



Simba Salesforce SAP Data Services Data Adapter

Installation and Configuration Guide

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About This Guide

Purpose

The *Simba Salesforce SAP Data Services Data Adapter Installation and Configuration Guide* explains how to install and configure the Simba Salesforce SAP Data Services Data Adapter in your SAP Data Services system so that you can use the adapter to work with data from Salesforce.com. This guide also includes detailed information about the adapter options and object parameters that you can configure when using the adapter in SAP Data Services Designer, as well as information about how the adapter handles Salesforce.com data types and Changed Data Capture (CDC).

Audience

The guide is intended for end users of the Simba Salesforce SAP Data Services Adapter, as well as administrators and developers implementing the adapter.

Knowledge Prerequisites

To use the Simba Salesforce SAP Data Services Adapter, the following knowledge is helpful:

- Ability to use SAP Data Services
- Ability to use the data store that the adapter is accessing
- An understanding of the role of adapters in enabling SAP Data Services to connect to and integrate data
- Knowledge about Changed Data Capture (CDC)
- Experience with systems administration and integration
- Ability to use SQL query statements

Document Conventions

Italics are used when referring to book and document titles.

Bold is used in procedures for graphical user interface elements that a user clicks and text that a user types.

Monospace font indicates commands, source code or contents of text files.

Note:

A text box with a pencil icon indicates a short note appended to a paragraph.

⚠ Important:

A text box with an exclamation mark indicates an important comment related to the preceding paragraph.

About the Simba Salesforce SAP Data Services Adapter

The Simba Salesforce SAP Data Services Adapter integrates directly with existing SAP Data Services systems and enables connections between Data Services and Salesforce.com. Using the adapter, you can import metadata from Salesforce.com and then work with that metadata when designing data flows in SAP Data Services Designer. You can also use the Changed Data Capture (CDC) feature in Data Services to keep imported data up-to-date with the data source.

Setting up the Simba Salesforce SAP Data Services Adapter involves completing the following tasks, which are explained in this guide:

1. Installing the adapter on a Job Server
2. Creating and starting an adapter instance in the Administrator
3. Creating an adapter datastore in the Designer

For detailed information about SAP Data Services, see the official SAP Data Services documentation on the SAP Help Portal: https://help.sap.com/viewer/p/SAP_DATA_SERVICES.

System Requirements

The Simba Salesforce SAP Data Services Adapter needs to be installed on a machine that is hosting a Job Server for your SAP Data Services system. The machine on which you are installing the adapter must meet the following requirements.

SAP Data Services

The Simba Salesforce SAP Data Services Adapter requires the following:

- SAP Data Services 4.3 Service Pack 1 Patch Level 0
- SAP JVM 1.8 or later

For information about how to install and configure SAP JVM 1.8 to work with SAP Data Services, see SAP Note 2275588. To search for SAP Notes, go to the "SAP Note & Knowledge Base Article Search" page: <https://support.sap.com/notes>.

Job Server

The Job Server on which you plan to install the Simba Salesforce SAP Data Services Adapter must be configured to manage adapters. For information about installing and configuring a Job Server, see the *SAP Data Services Installation Guide* on the SAP Help Portal: https://help.sap.com/viewer/p/SAP_DATA_SERVICES.

The host machine for the Job Server must be running on an operating system specified by SAP in their Product Availability Matrix. For more information, go to <https://userapps.support.sap.com/sap/support/pam>.

The adapter has been verified on the following platforms:

- Windows Server 2019 (64-bit AMD/Intel)
- RedHat EL 8 (64-bit AMD/Intel)

Installing the Adapter

Install the Simba Salesforce SAP Data Services Adapter on a machine that is hosting a Job Server for your SAP Data Services system.

The adapter is delivered as a ZIP file containing multiple subfolders. Each subfolder contains the version of the adapter that supports the platform indicated by the subfolder name.

The adapter is installed to the `[LINK_DIR]\adapters\jars` directory (or `[LINK_DIR]/adapters/jars` for non-Windows platforms), where `[LINK_DIR]` is the root directory for SAP Data Services. The default value of `[LINK_DIR]` is chosen when SAP Data Services is installed.

Important:

If you are replacing an existing installation of a Salesforce adapter, be aware that there are differences in Salesforce API support and that additional configuration steps are required after the installation process. For more information, see [Upgrading the Adapter](#) on page 37.

Installing the Adapter on Windows

The Windows version of the Simba Salesforce SAP Data Services Adapter is available as an MSI installer named `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].msi`, where `[Version]` and `[Build]` are the version number and build number of the adapter.

To install the adapter on a Windows machine:

1. Double-click **SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].msi** to run the installer.
2. Click **Next**.
3. Select the check box to accept the terms of the License Agreement if you agree, and then click **Next**.
4. Click **Typical**.
5. Click **Install**.
6. When the installation completes, click **Finish**.
7. If you received a license file through email, then copy the file to the `[LINK_DIR]\adapters\jars` directory, where `[LINK_DIR]` is the root directory for SAP Data Services. The name of the license file is

`SimbaSalesforceAdapterforSAPDataServices.lic`. You must have Administrator privileges when changing the contents of the directory.

8. If you installed the adapter on a hard drive that is not the `C :` drive, you must do the following to enable the Data Services Management Console to detect the adapter:
 - a. Copy the `Install_simbasalesforceadapter.xml` file from the installation package to the `[DS_COMMON_DIR]\adapters\install` directory, where `[DS_COMMON_DIR]` is the common configuration directory for the SAP Data Services system. The default location of `[DS_COMMON_DIR]` is chosen when SAP Data Services is installed.
 - b. Rename the copied `Install_simbasalesforceadapter.xml` file to `simbasalesforceadapter.xml`.
 - c. Copy the `Templates_simbasalesforceadapter.xml` file from the installation package to the `[DS_COMMON_DIR]\adapters\config\templates` directory.
 - d. Rename the copied `Templates_simbasalesforceadapter.xml` file to `simbasalesforceadapter.xml`

Note:

If you are experiencing issues with the installation, see [Troubleshooting](#) on page 11 for more information.

Installing the Adapter on Linux

The Linux version of the Simba Salesforce SAP Data Services Adapter is available as a tarball package named `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].tar`, where `[Version]` and `[Build]` are the version number and build number of the adapter. The tarball package contains a shell script named `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].sh`.

Important:

The Linux installer must be run by the user that installed SAP Data Services. The Linux installer assumes that `[LINK_DIR]` is defined.

To install the adapter on a Linux machine:

1. Extract the shell script from the `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].tar` tarball package.

2. Run the following command to make sure that the `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].sh` file is executable:

```
chmod +x SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].sh
```
3. Run the `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].sh` script.
4. If you received a license file through email, then copy the file to the `[LINK_DIR]/adapters/jars` directory, where `[LINK_DIR]` is the root directory for SAP Data Services. The name of the license file is `SimbaSalesforceAdapterforSAPDataServices.lic`. You must have Administrator privileges when changing the contents of the directory.

Installing the Adapter on Solaris

The Solaris version of the Simba Salesforce Adapter for SAP Data Services is available as a tarball package named `SimbaSalesforceAdapterforSAPDataServices_[Version].[Build].tar`, where `[Version]` and `[Build]` are the version number and build number of the adapter. The tarball package contains the following files, where `[LibVersion]` is the version number of the library:

- `force-wsc-[LibVersion].jar`
- `gson-[LibVersion].jar`
- `partner-[LibVersion].jar`
- `SimbaSalesforceAdapter.jar`

To install the adapter on a Solaris machine:

1. On the host machine for the Job Server, verify if the `[LINK_DIR]/adapters/jars` folder already exists, where `[LINK_DIR]` is the root directory for SAP Data Services. If not, then create the folder.
2. Extract the `.jar` files from the tarball package into the `[LINK_DIR]/adapters/jars` folder.
3. If you received a license file through email, then copy the file to the `[LINK_DIR]/adapters/jars` directory. The name of the license file is `SimbaSalesforceAdapterforSAPDataServices.lic`. You must have Administrator privileges when changing the contents of the directory.

Troubleshooting

The following section provides additional information and solutions to a problem that you might encounter while using Simba Salesforce SAP Data Services Adapter:

Problem

When starting an instance of the Simba Salesforce SAP Data Services Adapter in the Data Services Management Console, you receive an error message similar to the following:

```
File or directory X.jar not found. Please enter the
valid file name or directory. Configuration has been
saved.
```

Solution

1. Ensure there is a `DS_COMMON_DIR` environment variable and that it points to a valid path in the Data Services installation.
2. Navigate to the directory that `DS_COMMON_DIR` evaluates to and check for the existence of two files:
 - `SimbaSalesforceAdapter.xml`
 - `SimbaSalesforceAdapter.old`
3. If it exists, remove `SimbaSalesforceAdapter.old`, and either manually replace `SimbaSalesforceAdapter.xml` with the `Install_SimbaSalesforceAdapter.xml` file in the installation package, or rerun the installation script (step 8 in [Installing the Adapter on Windows](#) on page 8).
4. If the error persists after verifying the `SimbaSalesforceAdapter.xml` file is the same as the one in the installation package, it may be an indication of a faulty configuration in the XML. In this case, navigate to the **Adapter Configuration** tab in the Data Services Management Console, and inspect the value in the **Additional Java Launcher Options** field. Look for any typos, invalid paths, missing semicolons or references, etc. and attempt to resolve the issue manually.

Configuring the Adapter

To configure the Simba Salesforce SAP Data Services Adapter for use in SAP Data Services Designer, create and start an adapter instance through the Administrator on the Data Services Management Console, and then create an adapter datastore in the Designer.

Creating an Adapter Instance

You need to create an instance of the Simba Salesforce SAP Data Services Adapter in order to make it available in your Data Services system.

To create an adapter instance:

1. Go to the Administrator on the Data Services Management Console.
2. On the navigation pane on the left, expand **Adapter Instances** and then select the Job Server on which you installed the Simba Salesforce SAP Data Services Adapter.
3. Click the **Adapter Configuration** tab, then click **Add**, and then click **SimbaSalesforceAdapter**.

Note:

If you do not see the **SimbaSalesforceAdapter** option and the adapter is installed on a Windows machine, verify whether the adapter is installed on the C: drive. If it is not, then make sure that the necessary XML files have been copied into the common configuration directory for the SAP Data Services system. For more information, see [Installing the Adapter on Windows](#) on page 8.

4. Use the options in the Adapter Instance Startup configuration area to configure the adapter. For information about each configuration option, see [Adapter Instance Startup Configuration Options](#) on page 13.

Important:

You must provide a value in the **Adapter Instance Name** field.

5. Optionally, in the Run-time Configuration For Salesforce Adapter area, configure the logging behavior in the adapter by selecting a setting from the **Log Level** drop-down list. For more information, see [Adapter Instance Run-Time](#)

[Configuration Options](#) on page 15.

- To save your settings and create the adapter instance, click **Apply**.

You can now start the adapter instance to make it available for use in the Designer.

Adapter Instance Startup Configuration Options

The following table lists and describes the configuration options that are applied to an adapter instance when the instance is initially started. The options are listed in the top-down order in which they appear in the Data Services Management Console.

Option	Description
Adapter Instance Name	<p>A unique name for the adapter instance.</p> <div style="border: 1px solid #ccc; background-color: #f9f9f9; padding: 5px;"> <p>⚠ Important: You must provide a value in this field.</p> </div>
Access Server Host	The host name or IP address of the Access Server, which is used to support real-time jobs.
Access Server Port	The number of the port that the Access Server uses to listen for real-time job requests.
Use SSL Protocol	<p>When this option is set to true, communication between the adapter and the Job Server is encrypted using the SSL (Secure Sockets Layer) protocol.</p> <p>When this option is set to false, SSL encryption is not used.</p>
Character Set	Select the character set to and from which you want to convert text characters in the data.
Metadata Character Set	Select the character set to and from which you want to convert text characters in the metadata.
Adapter Retry Count	The maximum number of times that Data Services attempts to restart the adapter instance if the instance stops working.

Option	Description
Adapter Retry Interval	The amount of time in milliseconds that Data Services waits between each retry attempt.
Classpath	The value to use for the <code>-classpath</code> Java parameter.
Autostart	<p>When this option is set to true, the adapter instance starts automatically when Data Services starts.</p> <p>When this option is set to false, the adapter instance does not start automatically.</p>
Trace Mode	<p>When this option is set to true, the tracing functionality in the adapter includes a high level of detail in the logs.</p> <p>When this option is set to false, the tracing functionality includes only a minimal amount of information in the logs.</p>
Additional Java Launcher Options	A string of Java options to be applied when Data Services launches the Java process hosting the adapter. For example, you can modify the amount of memory allocated to the adapter by configuring Java Launcher options.
Adapter Type Name	<p>The name of the adapter on which the instance is based.</p> <div><p>Note:</p><p>This option cannot be modified.</p></div>
Adapter Version	<p>The version number of the adapter on which the instance is based.</p> <div><p>Note:</p><p>This option cannot be modified.</p></div>

Option	Description
Adapter Class	<p>The fully qualified class name of the adapter on which the instance is based.</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p>Note: This option cannot be modified.</p> </div>

Adapter Instance Run-Time Configuration Options

The Simba Salesforce SAP Data Services Adapter provides a logging functionality to help with troubleshooting issues. Configure logging behavior by setting the Log Level option, which is applied to the adapter instance during runtime.

⚠ Important:

Only enable logging long enough to capture an issue. Logging decreases performance and can consume a large quantity of disk space.

The adapter allows you to set the amount of detail included in log files. The following table lists the logging levels provided by the Simba Salesforce SAP Data Services Adapter, in order from least verbose to most verbose.

Logging Level	Description
OFF	Disables all logging output generated by the adapter.
FATAL	Logs very severe error events that lead the adapter to abort.
ERROR	Logs error events that might allow the adapter to continue running.
WARNING	Logs events that might result in an error if action is not taken.
INFO	Logs general information that describes the progress of the adapter.
DEBUG	Logs detailed information that is useful for debugging the adapter.

Logging Level	Description
TRACE	Logs all adapter activity.

The logs produced by the Simba Salesforce SAP Data Services Adapter appear in the trace and error log files of the adapter instance. To access the trace and error log files, go to the Adapter Instances area of the Administrator, then click the **Adapter Instance Status** tab, and then click the **Trace** and **Error** links located in the same row as the adapter instance.

Starting, Stopping, or Removing an Adapter Instance

You must start the adapter instance in order to make it available in the Designer.

To start an adapter instance:

1. In the Adapter Instances area of the Administrator, click the **Adapter Instance Status** tab.
2. Select the check box beside the name of the adapter instance that you want to start, and then click **Start**.
3. Refresh the Adapter Instance Status tab and verify that the status of the adapter is "Started".

Important:

If the Designer is already running, then you need to restart the program before the adapter becomes available.

To stop an adapter instance:

1. In the Adapter Instances area of the Administrator, click the **Adapter Instance Status** tab.
2. Select the check box beside the name of the adapter instance that you want to stop, and then click **Shutdown**.
3. Refresh the Adapter Instance Status tab and verify that the status of the adapter is "Shutdown".

To remove an adapter instance:

1. Stop the adapter instance.
2. In the Adapter Instances area of the Administrator, click the **Adapter Configuration** tab.

3. Select the check box beside the name of the adapter instance that you want to remove, and then click **Remove**.

Creating an Adapter Datastore

Create an adapter datastore for the Simba Salesforce SAP Data Services Adapter so that you can use the adapter to work with Salesforce.com metadata in the Designer.

To create an adapter datastore:

1. Start SAP Data Services Designer.
2. In the Local Object Library pane located in the lower-left part of the screen, click the **Datastores** tab, then right-click inside the pane, and then click **New**.
3. Use the options in the Create New Datastore dialog box to configure your adapter datastore:
 - a. In the **Datastore Name** field, type a unique name for your adapter datastore.
 - b. From the **Datastore Type** drop-down list, select **Adapter**.
 - c. From the **Job Server** drop-down list, select the Job Server on which the Simba Salesforce SAP Data Services Adapter is installed and running.
 - d. From the **Adapter Instance Name** drop-down list, select the Simba Salesforce SAP Data Services Adapter instance that you created.
 - e. To configure advanced options for the datastore, click **Advanced** to expand the options pane. For more information, see [Advanced Options](#) on page 19.
4. To save your settings and create the datastore, click **OK**.

The datastore appears in the Local Object Library pane. You can now use the Simba Salesforce SAP Data Services Adapter to access metadata from Salesforce.com.

Using OAuth

Simba Salesforce SAP Data Services Adapter supports OAuth 2.0 authentication, letting you access data securely without having to reveal user name and password credentials.

You can configure the adapter to use an Access Token or a Refresh Token to establish an OAuth connection. To do this, you must configure your application to integrate with Salesforce and then specify the necessary connection properties in the adapter datastore.

To configure the Salesforce application:

1. In your application, select an appropriate OAuth 2.0 authentication flow that Salesforce supports.
2. In the Force.com administration console, configure a connected app for your application and obtain a Consumer Key and Consumer Secret, which is also known as a Client ID and Client Secret.
3. Using the Consumer Key and Consumer Secret and any other required parameters, obtain the instance URL (to use as part of the `Endpoint` setting) and the Access Token or Refresh Token. Depending on the authentication flow that you selected, you might also need to obtain an authorization code.

Note:

If you are connecting to a sandbox system, you need to set the `Endpoint` to the sandbox URL instead.

Note:

For detailed information about setting up authorization using OAuth 2.0, see "Set Up Authorization" in the *Force.com REST API Developer Guide*: http://www.salesforce.com/us/developer/docs/api_rest/Content/quickstart_oauth.htm.

You can now access Salesforce metadata with the adapter using the connection values generated.

To configure the adapter to establish an OAuth connection, specify the necessary connection properties in the Advanced Options pane of the Create New Datastore dialog box or Edit Datastore dialog box. For details on how to create a datastore, see [Creating an Adapter Datastore](#) on page 17. For more details on the OAuth-related options, see [Advanced Options](#) on page 19.

To connect using an Access Token, provide the following connection information:

- OAuth Access Token
- OAuth Token Request End Point

For more details on generating an Access Token, see the Salesforce documentation: https://help.salesforce.com/articleView?id=remoteaccess_oidc_initial_access_token.htm&type=5.

To connect using a Refresh Token, provide the following connection information:

- OAuth Refresh Token
- OAuth Client ID
- OAuth Client Secret
- OAuth Token Request End Point

For more details on using a Refresh Token, see the Salesforce documentation: https://help.salesforce.com/articleView?id=remoteaccess_oauth_refresh_token_flow.htm&type=5.

Advanced Options

The following table lists and describes the advanced options that you can configure for an adapter datastore. The options are listed in the top-down order in which they appear in the Advanced Options pane of the Create New Datastore dialog box or Edit Datastore dialog box.

Option	Description
CDC Enable	<p>When this option is set to true, Changed Data Capture (CDC) is enabled and the adapter datastore tracks changes that have occurred in the data source since the data was last imported in Data Services. Tables that you import using this datastore cannot be used as target objects.</p> <p>When this option is set to false, CDC is disabled.</p>
Enable Bulk API Temporary File	<p>When this option is set to yes, the adapter creates a temporary file when using the Bulk API to write result set data. This option avoids connection rests.</p> <div style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <p>Note:</p> <p>This setting is deprecated and will be removed in a future release.</p> </div>
Disable REST Fallback	<p>When this option is set to yes, the adapter does not fall back to the REST API when a bulk query fails.</p>

Option	Description
Enable WSC Trace Logging	<p>When this option is set to yes, the Salesforce web server connector generates trace-level connection logs. These logs contain information on the request and response payloads sent to Salesforce.</p> <div style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <p>⚠ Important:</p> <p>Enabling this property captures the authentication credentials in plain text. Use this feature at your own risk.</p> </div> <p>When this option is set to no, WSC trace logging is disabled.</p>
Username	Your user name for accessing Salesforce.com.
Password	Your password for accessing Salesforce.com.
Token	<p>Your security token for accessing Salesforce.com. For information about how to obtain a security token, see "Reset Your Security Token" in the Salesforce documentation: https://help.salesforce.com/apex/HTViewHelpDoc?id=user_security_token.htm.</p> <div style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <p>📘 Note:</p> <p>Some connections require a security token, while others do not. Only provide a security token if your connection fails without it.</p> </div>
OAuth Access Token	The access token to use for OAuth connections.
OAuth Refresh Token	The Refresh Token used to obtain a fresh Access Token after it expires, when using OAuth authentication.
OAuth Client ID	The Client ID used for OAuth connections. On Salesforce, this is the Consumer Key property of a Connected App.

Option	Description
OAuth Client Secret	The Client Secret used for OAuth connections. On Salesforce, this is the Consumer Secret property of a Connected App.
OAuth Token Request End Point	The end point to use when requesting tokens to use for OAuth.
Web Service End Point	The authentication m_endpoint URL. If you do not specify an endpoint, the default value https://www.-salesforce.com/services/Soap/u/48.0 is used.
Batch Size	The maximum number of rows that a query returns at a time. The maximum value is 2000 rows.
Bulk API Batch Size	The maximum number of rows that can be sent to Salesforce.com in one bulk API call. The maximum value is 10000 rows.
Metadata Resilience	<p>When set to yes, the adapter is resilient to metadata errors and does not return error messages if it detects missing columns or tables while running a job or operation. For more information, see Metadata Resilience on page 25.</p> <p>When set to no, the adapter returns error messages if it detects missing columns or tables while running a job or operation.</p>
Default Base64Binary Field Length	<p>The maximum length of Base64Binary field data passed in from Salesforce.com.</p> <p>The maximum value is 5120000. Any data beyond this length is truncated.</p>
ID Column Required	<p>When this option is set to true, the adapter requires every result set to include an ID column, and returns an error if there is no ID column.</p> <p>When this option is set to false, ID columns are not required in result sets.</p>

Option	Description
Retry Number	The maximum number of times that the adapter retries a failed API call.
Proxy Host	The IP address or host name of the proxy server.
Proxy Port	The number of the port that the proxy server uses to listen for client connections.
Proxy Password	Your password for accessing the proxy server.
Proxy User Name	Your user name for accessing the proxy server.
CDC Deleted Records	When this option is set to disable , the adapter does not retrieve any deleted records.
	When this option is set to enable , the adapter retrieves limited data from deleted records, including the ID and deleted date.
Disable CDC Upserted Records	When this option is set to full data , the adapter retrieves the full contents of any deleted records.
	When this option is set to yes , the adapter does not retrieve inserted and updated records during CDC operations.
Bulk API Stop On First Failure	When this option is set to no , the adapter retrieves inserted or updated records during CDC operations.
	When this option is set to yes , the adapter stops loading data after it fails to load a record.
	When this option is set to no , the adapter continues to load data even if it fails to load some of the records.

Option	Description
Enable Failure Logging	<p>When this option is set to yes, the adapter logs information about the records that failed to load, including information such as the Salesforce job ID, batch ID, key column value, and the reason for the failure. The log file is saved in the location specified by the Failure Logging Path option.</p> <p>When this option is set to no, the adapter does not log information about records that failed to load.</p>
Failure Logging Path	<p>The location where the adapter saves the log file about records that failed to load, when Enable Failure Logging is set to yes. By default, the location is <code>[DS_COMMON_DIR]/adapters/log</code>.</p>
Auto Logout	<p>When this option is set to true, the adapter instance automatically logs out from Salesforce after the connection is closed.</p> <p>When this option is set to false, the adapter instance does not automatically log out from Salesforce after the connection is closed.</p> <div data-bbox="568 1102 1388 1283" style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p>Note:</p> <p>If you encounter "invalid session" errors when using the adapter, set this option to false.</p> </div>
Reduce API Calls	<p>When this option is set to YES, the adapter instance uses a single API call to retrieve multiple batches of data.</p> <p>When this option is set to NO, the adapter instance uses multiple API calls to retrieve multiple batches of data.</p> <div data-bbox="568 1535 1388 1715" style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p>Note:</p> <p>Enabling this option increases the amount of memory that the adapter instance consumes.</p> </div>

Option	Description
	<p>When this option is set to YES, the adapter instance does not use the Bulk API to retrieve data.</p> <p>When this option is set to NO, the adapter instance uses the Bulk API to retrieve data.</p>
Disable BULK Query	<p>Note:</p> <p>When using the Bulk API, the adapter instance retrieves data more quickly but also consumes more memory.</p>
Enable Parallel Bulk Job Execution	<p>When this option is set to yes, the adapter processes up to 10 batches of data in parallel for insert, delete, and update jobs. This improves performance, but can increase memory usage. Enable this option when there is no inter-dependency between the batches.</p> <p>When this option is set to no, the adapter does not process insert, delete, and update jobs in parallel.</p>
Bulk API Threshold	The number of query results at which the driver starts to use the Bulk API. The default value is 30000.
PKChunkSize	The number of results to include in each chunk, when query results are retrieved using primary key chunking. This is only relevant if the PKChunkThreshold is met. The default value is 100000.
PKChunkThreshold	The minimum number of records needed to enable the primary key chunking during Bulk query data retrieval. The default value is 100000.
Data Exchange Timeout	The amount of time, in seconds, after which the adapter closes a data fetch job, if an error occurs in SAP Data Services during that job. The default value is 60 seconds.

Option	Description
Date Time In UTC	When this option is set to yes , the adapter returns date/time data values in UTC (Coordinated Universal Time). When this option is set to no , the adapter converts date/time data values from UTC to your local time zone before returning the data.

Metadata Resilience

You can prevent the adapter from returning error messages in some cases where it detects missing columns or tables by setting the **Metadata Resilience** option to **yes**.

When metadata resilience is enabled, the adapter does not return error messages if it encounters the following scenarios while sending data to Salesforce.com:

- A table no longer exists, so the adapter does not make any changes in Salesforce.com.
- A column no longer exists, so the adapter does not send a value for that column to Salesforce.com.

Note:

The following metadata resilience functionality is expected to be available in a later version of the driver.

When metadata resilience is enabled, the adapter does not return error messages if it encounters the following scenarios while reading data from a source:

- A table no longer exists, so the adapter returns no records from the query.
- A field that is currently used in a data flow no longer exists, so the adapter returns a NULL value for every row of that field to Data Services.
- A field that is currently used in a WHERE clause no longer exists, so the adapter interprets the part of the WHERE clause containing that field as FALSE.

For example, if the WHERE clause is `WHERE ColumnA = A or ColumnB = B` and ColumnB no longer exists, then the adapter interprets the clause as `WHERE Column A = A`.

Using the Adapter in SAP Data Services Designer

After you create an adapter datastore for the Simba Salesforce SAP Data Services Adapter, you can import metadata from Salesforce.com and use it in your data flows.

Importing Metadata

Use the adapter datastore to import the Salesforce.com metadata that you want to use in your data flows. You can browse for metadata to import, or specify the name of a table to import.

To import metadata by browsing:

1. In the Local Object Library pane located in the lower-left part of the screen, click the **Datastores** tab, and then double-click your adapter datastore.

The Datastore Explorer lists the tables that are available through your Salesforce.com connection.

2. To view information about a table, expand the table and then expand any of the following folders as needed:
 - **Referenced By:** This folder contains the tables that reference the selected table. It is not available if the selected table is not referenced by other tables.
 - **References:** This folder contains the tables that the selected table references. It is not available if the selected table does not reference other tables.
 - **Columns:** This folder contains the columns that are part of the selected table.
3. Choose one:
 - To import the metadata of a specific table, right-click the table and then click **Import**.
 - To import the metadata of all the tables that belong to a folder, right-click the folder and then click **Import**.

In the Local Object Library pane, the imported metadata appears as tables nested under the adapter datastore.

To import metadata by name:

1. In the Local Object Library pane located in the lower-left part of the screen, click the **Datastores** tab.
2. Right-click your adapter datastore and then click **Import By Name**.

3. In the **Table Name** field, type the table name of the metadata that you want to import, and then click **OK**.

In the Local Object Library pane, the imported metadata appears as tables nested under the adapter datastore.

The DI_PICKLIST_VALUES Table

A picklist is a Salesforce.com field type that contains a numbered list of values from which one value can be selected. The Simba Salesforce SAP Data Services Adapter represents picklists using a virtual table named DI_PICKLIST_VALUES, which contains all the picklists in your Salesforce.com data source. To use picklist values in your data flows, use the adapter to import the DI_PICKLIST_VALUES table.

Important:

The DI_PICKLIST_TABLE does not appear when you browse a CDC-enabled datastore.

Viewing Table Metadata

After you import a table into your datastore, you can open it to view information such as the attributes that apply to the table and the columns that the table contains.

To view table metadata:

1. In the Local Object Library pane located in the lower-left part of the screen, click the **Datastores** tab, then expand the adapter datastore and the **Tables** node, and then double-click the table for which you want to view the metadata.
2. In the Table Metadata pane, browse through the tabs as needed to view information about the table.

For detailed information about the attributes that appear in the Table Metadata pane, see the *SAP Data Services Reference Guide* on the SAP Help Portal:

https://help.sap.com/viewer/p/SAP_DATA_SERVICES.

Deleting Imported Metadata

You can delete imported metadata from your adapter datastore.

To delete imported metadata:

1. In the Local Object Library pane located in the lower-left part of the screen, click the **Datastores** tab, and then expand the adapter datastore and the **Tables** node.

2. Right-click the table containing the metadata that you want to delete, and then click **Delete**. When prompted for confirmation, click **Yes**.

Using Salesforce.com Metadata in Data Flows

After installing and configuring the Simba Salesforce SAP Data Services Adapter, creating a datastore for the adapter, and importing the metadata, you can work with Salesforce.com metadata in SAP Data Services Designer and use the metadata as a target or a source in your data flows. For detailed information about using the Designer and creating data flows, see the *SAP Data Services Designer Guide* on the SAP Help Portal: https://help.sap.com/viewer/p/SAP_DATA_SERVICES.

The following tables describe the data type mappings, adapter source parameters, and adapter target parameters that are supported for Salesforce data.

Data Types

The Simba Salesforce SAP Data Services Adapter supports many common data formats, converting them between Salesforce data types and Data Services data types.

The following table lists the supported data type mappings.

Salesforce Primitive Type	Data Services Type
Base64	VarChar (base64-encoded)
Boolean	VarChar (as "true" or "false")
Currency	Double
Date	Date
Date/Time (timestamp)	DateTime
Double	Double
Int	Integer
Time	Double
String	VarChar

Adapter Source Parameters

The following table lists and describes the parameters you can configure in a metadata table that is imported by the Simba Salesforce SAP Data Services Adapter and used as a source in a data flow. The parameters are listed in the top-down order in which they appear in the **Adapter Source** tab in the Source Table Editor.

Parameter	Description
Check-Point Column	Do not specify a value in this field. In the Simba Salesforce SAP Data Services Adapter, this parameter is used in back-end processes only, and the value cannot be modified.
CDC Start Date	<p>A start date to use for CDC operations. Type a date using the format <code>yyyy.mm.dd 24h:mm:ss</code>. For example, 2015.12.31 18:30:00</p> <p>A CDC read starts from this date if the date is within the Salesforce.com retention period and either of these conditions are met:</p> <ul style="list-style-type: none"> • The date is further in the past than the current check-point date. • Or, there is no check-point date. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>Note:</p> <p>This parameter is applicable only when CDC is enabled. Also, Salesforce.com does not take seconds into account for <code>getUpdated()</code> and <code>getDeleted()</code> requests because the Salesforce API truncates date<code>Time</code> values. For more information, see "Polling for Changes" in the Salesforce.com documentation: https://www.salesforce.com/developer/docs/api/Content/polling_for_changes.htm.</p> </div>
Fetch Deleted Records	<p>When this parameter is set to yes, queries to the Salesforce API are executed with <code>QueryAll()</code> functionality. For more information, see "QueryAll" in the <i>Force.com REST API Developer Guide</i>: https://developer.salesforce.com/docs/atlas.en-us.api_rest.meta/api_rest/resources_queryall.htm.</p> <p>When set to no, queries are executed normally.</p>

Adapter Target Parameters

The following table lists and describes the parameters you can configure in metadata that is imported by the Simba Salesforce SAP Data Services Adapter and used as a target in a data flow. The parameters are listed in the top-down order in which they appear in the **Adapter Target** tab in the Target Table Editor.

Parameter	Description
	<p>The maximum number of rows at a time that SAP Data Services can send to the Simba Salesforce SAP Data Services Adapter.</p> <p>When this value is set to 0, SAP Data Services sends every row to the adapter at the same time.</p>
Loader Batch Size	<p>Note:</p> <p>It is recommended that you do not set this value higher than the Bulk API Batch Size value specified in the datastore. For information about using this option to tune for large loads, see Tuning Operations by Configuring Batch Sizes on page 32.</p>

Parameter	Description
Auto Correct Load	<p>When this parameter is set to yes, the adapter uses an UPSERT operation when loading data into the target. For example, if you insert a row that already exists in the target, then the adapter updates the existing row instead of inserting a duplicate row.</p> <p>When this parameter is set to no, the adapter uses INSERT instead of UPSERT. For example, if you insert a row that already exists in the target, then the adapter inserts a new (duplicate) row.</p> <div data-bbox="532 688 1386 989" style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <p>⚠ Important:</p> <p>You must specify a column name in the External ID Column parameter before the Auto Correct Load parameter can be used, because UPSERT statements in Salesforce require a field that is set up as an external ID.</p> </div>
External ID Column	<p>The name of a Salesforce column that is set up as an external ID. To verify if a column is an external ID, check the Description field of that column.</p> <p>External ID is a column attribute that you can specify in Salesforce. For more information, see "What is an external ID?" in the Salesforce documentation: https://help.salesforce.com/apex/HTViewHelpDoc?id=faq_import_general_what_is_an_external.htm.</p> <div data-bbox="532 1398 1386 1698" style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <p>⚠ Important:</p> <p>You must specify a column name in the External ID Column parameter before the Auto Correct Load parameter can be used, because UPSERT statements in Salesforce require a field that is set up as an external ID.</p> </div>

Using Boolean Conditionals in Queries

In the Designer, when you write a query that has a WHERE clause containing a Boolean value, the value must be specified as 1 or 0 instead of `true` or `false`.

The following is an example of a WHERE clause that checks for fields where the value of `bool_c` is `true`:

```
WHERE bool_c = 1
```

The following is an example of a WHERE clause that checks for fields where the value of `bool_c` is `false`:

```
WHERE bool_c = 0
```

If you use `true` or `false` instead, the query does not run.

Tuning Operations by Configuring Batch Sizes

The Salesforce API allows you to specify the maximum number of rows that can be sent in a single Bulk API request. The Bulk API Batch Size datastore option specifies the number of rows at a time that the Simba Salesforce SAP Data Services Adapter can send to Salesforce.com, and the Loader Batch Size adapter target parameter specifies the number of rows at a time that SAP Data Services can send to the target table. You can configure these options to tune operations that involve rows containing large amounts of data.

It is recommended that you do not set the Loader Batch Size parameter in the target table to a value that is greater than the Bulk API Batch Size datastore option. Doing so might cause the Simba Salesforce SAP Data Services Adapter to handle operations less efficiently.

Example: Configuring Batch Sizes to Optimize Adapter Performance

For example, if Loader Batch Size is set to 7500, Bulk API Batch Size is set to 5000, and SAP Data Services is sending 15000 rows, then the following occurs:

- Data Services sends a batch of 7500 rows to the adapter, causing the adapter to send a batch of 5000 rows and then a second batch of 2500 rows to Salesforce.com.
- Then, Data Services sends a second batch of 7500 rows to the adapter, again causing the adapter to send a batch of 5000 rows and then a second batch of 2500 rows to Salesforce.com.

In this scenario, the adapter uses a total of 4 API calls to send 15000 rows.

Setting these batch size options properly can optimize how the Simba Salesforce SAP Data Services Adapter handles operations. For example, if Loader Batch Size and Bulk API Batch Size are both set to 5000 and SAP Data Services is sending 15000 rows, then the following occurs:

- Data Services sends a batch of 5000 rows to the adapter, causing the adapter to send a batch of 5000 rows to Salesforce.com.
- This same operation repeats twice.

In this scenario, the adapter uses only 3 API calls to send 15000 rows.

Using Changed Data Capture

Changed Data Capture (CDC) is an SAP Data Services feature that tracks and reports the changes that have occurred in your data source since the last time you imported data from it and enables you to update the relevant targets in your data flows by applying those changes. To enable this feature, set the **CDC Enable** option to **true** in your adapter datastore.

When you import a table using a datastore that has CDC enabled, the Simba Salesforce SAP Data Services Adapter generates the following three columns in the imported table:

- **DI_OPERATION_TYPE**: This column contains the type of change that was made to the data (INSERT, UPDATE, or DELETE).
- **DI_SEQUENCE_NUMBER**: This column contains the sequence number. For example, a changed data record with sequence number 3 would be the third change that was made during the CDC time interval.
- **SFDC_TIMESTAMP**: This column contains the timestamp from Salesforce.com indicating when the change occurred.

Important:

When CDC is enabled, the tables in the datastore cannot be used as target objects in data flows.

Setting a Start Date for Changed Data Capture

Normally, a CDC operation reads every change in the data source that has occurred within the Salesforce.com retention period. To avoid redundancy and optimize the process, you can enable check-points or use the date specified in the CDC Start Date source object parameter.

Check-points mark the date of your last CDC read so that the next CDC operation only reads changes that have occurred after that date. Each check-point is associated with

a subscription name, which identifies the user that executed the CDC operation. Subscription names enable the data source to contain multiple unique check-points and to support cases where multiple users are executing CDC operations on the same data. To enable check points, on the CDC Options tab of a source object, select the **Enable Check-Point** check box and type a name in the **CDC Subscription Name** field.

Alternatively, you can specify a start date using the **CDC Start Date** parameter available on the Adapter Source tab of a source object. CDC reads start from this date if the date occurs within the Salesforce.com retention period and either of the following conditions are met:

- The start date occurs after the check-point date.
- Or, there is no check-point date available.

Otherwise, CDC reads start from the check-point date.

Designing a Data Flow with Changed Data Capture

The following procedure describes one method of using CDC. For more information about CDC, see the *SAP Data Services Designer Guide* on the SAP Help Portal: https://help.sap.com/viewer/p/SAP_DATA_SERVICES.

To design a data flow with Changed Data Capture:

1. In the Advanced Options pane for your adapter datastore, set the **CDC Enable** option to **true**.
2. Use the adapter datastore to import the table that you want to check for changes.
3. Create a data flow that uses the CDC-enabled table as the source object, and then connect the source to a Query transform.
4. Double-click the Query transform and then map the columns from the CDC table to the Query transform by selecting all the nodes in the **Schema In** pane and dragging them into the **Schema Out** pane.
5. In the data flow, double-click the source object, then click the **CDC Options** tab, and then configure the following options:
 - a. In the **CDC Subscription Name** field, type a unique name for identifying a checkpoint.
 - b. To enable check-points so that CDC operations start from the date of the last read instead of reading every change in the Salesforce.com retention period, select the **Enable Check-Point** check box.

⚠ Important:

Do not select the **Get Before-Image For Each Update Row** check box. This feature is not supported in Salesforce.com data sources.

6. Click the **Adapter Source** tab and then configure the following options:
 - a. In the **Check-Point Column** field, type a name for the column that contains check-point timestamps.
 - b. In the **CDC Start Date** field, type a start date for your CDC request using the format `yyyy.mm.dd 24h:mm:ss`. For example, **2015.12.31 18:30:00**.

📘 Note:

Salesforce.com does not take seconds into account for `getUpdated()` and `getDeleted()` requests because the Salesforce API truncates dateTime values. For more information, see "Polling for Changes" in the Salesforce.com documentation: https://www.salesforce.com/developer/docs/api/Content/polling_for_changes.htm.

- c. To include records that have been deleted from the data source in your CDC results, set the **Disable CDC Deleted Records** option to **no**.
7. In the data flow, add a `Map_CDC_Operation` transform and then connect the `Query` transform to it.
8. Double-click the `Map_CDC_Operation` transform, and then verify that the `Sequencing` column is set to `DI_SEQUENCE_NUMBER` and the `Row Operation` column is set to `DI_OPERATION_TYPE`.
9. In the data flow, add the table to which you want to apply the changes tracked by CDC, then set the table as the target object, and then connect the `Map_CDC_Operation` transform to the target.

When you run the job that contains this data flow, the CDC-enabled source object retrieves the changes that have been made to the table in the database, and then these changes are applied to the target object.

Operation Mapping in CDC

A CDC operation returns a record for each individual change made in the Salesforce.com data. For example, if a row has been inserted in the Salesforce.com data source, then the CDC operation returns an INSERT record in Data Services.

When multiple changes occur to the same row in the data source and the final change is a DELETE operation, CDC represents these changes by returning only a single DELETE record in Data Services.

When a row is inserted and then updated, CDC returns an INSERT record and an UPDATE record, but both records show the results of updating the row. The records do not show the state of the row between the INSERT and UPDATE operations.

Upgrading the Adapter

If you replace an existing installation of a Salesforce adapter with another one, be aware that there are differences in Salesforce API support and that additional configuration steps are required. These differences apply if you are doing either of the following:

- Upgrading from the SAP Data Services Adapter for Salesforce.com to the Simba Salesforce SAP Data Services Adapter.
- Or, upgrading from an earlier version of the Simba Salesforce SAP Data Services Adapter to a later version.

Reconfiguring Adapter Instances and Datastores

If you replace an existing installation of a Salesforce adapter with another one, you must recreate the adapter instances and change the web service end point used by the adapter datastores.

To reconfigure the adapter instances and datastores:

1. Note the names of any existing adapter instances, and then shut down and remove each one. For detailed instructions, see [Starting, Stopping, or Removing an Adapter Instance](#) on page 16.
2. Create adapter instances with the names noted in step 1 and then start the new adapters.
3. In SAP Data Services Designer, do the following for each Simba Salesforce adapter datastore:
 - a. Right-click the datastore and select **Edit**.
 - b. In the **Web Service End Point** field, change the value to **`https://login.salesforce.com/services/Soap/u/[APIVersion]`**, where **[APIVersion]** is the Salesforce API version that the adapter uses:

Simba Salesforce Adapter Version	API Version
14.2.4	33.0
14.2.5	35.0
14.2.6	36.0

Simba Salesforce Adapter Version	API Version
14.2.7, 14.2.8, or 14.2.9	37.0
14.2.10 or 14.2.11	41.0
14.2.12 or 14.2.13	44.0
14.2.14 or 14.2.15	46.0
14.2.16 or 14.2.17	48.0
14.2.18 or later	52.0

- c. Click **OK**.

Differences in Salesforce API Support

The SAP Data Services Adapter for Salesforce.com supports a different Salesforce API version compared to the Simba Salesforce SAP Data Services Adapter, and different releases of the Simba Salesforce SAP Data Services Adapter all support different Salesforce API versions as well. The fields that are available when you browse your metadata in the Datastore Explorer vary depending on the Salesforce API version that the adapter is using, so it is recommended that you refer to the *Salesforce Field Reference Guide* to verify how your metadata is affected when you change from one adapter to another.

The *Salesforce Field Reference Guide* can be found here: https://developer.salesforce.com/docs/atlas.en-us.sfFieldRef.meta/sfFieldRef/salesforce_field_reference.htm.

Security and Authentication

To protect data from unauthorized access, Salesforce requires all connections to be authenticated with user credentials and encrypted using TLS 1.2 or later with one-way authentication. The Simba Salesforce SAP Data Services Adapter provides full support for the security protocols that are used in Salesforce data stores.

Note:

In this documentation, "SSL" indicates both TLS (Transport Layer Security) and SSL (Secure Sockets Layer). The adapter supports industry-standard versions of TLS/SSL.

The adapter provides a mechanism that allows you to authenticate your connection using OAuth 2.0. For detailed configuration instructions, see [Creating an Adapter Datastore](#) on page 17.

Additionally, the Simba Salesforce SAP Data Services Adapter automatically applies one-way authentication over TLS 1.2. The TLS/SSL version that the adapter supports depends on the JVM version that you are using. For information about the TLS/SSL versions that are supported by each version of Java, see "Diagnosing TLS, SSL, and HTTPS" on the Java Platform Group Product Management Blog: https://blogs.oracle.com/java-platform-group/entry/diagnosing_tls_ssl_and_https.

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