Informatica

Informatica® Cloud Data Integration

SAP ODP Extractor Connector

Informatica Cloud Data Integration SAP ODP Extractor Connector
July 2024

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Preface

Use SAP ODP Extractor Connector to learn how to read from SAP by using Cloud Data Integration. Learn to create an SAP ODP Extractor connection, develop and run mappings, mapping tasks, and data transfer tasks in Cloud Data Integration.

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CHAPTER 1

Introduction to SAP ODP Extractor Connector

You can use SAP ODP Extractor Connector to extract data from SAP S4 HANA, ECC, and other Operational Data Provisioning (ODP)-enabled applications. You can also perform delta extraction on any ODP source that is enabled with Operational Delta Queue (ODQ).

ODP is an SAP NetWeaver based framework that unifies the data transfer between the source and target systems. The ODP installed as a source in the SAP system maintains the Operational Delta Queue (ODQ) that allows delta data extraction from ODP-enabled data sources. ODP is the key infrastructure used for the data extraction from ABAP-based SAP systems to an SAP S/4HANA system.

You can use the SAP ODP Extractor connection in mappings, mapping tasks, and data transfer tasks. You can switch mappings to advanced mode to include transformations and functions that enable advanced functionality.

SAP ODP source objects

You can connect to SAP ODPs using SAP ODP Extractor Connector.

SAP providers vary based on the source object through which you can extract data. The SAP providers define the context for the ODP extraction mechanism.

Use SAP ODP Extractor Connector to connect to ODPs available in the following contexts or providers:

Providers/Context	Source SAP System and ODPs
SAP Service Application Programming Interface (S-API)	SAP Data Sources/Extractors without Enterprise Search (ESH)
HANA	SAP HANA Information View
BW	SAP NetWeaver Business Warehouse
ABAP_CDS	ABAP Core Data Services
SAP SLT	SLT Queue

ODQ is maintained for contexts SAPI, BW, and SLT. You can use the SAP ODP Extractor connection to extract historical and delta data wherever applicable through the ODP-enabled source objects.

SAP ODP Extractor Connector identifies the different contexts available based on the SAP system that you want to use. Identified contexts appear as packages in the **Select Object** dialog box. You can select any of the packages to get the list of the available activated ODPs for that context. You can filter by the ODP name when you connect to the SAP system.

Data Integration imports the following SAP ODP information:

- ODP name
- Business descriptions
- ODP type
- ODP transfer structure fields
- Field information such as the name, type, description, filterable, precision, scale, SAP type, SAP length, SAP output length, and SAP decimals.

SAP ODP Extractor Connector assets

Create assets in Data Integration to integrate data using SAP ODP Extractor Connector.

When you use SAP ODP Extractor Connector, you can include the following Data Integration assets:

- Data transfer task
- Mapping
- Mapping task

For more information about configuring assets and transformations, see *Mappings*, *Transformations*, and *Tasks* in the Data Integration documentation.

CHAPTER 2

Connections for SAP ODP Extractor

Create an SAP ODP Extractor connection to securely read data from SAP ODP objects. You can use an SAP ODP Extractor connection in mappings, mapping tasks, and data transfer tasks.

You can use an SAP ODP Extractor connection to read data from the following applications:

- SAP S/4HANA
- ECC
- Applications enabled with Operational Data Provisioning (ODP)
- Applications enabled with Operational Delta Queue (ODQ)

Prerequisites

Before you use an SAP ODP Extractor connection, the SAP administrator needs to perform certain prerequisite tasks to configure the Secure Agent machine and SAP system.

To process data through SAP, you also need to verify if the required licenses are enabled for the SAP system.

Verify the required SAP Notes in the SAP server

To read data from the SAP ODP objects, you need to verify that the required SAP Notes are available in the SAP server.

- 1931427 - ODP Data Replication API 2.0
- 2232584 - Release of SAP extractors for ODP replication (ODP SAPI)

SAP ODP Extractor Connector uses the ODP Replication APIs version 2.0 when you read data from SAP ODP objects.

Download and configure the SAP libraries

To read data from SAP ODP objects, you need to download and configure the SAP JCo libraries on the Secure Agent machine. If you encounter any issues while you download libraries, contact SAP Customer Support.

1. Go to the SAP Support Portal, and then click **Software Downloads**.

   Note: You need to have SAP credentials to access **Software Downloads** from the SAP Support Portal.

2. Download the latest version of the 64-bit SAP JCo libraries based on the operating system on which the Secure Agent runs.

Operating System	SAP JCo Libraries
Windows	- sapjco3.jar - sapjco3.dll
Linux	- sapjco3.jar - libsapjco3.so

3. Copy the JCo libraries to the following directory:
`<Informatica Secure Agent installation directory>\apps\Data_Integration_Server\ext\deploy_to_main\bin\rdtm-extra\tpl\sap`

   Create the `deploy_to_main\bin\rdtm-extra\tpl\sap` directory if it does not already exist.

4. Log in to Informatica Intelligent Cloud Services and configure the JAVA_LIBS property for the Secure Agent.
   a. Select **Administrator** > **Runtime Environments**.
   b. Click **Runtime Environments** to access the **Runtime Environments** page.
   c. To the left of the agent name, click **Edit Secure Agent**.
   d. From the **Service** list, select **Data Integration Server**.
   e. From the **Type** list, select **Tomcat JRE**.
   f. Enter the JAVA_LIBS value based on the operating system on which the Secure Agent runs.

Operating System	Value
Windows	..\bin\rdtm-extra\tpl\sap\sapjco3.jar;..\bin\rdtm\javalib\sap\sap-adapter-common.jar
Linux	../bin/rdtm-extra/tpl/sap/sapjco3.jar:../bin/rdtm/javalib/sap/sap-adapter-common.jar

   Warning: If you copy the value directly from the table, the hyphens (-) in the value might be incorrectly copied. Copy the value to a text editor and make sure that the value you copied is not corrupted.



   g. Click **Save**.

5. After you save the JAVA_LIBS value, configure the JVMClassPath property for the Secure Agent.
   a. From the **Service** list, select **Data Integration Server**.
   b. From the **Type** list, select **DTM**.

c. Enter the JVMClassPath value based on the operating system on which the Secure Agent runs.

Operating System	Value
Windows	pmserversdk.jar;..\..\bin\rdtm-extra\tpl\sap\sapjco3.jar;..\..\bin\rdtm\javalib\sap\sap-adapter-common.jar
Linux	pmserversdk.jar:../../bin/rdtm-extra/tpl/sap/sapjco3.jar:../../bin/rdtm/javalib/sap/sap-adapter-common.jar

Warning: If you copy the value directly from the table, the hyphens (-) in the value might be incorrectly copied. Copy the value to a text editor and make sure that the value you copied is not corrupted.



d. Click **Save**.

e. Repeat steps 2 through 5 on every machine where you installed the Secure Agent.

6. Restart the Secure Agent.

Configure SAP user authorization

Configure the SAP user account in the SAP system to process SAP ODP data.

For more information about how to configure SAP user authorization in the SAP system, see SAP user authorizations.

The following table describes the required authorization to read from SAP ODP objects:

Read Object Name	Authorization Values	Value	Activity	Design Time/Run Time
S_RFC	RFC_TYPE - Function Group(FUGR)	SYST	16	Both
	RFC_TYPE - Function Module(FUGR)	RFC1	16	Both
	RFC_TYPE - Function Module(FUNC)	RFCPING	16	Both
	RFC_TYPE - Function Group(FUGR)	RFC_METADATA	16	Both
	RFC_TYPE - Function Module(FUNC)	RFC_METADATA_GET	16	Both
	RFC_TYPE - Function Module(FUNC)	RFC_GET_FUNCTION_INTERFACE	16	Both

Read Object Name	Authorization Values	Value	Activity	Design Time/Run Time
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_CONTEXT_GET_LIST	16	Both
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_GET_DETAIL	16	Both
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_GET_LIST	16	Both
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_OPEN	16	Both
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_CLOSE	16	Both
	RFC_TYPE - Function Module(FUNC)	/INFADI/ODP_FETCH_XML	16	Run Time
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_FETCH	16	Run Time
	RFC_TYPE - Function Module(FUNC)	RODPS_REPL_ODP_FETCH_XML	16	Run Time
	RFC_TYPE - Function Module(FUNC)	DDIF_FIELDINFO_GET	16	Both
S_BTCH_ADM	FIELD NAME - BTCADMIN	Y	N/A	Both
S_BTCH_JOB	FIELD NAME - JOBACTION	RELE	RELE(Release Jobs)	Both
	FIELD NAME - JOBGROUP	' '	N/A	Both
S_RS_ODP_H	FIELD NAME - RSODPHNAME	*	3	Both
	FIELD NAME - RSODPHPKG	*	3	Both
S_RO_OSOA	FIELD NAME - OLTPSOURCE	*	3	Both
	FIELD NAME - OSOAAPCO	*	3	Both
	FIELD NAME - OSOAPART	Data, Definition	3	Both
S_RS_HYBR	FIELD NAME - RSHYBRPROV	'*'	3	Both
	FIELD NAME - RSHYBRPROJ	Definition	3	Both

Read Object Name	Authorization Values	Value	Activity	Design Time/Run Time
S_RS_ICUBE	FIELD NAME - OLTPSOURCE	*	3	Both
	FIELD NAME - OSOAAPCO	*	3	Both
	FIELD NAME - OSOAPART	Data, Definition	3	Both
S_RS_IOMAD	FIELD NAME - RSINFOAREA	*	3	Both
	FIELD NAME - RSAPPLNM	*	3	Both
	FIELD NAME - RSIOBJNM	*	3	Both
S_RS_MPRO	FIELD NAME - RSINFOAREA	*	3	Both
	FIELD NAME - RSMPRO	*	3	Both
	FIELD NAME - RSMPROOBJ	Data	3	Both
S_RS_ODSO	FIELD NAME - RSINFOAREA	*	3	Both
	FIELD NAME - RSODSOBJ	*	3	Both
	FIELD NAME - RSODSPART	Data	3	Both
S_ADMI_FCD	FIELDNAME - S_ADMI_FCD	PADM	N/A	Both

Configure the Secure Network Communication protocol

To use the SAP ODP Extractor connection with the Secure Network Communication (SNC) protocol, you need to configure the SNC protocol on both the SAP server and Secure Agent machine.
To create a connection with the SNC protocol, use the application server SNC connection and load balancing server SNC connection.

For more information about the prerequisites and steps to configure an SAP SNC connection, see Configure the SAP Secure Network Communication protocol Informatica How-To Library article.

Connect to SAP ODP

Let's configure the SAP ODP Extractor connection properties to connect to SAP ODP objects.

Before you begin

Before you get started, you'll need to configure the Secure Agent machine and SAP system to establish an SAP ODP Extractor connection.

Check out "Prerequisites" on page 9 to learn more about these tasks.

Connection details

The following table describes the basic connection properties:

Property	Description
Connection Name	Name of the connection. Each connection name must be unique within the organization. Connection names can contain alphanumeric characters, spaces, and the following special characters: _ . + -, Maximum length is 255 characters.
Description	Description of the connection. Maximum length is 4000 characters.
Type	SAP ODP Extractor
Runtime Environment	The name of the runtime environment where you want to run tasks to access SAP S/4HANA or SAP ECC. Select a Secure Agent or serverless runtime environment. For more information about how to configure a serverless environment, see "Use the serverless runtime environment" on page 20.

SAP server connection types

You can configure application server, application server SNC, load balancing server, and load balancing server SNC connection types to access SAP ODP.
Select the required connection type and then configure the connection-specific parameters.

Application server connection

Application server connection is the default type which requires your SAP client details.

The following table describes the basic connection properties for an application server connection:

Connection property	Description
SAP Client Number	The client number of the SAP application server. Get the required client number from the SAP system to which you want to connect.
SAP Language	Language code that corresponds to the SAP language. Get the required language code from the SAP system to which you want to connect.
SAP Application Server	The host name of the SAP application Server.
SAP System Number	The system number of the SAP application server to connect. Get the required system number from the SAP system to which you want to connect.

Connection property	Description
SAP Username	The user name with the appropriate user authorization to connect to the SAP account.
SAP Password	The password to connect to the SAP account.
Subscriber Name	A name that defines the Secure Agent as a unique subscriber in the SAP system. SAP uses this name to define unique operational delta queue (ODQ) in case of delta read from ODP.

Application server SNC connection

Application server SNC connection requires the Secure Agent PSE certificate name, SAP server PSE certificate name, and path to the X509 certificate file along with your SAP client details.

The following table describes the basic connection properties for an application server SNC connection:

Connection property	Description
SAP Client Number	The client number of the SAP application server. Get the required client number from the SAP system to which you want to connect.
SAP Language	Language code that corresponds to the SAP language. Get the required language code from the SAP system to which you want to connect.
SAP Application Server	The host name of the SAP application Server.
SAP System Number	The system number of the SAP application server to connect. Get the required system number from the SAP system to which you want to connect.
SNC My Name	The agent Personal Security Environment (PSE) or certificate name generated for the Secure Agent. Default length is 256.
SNC Partner Name	The server PSE or certificate name generated on the SAP server. Default length is 256.
SNC Quality of Protection (QoP)	The level of protection applied to a communication path when you create an SAP SNC connection. Select one of the following options from the list: - 1 - Apply authentication only - 2 - Apply authentication and integrity protection - 3 - Apply authentication, integrity, and privacy protection (encryption) - 8 - Apply global default protection (usually 3) - 9 - Apply the maximum protection Default is 3 - Apply authentication, integrity, and privacy protection (encryption).

Connection property	Description
Use X509 Certificate	Method of logging in. Select **Use X509 Certificate** to log in with SNC encryption that uses the X.509 certificate. If you don't select this option, you need to enter your SAP user name in the **X509 Certificate Path or SAP Username** property. Default is disabled.
X509 Certificate Path or SAP Username	The path and file name of the X509 certificate file. If the X509 certificate file name is abc.crt and the path is `\root\<folder name>`, enter both the path and file name in the following format: `\root\<folder name>\abc.crt` If you select to use the X509 certificate, you don't need to enter the SAP user name and password. If you don't want to use the X509 certificate, enter the SAP user name for which SNC is configured in the SAP server.
Subscriber Name	A name that defines the Secure Agent as a unique subscriber in the SAP system. SAP uses this name to define unique operational delta queue (ODQ) when the Secure Agent reads delta data from ODP.

The following table describes the advanced connection properties for application server SNC connection:

Property	Description
SAP Cryptographic Library Path	The path and file name of the SAP cryptographic library. Enter both the path and file name in the following format based on the operating system on which the Secure Agent runs: - On Windows: `\root\<folder name>\sapcrypto.dll` - On Linux: `/root/<folder name>/libsapcrypto.so`

Load balancing server connection

Create a load balancing server connection when you want to connect to the SAP system with the least load at run time.

Load balancing server connection requires your SAP client details and message server group name.

The following table describes the basic connection properties for a load balancing server connection:

Connection property	Description
SAP Client Number	The client number of the SAP message server. Get the required client number from the SAP system to which you want to connect.
SAP Language	Language code that corresponds to the SAP language. Get the required language code from the SAP system to which you want to connect.
SAP Message Server	The host name of the SAP message server.

Connection property	Description
SAP System ID	The system ID of the SAP message server. Get the required system ID from the SAP system to which you want to connect.
SAP Group	The name of the SAP logon group through which you want to connect. For example, PUBLIC.
SAP Username	The user name with the appropriate user authorization to connect to the SAP account.
SAP Password	The password to connect to the SAP account.
Subscriber Name	A name that defines the Secure Agent as a unique subscriber in the SAP system. SAP uses this name to define unique operational delta queue (ODQ) when you read delta data from ODP.

Load balancing server SNC connection

Create a load balancing server SNC connection when you want to connect to the SAP system using the (SNC) protocol with the least load at run time.

Load balancing server SNC connection requires the Secure Agent PSE certificate name, SAP server PSE certificate name, and path to the X509 certificate file along with your SAP client details and message server group name.

The following table describes the basic connection properties for a load balancing server SNC connection:

Connection property	Description
SAP Client Number	The client number of the SAP message server. Get the required client number from the SAP system to which you want to connect.
SAP Language	Language code that corresponds to the SAP language. Get the required language code from the SAP system to which you want to connect.
SAP Message Server	The host name of the SAP message server.
SAP System ID	The system ID of the SAP message server. Get the required system ID from the SAP system to which you want to connect.
SAP Group	The name of the SAP logon group through which you want to connect. For example, PUBLIC.
SNC My Name	The agent PSE or certificate name generated for the Secure Agent. Default length is 256.
SNC Partner Name	The server PSE or certificate name generated on the SAP server. Default length is 256.

Connection property	Description
SNC Quality of Protection (QoP)	The level of protection applied to a communication path when you create an SAP SNC connection. Select one of the following options from the list: - 1 - Apply authentication only - 2 - Apply authentication and integrity protection - 3 - Apply authentication, integrity, and privacy protection (encryption) - 8 - Apply global default protection (usually 3) - 9 - Apply the maximum protection Default is 3 - Apply authentication, integrity, and privacy protection (encryption).
Use X509 Certificate	Method of logging in. Select **Use X509 Certificate** to log in with SNC encryption that uses the X.509 certificate. If you don't select this option, you need to enter your SAP user name in the **X509 Certificate Path or SAP Username** property. Default is disabled.
X509 Certificate Path or SAP Username	The path and file name of the X509 certificate file. If the X509 certificate file name is abc.crt and the path is `\root\<folder name>`, enter both the path and file name in the following format: `\root\<folder name>\abc.crt` If you select to use the X509 certificate, you don't need to enter the SAP user name and password. If you don't want to use the X509 certificate, enter the SAP user name for which SNC is configured in the SAP server.
Subscriber Name	A name that defines the Secure Agent as a unique subscriber in the SAP system. SAP uses this name to define unique operational delta queue (ODQ) when you read delta data from ODP.

The following table describes the advanced connection properties for load balancing server SNC connection:

Property	Description
SAP Cryptographic Library Path	The path and file name of the SAP cryptographic library. Enter both the path and file name in the following format based on the operating system on which the Secure Agent runs: - On Windows: `\root\<folder name>\sapcrypto.dll` - On Linux: `/root/<folder name>/libsapcrypto.so`

Advanced settings

The following table describes the advanced connection properties:

Property	Description

Additional Parameters	Additional SAP parameters that you can use when you connect to the SAP system.
	You can enter multiple additional parameters, separated by semicolon, in the following format:
	`<parameter name1>=<value1>;<parameter name2>=<value2>;<parameter name3>=<value3>....`
	For example, to generate SAP JCo and SAP CPIC trace files, enter the following additional parameters:
	`jco.client.trace="1";jco.client.cpic_trace="3";`
	During the run time, the SAP JCo and SAP CPIC trace files are generated in the following location:
	`<Informatica Secure Agent installation directory>\apps\Data_Integration_Server\<DIS version>\ICS\main\bin\rdtm`
	During the design time, the SAP CPIC traces are generated in the `tomcat.out` files at the following location:
	`<Informatica Secure Agent installation directory>\apps\Data_Integration_Server\<DIS version>tomcat.out`

Display Delta Fields	Specifies whether the mapping displays the operation modes that caused the changed data on ODP sources. When enabled, the mapping generates the ODQ_CHANGEMODE and ODQ_ENTITYCNTR fields on the **Fields** tab for ODP sources that are enabled with Operational Delta Queue (ODQ). Default is disabled.

Hierarchical data extraction from SAP ODP objects

Before you create an SAP ODP Extractor connection, you need to install the SAP ODP Extractor transport files from the Secure Agent directory to the SAP system when you want to extract hierarchical data from SAP ODP objects from a Unicode SAP system.

Ensure that the transport files you install on the SAP machines are the latest. Get the latest transport files from the following directory:

`<Informatica Secure Agent installation directory>\downloads\package-SAPODP.<Latest version>\package\sapodp\sap-transport`

Prerequisites to install the transport files

Before you install the SAP ODP Extractor transports, you need to perform the prerequisite tasks.

- The transport files are applicable for SAP version ERP 6.0 EHP7 system or later.
- Before you install the transports on your production system, install and test the transports in a development system.

The following table lists the transports that you need to install to read data from the SAP ODP objects:

Data and Cofile Names	Transport Request	Functionality
- K900426.IN7 - R900426.IN7	IN7K900426	Install the transports only when you want to read from an SAP ODP that supports hierarchy. If the SAP ODP objects that do not contain hierarchical data, you can use SAP ODP Extractor Connector without installing the SAP ODP Extractor transport files.

Installing transport files

To install the SAP ODP Extractor transport files, perform the following steps:

1. Find the transport files in the following directory on the Secure Agent machine:
   `<Informatica Secure Agent installation directory>\downloads\package-SAPODP.<Latest version>\package\sapodp\sap-transport`
2. Copy the cofile transport file to the `Cofile` directory in the SAP transport management directory on each SAP machine that you want to access.
   The cofile transport file uses the following naming convention: `<number>.<sap system>`.
3. Copy the data transport file to the `Data` directory in the SAP transport management directory on each SAP machine that you want to access.
   The data transport file uses the following naming convention: `<number>.<sap-system>`.
4. To import the transports to SAP, in the STMS, click **Extras** > **Other Requests** > **Add** and add the transport request to the system queue.
5. In the **Add Transport Request to Import Queue** dialog box, enter the request number for the cofile transport.
   The request number inverts the order of the renamed cofile as follows: `<sap-system><number>`.
6. In the Request area of the import queue, select the transport request number that you added, and click **Import**.
7. If you want to upgrade from a previous version of the Informatica Transports, select the **Overwrite Originals** option.

Use the serverless runtime environment

You can use a serverless runtime environment hosted on AWS or Azure to connect to the SAP system when you configure an SAP ODP Extractor connection on Linux.

You can't create an SNC connection when you use the serverless runtime environment.

Before you configure an SAP ODP Extractor connection using the serverless runtime environment, perform the following tasks:

- Add the libraries in the Amazon S3 bucket or Azure container in your AWS or Azure account.
- Configure the .yml serverless configuration file.
- Configure the JAVA_LIBS and JVMClassPath properties for the serverless runtime environment on Linux.

Add the libraries in the Amazon S3 bucket or Azure container in your AWS or Azure account

Perform the following steps to configure an SAP ODP Extractor connection in a serverless runtime environment:

1. Create the following structure for the serverless agent configuration in AWS or Azure:
   `<Supplementary file location>/serverless_agent_config`
2. Add the libraries in the Amazon S3 bucket or Azure container in the following location in your AWS or Azure account: `<Supplementary file location>/serverless_agent_config/sap`

Configure the .yml serverless configuration file

Perform the following steps to configure the .yml serverless configuration file in the serverless runtime environment, and to copy the libraries to the serverless agent directory:

1. Copy the following code snippet to a text editor:

```
version: 1
agent:
  dataIntegrationServer:
    autoDeploy:
      sap:
        jcos:
          - fileCopy:
              sourcePath: sap/jco/<sapjco_libary_filename>
          - fileCopy:
              sourcePath: sap/jco/<sapjco_libary_filename>
```

   where the source path is the directory path of the library files in AWS or Azure.
2. Ensure that the syntax and indentations are valid, and then save the file as `serverlessUserAgentConfig.yml` in the following AWS or Azure location: `<Supplementary file location>/serverless_agent_config`
   When the .yml file runs, the libraries are copied from the AWS or Azure location to the serverless agent directory.

Configure the JAVA_LIBS and JVMClassPath properties for the serverless runtime environment

Perform the following steps in Administrator to configure the JAVA_LIBS and JVMClassPath properties for the serverless runtime environment on Linux:

1. Log in to Informatica Intelligent Cloud Services.
2. Select **Administrator** > **Serverless Environments**.
3. On the **Serverless Environments** tab, expand the Actions menu for the required serverless runtime environment, and then select **Edit**.
4. On the **Runtime Configuration Properties** tab, select **Data Integration Server** as the service.
5. Select the following **Type** and **Name**, and then enter the JAVA_LIBS and JVMClassPath values:

Type	Name	Value
Tomcat_JRE	JAVA_LIBS	`../bin/rdtm-extra/tpl/sap/sapjco3.jar:../bin/rdtm/javalib/sap/sap-adapter-common.jar`
PMRDTM_CFG	JVMClassPath	`pmserversdk.jar:../../bin/rdtm-extra/tpl/sap/sapjco3.jar:../../bin/rdtm/javalib/sap/sap-adapter-common.jar`

6. Click **Save**.

For more information about how to configure and use the serverless environment, see "Serverless runtime environment setup" in *Runtime Environments* in the Administrator help.

CHAPTER 3

Mappings and mapping tasks with SAP ODP Extractor

Use a mapping to define the data flow logic. Use the Data Integration Mapping Designer to configure mappings. In advanced mode, the Mapping Designer updates the mapping canvas to include transformations and functions that enable advanced functionality.

When you configure a mapping to describe the flow of data from source and target, you can also add transformations to transform data. A transformation includes field rules to define incoming fields. Links visually represent how data moves through the data flow.

After you create a mapping, you can run the mapping or you can deploy the mapping in a mapping task. The Mapping Configuration application allows you to process data based on the data flow logic defined in a mapping or integration template.

Use the Mapping task wizard to create a mapping task. When you create a mapping task, you select the mapping or integration template for the task to use.

If you configured parameters, which are placeholders for information, in a mapping, you can define the parameters in the mapping task. Defining parameters provides additional flexibility and allows you to use the same mapping in multiple mapping tasks. For example, you can use a parameter for a source connection in a mapping, and then define the source connection when you configure the mapping task.

When you create a mapping task, you can associate the task with a schedule to run it at specified times or on regular intervals. Or, you can run it manually. You can also configure advanced session properties. You can monitor tasks that are currently running and view details about completed tasks.

SAP ODP sources in mappings

To read data from an SAP S/4HANA application, configure an SAP ODP object as the Source transformation in a mapping.

Specify the name and description of the SAP ODP source. Configure the source and advanced properties for the source object.

The following table describes the SAP ODP Extractor source properties that you can configure in a Source transformation:

Property	Description
Connection	Name of the source connection.
Source Type	The source type. Select from one of the following types: - Single. Select to specify a single SAP ODP object. - Parameter. Select to specify the SAP ODP object as a parameter.
Source Object	Source object for the task. Select the source object from the list.
Preview Data	Not applicable

The following table describes the SAP ODP Extractor advanced source properties:

Property	Description
Data Fetch Mode	The data fetch mode used while reading records from ODP. You can select from the following options: **0-Full** Reads all the records for the selected ODP. **1-Delta Plus** Reads all records of the ODP from the SAP system and also initializes the Operational Delta Queue (ODQ) for the selected ODP in the subscriber that you defined in the SAP system when you run the mapping for the first time using this mode. Subsequently, use this mode to read delta data of the ODP from the SAP system. **2-Delta Only** Initializes the Operational Delta Queue (ODQ) for the selected ODP in the subscriber that you defined in the SAP system when you run the mapping for the first time using this mode. Subsequently, when you use this mode and run the mapping, the Secure Agent reads delta data of the ODP from the SAP system. **3-Repetitive** Extracts delta records of the last delta run. For example, use this mode when the mapping with the Delta Plus or Delta Only option fails, and you want to read the last delta again. **Parameter** Use this option when you want to parameterize the data fetch mode values. Specify a valid data fetch mode value in the **Parameter Name for Data Fetch Mode** field.
Parameter Name for Data Fetch Mode	The parameter name that you defined for the **Data Fetch Mode** property in the parameter file. You can specify the following values for the data fetch mode: - 0 for Full - 1 for Delta Plus - 2 for Delta Only - 3 for Repetitive If you pass any other value, the jobs fail when you run the mapping.
Job Timeout	Defines the maximum amount of time in minutes while processing the mapping during which the Secure Agent machine must wait before it receives communication from SAP and get the data packets. Default is 120. The timeout applies only when the Secure Agent machine waits for SAP to send the data packets. Do not modify the default value.

Property	Description
Packet size in MB	The packet size of each SAP data packet while reading data from SAP S/4HANA. Default is 8 MB. To increase the default packet size, you need to increase the Java heap memory for the Secure Agent machine. For more information about increasing the Java heap memory, see "Increasing the heap size" on page 25.
Tracing	Sets the amount of detail that appears in the log file. You can choose terse, normal, verbose initialization or verbose data. Default is normal.

Increasing the heap size

To increase performance and avoid run-time environment memory issues, you need to increase the Java heap size for the Secure Agent machine.

1. Select **Administrator** > **Runtime Environments**.
2. On the **Runtime Environments** page, select the Secure Agent machine that runs the mapping.
3. Click **Edit**.
4. In the **System Configuration Details** section, select **Data Integration Server** as the **Service** and **DTM** as the **Type**.
5. Edit the **JVMOption1** system property and set the value to **Xmx512m**.
6. Click **OK** to save the changes.

Operators in source filter expressions

To filter data from SAP ODP source objects, you need to add the required operator in a filter expression and define the filter expression in the task.

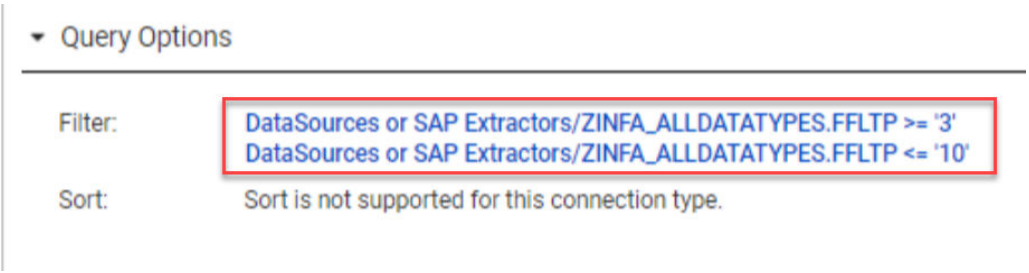
You can use the following operators in a filter expression:

- = (Equal to)
- <> (Not equal to)

Consider the following guidelines to add operators in a filter expression:

- You can't filter data when you use the < (Less than) or > (Greater than) operator.
- To filter values within a range, you need to add both the <= (Less than or equal to) and >= (Greater than or equal to) operators together. But when you add the <= (Less than or equal to) or >= (Greater than or equal to) operators separately, the mapping doesn't filter values.
  For example, to filter values within a range of >=3 and <=10 from the FFLTP field of the ZINFA_ALLDATATYPES object when the SAP ODP source is available in the DataSources or SAP Extractors context, add operators in the following format:
  - DataSources or SAP Extractors/ZINFA_ALLDATATYPES.FFLTP >= '3'
  - DataSources or SAP Extractors/ZINFA_ALLDATATYPES.FFLTP <= '10'

The following image shows the configured data filters that filter values within a range of >=3 and <=10 from the FFLTP field:



Rules and guidelines for SAP ODP source objects

Consider the following rules and guidelines for SAP ODP objects used as sources in mappings and mapping tasks:

- Only the available contexts in the selected SAP system appear as packages.
- Ensure that the required ODP is activated in the SAP system before you can use in Data Integration. Only the activated ODPs appear in the browser list of the SAP ODP Extractor Connector.
- If the ODP name contains namespace (“/”) characters at the beginning, the Secure Agent replaces those characters with T__. Every subsequent namespace character in the ODP name is replaced by “__”. For example, if the ODP name is /IMO/CMSD17, it appears in the browser list as T__IMO__CMSD17.
- If the field name of the selected ODP has a namespace character (“/”), that character is replaced with an underscore (_) character.
- Do not edit the field metadata as it might corrupt the extracted data.
- Partitioning is not applicable with filters and hierarchal data sources.
- You can read delta data for ODPs that are supported in the SAP system. If you try to run the delta mode for ODPs where the ODQ is not maintained in the SAP system, a runtime error occurs. If the ODQ is not applicable for contexts such as HANA and ABAP CDS views, delta data fetch modes are not applicable.
- You can apply filters only for the selected fields of the ODPs. You can identify those fields with the attribute Filterable marked as Y. If you apply filters on any other fields, it results in a runtime error.
- Sorting of data is not applicable.
- You cannot use more than one SAP ODP source in a Joiner transformation.
- To search SAP ODP source objects that contain similar string in the object name, enter a string of the object name that you want to search and add the asterisk wild card character to the beginning or end of the search string based on the search requirement.
  For example, to search for all SAP ODP source objects that contain the string 0BUCKET in the object names, enter 0BUCKET* in the **Search** field.

Delta extraction for SAP ODP Extractor mappings

You can use the SAP ODP Extractor to extract delta data from ODPs that are enabled for delta. SAP maintains Operation Data Queue (ODQ) for delta-enabled ODPs.

For contexts such as HANA and ABAP CDS views, SAP does not maintain ODQ at the source and therefore you cannot extract delta data from the ODPs of these contexts.

When you configure a mapping, use the following sequence to extract data from ODPs:

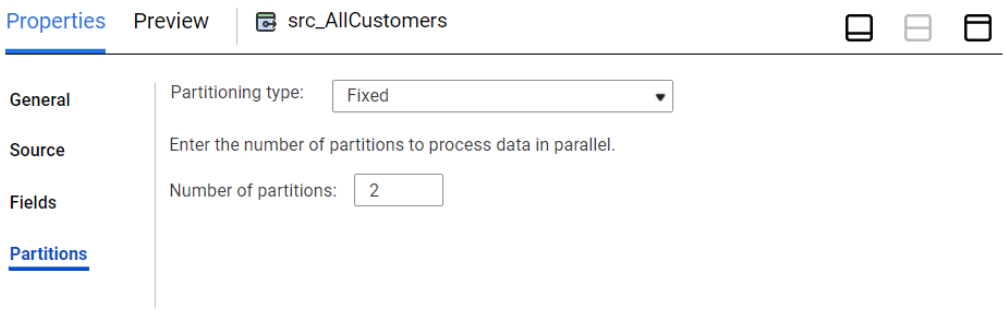
1. Run the mapping using Full as the data fetch mode to extract all the records of the ODP to create the initial setup.
2. Run the job in Delta Only mode to initialize ODQ for the selected ODP for your subscriber in the SAP system. SAP starts tracking for any changes of data in ODQ.
3. Alternatively, combine operations 1 and 2 to run the job in the Delta Plus data fetch mode. Using this option, you can extract all the records from the ODP and initialize ODQ for the ODPs from your defined subscriber.
4. Subsequently, you can run the mapping with either Delta Only or Delta Plus mode to extract delta data for the selected SAP system.
5. At any time, if you want to extract the last delta data, run the mapping in the Repetitive data fetch mode.

Fixed partitioning for SAP ODP sources

You can configure fixed partitioning in a mapping that reads data from SAP ODP sources.

Enable partitioning when you configure the Source transformation in the Mapping Designer.

On the **Partitions** tab for the Source transformation, you select fixed partitioning and enter the number of partitions, as shown in the following image:



The mapping task distributes rows of data based on the number of partitions that you specify. You can specify up to 64 partitions.

Configuring a mapping with an SAP ODP source

Use the Data Integration Mapping Designer to configure a mapping.

1. To create a mapping, click **Data Integration** > **New** > **Mappings**. Select **Mapping** and click **Create**.
2. Enter a name and description for the mapping, and click **OK**.

   You can use alphanumeric characters and underscores (_) in the mapping name.
3. To configure a source, on the **Transformation** palette, click **Source**.
4. In the **Properties** panel, on the **General** tab, enter a name and description.
5. Click the **Source** tab and configure source details.

6. Specify the source type. You can choose one of the following options:
   - Select **Single Object** to select a single SAP object.
   - Select **Parameter** to configure the source objects in a mapping task associated with this mapping.
7. Click **Query Options** in the **Source** tab to specify any filter for the SAP ODP object.

   Note: To specify a date/time filter, use the following format: DD/MM/YYYY HH:MM:SS
8. Click **Advanced** to specify the advanced source properties.

   Note: You cannot add or remove source fields or edit the field metadata.
9. To add a transformation, on the **Transformation palette**, click the transformation name. Or, drag the transformation onto the mapping canvas.
   a. On the **General** tab, you can enter a name and description for the transformation.
   b. Draw a link to connect the previous transformation to the transformation.

      When you link transformations, the downstream transformation inherits the incoming fields from the previous transformation.
      For a Joiner transformation, draw a master link and a detail link.
   c. To preview fields, configure the field rules, or rename fields, click **Incoming Fields**.
   d. Configure additional transformation properties, as needed.

      The properties that you configure vary based on the type of transformation you create.
   e. To add another transformation, repeat these steps.
10. To add a Target transformation, on the **Transformation palette**, click **Target**.
    a. On the **General** tab, you can enter a name and description.
    b. Draw a link to connect the previous transformation to the Target transformation.
    c. Click the **Target** tab and configure target details. If necessary, configure the advanced target properties.

       Target details and advanced target properties appear based on the connection type. For more information, see *Transformations*.
    d. To preview fields, configure the field rules, or rename fields, click **Incoming Fields**.
    e. Click **Field Mapping** and map the fields that you want to write to the target.
    f. To add another Target transformation, repeat these steps.
11. Click the **Field Mapping** to map the Source and Target fields.

    You can use the Automatic option if the fields are similar between the source and target.
12. Save and run the mapping or save and create a mapping task.

Creating a mapping task

You can create a mapping task based on a valid mapping or integration template on the Mappings page.

1. To create a mapping task, click **Data Integration** > **New** > **Tasks**.
2. Enter a name for the task.

   Task names must be unique within the organization. Task names can contain alphanumeric characters, spaces, and the following special characters:_ . + -Task names are not case sensitive.

3. Select the runtime environment that contains the Secure Agent that you want to use to access the SAP ODP Extractor connection.
4. Select **Mapping** as the task based on which you want to create the mapping task.
5. Click **Select** to specify a mapping.

   The **Select a Mapping** dialog box appears.
6. Select a mapping or search for the required mapping and select **OK**.

   The image of the selected mapping appears.
7. Click **Next**.

   If you specified any parameters in the source or target details in the mapping, the Source or Target page appears. If not, the Schedule page appears.
8. Click **Next** to configure a schedule and advanced options. Perform any of the following steps based on your requirements.
   a. Click **Run this task on schedule** and specify the schedule you want to use.
   b. Configure the email notification options.
   c. Configure advanced options for the task.
   d. Configure the advanced source properties and advanced target properties.
   e. Specify the execution mode.
9. Optionally, add the advanced session properties.
   a. Click **Add**.
   b. Select a session property.
   c. Configure the value of the session property.
10. Save and run the mapping task.

CHAPTER 4

Data type reference

Data Integration uses the following data types in mappings, mapping tasks, and data transfer tasks with SAP:

SAP native data types

SAP data types appear in the **Fields** tab of the Source transformation when you choose to edit metadata for the fields. SAP performs any necessary conversion between the SAP data types and the native data types of the underlying source database tables.

Transformation data types

Set of data types that appear in the remaining transformations. They are internal data types based on ANSI SQL-92 generic data types, which Data Integration uses to move data across platforms. Transformation data types appear in all remaining transformations in a mapping or mapping task.

When Data Integration reads source data, it converts the native data types to the comparable transformation data types before transforming the data.

SAP and transformation data types

The following table lists the SAP data types that SAP ODP Extractor Connector supports along with the corresponding transformation data types:

SAP Data Type	Transformation Data Type	Range for Transformation Data Type
ACCP	Date/time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D.
CHAR	String	1 to 104,857,600 characters Fixed-length or varying-length string.
CLNT	String	1 to 104,857,600 characters Fixed-length or varying-length string.
CUKY	String	1 to 104,857,600 characters Fixed-length or varying-length string.
CURR	Decimal	Precision 1 to 28 digits, scale 0 to 28
DATS	Date/time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. Precision to the nanosecond.
DEC	Decimal	Precision 1 to 28 digits, scale 0 to 28

SAP Data Type	Transformation Data Type	Range for Transformation Data Type
FLTP	Double	Precision 15, scale 0
INT1	Small Integer	Precision 5, scale 0
INT2	Small Integer	Precision 5, scale 0
INT4	Integer	Precision 10, scale 0
LANG	String	1 to 104,857,600 characters Fixed-length or varying-length string.
LCHR	String	1 to 104,857,600 characters Fixed-length or varying-length string.
LRAW	Binary	Uninterrupted sequence of bytes with a maximum length of 255 positions.
NUMC	String	1 to 104,857,600 characters Fixed-length or varying-length string.
PREC	Binary	Uninterrupted sequence of bytes with a maximum length of 255 positions.
QUAN	Decimal	Precision 1 to 28 digits, scale 0 to 28
RAW	Binary	Uninterrupted sequence of bytes with a maximum length of 255 positions.
TIMS	Date/time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. Precision to the nanosecond.
UNIT	String	1 to 104,857,600 characters Fixed-length or varying-length string.
VARC	String	1 to 104,857,600 characters Fixed-length or varying-length string.

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