



Simba Salesforce Adapter
for
SAP Data Services

Installation and Configuration Guide

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Simba Technologies Inc.



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Simple Logging Façade for Java (SLF4J)

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About This Guide

Purpose

The *Simba Salesforce Adapter for SAP Data Services Installation and Configuration Guide* explains how to install and configure the Simba Salesforce Adapter for SAP Data Services 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

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

Knowledge Prerequisites

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

- Ability to use SAP Data Services
- Ability to use Salesforce.com
- An understanding of the role of adapters in enabling SAP Data Services to connect to and integrate data
- Knowledge about Change 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.

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Introduction

The Simba Salesforce Adapter for SAP Data Services 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 Adapter for SAP Data Services 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, refer to the official *SAP Data Services* documentation available at <http://help.sap.com/bods/>

System Requirements

The Job Server on which you plan to install the Simba Salesforce Adapter for SAP Data Services must be configured to manage adapters. For information about installing and configuring a Job Server, see the *SAP Data Services Installation Guide* available at <http://help.sap.com/bods/>

The host computer for the Job Server must be running one of the following operating systems:

- Windows Server 2008, 2008 R2, 2012, or 2012 R2 (64-bit AMD/Intel)
- SUSE Linux SLES 11 (64-bit AMD/Intel)
- SUSE RedHat EL 5 or 6 (64-bit AMD/Intel)
- IBM AIX 6.1 or 7.1 (POWER)
- Solaris 10 or 11 (SPARC)

Installing the Adapter

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

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.

Windows

The Windows version of the Simba Salesforce Adapter for SAP Data Services is delivered 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 computer:

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. Install the license by copying the file named `SimbaSalesforceAdapterforSAPDataServices.lic` to the `LINK_DIR\adapters\jars` directory, where `LINK_DIR` is the root directory for SAP Data Services.

Linux

The Linux version of the Simba Salesforce Adapter for SAP Data Services is delivered in 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 computer:

1. Extract the shell script from the `SimbaSalesforceAdapterforSAPDataServices_<version>.build.tar` tarball package.
2. Run the following command to ensure that the `SimbaSalesforceAdapterforSAPDataServices_<version>.build.sh` file is executable:

```
chmod +x SimbaSalesforceAdapterforSAPDataServices_<version>.build.sh
```
3. Run the `SimbaSalesforceAdapterforSAPDataServices_<version>.build.sh` script.
4. Install the license by copying the file named `SimbaSalesforceAdapterforSAPDataServices.lic` to the `LINK_DIR\adapters\jars` directory, where `LINK_DIR` is the root directory for SAP Data Services.

Solaris

The Solaris version of the Simba Salesforce Adapter for SAP Data Services is delivered in 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:

- `partner-33.jar`
- `SimbaSalesforceAdapter.jar`
- `wsc-22-jdk-1-5.jar`

To install the adapter on a Solaris computer:

1. On the host computer 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 three .jar files from the tarball package into the `LINK_DIR/adapters/jars` folder.
3. Install the license by copying the file named `SimbaSalesforceAdapterforSAPDataServices.lic` to the `LINK_DIR/adapters/jars` directory.

Upgrading the Adapter

If you install a new version of the Simba Salesforce Adapter for SAP Data Services over an existing installation, after the new installation is complete you must restart the adapter instances. For more information, see *Starting and Stopping an Adapter Instance* on page 11.

Configuring the Adapter

To configure the Simba Salesforce Adapter for SAP Data Services 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 Adapter for SAP Data Services 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 Adapter for SAP Data Services.
3. Click the **Adapter Configuration** tab, then click **Add**, and then click **SimbaSalesforceAdapter**

4. Use the options in the Adapter instance startup configuration area to configure the Simba Salesforce Adapter for SAP Data Services. For information about each configuration option, see *Adapter Instance Startup Configuration Options* on page 9.
Important: You must provide a value in the Adapter Instance Name field.
5. Optionally, in the Run-time configuration for SalesforceAdapter area, configure the logging behavior in the adapter by selecting a setting from the Log Level list. For more information, see *Adapter Instance Run-Time Configuration Options* on page 11.
6. 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

Table 1 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	A unique name for the adapter instance. Important: You must provide a value in this field.
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	When this option is set to true , communication between the adapter and the Job Server is encrypted using the SSL (Secure Sockets Layer) protocol. When this option is set to false , SSL encryption is not used.
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 will attempt to restart the adapter instance if the instance stops working.

Option	Description
Adapter Retry Interval	The amount of time in milliseconds that Data Services will wait 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> <p>Note: This option cannot be modified.</p>
Adapter Version	<p>The version number of the adapter on which the instance is based.</p> <p>Note: This option cannot be modified.</p>
Adapter Class	<p>The fully qualified class name of the adapter on which the instance is based.</p> <p>Note: This option cannot be modified.</p>

Table 1 Adapter Instance Startup Configuration Options

Adapter Instance Run-Time Configuration Options

The Simba Salesforce Adapter for SAP Data Services 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. *Table 2* lists the logging levels provided by the Simba Salesforce Adapter for SAP Data Services, 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 will lead the adapter to abort.
ERROR	Logs error events that might still allow the adapter to continue running.
WARNING	Logs potentially harmful situations.
INFO	Logs general information that describes the progress of the adapter.
DEBUG	Logs detailed information that is useful for debugging the adapter.
TRACE	Logs more detailed information than the DEBUG level.

Table 2 Adapter Logging Levels

The logs produced by the Simba Salesforce Adapter for SAP Data Services 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 and Stopping 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".

Creating an Adapter Datastore

Create an adapter datastore for the Simba Salesforce Adapter for SAP Data Services 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. In the Datastore Type list, select **Adapter**
 - c. In the Job Server list, select the Job Server on which the Simba Salesforce Adapter for SAP Data Services is installed and running.
 - d. In the Adapter Instance Name list, select the Simba Salesforce Adapter for SAP Data Services 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 12.

Important: You must provide values in the Username and Password fields.
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 Adapter for SAP Data Services to access metadata from Salesforce.com.

Advanced Options

Table 3 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 will track 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>
Username	Your user name for accessing Salesforce.com.
Password	Your password for accessing Salesforce.com.
Web service end point	<p>The URL for accessing the Salesforce.com web service.</p> <ul style="list-style-type: none"> When using OAuth authentication, provide a URL in the following format, where <i>InstanceURL</i> is the Salesforce instance to which your application should send API calls, and <i>Version</i> is the SOAP API version: <i>InstanceURL/services/Soap/u/Version</i> <p>For example, https://na11.salesforce.com/services/Soap/u/33</p> <ul style="list-style-type: none"> When using SSO authentication, provide the URL to the server that will receive Web services requests. You can obtain this URL by logging in to the server and using the <code>getServerUrl()</code> method. When using User Name and Password authentication, provide the authentication <code>m_endpoint</code> URL. If you do not specify an endpoint, the default value <code>https://login.salesforce.com/services/Soap/u/33.0</code> is used.
OAuth Url	The endpoint for requesting OAuth access tokens from Salesforce.com.
Batch size	<p>The maximum number of rows that a query returns at a time.</p> <p>The maximum value is 2000 rows.</p>
Bulk API Batch Size	<p>The maximum number of rows that can be sent to Salesforce.com in one bulk API call.</p> <p>The maximum value is 10000 rows.</p>

Option	Description
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 <i>Metadata Resilience</i> on page 15.</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 will be truncated.</p>
Access token	<p>Your access token for accessing Salesforce.com through OAuth authentication.</p> <p>Important: The access token is used as your session ID when you make requests to Salesforce.com. Protect your access token as you would any other user credentials.</p>
Consumer key	<p>The consumer key from Salesforce.com that allows your application to access Salesforce.com.</p>
ID column required	<p>When this option is set to true, the adapter requires every result set to include an ID column and will return 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>
Retry number	<p>The maximum number of times that the adapter will retry a failed API call.</p>
Proxy host	<p>The IP address or host name of the proxy server.</p>
Proxy port	<p>The number of the port that the proxy server uses to listen for client connections.</p>
Proxy password	<p>Your password for accessing the proxy server.</p>
Proxy user name	<p>Your user name for accessing the proxy server.</p>

Option	Description
Refresh token	Your refresh token for obtaining a new OAuth access token from Salesforce.com after the existing access token expires. Important: A refresh token may exist until you explicitly revoke it. Protect your refresh token as you would any other user credentials.
Session ID	A unique session ID for when you connect to Salesforce.com through Single Sign-On authentication.
Disable CDC deleted records	When this option is set to yes , the adapter does not retrieve deleted records during CDC operations. When this option is set to no , the adapter retrieves deleted records during CDC operations. Important: If the "Fetch Deleted Records" parameter in a source object is set to yes or no, then that setting takes precedence over "Disable CDC deleted records". For more information, see <i>Adapter Source Parameters</i> on page 18.
Disable CDC upserted records	When this option is set to yes , the adapter does not retrieve inserted and updated records during CDC operations. When this option is set to no , the adapter retrieves inserted or updated records during CDC operations.

Table 3 Adapter Datastore Advanced Options

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 Adapter for SAP Data Services, 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. To import the metadata of a specific table, right-click the table and then click **Import**

OR

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 Adapter for SAP Data Services 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 *Reference Guide* available at <http://help.sap.com/bods/>

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 Adapter for SAP Data Services, 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 *Designer Guide* available at <http://help.sap.com/bods/>

Data Types

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

Table 4 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

Table 4 Supported Data Types

Adapter Source Parameters

Table 5 lists and describes the parameters you can configure in a metadata table that is imported by the Simba Salesforce Adapter for SAP Data Services 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 Adapter for SAP Data Services, 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 <i>yyyy.mm.dd 24h:mm:ss</i>. 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. • There is no check-point date. <p>Note: 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 <code>dateTime</code> values. For more information, see <i>Polling for Changes</i> in the Salesforce.com documentation available at https://www.salesforce.com/developer/docs/api/content/polling_for_changes.htm</p>
Fetch Deleted Records	<p>When this parameter is set to yes, CDC result sets include data that has been deleted from the table.</p> <p>When this parameter is set to no, CDC result sets include only data that has been inserted or updated.</p> <p>When this parameter is set to default, the setting specified for the "Disable CDC deleted records" datastore option determines whether or not CDC returns deleted data. For more information, see <i>Advanced Options</i> on page 12.</p>

Table 5 Adapter Source Parameters

Adapter Target Parameters

Table 6 lists and describes the parameters you can configure in metadata that is imported by the Simba Salesforce Adapter for SAP Data Services 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
Loader Batch Size	<p>The maximum number of rows at a time that SAP Data Services can send to the Simba Salesforce Adapter for SAP Data Services.</p> <p>When this value is set to 0, SAP Data Services will send every row to the adapter at the same time.</p> <p>Note: 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 <i>Tuning Operations by Configuring Batch Sizes</i> on page 21.</p>
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 will insert a new (duplicate) row.</p> <p>Important: 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>

Parameter	Description
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 <i>What is an external ID?</i> in the Salesforce documentation at https://help.salesforce.com/apex/HTViewHelpDoc?id=faq_import_general_what_is_an_external.htm</p> <p>Important: 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>

Table 6 Adapter Target Parameters

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, then the query will 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 Adapter for SAP Data Services 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 may cause the Simba Salesforce Adapter for SAP Data Services to handle operations less efficiently.

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 will occur:

- SAP Data Services will send 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, SAP Data Services will send 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 Adapter for SAP Data Services 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 will occur:

- Data Services will send 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 Adapter for SAP Data Services 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 will only read 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.
- 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 *Designer Guide* available at <http://help.sap.com/bods/>

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 available at 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 Fetch Deleted Records option to **yes**
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 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 will show the results of updating the row. The records will not show the state of the row between the INSERT and UPDATE operations.

Contact Us

If you have difficulty using the adapter, please contact our Technical Support staff. We welcome your questions, comments, and feature requests.

Technical Support is available Monday to Friday from 8 a.m. to 5 p.m. Pacific Time.

Important: To help us assist you, prior to contacting Technical Support please prepare a detailed summary of the client and server environment including operating system version, patch level, and configuration.

You can contact Technical Support via:

- **E-mail:** support@simba.com
- **Web site:** www.simba.com
- **Telephone:** (604) 633-0008 Extension 3
- **Fax:** (604) 633-0004

You can also follow us on Twitter @SimbaTech

Appendix A: Known Issues

The following are known issues that you might encounter while using the Simba Salesforce Adapter for SAP Data Services in SAP Data Services Designer.

Date or dateTime columns retrieved from Salesforce.com display incorrect values

When date or dateTime columns are retrieved from Salesforce.com and loaded into the Designer, the values are incremented and do not correctly represent the values that are actually in the Salesforce.com tables.

As a workaround, map any date or dateTime columns to the varchar data type in the Designer.

To map date or dateTime columns to the varchar data type:

1. In your data flow, double-click the Query transform that is connected to the source object retrieving data from Salesforce.com.
2. In the **Schema Out** pane, access the column properties for a date or dateTime column by double-clicking the column.
3. On the **General** tab, in the Data type list, select **varchar**
4. Click **OK** to save your changes and close the dialog box.
5. Repeat steps 2 to 4 for each date or dateTime column in the table.

The Simba Salesforce Adapter for SAP Data Services recognizes date and dateTime values when parsing varchar data and returns the values correctly.

Appendix B: Migrating from the SAP Data Services Adapter for Salesforce.com

If you used the SAP Data Services Adapter for Salesforce.com to work with your Salesforce.com data in the past and are now using the Simba Salesforce Adapter for SAP Data Services instead, consider the following differences between the two adapters.

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. SAP Data Services Adapter for Salesforce.com version 4.2 uses Salesforce API 21, and Simba Salesforce Adapter for SAP Data Services version 14.2.4 uses Salesforce API 33. The following tables outline some of the metadata field differences between Salesforce API versions 21 and 33.

Table 7 lists some of the fields that were required (non-nullable) in Salesforce API 21, but are no longer used in Salesforce API 33. The fields are organized based on the tables in which they were available.

Table Name	Field Name
CustomConsoleComponent	<ul style="list-style-type: none"> Developer Name IsWidthFixed IsHeightFixed IsHidden IsPopoutDisabled MasterLabel
PushTopic	<ul style="list-style-type: none"> NotifyForOperations
User	<ul style="list-style-type: none"> UserPreferencesDisableAutoSubForFeeds UserPreferencesOptOutOfTouch

Table 7 Removed Required Metadata Fields

Table 8 lists some of the required (non-nullable) fields that are used in Salesforce API 33 but not in Salesforce API 21. The fields are organized based on the tables in which they are available.

Table Name	Field Name
ActionLinkGroupTemplate	<ul style="list-style-type: none"> • Category • DeveloperName • ExecutionsAllowed • IsPublished • MasterLabel
ActionLinkTemplate	<ul style="list-style-type: none"> • ActionLinkGroupTemplateId • ActionUrl • IsConfirmationRequired • IsGroupDefault • LabelKey • LinkType • Method • Position • UserVisibility
Announcement	<ul style="list-style-type: none"> • ExpirationDate • FeedItemId
ApexPage	<ul style="list-style-type: none"> • IsAvailableInTouch • IsConfirmationTokenRequired
AuthProvider	<ul style="list-style-type: none"> • DeveloperName • FriendlyName • OptionsIncludeOrgIdInId • OptionsSendAccessTokenInHeader • OptionsSendClientCredentialsInHeader • ProviderType

Table Name	Field Name
CollaborationGroup	<ul style="list-style-type: none"> • IsArchived • IsAutoArchiveDisabled
CollaborationGroupRecord	<ul style="list-style-type: none"> • CollaborationGroupId • RecordId
ContentDistribution	<ul style="list-style-type: none"> • ContentVersionId • Name • OwnerId • PreferencesAllowOriginalDownload • PreferencesAllowPDFDownload • PreferencesAllowViewInBrowser • PreferencesExpires • PreferencesLinkLatestVersion • PreferencesNotifyOnVisit • PreferencesNotifyRndtnComplete • PreferencesPasswordRequired
ContentVersion	<ul style="list-style-type: none"> • ContentLocation • IsMajorVersion • Origin
CorsWhitelistEntry	<ul style="list-style-type: none"> • DeveloperName • MasterLabel • UrlPattern
CustomConsoleComponent	<ul style="list-style-type: none"> • DeveloperName • IsHeightFixed • IsHidden • IsPopoutDisabled • IsWidthFixed • MasterLabel

Table Name	Field Name
DuplicateRecordItem	<ul style="list-style-type: none"> • DuplicateRecordSetId • RecordId
DuplicateRecordSet	<ul style="list-style-type: none"> • DuplicateRuleId
EmailDomainKey	<ul style="list-style-type: none"> • Domain • DomainMatch • IsActive • Selector
EventRelation	<ul style="list-style-type: none"> • EventId • RelationId
ExternalDataUserAuth	<ul style="list-style-type: none"> • ExternalDataSourceId
FieldPermissions	<ul style="list-style-type: none"> • Field • ParentId • PermissionsEdit • PermissionsRead • SubjectType
ListViewChart	<ul style="list-style-type: none"> • AggregateType • ChartType • DeveloperName • MasterLabel • OwnerId • SubjectType
Macro	<ul style="list-style-type: none"> • Name • OwnerId
MacroShare	<ul style="list-style-type: none"> • AccessLevel • ParentId • UserOrGroupId

Table Name	Field Name
MobileDeviceRegistrar	<ul style="list-style-type: none"> • DeveloperName • MasterLabel • Provider
ObjectPermissions	<ul style="list-style-type: none"> • ParentId • PermissionsCreate • PermissionsDelete • PermissionsEdit • PermissionsModifyAllRecords • PermissionsRead • PermissionsViewAllRecords • SubjectType
Order	<ul style="list-style-type: none"> • OwnerId
PermissionSet	<ul style="list-style-type: none"> • PermissionsAllowUniversalSearch • PermissionsAllowViewKnowledge • PermissionsAssignPermissionSets • PermissionsAssignTopics • PermissionsChatterForSharePoint • PermissionsConfigCustomRecs • PermissionsConnectOrgToEnvironmentHub • PermissionsCreateCustomizeFilters • PermissionsCreateTopics • PermissionsCreateWorkBadgeDefinition • PermissionsCustomMobileAppsAccess • PermissionsDeleteTopics • PermissionsEditTopics • PermissionsForceTwoFactor • PermissionsGovernNetworks • PermissionsIdentityConnect

Table Name	Field Name
PermissionSet (continued)	<ul style="list-style-type: none"> • PermissionsIdentityEnabled • PermissionsManageCustomPermissions • PermissionsManageExchangeConfig • PermissionsManageInternalUsers • PermissionsManageIpAddresses • PermissionsManageLoginAccessPolicies • PermissionsManagePasswordPolicies • PermissionsManageProfilesPermissionsets • PermissionsManageRoles • PermissionsManageSearchPromotionRules • PermissionsManageSharing • PermissionsManageTwoFactor • PermissionsManageUnlistedGroups • PermissionsMergeTopics • PermissionsSalesConsole • PermissionsShareInternalArticles • PermissionsTwoFactorApi • PermissionsViewAllUsers • PermissionsViewEventLogFiles • PermissionsViewHelpLink • PermissionsWorkDotComUserPerm
PermissionSetLicenseAssign	<ul style="list-style-type: none"> • Assigneeld • PermissionSetLicenseId
PushTopic	<ul style="list-style-type: none"> • NotifyForOperationCreate • NotifyForOperationDelete • NotifyForOperationUndelete • NotifyForOperationUpdate
SearchPromotionRule	<ul style="list-style-type: none"> • Query

Table Name	Field Name
SetupEntityAccess	<ul style="list-style-type: none"> • ParentId • SetupEntityId
StreamingChannel	<ul style="list-style-type: none"> • Name • OwnerId
StreamingChannelShare	<ul style="list-style-type: none"> • AccessLevel • ParentId • UserOrGroupId
Topic	<ul style="list-style-type: none"> • Name
TopicAssignment	<ul style="list-style-type: none"> • EntityId • TopicId
User	<ul style="list-style-type: none"> • EmailPreferencesAutoBcc • EmailPreferencesAutoBccStayInTouch • EmailPreferencesStayInTouchReminder • UserPermissionsChatterAnswersUser • UserPermissionsSupportUser • UserPermissionsWorkDotComUserFeature • UserPreferencesDisableAllFeedsEmail • UserPreferencesDisableBookmarkEmail • UserPreferencesDisableChangeCommentEmail • UserPreferencesDisableEndorsementEmail • UserPreferencesDisableFeedbackEmail • UserPreferencesDisableFileShareNotificationsForApi • UserPreferencesDisableFollowersEmail • UserPreferencesDisableLaterCommentEmail • UserPreferencesDisableLikeEmail • UserPreferencesDisableMentionsPostEmail • UserPreferencesDisableMessageEmail

Table Name	Field Name
User (continued)	<ul style="list-style-type: none"> • UserPreferencesDisableProfilePostEmail • UserPreferencesDisableRewardEmail • UserPreferencesDisableSharePostEmail • UserPreferencesDisableWorkEmail • UserPreferencesDisCommentAfterLikeEmail • UserPreferencesDisMentionsCommentEmail • UserPreferencesDisProfPostCommentEmail • UserPreferencesEnableAutoSubForFeeds • UserPreferencesHideChatterOnboardingSplash • UserPreferencesHideS1BrowserUI • UserPreferencesHideSecondChatterOnboardingSplash • UserPreferencesOptOutOfTouch • UserPreferencesProcessAssistantCollapsed • UserPreferencesShowCityToExternalUsers • UserPreferencesShowCityToGuestUsers • UserPreferencesShowCountryToExternalUsers • UserPreferencesShowCountryToGuestUsers • UserPreferencesShowEmailToExternalUsers • UserPreferencesShowFaxToExternalUsers • UserPreferencesShowManagerToExternalUsers • UserPreferencesShowMobilePhoneToExternalUsers • UserPreferencesShowPostalCodeToExternalUsers • UserPreferencesShowPostalCodeToGuestUsers • UserPreferencesShowProfilePicToGuestUsers • UserPreferencesShowStateToExternalUsers • UserPreferencesShowStateToGuestUsers • UserPreferencesShowStreetAddressToExternalUsers

Table Name	Field Name
User (continued)	<ul style="list-style-type: none"> • UserPreferencesShowTitleToExternalUsers • UserPreferencesShowTitleToGuestUsers • UserPreferencesShowWorkPhoneToExternalUsers
UserPackageLicense	<ul style="list-style-type: none"> • PackageLicenseId • UserId
UserShare	<ul style="list-style-type: none"> • UserAccessLevel • UserId • UserOrGroupId
WorkAccess	<ul style="list-style-type: none"> • AccessType • OwnerId • ParentId
WorkAccessShare	<ul style="list-style-type: none"> • AccessLevel • ParentId • UserOrGroupId
WorkBadge	<ul style="list-style-type: none"> • DefinitionId • RecipientId • SourceId
WorkBadgeDefinition	<ul style="list-style-type: none"> • Description • ImageUrl • IsActive • IsCompanyWide • IsLimitPerUser • Name • OwnerId
WorkBadgeDefinitionShare	<ul style="list-style-type: none"> • AccessLevel • ParentId • UserOrGroupId

Table Name	Field Name
WorkThanks	<ul style="list-style-type: none"> • GiverId • Message • OwnerId
WorkThanksShare	<ul style="list-style-type: none"> • AccessLevel • ParentId • UserOrGroupId

Table 8 New Required Metadata Fields