# **Configure Active Directory Synchronization Service (ADSS)**

Last Modified on 07/17/2024 10:05 am EDT

Starting with V10.0, Cora SeQuence has been renamed to Cora Orchestration.

#### V10.6 and later

#### Overview

After you install Cora SeQuence, you can configure the Active Directory Synchronization Service (ADSS) to import users from your Active Directories into Cora SeQuence. The Active Directory Synchronization Service will only pull information from your Active Directory and will never write to it. The configuration consists of two main procedures, each of which has numerous sub steps.

- 1. Complete the Active Directory Wizard
- 2. Configure ADSS

#### NOTE

Every user object in your Active Directory that needs to be synchronized, must have at least a First Name and a Last Name. These are mandatory fields and Cora SeQuence will not synchronize a user if these fields are empty.

Active Directory Synchronization Service (ADSS) is a Windows service that enables easier user management within Cora SeQuence. ADSS copies the structure from the Active Directory based on the filter(s) that you define. Any parent container will be placed on the top (root level), for example, Entire Organization. ADSS is an optional component that is installed by default when you install Cora SeQuence.

By default, Active Directory data is synchronized in bulk to Cora SeQuence, overwriting changes to the organization made in Cora SeQuence. This is true even if Insert/Update/Delete options have been deselected in the screen above. If you want to revert back to the synchronization behavior of previous versions, which took the above settings into account, for example, if Update is not selected, the synchronization will not overwrite records edited in Cora SeQuence, you can do so by editing the ADSS web.config file and setting this field to *false* (The default is *true*).

useBulkSynchronization="false"

### Multiple Domains Synchronization Considerations

Cora SeQuence supports multiple domains synchronization.

Please note the following considerations for multiple domains synchronization:

 Synchronizing a user who has the same display name on multiple domains: the user will by synchronized properly and each entry will be unique, since it will have a unique DN, meaning that a synchronized user will authenticate using his DOMAIN\username.
 However, the employee picker in the App Studio which is used in different activities and modules is

based on employee display name, so the same display name may appear more than once.

2. When synchronizing an OU structure from multiple domains, ensure the parent name of an OU from different domains is different, for example:

#### Domain 1

#### -> OU=Retailers-1 (Parent)

- -> OU=Retailer 1
  - -> OU=Users
- -> OU=Retailer 2
  - -> OU=Users
- -> OU=Retailer 3
  - -> OU=Users

#### Domain 2

-> OU=Retailers-2 (Parent)

- -> OU=Retailer 1
  - -> OU=Users
- -> OU=Retailer 2
  - -> OU=Users
- -> OU=Retailer 3

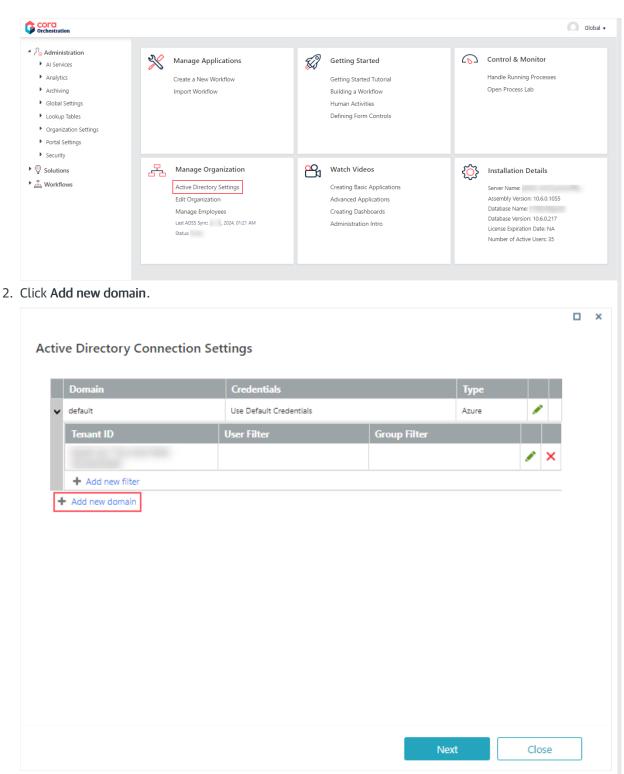
-> OU=Users

#### Prerequisites

- Verify that you have Read access to your organization's active directory.
- Administrative access to the Administration environment (i.e. global administrator).
- Knowledge of LDAP query and filter.
- Access to the Windows Services console on the server(s) where the Active Directory Synchronization Service is installed.
- Access to the external secret key storage, if external secret source is used.

#### 1. Complete the Active Directory Wizard

1. In the Administration site, click Active Directory Settings.



3. Define the Active Directory Domain (On Premises or Azure), and click Save.

### **On Premises**

The credentials are going to be used to query the Active Directory (make sure the user has permissions to do this). If **Use Default Credentials** is selected, then the user running the Active Directory Synchronization Service will be used. If you select the **Synchronize Group Managers** check box, users with the manager role in AD will be assigned the manager role in Cora SeQuence.

Active Directory Domain Wizard	×
Active Directory Domain	
Name *   AD Domain   Type *   ● On Premises ● Azure   Use Default Credentials   ✔   Credentials *   SSL   ✔   Synchronize Group Managers   ✔	
Save Cancel	

#### Azure

Copy the Client ID from your Azure AD portal, Azure Active Directory > App registration > Your app. Copy the Client Secret Key from your Azure AD portal, Azure Active Directory > App registration > Your app > Keys > Set the Expiration Duration > Click Save (the certificate value displays after you click Save). Select the Secret Source of the secret key, Internal or External.

Active Directory Domain Wizard	×
Active Directory Domain	
Name *	
AD Domain	
Type *	
O On Premises O Azure	
Client ID *	
f64a062b-4088-4790-a89b-a1549777867	
Identification *	
Client Secret Key	
<ul> <li>Certificate Thumbprint</li> </ul>	
Secret Source *	
Internal External	
Save	Cancel

- 4. (Optional) Click Add new filter to define a filter for the domain, and click Next. For more information use these links.
  - https://msdn.microsoft.com/en-us/library/azure/ad/graph/api/entity-and-complex-type-reference#group-entity
  - https://msdn.microsoft.com/en-us/library/azure/ad/graph/api/entity-and-complex-type-reference#user-entity

Copy the **Tenant ID** (Directory ID) from your Azure AD portal: **Azure Active Directory > Properties > Directory ID** (the Directory ID is the Tenant ID).

Active Directory Filter Wizard	×
Active Directory Filter	
Tenant ID *	
The identifier for the tenant that the synchronization targets.	
xxxxxxxxx-HHHH-OLYT-ABCD-xxxxxxxxxx	
Use Filters:	
User Filter	
Set the filter to retrieve specific set of users	
Group Filter	
Set the filter to retrieve specific set of groups	
O Use Group Membership:	
Group ID *	
Synchronize users only	
Save Ca	ancel

5. Select the attributes (in addition to the standard ones), that you want to import from the Active Directory to Cora SeQuence, and then click **Finish**.

You can import user photos from the Active Directory using the photo property. Any photos that are saved in this property will be imported into Cora SeQuence. Any additional properties you choose to synchronize will be added to the employees table in the Cora SeQuence database (*tblEmployees*). Apart from the photo, these properties will only be available on the database table.

## 2. Configure Active Directory Synchronization Service

- 1. Log on to the server where the Active Directory Synchronization Service is installed, and open the Services console.
- 2. Locate the Active Directory Synchronization Service, open its Properties page, and click the General tab. The service should be set to *Automatic* in the Startup Type field.

Active Directory S	ynchronization Service Properties (Local Compu 🔀
General Log On	Recovery Dependencies
Service name:	Active Directory Synchronization Service
Display <u>n</u> ame:	Active Directory Synchronization Service
Description:	This service synchronizes between Active Directory
Pat <u>h</u> to executab "C:\Program Files	le: \PNMsoft\Active Directory Synchronization Service\PNM:
Startup typ <u>e</u> :	Automatic
Help me configure	e service startup options.
Service status:	Stopped
<u>S</u> tart	Stop Pause Resume
You can specify t from here.	he start parameters that apply when you start the service
Start para <u>m</u> eters:	
	OK Cancel Apply

3. Click the Log On tab.

The user configured in this screen is the one that was specified during the Sequence installation. This is the user who will query Active Directory for the default domain and the domains that are set to use the default credentials.

ve Directory	Synchronization Service Properties (Local Comp
neral Log Or	Recovery Dependencies
og on as:	
〕 <u>L</u> ocal Syster □ Allo <u>w</u> ser	m account rvice to interact with desktop
Ihis accour	nt: DOMAINNAME\ValidUser Browse
Password:	•••••
<u>C</u> onfirm pass	sword:
elp me configu	ure user account log on options,
	ure user account log on options. • or disable this service for the hardware profiles listed belo
ou can enable	or disable this service for the hardware profiles listed belo
	or disable this service for the hardware profiles listed belo file Service
ou can enable Hardware Prof Undocked Pro	or disable this service for the hardware profiles listed belo file Service
ou can enable Hardware Prol Undocked Pro	e or disable this service for the hardware profiles listed belo file Service ofile Enabled

### NOTE

You can install the Active Directory service on multiple machines for redundancy. The Cora SeQuence engine automatically configures failover mode and no additional actions are required.

### Appendix A: Active Directory Service Config File

Open the *Active Directory Service Config* file.

By default, the file is located in C:\Program Files\PNMsoft\Active Directory Synchronization Service .

#### **IMPORTANT**

Any manual changes made to the configuration will be overwritten when you upgrade Cora SeQuence versions. It is important that you record any changes, so you can implement them after you upgrade.

The following snippet is the only part that can be edited. An explanation of each key and its valid input follows:

<adSyncronizationThread type="PNMsoft.Sequence.WindowsServices.ADSS.BuiltinThreads.ADSyncronizator, PNMsof t.Sequence.WindowsServices.ADSS" interval="60" domain="MYDOMAIN" computerNameAD="MYDOMAIN" pageSize="100" serverPageTimeLimit="60" adUniqueKey="objectGuid" startSynchLoopsAt="" stopSynchLoopsAt="" useTombstonesToDetectDeletedObjects="true" />

Key Name	Description	Valid Setting	Recommended Setting
interval	Time period in minutes that the service will pause after each update from the AD server.	Any positive integer	720
domain	Name of the domain managed by the AD server. The value is taken from the config file when the domain name of the filter is empty.	Any string (configured by the installer to what was entered in the ADSS screen)	Short name of the default domain to synchronize
computerNameAD	AD server name.	Any string, but must be equal to the domain. Configured by the installer to what was entered in the ADSS screen)	Must be equal to the domain.
pageSize	Number of records copied from the AD server each time. Should be lowered when the AD server responds slowly to avoid timeouts.	20-500	100
server Page Time Li mit	Time period in seconds that the service waits for a reply before timing out. Should be raised when the AD server responds slowly.	60-500	60
ad Unique Key	Determines the unique key setting for the AD service. Valid settings are <i>objectGuid</i> to denote using the key from the AD server, or <i>domainUserName</i> to denote a combination of the user's domain and NT user name.	objectGuid or domainUserName	objectGuid

Key Name	Description	Valid Setting	Recommended Setting
startSynchLoopsAt	Used in combination with the <i>stopSynchLoopsAt</i> attribute to limit the AD queries by hour of the day.	24 hour time format: HH:mm, for example 14:35. Other formats will not be processed.	-
stopSynchLoopsAt	Used in combination with the <i>stopSynchLoopsAt</i> attribute to limit the AD queries by hour of the day.	24 hour time format: HH:mm, for example 14:35. Other formats will not be processed.	-
useTombstonesTo DetectDeletedOjbe cts	If set to <i>true</i> Cora SeQuence recognizes tombstones, which represent objects deleted from AD and deletes (if group or OU) or made inactive (if user).	True or False	True
debugState	Obsolete	On or Off	-

## Appendix B: Add Custom Code

You can add custom code before and/or after each synchronization cycle, as follows:

- 1. Create a new class library project.
- 2. Ensure that your class inherits from *IBeforeSynchronizationCycleStarted* for code to be executed before synchronization or from *IAfterSynchronizationCycleCompleted* for code to be executed after synchronization.
- 3. Implement the method *OnBeforeSynchronizationCycleStarted* for code to be executed before synchronization or *OnAfterSynchronizationCycleCompleted* for code to be executed after synchronization.
- 4. Sign your assembly and place it on the server GAC.
- 5. Register the assembly you have just created in the following section of the config file, according to the following sample.

<eventAssemblies>

```
<\! add type="CustomEventAssemblyNamespace.CustomEventClass, CustomEventAssemblyName, Version=1.0.0.0, \\
```

- Culture=neutral, PublicKeyToken=ca08babd3815c17a" eventName="EvenetMethodName" />
- </eventAssemblies>

```
-->
```

</serviceEvents>

### NOTE

Replace *EvenetMethodName* with *OnBeforeSynchronizationCycleStarted* or *OnAfterSynchronizationCycleCompleted*.

Appendix C: Basic LDAP Syntax

<sup>&</sup>lt;serviceEvents>

<sup>&</sup>lt;!-- Example how to add custom event handler assembly to the service

Argument	Name	Description
=	Equal to	This LDAP argument means a certain attribute must be equal to a certain value to be true. For example, if you want to find all objects that have the first name of John, you would use: (givenName=John) This would return all objects that have the first name of John of the LDAP statement.
&	Logical AND	Use this syntax when you have more than one condition, and you want all conditions in the series to be true. For example, if you want to find all of the people that have the first name of John and live in Dallas, you would use: (&(givenName=John)( physicalDeliveryOfficeName=Dallas)) Notice that each argument is in its own set of parentheses. The entire the provide that each argument must be true for this fitter to apply to your object.
!	Logical NOT	This operator is used to exclude objects that have a certain attribute. Suppose you need to find all objects except those that have the first name of John. You would use the following statement: (!givenName=John) This statement would find all objects that do not have the first name of and inside the all objects that do not have the first name of and inside the all objects that do not have the first name of and inside the all objects that do not have the first name of all inside in this statement, it is surrounded with parentneses for illustration.
*	Wildcard	Use the wildcard operator to represent a value that could be equal to anything. One such situation might be if you wanted to find all objects that have a value for title. You would then use: (title=*) This would return all objects that have the title attribute populated with starts with 90. Then, you could use the following to find those: (givenName=Jo*) This would apply to all objects whose first name starts with Jo.

For more information, review the following articles:

- LDAP Query Basics: http://technet.microsoft.com/en-us/library/aa996205(v=exchg.65).aspx
- Search Filter Syntax: http://msdn.microsoft.com/en-us/library/aa746475(v=vs.85).aspx
- Active Directory, LDAP Syntax Filters: http://social.technet.microsoft.com/wiki/contents/articles/5392.active-directory-ldap-syntaxfilters.aspx

V9.x - V10.5

Overview

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- 1. Complete the Active Directory Wizard
- 2. Configure ADSS

#### NOTE

Every user object in your Active Directory that needs to be synchronized, must have at least a First Name and a Last Name. These are mandatory fields and Cora SeQuence will not synchronize a user if these fields are empty.

#### About the Active Directory Synchronization Service

Active Directory Synchronization Service (ADSS) is a Windows service that enables easier user management within Cora SeQuence. ADSS copies the structure from the Active Directory based on the filter(s) that you define. Any parent container will be placed on the top (root level), for example, Entire Organization. ADSS is an optional component that is installed by default when you install Cora SeQuence.

By default, Active Directory data is synchronized in bulk to Cora SeQuence, overwriting changes to the organization made in Cora SeQuence. This is true even if Insert/Update/Delete options have been deselected in the screen above. If you want to revert back to the synchronization behavior of previous versions, which took the above settings into account, for example, if Update is not selected, the synchronization will not overwrite records edited in Cora SeQuence, you can do so by editing the ADSS web.config file and setting this field to *false* (The default is *true*).

useBulkSynchronization="false"

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Please note the following considerations for multiple domains synchronization:

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However, the employee picker in the App Studio which is used in different activities and modules is based on employee display name, so the same display name may appear more than once.

2. When synchronizing an OU structure from multiple domains, ensure the parent name of an OU from different domains is different, for example:

#### Domain 1

- -> OU=Retailers-1 (Parent)
  - -> OU=Retailer 1
    - -> OU=Users
  - -> OU=Retailer 2

```
-> OU=Users
```

```
-> OU=Retailer 3
```

-> OU=Users

## Domain 2

```
-> OU=Retailers-2 (Parent)
```

-> OU=Retailer 1

-> OU=Users

- -> OU=Retailer 2
  - -> OU=Users

```
-> OU=Retailer 3
```

-> OU=Users

## Prerequisites

- Verify that you have Read access to your organization's active directory.
- Administrative access to the Sequence Administration environment (i.e. global administrator).
- Knowledge of LDAP query and filter.
- Access to the Windows Services console on the server(s) where the Active Directory Synchronization Service is installed.

## Procedure 1: Complete the Active Directory Wizard

1. From the Administration site, click Active Directory Settings.

Administration Solutions 3 Workflows	*	Manage Applications Create a New Workflow Import Workflow	53	Getting Started Getting Started Tutorial Building a Workflow Human Activities Defining Form Controls	6	Control and Monitor Handle Running Processes Open Process Lab
	<u>4</u>	Manage Organization Active Directory Settings Edit Organization Manage Calendars Lest ADSS Syn:: Nov 21, 2017, 12:38 PM Status: Completed	සි	Watch Videos Creating Basic Applications Advanced Applications Creating Dashboards Administration Intro	¢	Installation Details Server Name: admin.seq8.pnmsoft.com Assembly Version: 8.3.1.0 Database Version: 8.3.1.0 License Expiration Date: NA Number of Active Users: 212

2. Click Add new domain.

	Domain	Credentials	Туре				
~	PNMSOFT	Use Default Credentials	On Premises				
	LDAP Path	Filter					
	An open setting to the set	Belgeriffans oneitiffe fannin fermenis fir Periodensents fir	provide CC - No. 40				
	de-generality in the st						
	+ Add new filter						
~	test	Use Default Credentials	Azure				
	Tenant ID	User Filter	Group Filter				
	No active directory filters were defined.						
	+ Add new filter						
_	Add new domain						
+							
+							
+							
+							
+							

3. Define the Active Directory Domain (On Premises or Azure), and click Save.

#### **On Premises**

The credentials are going to be used to query the Active Directory (make sure the user has permissions to do this). If **Use Default Credentials** is selected, then the user running the Active Directory Synchronization Service will be used. If you select the **Synchronize Group Managers** check box, users with the manager role in AD will be assigned the manager role in Cora SeQuence.

Active Directory Domain Wizard	×
Active Directory Domain	
Name *   AD Domain   Type *   ● On Premises ● Azure   Use Default Credentials   ✔   Credentials *   SSL   ✔   Synchronize Group Managers	
Save Cancel	

#### Azure

Copy the **Client ID** from your Azure AD portal: **Azure Active Directory** > **App registration** > *Your app*. Copy the **Client Secret Key** from your Azure AD portal: **Azure Active Directory** > **App registration** > *Your app* > **Keys** > **Set the Expiration Duration** > **Click Save** (the certificate value displays after you click Save).

tive Directory Domain Wizard			
Active Directory Domain			
Name *			
AD Domain			
Type *			
On Premises O Azure			
Client ID *			
f64a062b-4088-4790-a89b-a154975	33214		
Identification *			
Client Secret Key			
O Certificate Thumbprint			
	Save	Ca	ncel

- 4. (Optional) Define a filter for the domain, and click Next.
  - For more information use these links.
    - https://msdn.microsoft.com/en-us/library/azure/ad/graph/api/entity-and-complex-type-reference#group-entity
    - https://msdn.microsoft.com/en-us/library/azure/ad/graph/api/entity-and-complex-type-reference#user-entity

	Domain	Cree	lentials	Туре		
~	AD Domain		Use Default Credentials		1	>
	Tenant ID		User Filter	Group Filter		
	No active directory filters	were defined				
	+ Add new filter					
*	PNMSOFT	Use	Default Credentials	On Premise	s 🧳	
	LDAP Path	Filter				
	de-presentation front	Sector Sector	the state of the later state		1	>
	de-president field	(property) (reserves)	n Supercoloud standard - Science advisor		- /	>
	+ Add new filter					
+ .	Add new domain					
H	<ul> <li>▲ 1 2 </li> <li>▶ ●</li> </ul>				3 items in 2 p	ages

Copy the **Tenant ID** (Directory ID) from your Azure AD portal: **Azure Active Directory > Properties > Directory ID** (the Directory ID is the Tenant ID).

Active Directory Filter Wizard			×
Active Directory Filter			
* <b>Tenant ID</b> The identifier for the tenant that the synchronizati	on targets.		
0XXXXXX-YYYY-HHHH-ABCD-123456789123	5	×	
<b>User Filter</b> Set the filter to retrieve specific set of users			
<b>Group Filter</b> Set the filter to retrieve specific set of groups			
	Save	Cancel	

5. Select the attributes (in addition to the standard ones), that you want to import from the Active Directory to Cora SeQuence, and then click **Finish**.

You can import user photos from the Active Directory using the photo property. Any photos that are saved in this property will be imported into Cora SeQuence. Any additional properties you choose to synchronize will be added to the employees table in the Cora SeQuence database (*tblEmployees*). Apart from the photo, these properties will only be available on the database table.

## Procedure 2: Configure Active Directory Synchronization Service

- 1. Log on to the server where the Active Directory Synchronization Service is installed, and open the Services console.
- 2. Locate the Active Directory Synchronization Service, open its Properties page, and click the General tab. The service should be set to *Automatic* in the Startup Type field.

Active Directory Synchronization Service Properties (Local Compu 🗙						
General Log On Recovery Dependencies						
Service name:	Active Directory Synchronization Service					
Display <u>n</u> ame:	Active Directory Synchronization Service					
Description:	This service synchronizes between Active Directory And database.					
-	Path to executable: "C:\Program Files\PNMsoft\Active Directory Synchronization Service\PNM:					
Startup typ <u>e</u> :	Automatic					
Help me configu	Help me configure service startup options.					
Service status:	vice status: Stopped					
<u>S</u> tart	Stop <u>P</u> ause <u>R</u> esume					
You can specify the start parameters that apply when you start the service from here.						
Start parameters:						
	OK Cancel Apply					

3. Click the Log On tab.

The user configured in this screen is the one that was specified during the Sequence installation. This is the user who will query Active Directory for the default domain and the domains that are set to use the default credentials.

Active Directory Synchroniza	tion Service Properties (Local Compu 🔀
General Log On Recovery	Dependencies
Log on as:	
C Local System account	t with desktop
• Ihis account:	IAINNAME\ValidUser
Password:	•••••
Confirm password:	•••••
Help me configure user accou	nt log on options.
You can enable or disable this	service for the hardware profiles listed below:
Hardware Profile	Service
Undocked Profile	Enabled
Troubleshooting using hardwa	re profiles. Enable Disable
[	OK Cancel <u>Apply</u>

**NOTE**: You can install the Active Directory service on multiple machines for redundancy. The Cora SeQuence engine automatically configures failover mode and no additional actions are required.

### Appendix A: Active Directory Service Config File

Open the Active Directory Service Config file.

By default, the file is located in C:\Program Files\PNMsoft\Active Directory Synchronization Service .

**IMPORTANT**: Any manual changes made to the configuration will be overwritten when you upgrade Cora SeQuence versions. It is important that you record any changes so you can implement them after you upgrade.

The following snippet is the only part that can be edited. An explanation of each key and its valid input follows:

<adSyncronizationThread type="PNMsoft.Sequence.WindowsServices.ADSS.BuiltinThreads.ADSyncronizator, PNMsof t.Sequence.WindowsServices.ADSS"

interval="60"
domain="MYDOMAIN"
computerNameAD="MYDOMAIN"
pageSize="100"
serverPageTimeLimit="60"
adUniqueKey="objectGuid"
startSynchLoopsAt=""
stopSynchLoopsAt=""
useTombstonesToDetectDeletedObjects="true" />

Key Name	Description	Valid Setting	Recommended Setting
----------	-------------	---------------	------------------------

Key Name	Description	Valid Setting	Recommended Setting
interval	Time period in minutes that the service will pause after each update from the AD server.	Any positive integer	720
domain	Name of the domain managed by the AD server. The value is taken from the config file when the domain name of the filter is empty.	Any string (configured by the installer to what was entered in the ADSS screen)	Short name of the default domain to synchronize
computerNameAD	AD server name. (Obsolete from Cora SeQuence v7.4)	Any string, but must be equal to the domain. Configured by the installer to what was entered in the ADSS screen)	Must be equal to the domain.
pageSize	Number of records copied from the AD server each time. Should be lowered when the AD server responds slowly to avoid timeouts.	20-500	100
serverPageTimeLimit	Time period in seconds that the service waits for a reply before timing out. Should be raised when the AD server responds slowly.	60-500	60
adUniqueKey	Determines the unique key setting for the AD service. Valid settings are <i>objectGuid</i> to denote using the key from the AD server, or <i>domainUserName</i> to denote a combination of the user's domain and NT user name.	objectGuid or domainUserName	objectGuid
startSynchLoopsAt	Used in combination with the <i>stopSynchLoopsAt</i> attribute to limit the AD queries by hour of the day.	24 hour time format: HH:mm, for example 14:35. Other formats will not be processed.	-

Key Name	Description	Valid Setting	Recommended Setting
stopSynchLoopsAt	Used in combination with the <i>stopSynchLoopsAt</i> attribute to limit the AD queries by hour of the day.	24 hour time format: HH:mm, for example 14:35. Other formats will not be processed.	-
useTombstonesToDetect DeletedOjbects	If set to <i>true</i> Cora SeQuence recognizes tombstones, which represent objects deleted from AD and deletes (if group or OU) or made inactive (if user).	True or False	True
debugState	Obsolete	On or Off	-

## Appendix B: Add Custom Code

#### Adding Custom Code

You can add custom code before and/or after each synchronization cycle, as follows:

- 1. Create a new class library project.
- 2. Ensure that your class inherits from *IBeforeSynchronizationCycleStarted* for code to be executed before synchronization or from *IAfterSynchronizationCycleCompleted* for code to be executed after synchronization.
- 3. Implement the method *OnBeforeSynchronizationCycleStarted* for code to be executed before synchronization or *OnAfterSynchronizationCycleCompleted* for code to be executed after synchronization.
- 4. Sign your assembly and place it on the server GAC.
- 5. Register the assembly you have just created in the following section of the config file, according to the following sample.

#### <serviceEvents>

```
<!-- Example how to add custom event handler assembly to the service
<eventAssemblies>
<add type="CustomEventAssemblyNamespace.CustomEventClass, CustomEventAssemblyName, Version=1.0.0.0,
Culture=neutral, PublicKeyToken=ca08babd3815c17a" eventName="EvenetMethodName" />
</eventAssemblies>
--->
</serviceEvents>
```

**NOTE**: Replace *EvenetMethodName* with *OnBeforeSynchronizationCycleStarted* or *OnAfterSynchronizationCycleCompleted*.

### Appendix C: Basic LDAP Syntax

Argument	Name	Description
=	Equal to	This I DAP argument means a certain attribute must be equal to a certain first name of John, you would use: (givenName=John) This would return all objects that have the first name of John Parentheses are included to emphasize the beginning and end of the LDAP statement.
&	Logical AND	Use this syntax when you have more than one condition, and you want all people that have the first name of John and twe in Dallas, you would use: (&(givenName=John)( physicalDeliveryOfficeName=Dallas)) Notice that each argument is in its own set of, parentheses. The entire LDAP office that each argument must be true for this fifter to apply to your object.
!	Logical NOT	This operator is used to exclude objects that have a certain attribute name of John. You would use the following statement: (!givenName=John) This statement would find all objects that do not have the first name of the first nam
*	Wildcard	Use, the wildcard operator to represent a value that could be equal to have a "value for title. You would then use: (title=*) This would return all objects that have the title attribute populated with a with Jo. Then, you could use the following to find those: (givenName=Jo*) This would apply to all objects whose first name starts with Jo.

For more information please review the following articles:

- LDAP Query Basics http://technet.microsoft.com/en-us/library/aa996205(v=exchg.65).aspx
- Search Filter Syntax http://msdn.microsoft.com/en-us/library/aa746475(v=vs.85).aspx
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