Directory Connector software up to date to the latest version. We recommend that you use this procedure to allow automatic upgrades to the software to be installed silently when they're available.

Procedure

Step 1
From Cisco Directory Connector, go to **Configuration > General**, and then check **Automatically upgrade to the new Cisco Directory Connector version**.

Step 2
Click **Apply** to save your changes.

The app installs new software upgrades as soon as they're available.

Note
You can manually manage upgrades, if you prefer. See **Upgrade to the Latest Cisco Directory Connector** for more information.

Map User Attributes

You can map attributes from your local Active Directory to corresponding attributes in the cloud. The only required field is the *uid*.

You can choose what Active Directory attribute to map to the cloud—for example, you can map `firstName` `lastName` in Active Directory or a custom attribute expression to `displayName` in the cloud.

Note
Accounts in Active Directory must have an email address; the uid maps by default to the `ad` field of mail (not `sAMAccountName`).

If you choose to have the preferred language come from your Active Directory, then Active Directory is the single source of truth: users won't be able to change their language setting in Cisco Webex Settings and administrators won't be able to change the setting in Cisco Webex Control Hub.

Procedure

Step 1
From Cisco Directory Connector, click **Configuration**, and then choose **User Attribute Mapping**.

This page shows the attribute names for Active Directory (on the left) and the Cisco Webex cloud (on the right). All required attributes are marked with a red asterisk.

Step 2
Scroll down to the bottom of the **Active Directory Attribute Names**, and then choose one of these Active Directory attributes to map to the cloud attribute **uid**.
• **mail**—Used by most deployments for email format.
• **userPrincipalName**—An alternative choice if your mail attribute is used for other purposes in Active Directory. This attribute must be in email format.

You can map any of the other Active Directory attributes to uid, but we recommend that you use mail or userPrincipalName, as covered in the guidelines above. To see what attributes in Active Directory correspond to in the cloud, see [Active Directory Attributes in Cisco Directory Connector](#).

**Caution** For the synchronization to work, you must make sure the Active Directory attribute that you choose is in email format. Cisco Directory Connector shows a pop up to remind you if you don't choose one of the recommended attributes.

**Step 3** If the predefined Active Directory attributes do not work for your deployment, click the attribute drop-down, scroll to the bottom, and then choose **Customize Attribute** to open a window that lets you define an attribute expression.

**Tip** Click **Help** to get more information about the expressions and see examples of how expressions work. You can also see [Expressions for Customized Attributes, on page 12](#) for more information.

In this example, let's map the Active Directory attributes `givenName` and `Sn` to the cloud attribute `displayName`:

a) Define the attribute expression as `givenName + " " + Sn` (the quotes being an extra space), and then provide an existing user email to verify.

b) Click **Verify**, and see if the result matches what you were expecting.

A successful result looks like this:

```
step 3: if the predefined active directory attributes do not work for your deployment, click the attribute drop-down, scroll to the bottom, and then choose customize attribute to open a window that lets you define an attribute expression.

**tip** click help to get more information about the expressions and see examples of how expressions work. you can also see expressions for customized attributes, on page 12 for more information.

in this example, let's map the active directory attributes givenName and Sn to the cloud attribute displayName:

a) Define the attribute expression as givenName + " " + Sn (the quotes being an extra space), and then provide an existing user email to verify.

b) Click verify, and see if the result matches what you were expecting.

A successful result looks like this:

```

```
c) If the results are what you expected, click **OK** to save the new customized attribute.

Later, if you want to change the `displayName`, you can enter a new attribute expression.
Cisco Directory Connector verifies the attribute value of uid in the identity service and retrieves 3 available users under the current user filter options. If all of these 3 users have a valid email format, Cisco Directory Connector shows the following message:

If the attribute can't be verified, you'll see the following warning and can return to Active Directory to check and fix the user data:

Step 4  After you make your choices, click Apply.

Any user data that is contained in Active Directory overwrites the data in the cloud that corresponds to that user. For example, if you created a user manually in Cisco Webex Control Hub, the user’s email address must be identical to the email in Active Directory. Any user without a corresponding email address in Active Directory is deleted.

Active Directory Attributes in Cisco Directory Connector

You can map attributes from your local Active Directory to corresponding attributes in the cloud by using the User Attribute Mapping tab.
This table compares the mapping between the Active Directory Attribute Names and the Cisco Cloud Attribute Names. These values and mappings are the default setting in Cisco Directory Connector. You can choose different attributes in the Active Directory drop-downs and determine which on-premises attribute synchronizes to which cloud attribute.

Think of the drop-down attributes as presets. As an alternative, you can also specify a customized attribute, your own preset, in Active Directory (an expression with multiple attributes) to map to a single cloud attribute. This way, you have the flexibility to determine the display names of your users—for example, you can add an expression that creates a customized attribute based on the employee title, given name, and surname in Active Directory.

You can also specify any of the Active Directory attributes to map to uid in the cloud. However, you must make sure that the on-premises attribute follows email format.

<table>
<thead>
<tr>
<th>Active Directory Attribute Names</th>
<th>Cisco Cloud Attribute Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>buildingName</td>
</tr>
<tr>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td>departmentNumber</td>
<td>departmentNumber</td>
</tr>
<tr>
<td>displayName</td>
<td>displayName</td>
</tr>
<tr>
<td>employeeNumber</td>
<td>employeeNumber</td>
</tr>
<tr>
<td>employeeType</td>
<td>employeeType</td>
</tr>
<tr>
<td>facsimileTelephoneNumber</td>
<td>facsimileTelephoneNumber</td>
</tr>
<tr>
<td>givenName</td>
<td>givenName</td>
</tr>
<tr>
<td>l</td>
<td>jabberID</td>
</tr>
<tr>
<td>—</td>
<td>locale</td>
</tr>
<tr>
<td>manager</td>
<td>manager</td>
</tr>
<tr>
<td>mobile</td>
<td>mobile</td>
</tr>
<tr>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>ou</td>
<td>ou</td>
</tr>
<tr>
<td>physicalDeliveryOfficeName</td>
<td>physicalDeliveryOfficeName</td>
</tr>
<tr>
<td>postalCode</td>
<td>postalCode</td>
</tr>
</tbody>
</table>
Expressions for Customized Attributes

This table summarizes the available operators and provides examples for customized attributes in Cisco Directory Connector.

Table 5: Expressions for Customized Attributes

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description and Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>Removes all characters from the beginning of the string to the position of the character or string argument, if matched.</td>
</tr>
<tr>
<td></td>
<td><strong>Example Expression</strong></td>
</tr>
<tr>
<td></td>
<td>&quot;<a href="mailto:abc@example.com">abc@example.com</a>&quot; % &quot;@&quot;</td>
</tr>
<tr>
<td></td>
<td><strong>Result</strong></td>
</tr>
<tr>
<td></td>
<td>example.com</td>
</tr>
<tr>
<td>Operator</td>
<td>Description and Example</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| -        | Strips the back of the input string from the end of the specified string.  
**Example Expression**  
"abc@example.com" - "@"  
**Result**  
abc |
| +        | Concatenates input strings or expressions.  
**Example Expression**  
"abc" + "" + "def"  
**Result**  
abc def |
| | | Evaluates the separated expressions against the empty string, and selects the first non-empty result.  
**Example Expression**  
"" | "abc"  
**Result**  
abc |

## Synchronize Directory Avatars From an Active Directory Attribute to the Cloud

You can synchronize your users' directory avatars to the cloud so that each avatar appears when they sign in to the Cisco Webex Teams app. Use this procedure to synchronize raw avatar data from an Active Directory attribute.

### Procedure

**Step 1**  
From Cisco Directory Connector, go to **Configuration**, click **Avatar**, and then check **Enable**.

**Step 2**  
For **Get avatar from**, choose **AD attribute**, and then choose the **Avatar attribute** that contains the raw avatar data that you want to synchronize to the cloud.

**Step 3**  
To verify that the avatar is accessed correctly, enter a user's email address and then click **Get user's avatar**. The avatar appears to the right.

**Step 4**  
After you verify that the avatar appeared correctly, click **Apply** to save your changes.

- The images that are synchronized become the default avatar for users in the Cisco Webex Teams app. Users are not allowed to set their own avatar after this feature is enabled from Cisco Directory Connector.
- The user avatars synchronize over to both Cisco Webex Teams and any matching accounts on the WebEx site.
What to do next

Do a dry run synchronization; if there are no issues, then do a full synchronization to get your Active Directory user accounts and avatars to synchronize into the cloud and appear in Cisco Webex Control Hub.

Synchronize Directory Avatars From a Resource Server to the Cloud

You can synchronize your users' directory avatars to the cloud so that each avatar appears when they sign in to the Cisco Webex Teams app. Use this procedure to synchronize avatars from a resource server.

Before you begin

- The URI pattern and variable value in this procedure are examples. You must use actual URLs where your directory avatars are located.

- The avatar URI pattern and the server where the avatars reside must be reachable from the Cisco Directory Connector application. The connector needs http or https access to the images, but the images don't need to be publicly accessible on the internet.

- The avatar data synchronization is separated from the Active Directory user profiles. If you run a proxy, you must ensure that avatar data can be accessed by NTLM authentication or basic-auth.

Procedure

**Step 1**

From Cisco Directory Connector, go to Configuration, click Avatar, and then check Enable.

**Step 2**

For Get avatar from, choose Resource server and then enter the Avatar URI Pattern—For example, http://www.example.com/dir/photo/zoom/{mail: .*?(?=.*@.*)}.jpg

Let's look at each part of the avatar URI pattern and what they mean:

- **http://www.example.com/dir/photo/zoom/**—The path to where all of the photos that will be synced is located. It has to be a URL which the Cisco Directory Connector service on your server must be able to reach.

- **mail:**—Tells Cisco Directory Connector to get the value of the mail attribute from Active Directory

- **.*?(?=.*@.*)**—A regex syntax that performs these functions:

  - .*—Any character, repeating zero or more times.

  - ?—Tells the preceding variable to match as few characters as possible.

  - *(?=.*@.*)—Matches a group after the main expression without including it in the result. Directory Connector looks for a match and doesn't include it in the output.

  - @.—The at-symbol, followed by any character, repeating zero or more times.

- **.jpg**—The file extension for your users' avatars. See supported file types in this document and change the extension accordingly.

**Step 3**

(Optional) If your resource server requires credentials, check Set user credential for avatar, then either choose Use current service logon user or Use this user and enter the password.
**Step 4** Enter the **Variable Value**—For example: `abcd@example.com`.

**Step 5** Click **Test** to make sure the avatar URI pattern works correctly.

**Example:**
In this example, if the mail value for one AD entry is `abcd@example.com` and jpg images were being synchronized, the **Final Avatar URI** is `http://www.example.com/dir/photo/zoom/abcd.jpg`.

**Step 6** After the URI information is verified and looks correct, click **Apply**.

For detailed information about using regular expressions, see the [Microsoft Regular Expression Language Quick Reference](#).

- The images that are synchronized become the default avatar for users in the Cisco Webex Teams app. Users are not allowed to set their own avatar after this feature is enabled from Cisco Directory Connector.
- The user avatars synchronize over to both Cisco Webex Teams and any matching accounts on the WebEx site.

**What to do next**
Do a dry run synchronization; if there are no issues, then do a full synchronization to get your Active Directory user accounts and avatars to synchronize into the cloud and appear in Cisco Webex Control Hub.

---

**Synchronize On-Premises Room Information to the Cisco Webex Cloud**

Use this procedure to synchronize on-premises room information from Active Directory into the Cisco Webex cloud. After you synchronize the room information, the on-premises room devices with a configured, mapped SIP address show up as searchable entries on cloud-registered room devices, such as a Cisco Webex Room Device or Cisco Webex Board.

**Procedure**

**Step 1** From the Cisco Directory Connector, go to **Configuration**, and then choose **Object Selection**.

**Step 2** Check **Identify Room** to separate the room data from the user data so it's identified properly.

When this setting is disabled, room data is treated the same way as user synchronized data.

**Step 3** Go to **User Attribute Mapping**, and then change the attribute mapping for the cloud attribute `sipAddresses;type=enterprise`.

- Choose **MSRTCSIP-PrimaryUserAddress** if available.
- If you don't have the above attribute in your Active Directory schema, use another field such as `ipPhone`.

**Step 4** Create a Room Resource mailbox in Exchange. This adds the `msExchResourceMetaData;ResourceType:Room` attribute which the Cisco Directory Connector then uses to identify rooms.
Step 5  From AD users and computers, navigate to and edit properties of the Room. Add the Fully Qualified SIP URI with a prefix of sip:

Step 6  Do a dry run sync and then a full run sync in Cisco Directory Connector

The new room objects are listed Objects Added and matched room objects appear in Objects Matched in the dry run report. Any room objects flagged for deletion are under Rooms Deleted.

The dry run results show any room resources that were matched.
This setting separates the Active Directory room data (including the room's attribute) from user data. After the synchronization finishes, the Cisco Directory Connector dashboard shows room data that was uploaded to the cloud.

**What to do next**

Now that you've done these steps, when you do a search on a Cisco Webex Room Device or Cisco Webex Board, you'll see the synchronized room entries that are configured with SIP addresses. When you place a call from the Webex device on that entry, a call will be placed to the SIP address that has been configured for the room.

---

**Note**

The endpoint cannot loop a call back to Cisco Webex Teams. For test dialing devices, these devices need to be registered as a SIP URI on-premises or somewhere other than Webex Teams. If the AD room system you are searching for is registered to Webex and the same email address is on the Webex Room Device or Webex Board for Calendar Service, then the search results won't show the duplicate entry, the Webex Room or Board is dialed directly in Webex Teams, and a SIP call is not made.
Provision Users with Cisco Directory Connector

Follow these steps to provision Active Directory users for Cisco Webex accounts. You can provision users from a multiple domain Active Directory deployment (with either a single forest or multiple forests) after you install Cisco Directory Connector 3.0. During the process to onboard users from different domains, you must decide whether to retain or delete the user objects which might already exist in the Cisco Webex cloud—for example, test accounts from a trial. The goal is to have an exact match between your Active Directories and the Cisco Webex cloud.

Procedure

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<td>Perform a dry run to compare objects in the on-premises Active Directory and objects in the Cisco Webex cloud. A dry run allows you to see what objects will be added, modified, or deleted before you run a full or incremental synchronization and commit the changes to the cloud.</td>
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<td><strong>Step 2</strong> Do a Full Synchronization of Active Directory Users Into the Cloud, on page 22</td>
<td>When you run a full synchronization, the connector service sends all filtered objects from your Active Directory (AD) to the cloud. The connector service then updates the identity store with your AD entries. If you created an auto-assign license template, you can assign that to the newly synchronized users.</td>
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<td><strong>Step 3</strong> Assign Cisco Webex Services to Directory Synchronized Users in Cisco Webex Control Hub, on page 24</td>
<td>After you complete a full user synchronization from Cisco Directory Connector into Cisco Webex Control Hub, you can assign the same Cisco Webex service licenses to all of your users at once or add additional licenses to new users if you already configured an auto-assigned license template. You can make individual changes after this initial step.</td>
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Do a Dry Run Synchronization on Your Active Directory Users

Perform a dry run to compare objects in the on-premises Active Directory and objects in the Cisco Webex cloud. A dry run allows you to see what objects will be added, modified, or deleted before you run a full or incremental synchronization and commit the changes to the cloud.

During the process to onboard users from different domains, you must decide whether to retain or delete the user objects which might already exist in the Cisco Webex cloud—for example, test accounts from a trial. The goal is to have an exact match between your Active Directories and the Cisco Webex cloud.

If you have multiple domains in a single forest or multiple forests, you must do this step on each of the Cisco Directory Connector instances you've installed for each Active Directory domain.
Before you begin

Tip
You may already have some Cisco Webex Teams users before you used Cisco Directory Connector. Among the users in the cloud, some might be matched into the on-premises Active Directory and assigned licenses for services. But some may be test users that you want to delete while doing a synchronization.

Procedure

Step 1
Choose one:

• After first-time sign in, click Yes on the prompt to perform a dry run.
• If you miss a reminder to perform a dry run, at any time from Cisco Directory Connector, click Dashboard, choose Sync Dry Run, and then click OK to start a dry run synchronization.

When the dry run completes, you'll see one of the following results:

• Figure 2: Detected Mismatched Objects in Cisco Directory Connector
• Figure 3: Summary of Dry Run Report Results and Mismatched Objects in Cisco Directory Connector
The dry run identifies the users by comparing them with domain users. The application can identify the users if they belong to the current domain. In the next step, you must decide whether to delete the objects or retain them. The mismatched objects are identified as already existing in the Cisco Webex cloud but not existing in the on-premises Active Directory.

Step 2
Review the dry run results and then choose one:

- We recommend that you click **No, retain objects**, which will keep the mismatched user data and let you proceed with another dry run.
- Click **Yes, delete objects** if you want to remove mismatched user accounts, then click **Yes** to confirm the operation.

Determine whether you want to retain the users for when you synchronize the next domain in your multiple domain deployment. For the next Active Directory domain synchronization, all users in the cloud must be matched with users in the on-premises in a different Active Directory domain. You can decide to delete mismatched users. After you get an exact match between on-premises and the cloud, you can configure automatic synchronization.

Step 3
In the **Confirm Dry Run** prompt, click **Yes** to redo the dry run synchronization and view the dashboard to see the results.

Any accounts that were successfully synchronized in the dry run appear under **Objects Matched**.

If a user in the cloud doesn't have a corresponding user with the same email in Active Directory, the entry is listed under **Admin objects will be deleted**. To avoid this delete flag, you can add a user in Active Directory with the same email address.

To view the details of the items that were synchronized, click the corresponding tab for specific items or **Objects Matched**. To save the summary information, click **Save Results to File**.

Step 4
If the results are expected, go to **Actions > Synchronization mode > Enable Synchronization**, and then click **Enable Now** to do a manual synchronization and put Cisco Directory Connector in manual mode at this point.

**Note** After doing a synchronization on the last Active Directory domain in your multiple domain deployment, you must enable automatic mode for Cisco Directory Connector. You can enable automatic mode only when the objects are completely matched between the Cisco Webex cloud and all on-premises Active Directories.

**Things to Keep in Mind**

- Perform a dry run before you enable full synchronization, or when you change the synchronization parameters. If the dry run was initiated by a configuration change, you can save the settings after the dry run is complete. If you have already added users manually, performing an Active Directory synchronization may cause previously added users to be removed. You can check the Cisco Directory Connector Dry Run Reports to verify that all expected users are present before you fully synchronize to the cloud.

- If matched users are marked to be deleted and you're not sure how to proceed, see troubleshooting information and how to contact support in **Troubleshooting and Fixes for Cisco Directory Connector**.

**Note** Deleted users are kept in the cloud identity service for 7 days before they are permanently deleted.
- Cisco Directory Connector is case sensitive, so ensure that your user data shows up correctly in the dry run synchronization report before you proceed. You may have to make modifications in Active Directory if you notice any errors.

What to do next
- Choose a synchronization type:
  - **Do a Full Synchronization of Active Directory Users Into the Cloud**, on page 22 for when you first synchronize new users to the cloud. You do so from **Actions > Sync Now > Full**, and then users from the current domain are synchronized.
  - **Set the Connector Schedule** and **Run an Incremental Synchronization** after you run a full synchronization and if you want to pick up changes after the initial synchronization. This type of synchronization is recommended to pick up on small changes made to the Active Directory user source.
    
    By default, an incremental synchronization is set to occur every 30 minutes, but you can change this value. The incremental synchronization does not occur until you initially perform a full synchronization.
  - If you have multiple domains, repeat these steps on any other Cisco Directory Connector that you've installed.

Do a Full Synchronization of Active Directory Users Into the Cloud

When you run a full synchronization, the connector service sends all filtered objects from your Active Directory (AD) to the cloud. The connector service then updates the identity store with your AD entries. If you created an auto-assign license template, you can assign that to the newly synchronized users.

If you have multiple domains, you must do this step on each of the Cisco Directory Connector instances you've installed for each Active Directory domain.

Cisco Directory Connector synchronizes the user account state—In Active Directory, any users that are marked as disabled appear as disabled in the cloud, too.

Before you begin
- If you want the Cisco Webex Teams user accounts to be activated after the full synchronization and before they sign in for the first time, you must do these steps to bypass the email validation:
  - Use Cisco Webex Control Hub to verify domains contained in the email addresses. Then contact the Cisco TAC to optionally claim the domains. See “Add, Verify, and Claim Domains”.
  - **Suppress automatic email invites**, so that new users won't receive the automatic email invitation to Webex Teams. (You can do your own email campaign.)

> **Note**

Activated users still appear with an Invite Pending status in Control Hub. After they sign in, they appear as Active.
• When you enable synchronization, Cisco Directory Connector asks you to perform a dry run first. We recommend that you do a dry run before a full synchronization to catch any potential errors.

• You must set up an auto-assign license template before you use it on new Cisco Webex Teams users that you synchronized from Active Directory.

Procedure

Step 1

Choose one:

• After first-time sign in, if the dry run is complete and looks correct for all domains, click Enable Now to allow automatic synchronization to occur.

• From Cisco Directory Connector, go to the Dashboard, click Actions, choose Synchronization Mode > Enable Synchronization, and then click Sync Now > Full to start the synchronization.

Step 2

Confirm the start of the synchronization.

For any changes that you make to users in Active Directory (for example, display name), Cisco Webex Control Hub reflects the change immediately when you refresh the user view, but the Cisco Webex Teams app reflects the changes 72 hours from when you perform the synchronization.

Tip You can try to clear the local cache for the Webex Teams app by following these directions: Windows or Mac.

• During the synchronization, the dashboard shows the synchronization progress; this may include the type of synchronization, the time it started, and what phase in which the synchronization is currently running.

• After synchronization, the Last Synchronization and Cloud Statistics sections are updated with the new information. User data is synchronized to the cloud.

• If errors occur during the synchronization, the status indicator ball turns red.

Step 3

Click Refresh if you want to update the status of the synchronization. (Synchronized items appear under Cloud Statistics.)

Step 4

For information about errors, select the Launch Event Viewer from the Actions toolbar to view the error logs.

Step 5

To set a synchronization schedule for ongoing incremental syncs to the cloud, see Set the Connector Schedule and Run an Incremental Synchronization.

• After full synchronization is completed, the status for directory synchronization updates from Disabled to Operational on the Settings page in Cisco Webex Control Hub.

• When all data is matched between on-premises and cloud, Cisco Directory Connector changes from manual mode to automatic synchronization mode.

• Unless you integrate Single Sign-On, verify domains, and optionally get Cisco TAC to claim domains for the email accounts that you synchronized, and suppress automated emails, the Cisco Webex Teams user accounts remain in a pending activation state until users sign in to Cisco Webex Teams for the first time to confirm their accounts. See the Before You Begin section for guidance on how to synchronize the accounts as activated users.
• If you have multiple domains, do this step on any other Cisco Directory Connector that you've installed. After synchronization, the users on all domains you added are listed in Cisco Webex Control Hub.

• If you integrated Single Sign-On with Cisco Webex and suppressed email notifications, the email invitations are not sent out to the newly synchronized users.

• You cannot manually add users in Cisco Webex Control Hub after the first manual synchronization from Cisco Directory Connector. User management is performed from Cisco Directory Connector after the first synchronization.

What to do next

• If you remove a user from Active Directory, the user is deleted after the next Cisco Directory Connector synchronization. If you disable a user through Active Directory (by checking Account is disabled in the Active Directory interface), the user is changed to inactive but the user profile data is kept in the backend. Each action has a different logic, but in both cases the user account disappears from the Cisco Webex Control Hub.

  Note

  Deleted users are kept in the cloud identity service for 7 days before they are permanently deleted.

• Note these exceptions to an incremental synchronization (follow the full synchronization steps above instead):
  
  • In the case of an updated avatar but no other attribute change, incremental sync won't update the user's avatar to the cloud.
  
  • Configuration changes on attribute mapping, base DN, filter, and avatar setting require a full synchronization.

Assign Cisco Webex Services to Directory Synchronized Users in Cisco Webex Control Hub

After you complete a full user synchronization from Cisco Directory Connector in to Cisco Webex Control Hub, you can use Cisco Webex Control Hub to assign the same Cisco Webex service licenses to all of your users at once or add additional licenses to new users if you already configured an auto-assigned license template. You can make individual user account changes after this initial step.

When you assign a license to a Cisco Webex Teams user, that user receives an email confirming the assignment, by default. The email is sent by a notification service in Cisco Webex Control Hub. If you integrated Single Sign-On with your Cisco Webex organization, you can also suppress these automatic email notifications if you prefer to contact your users directly.

Before you begin

• You must set up an auto-assign license template before you use it on new Cisco Webex Teams users that you synchronized from Active Directory.

• Do a Dry Run Synchronization on Your Active Directory Users, on page 18
• Do a Full Synchronization of Active Directory Users Into the Cloud, on page 22

**Procedure**

**Step 1**
From the customer view in https://admin.webex.com, go to Users, click Manage Users, choose Modify all synchronized users, and then click Next.

**Step 2**
If you suppressed email notifications, read the prompt that appears and then click Next.

**Step 3**
On Sync Status, click the refresh arrow to reload the list, click Next, and then choose one:

- Check the Cisco Webex services that you want to apply initially to all of the synchronized users.
- If the license template has already been configured and activated, Cisco Webex services from the template are applied to the newly synchronized users.

**What to do next**

- If emails aren't suppressed, an email is sent to each user with an invite to join and download Cisco Webex.
- If you selected the same Cisco Webex services for all of your users, afterwards you can change license assigned individually or in bulk.

**Related Topics**

- Ways to Add and Manage Users in Your Organization

**Known Issues with Cisco Directory Connector**

- Windows Server versions prior to 2012 R2 have a cookie issue that affects Cisco Directory Connector. This issue is fixed in versions 2012 R2 and 2016.

- For any changes that you make to users in Active Directory (for example, display name), Cisco Webex Control Hub reflects the change immediately when you refresh the user view, but the Cisco Webex Teams app reflects the changes 72 hours from when you perform the synchronization.

  You can try to clear the local cache for the Webex Teams app by following these directions: [Windows](#) or [Mac](#).

- If you want to deploy Hybrid Call Service in your organization, you should not use the automatic license assignment template. If new users are synchronized from Cisco Directory Connector and then automatically enabled for Call Service Aware or Call Service Connect, the user activation fails because Unified CM configuration is not yet in place.

- When a user uses a Webex Teams desktop or mobile app to search and call a Room that only has a synchronized SIP URI, then the call will ring indefinitely at this time.
Known Issues with Cisco Directory Connector