Informatica

Informatica® PowerExchange for Snowflake
10.5.4

User Guide for PowerCenter

Informatica PowerExchange for Snowflake User Guide for PowerCenter
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Preface

Use the *Informatica® PowerExchange® for Snowflake User Guide* to learn how to read from and write to Snowflake by using the PowerCenter Client. Learn to create a Snowflake connection, develop mappings, and run sessions in an Informatica domain.

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To find online support resources on the Informatica Network, visit https://network.informatica.com and select the eSupport option.

CHAPTER 1

Introduction to PowerExchange for Snowflake

This chapter includes the following topics:

PowerExchange for Snowflake Overview

You can use PowerExchange for Snowflake to extract data from and load data to Snowflake.

You can extract data from other applications, databases, and flat files, and use PowerExchange for Snowflake to load the data to Snowflake. You can also read data from and write data to Snowflake that is enabled for staging data in Amazon, Azure, and Google Cloud Platform.

You can import Snowflake objects as sources and targets to create mappings, and run a session to extract data from or load data to Snowflake. When you use Snowflake objects in mappings, you must configure properties specific to Snowflake.

Example

An enterprise application uses an Oracle database to store the product transaction details such as transactionID, customerID, productID, quantity, and order date. You need to analyze the completed transactions, pending transactions, and availability of stock. Use PowerExchange for Snowflake to create a mapping to extract all the transaction records from the Oracle source and load the records to a Snowflake target for data analysis.

Introduction to Snowflake

Snowflake is a cloud data warehouse service that organizations can use to store and analyze data.

Snowflake is a Software-as-a-Service (SaaS) application that uses an SQL database engine with an architecture designed for the cloud.

The Snowflake architecture comprises the following three layers, which sets Snowflake apart from other data warehouses with its additional functionalities and capabilities:

- Database Storage. When you load data to Snowflake, Snowflake reorganizes and stores the data in the Snowflake database. You can access the data stored in the Snowflake database through SQL query operations.
- Query Processing. Snowflake processes all queries in the query processing layer. The processing layer contains all the compute resources that Snowflake needs to run queries. For example, Snowflake uses CPU, memory, and temporary storage to run queries.
- Cloud Services. The cloud services layer contains all the different components that Snowflake needs to process the user requests. For example, Snowflake uses authentication, infrastructure management, and access control services to process user requests.

CHAPTER 2

PowerExchange for Snowflake Configuration

This chapter includes the following topics:

PowerExchange for Snowflake Configuration Overview

PowerExchange for Snowflake installs with PowerCenter. After you install or upgrade Informatica Services, you must register the PowerExchange for Snowflake plug-in with the PowerCenter repository.

Prerequisites

Before you use PowerExchange for Snowflake, perform the following tasks:

- Install or upgrade PowerCenter.
- Verify that you have read and write permissions on the following directories on each machine that runs the PowerCenter Integration Service and PowerCenter Repository Service:
    - `<Informatica installation directory>\server\connectors\cci\plugins`
    - `<Informatica installation directory>\server\bin\Plugin`
    - `<Informatica installation directory>\connectors\thirdparty`
- Verify that you have read and write permissions on the following directories on each machine where you installed the PowerCenter Client:
    - `<Informatica installation directory>\clients\PowerCenterClient`
    - `<Informatica installation directory>\clients\PowerCenterClient\bin\Help\<language>`

For more information about product requirements and supported platforms, see the Product Availability Matrix on Informatica Network:
https://network.informatica.com/community/informatica-network/product-availability-matrices.

Registering the PowerExchange for Snowflake Plug-in

After you complete the installation, register the PowerExchange for Snowflake plug-in with the repository.

To register the plug-in, the repository must be running in exclusive mode. Use the Administrator tool or the pmrep RegisterPlugin command line program to register the plug-in. If you do not have the correct privileges to register the plug-in, contact the user who manages the PowerCenter Repository Service.

The plug-in file is an `.xml` file that defines the functionality of the adapter. When you install the server component, the installer copies the plug-in file to the following directory:

```
<Informatica installation directory>/server/bin/Plugin
```

The name of the plug-in file for PowerExchange for Snowflake is `SnowflakeCloudDataWarehousePlugin.xml`.

Registering the Plug-in from the Administrator Tool

Register a repository plug-in to add its functionality to the repository.

1. Run the PowerCenter Repository Service in exclusive mode.
2. In the **Navigator**, select the PowerCenter Repository Service to which you want to add the plug-in.
3. In the **Contents** panel, click the **Plug-ins** view.
4. In the **Actions** menu of the **Domain** tab, select **Register Plug-in**.
5. On the **Register Plugin** page, click the **Browse** button to locate the plug-in file.
6. Enter your user name and password.
7. Click **OK**.

   The PowerCenter Repository Service registers the plug-in with the repository. The results of the registration operation appear in the activity log.
8. Run the PowerCenter Repository Service in normal mode.

Registering the Plug-in from the Command Line Interface

You can use the `pmrep RegisterPlugin` command to register the plug-in from the command line interface.

1. Run the PowerCenter Repository Service in exclusive mode.
2. Run the `pmrep Connect` command to connect to the Repository Service with a user account that has the Administrator Repository privilege.

   The RegisterPlugin command uses the following syntax:

   ```
   pmrep connect -r <repository name> -d <domain_name> -n <domain user name> -x
   <domain_password>
   ```
3. Find `<adaptername>.xml` in the following directory:

   ```
   <Informatica installation directory>\server\bin\Plugin
   ```

4. Run the `pmrep RegisterPlugin` command to update the repository.

   The RegisterPlugin command uses the following syntax:

   ```
   pmrep registerplugin -i <Informatica installation directory\server\bin\Plugin
   \SnowflakeCloudDataWarehousePlugin.xml -e
   ```

Configure the Java Heap Memory

When the source or target contains a large amount of data, configure the memory for the Java heap size on the node that runs the PowerCenter Integration Service. You must ensure that the minimum physical memory available on the server machine for each session is in the range of 300 to 500 MB.

You must set a maximum heap size value based on the amount of data that you want to process.

1. In the Administrator tool, navigate to the PowerCenter Integration Service for which you want to change the Java heap size.
2. On the **Processes** tab, edit the **General Properties** section.
3. Specify the maximum heap size in Java SDK Maximum Memory limit based on the amount of data you want to process.

   The default value of the maximum heap size is 64 MB and the minimum size is 32 MB.
4. Click **OK**.
5. Recycle the PowerCenter Integration Service.

Configuring HTTP Proxy Options

If your organization uses a proxy server to access the internet, you can configure the HTTP proxy server authentication settings for the PowerCenter Client and the PowerCenter Integration Service to read data from or write data to Snowflake.

Configuring HTTP Proxy Options for the PowerCenter Client

You can configure the proxy server authentication settings in the `ccijvmoptions.ini` file for the PowerCenter Client.

1. Ensure that you enable the proxy server settings from your web browser.
2. Access the `ccijvmoptions.ini` file from the following location: `<PowerCenter Installation Directory>\clients\PowerCenterClient\client\bin`
3. Add the following properties to the `ccijvmoptions.ini` file:

   ```
   -Dhttp.useProxy=true
   -Dhttps.proxyHost=<Host name of the HTTPS proxy server>
   -Dhttp.proxyHost=<Host name of the HTTP proxy server>
   -Dhttps.proxyPort=<Port number of the HTTPS proxy server>
   -Dhttp.proxyPort=<Port number of the HTTP proxy server>
   ```
4. Restart the PowerCenter Client.

Configuring HTTP Proxy Options for the PowerCenter Integration Service

You can configure the proxy server authentication settings for the PowerCenter Integration Service from the Administrator Console.

1. Ensure that you enable the proxy server settings from your web browser.
2. In the Administrator Console, navigate to the PowerCenter Integration Service for which you want to set the proxy server settings and then add the following JVM options in the custom properties section:

   ```
   JVMOption1=-Dhttp.useProxy=true
   ```

   ```
   JVMOption2=-Dhttps.proxyHost=<Host name of the HTTP proxy server>
   ```

   ```
   JVMOption3=-Dhttps.proxyPort=<Port number of the HTTP proxy server>
   ```

3. Restart the PowerCenter Integration Service.

For more information about the proxy settings configuration for the JDBC driver, see https://docs.snowflake.net/manuals/user-guide/jdbc-configure.html#connecting-using-a-proxy-server

CHAPTER 3

Snowflake Sources and Targets

This chapter includes the following topics:

Snowflake Sources and Targets Overview

You can create a mapping with a Snowflake source to extract data from Snowflake. You can create a mapping with any source and a Snowflake target to load data to Snowflake. You can use tables, external tables, views, or materialized views as Snowflake sources.

When the PowerCenter Integration Service extracts data from the source or loads data to the target, it converts the data based on the data types associated with the source or the target.

Import Snowflake Source and Target Definitions

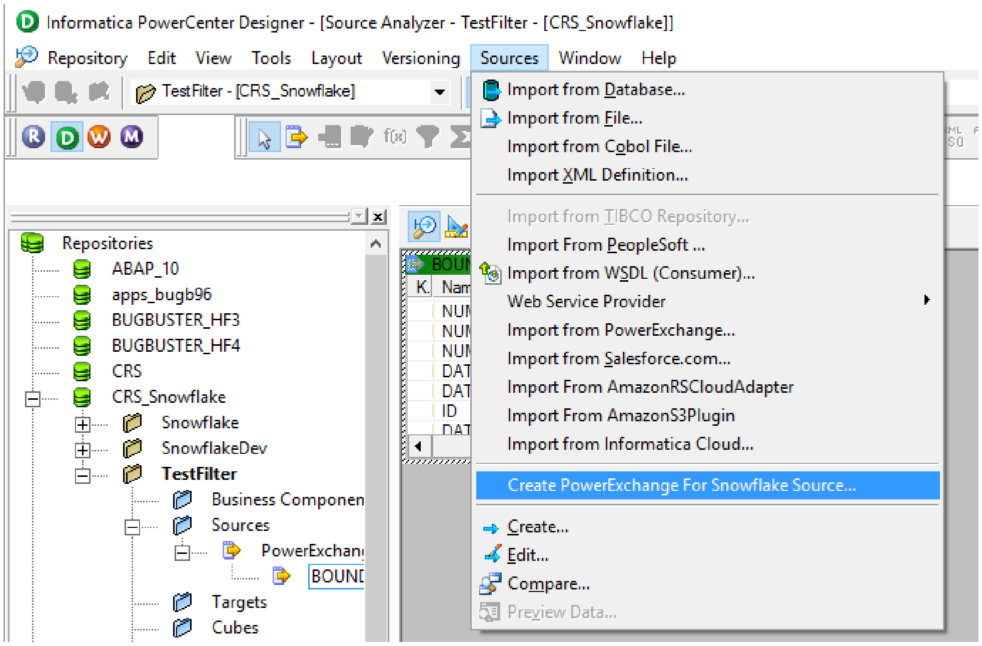
Use the **Create PowerExchange For Snowflake Source** or **Create PowerExchange For Snowflake Target** wizard to import Snowflake source and target definitions into the PowerCenter repository.

You must import Snowflake source and target objects before you create a mapping.

1. Start PowerCenter Designer and connect to a PowerCenter repository configured with a Snowflake instance.
2. Open a source or target folder.

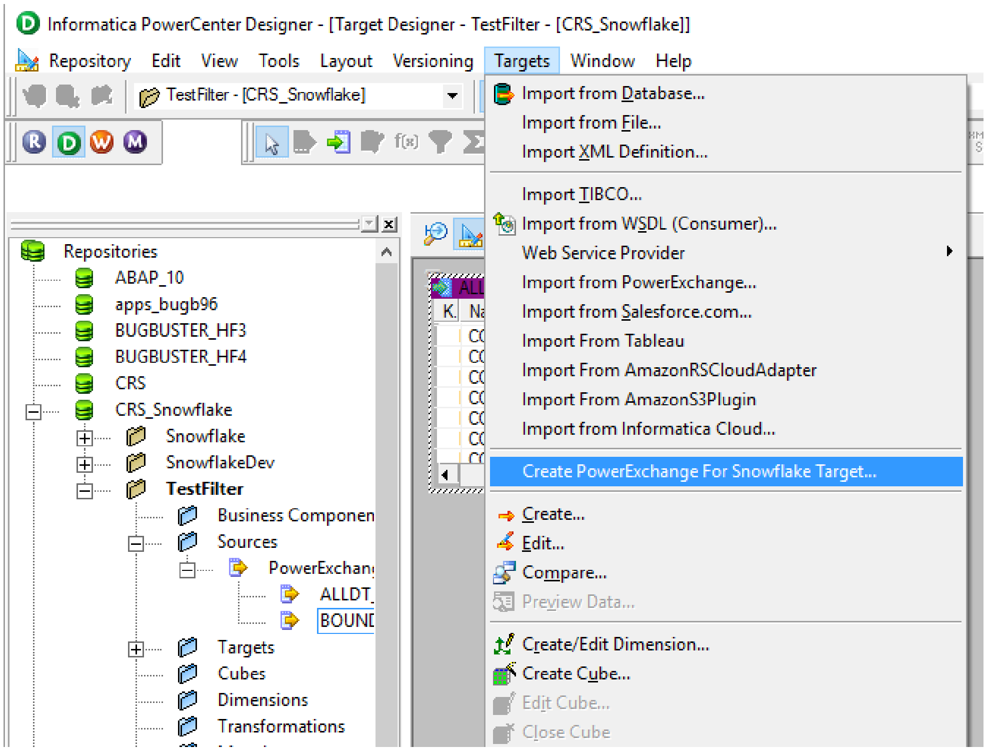
3. Select **Source Analyzer** or **Target Designer**.

   - In the Source Analyzer, click **Sources** > **Create PowerExchange For Snowflake Source**.
     The following image shows the option to create a Snowflake source:


Informatica PowerCenter Designer - [Source Analyzer - TestFilter - [CRS_Snowflake]]
Repository
Edit
View
Tools
Layout
Versioning
Sources
Window
Help
TestFilter - [CRS_Snowflake]
Repositories
ABAP_10
apps_bugb96
BUGBUSTER_HF3
BUGBUSTER_HF4
CRS
CRS_Snowflake
Snowflake
SnowflakeDev
TestFilter
Business Componen
Sources
PowerExchan
BOUND
Targets
Cubes
Import from Database...
Import from File...
Import from Cobol File...
Import XML Definition...
Import from TIBCO Repository...
Import From PeopleSoft ...
Import from WSDL (Consumer)...
Web Service Provider
Import from PowerExchange...
Import from Salesforce.com...
Import From AmazonRSCloudAdapter
Import From AmazonS3Plugin
Import from Informatica Cloud...
Create PowerExchange For Snowflake Source...
Create...
Edit...
Compare...
Preview Data...

The **Snowflake Connection Details** dialog box appears.

- In the Target Analyzer, click **Targets** > **Create PowerExchange For Snowflake Target**.
  The following image shows the option to create a Snowflake target:



  The **Snowflake Connection Details** dialog box appears.

4. Configure the following connection parameters:

Connection Parameter	Description
Username	Enter the user name to connect to the Snowflake account.
Password	Enter the password to connect to the Snowflake account.
Account	Enter the name of the Snowflake account. In the Snowflake URL, your account name is the first segment in the domain.
Warehouse	Enter the Snowflake warehouse name.

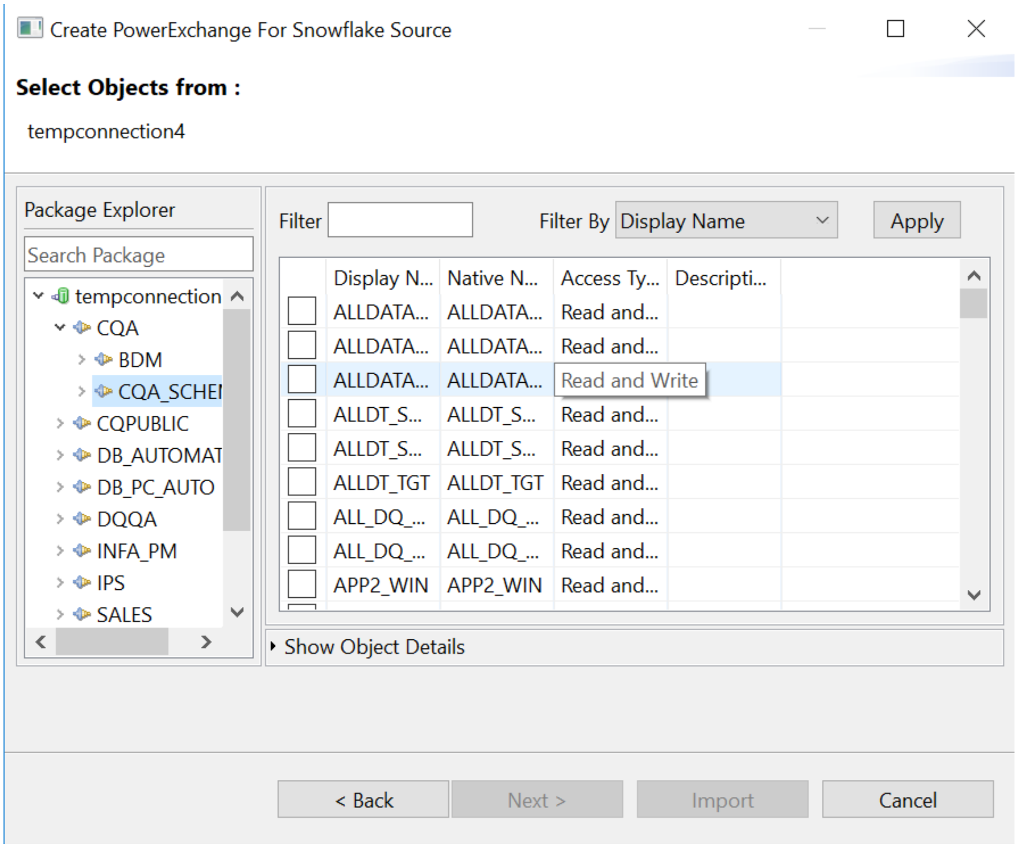
Connection Parameter	Description
Role	Specify the Snowflake role assigned to the user.

Additional JDBC URL Parameters	Enter one or more JDBC connection parameters in the following format:
	`<param1>=<value>&<param2>=<value>&<param3>=<value>....`
	For example, specify the database and schema that you want to filter out while importing the object in the Designer. Enter the database and schema name in the following format:
	`user=jon&warehouse=mywh&db=mydb&schema=public`
	Note: If you do not specify, all the database and schemes are displayed while importing the tables.

5. Click **Test** to test the connection.
6. Click **Finish** to add the connection.
7. Click **Next**.

   The **Select Objects from** tab appears.
8. Select the database and schema in **Package Explorer**.

   The following image shows the list of tables that appear:



Create PowerExchange For Snowflake Source

Select Objects from :

tempconnection4

Package Explorer

Search Package

- tempconnection
  - CQA
    - BDM
    - CQA_SCHEI
  - CQPUBLIC
  - DB_AUTOMAT
  - DB_PC_AUTO
  - DQQA
  - INFA_PM
  - IPS
  - SALES

Filter:

Filter By: Display Name

	Display N...	Native N...	Access Ty...	Descripti...
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and Write	
□	ALLDT_S...	ALLDT_S...	Read and...	
□	ALLDT_S...	ALLDT_S...	Read and...	
□	ALLDT_TGT	ALLDT_TGT	Read and...	
□	ALL_DQ_...	ALL_DQ_...	Read and...	
□	ALL_DQ_...	ALL_DQ_...	Read and...	
□	APP2_WIN	APP2_WIN	Read and...	

Note: The package explorer displays only the database and schema name specified in the **Additional JDBC URL Parameters** field in the connection properties. If you have not specified the database and schema name specified in the **Additional JDBC URL Parameters** field, all the database and schemas are displayed.

9. Select the table that you want to import, and then click **Import**.

   To view the table metadata, select the table, and double-click the table name.

Configure a Snowflake Source Definition Using a Custom SQL Query

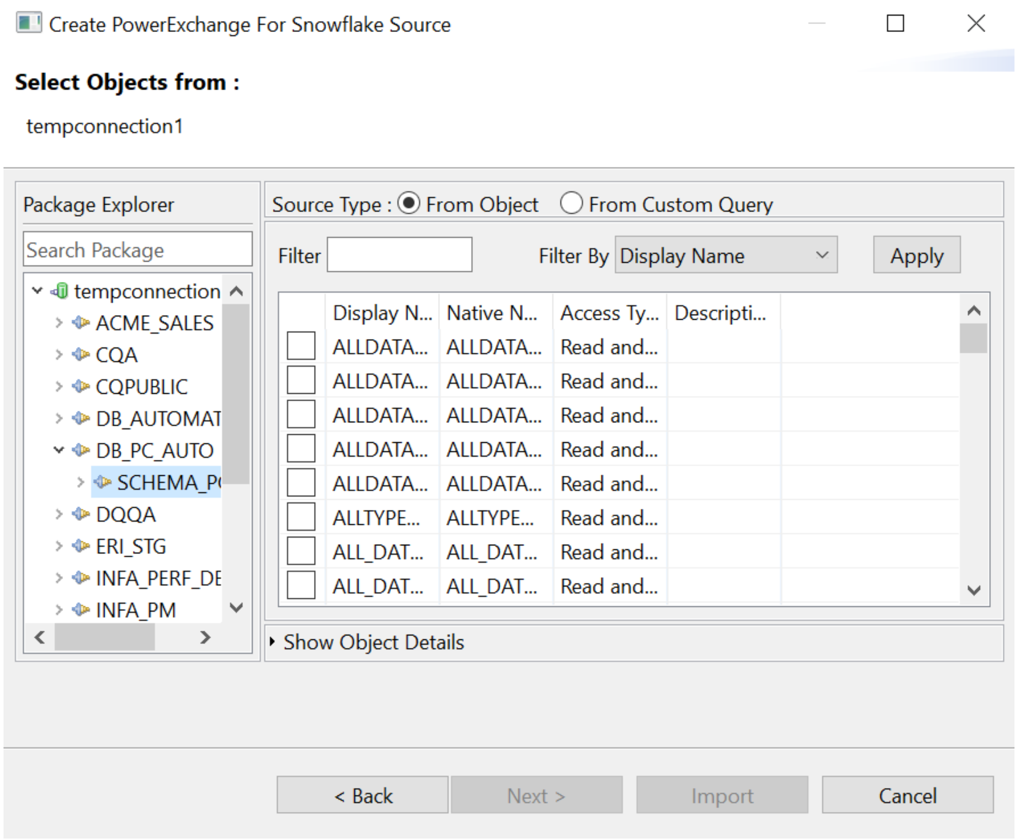
You can configure a Snowflake source definition either by selecting the tables in the package explorer or by using a custom SQL query.

1. Start PowerCenter Designer and connect to a PowerCenter repository configured with a Snowflake instance.
2. Open a source folder.
3. Open the **Source Analyzer**, and then click **Sources** > **Create PowerExchange For Snowflake Source**.

   The **Snowflake Connection Details** dialog box appears.
4. Add the connection details, and click **Finish** to add the connection.
5. Click **Next**.

   The **Select Objects from** tab appears.
6. Select the database and schema in **Package Explorer**.
7. To configure a Snowflake source, select the source type:
   - Select **From Object** to select from the list of tables that you want to import, and then click **Import**.

The following image shows the list of tables that appear when you select the **From Object** source type:



Create PowerExchange For Snowflake Source

Select Objects from :

tempconnection1

Package Explorer

Search Package

- tempconnection
  - ACME_SALES
  - CQA
  - CQPUBLIC
  - DB_AUTOMAT
  - DB_PC_AUTO
    - SCHEMA_P(
  - DQQA
  - ERI_STG
  - INFA_PERF_DE
  - INFA_PM

Source Type : ● From Object ○ From Custom Query

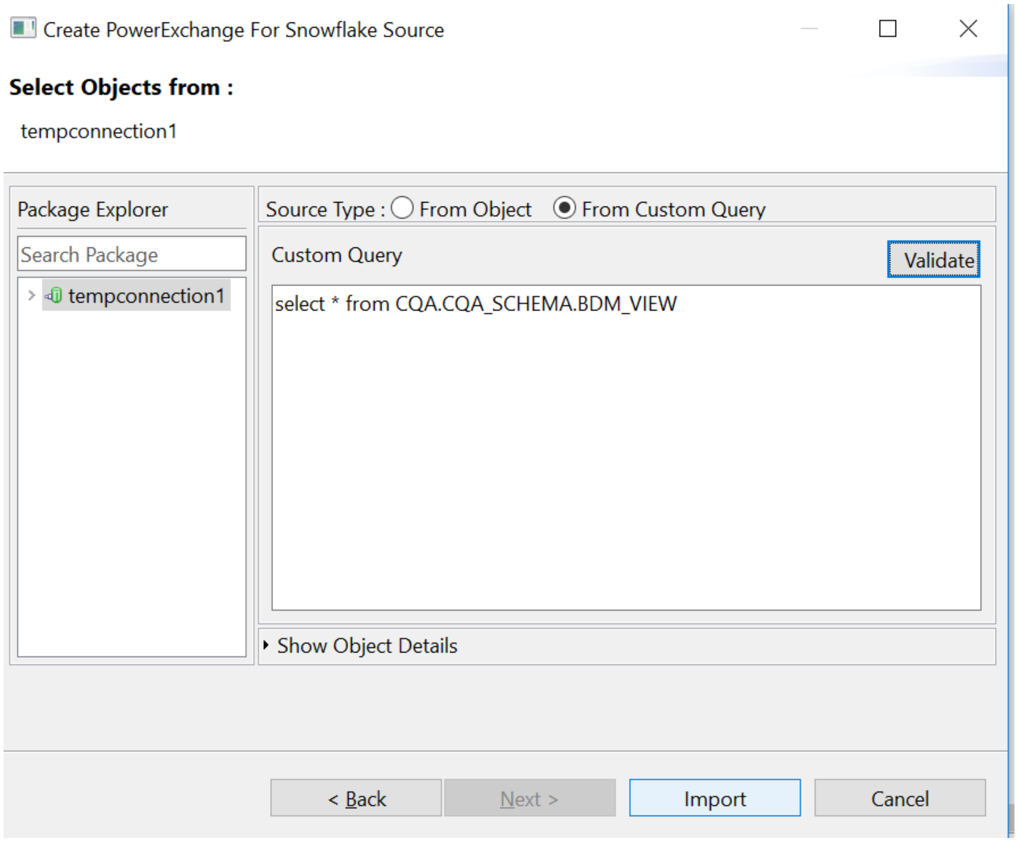
Filter

Filter By Display Name

	Display N...	Native N...	Access Ty...	Descripti...
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLDATA...	ALLDATA...	Read and...	
□	ALLTYPE...	ALLTYPE...	Read and...	
□	ALL_DAT...	ALL_DAT...	Read and...	
□	ALL_DAT...	ALL_DAT...	Read and...	

- Select **From Custom Query** to configure the source using a custom SQL query, and click **Import**.

The following image shows the configured custom query to import the tables:



Create PowerExchange For Snowflake Source

Select Objects from :

tempconnection1

Source Type : ○ From Object ● From Custom Query

Custom Query

```
select * from CQA.CQA_SCHEMA.BDM_VIEW
```

Note: If you want to edit a custom SQL query and then reimport the source into PowerCenter Designer, the column order of the object is changed and the mapping fails. You must ensure to maintain the column order of the object.

Defining Primary Keys for Target Tables

When you update or delete records in a Snowflake target, you might encounter the following scenarios with primary keys:

- The target table does not have the primary keys defined.
- The data imported from the source table in a mapping contains duplicate values for the primary keys.

In these scenarios, you can define the primary keys before you update or delete records in Snowflake.

Choose one from the following options:

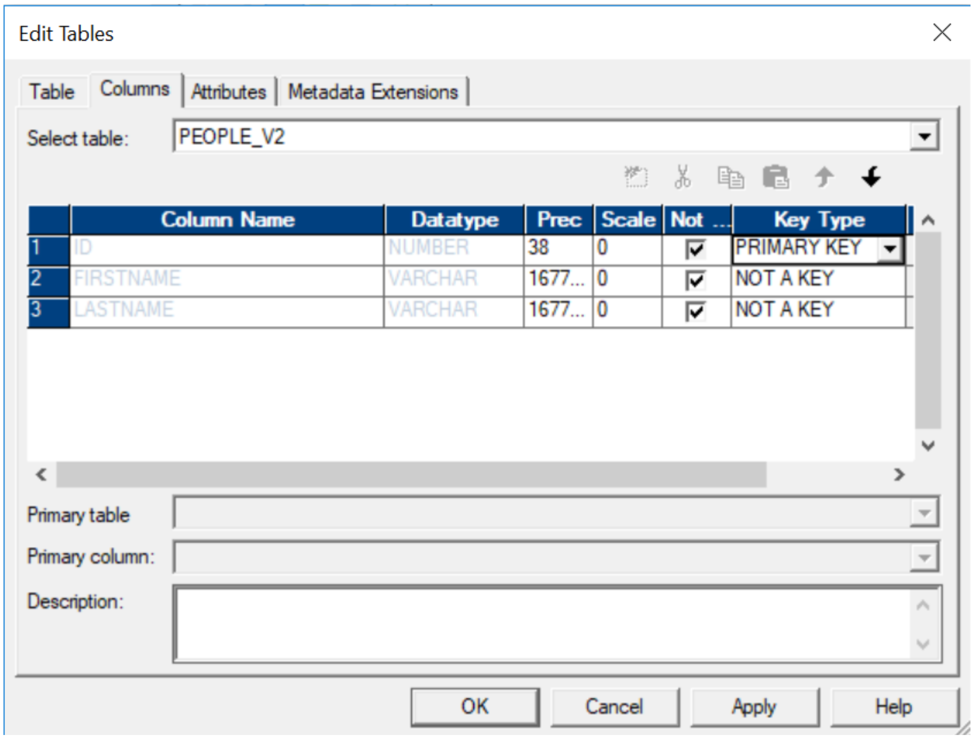
Define Primary Keys in the Snowflake Target Tables

Before you import the Snowflake target definition in the PowerCenter Designer, define the primary keys in the Snowflake target table.

Define Primary Keys for the Target Definition from the Designer

After you import the Snowflake target definition in the PowerCenter Designer, define the primary keys in the target definition from the Designer.

1. Double-click the imported Snowflake target definition.
2. Under **Key Type** on the **Columns** tab, select the required number of primary keys for the columns. The following image shows the **Key Type** field where you can specify the primary keys for the column:



Select table: PEOPLE_V2

	Column Name	Datatype	Prec	Scale	Not ...	Key Type
1	ID	NUMBER	38	0	☑	PRIMARY KEY
2	FIRSTNAME	VARCHAR	1677...	0	☑	NOT A KEY
3	LASTNAME	VARCHAR	1677...	0	☑	NOT A KEY

Primary table:

Primary column:

Description:

3. Click **OK**.

CHAPTER 4

Snowflake Mappings

This chapter includes the following topics:

Snowflake Mappings Overview

After you import a Snowflake source or target definition into the PowerCenter repository, you can create a mapping to extract data from a Snowflake source or load data to a Snowflake target.

You can extract data from one or more Snowflake sources, and load data to one or more Snowflake targets. You can join multiple Snowflake tables when you specify a join condition.

You can enter a filter condition to reduce the number of source rows the PowerCenter Integration Service returns from Snowflake sources. You can enter a single filter condition or a series of conditions.

Source Filter

You can enter a filter condition to reduce the number of source rows the PowerCenter Integration Service returns from Snowflake sources. You can enter a single filter condition or a series of conditions.

Use the source filter in the **Application Source Qualifier** to retrieve rows from an entity that meet a condition.

You can provide a source filter to improve the performance when you read from Snowflake.

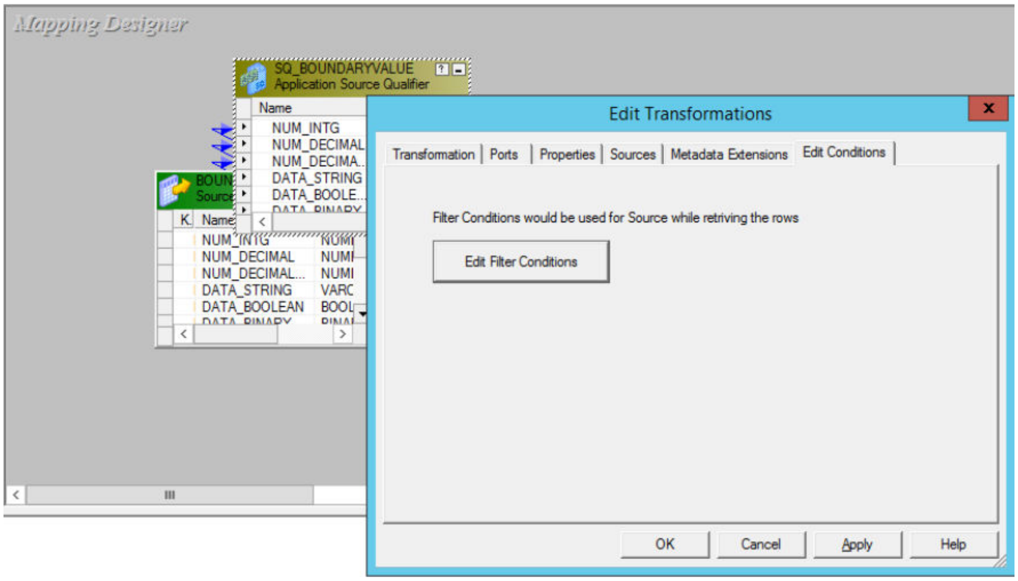
Note: You cannot apply a filter on Snowflake data of Binary or Time data type.

Configuring a Source Filter

Configure a source filter from the **Application Source Qualifier**.

1. In the **Mapping Designer**, double-click the **Application Source Qualifier**.

   The **Edit Transformation** tab appears as shown in the following image:



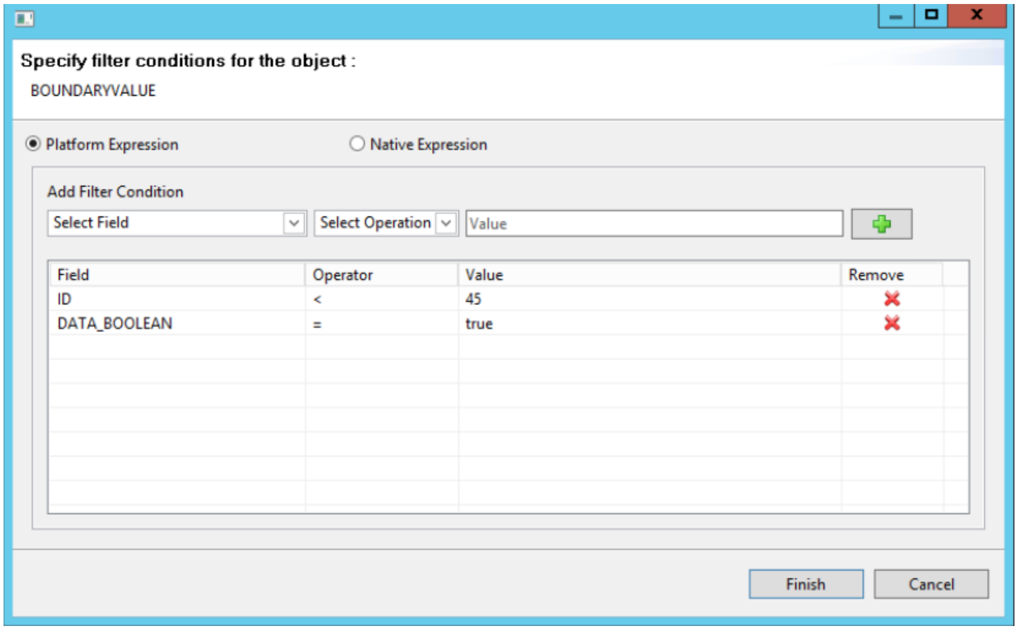
Filter Conditions would be used for Source while retriving the rows

2. Click the **Edit Conditions** tab.
3. Click **Edit Filter Conditions**.

   The **Add Filter Condition** dialog box appears.

4. Select the filter field and operator that you want to specify in the condition, enter a value for the condition, and click **Add Condition**.

   The condition appears in the Filter Expression pane as shown in the following image:



Field	Operator	Value	Remove
ID	<	45	✖
DATA_BOOLEAN	=	true	✖

5. Click **Finish** to add the filter condition.
6. Click **OK**.

Source Join

You can enter a join condition to join multiple Snowflake source tables.

Configure the source join from the Application Source Qualifier of the parent table. When you configure the join in the Mapping Designer, retain the source qualifier only of the parent table and then link the fields from the child tables to the parent source qualifier.

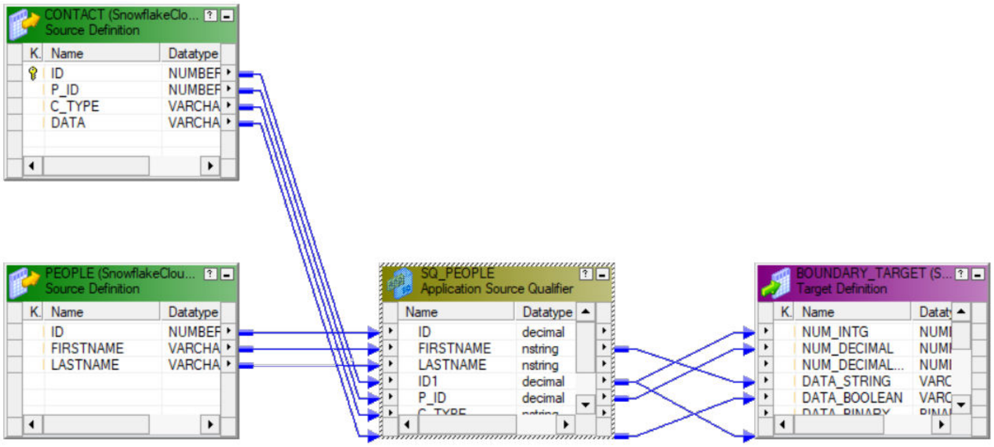
Use the Infa Expression or Native Expression type to define the relationship of the tables that you want to join.

Configuring a Source Join

You can use the Application Source Qualifier of the parent table to join multiple tables.

1. In the **Mapping Designer**, retain the source qualifier only of the parent table and manually delete the source qualifiers for the child tables.
2. Link the fields from the child tables to the parent source qualifier.

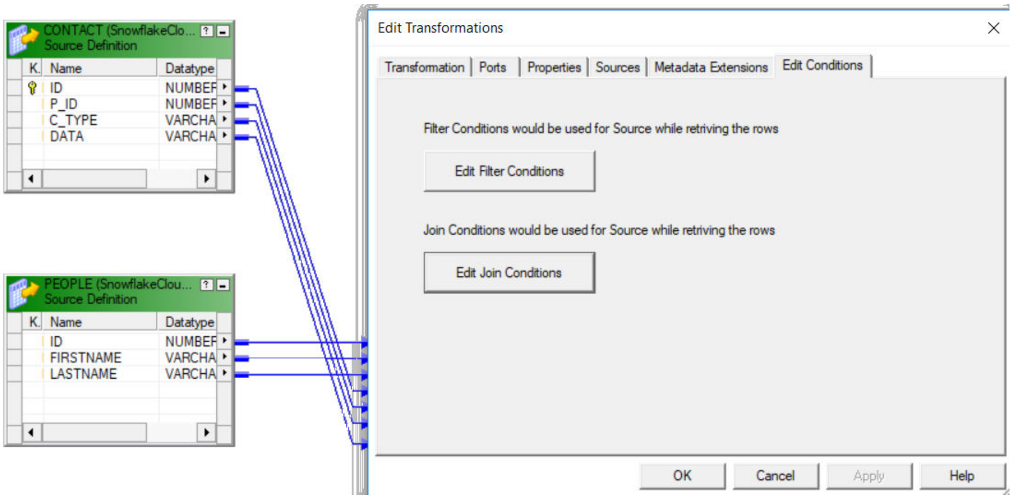
   The following image shows an example mapping that contains the linked child tables with the parent source qualifier:



3. Double-click the **Application Source Qualifier** of the parent table.

   The **Edit Transformation** tab appears.

The following image shows the **Edit Conditions** tab in the Application Source Qualifier Transformation type:



Filter Conditions would be used for Source while retriving the rows

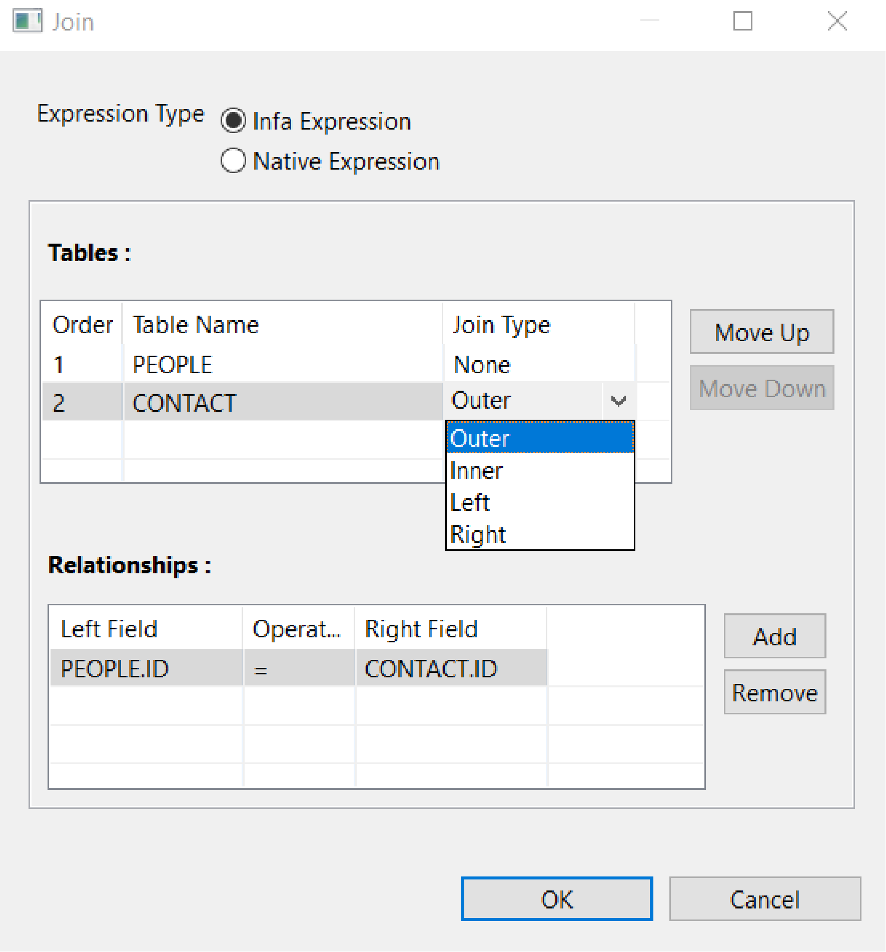
Join Conditions would be used for Source while retriving the rows

4. Click the **Edit Conditions** tab.
5. Click **Edit Join Conditions**.
6. To define a join condition for the tables using **Infa Expression**, perform the following tasks:
   a. In the **Tables** section, select the child table, and then select the join type for the child table with the parent table.

b. In the **Relationships** section, define the relationship for the join.

The **Add** button in the **Relationships** section enables only when you select the child table.

The following image shows the join types that you can configure and the relationship that you can define to join tables when you use the Infa expression:



Join

Expression Type ● Infa Expression ○ Native Expression

Tables :

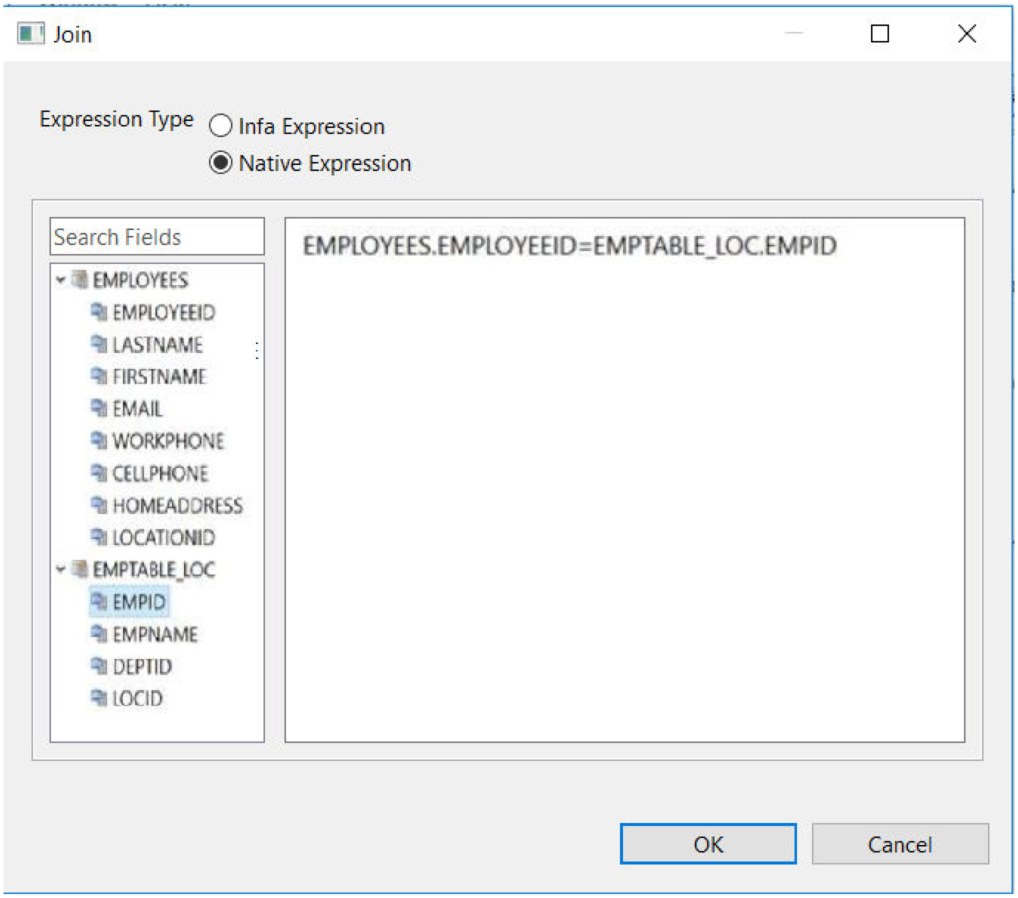
Order	Table Name	Join Type
1	PEOPLE	None
2	CONTACT	Outer

Relationships :

Left Field	Operat...	Right Field
PEOPLE.ID	=	CONTACT.ID

7. To define a join condition using **Native Expression**, select the fields and define a join query syntax:

The following image shows the fields that you add when you define the join query:



Expression Type ○ Infa Expression ● Native Expression

```
EMPLOYEES.EMPLOYEEID=EMPTABLE_LOC.EMPID
```

8. Click **OK**.

Rules and Guidelines for Configuring a Filter and Join

Use the following rules and guidelines when you configure a filter and join:

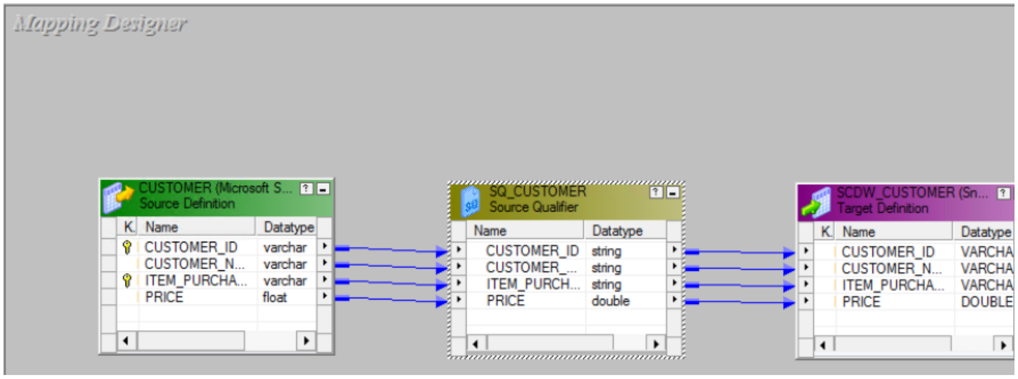
- You cannot use the OR operator in a filter condition.
- When you configure a native filter or join condition to import Snowflake tables, and the table name and column name contains special characters, you must add both the table name and column name in double quotes.
- If you configure both a native filter and a join condition in the Snowflake application source qualifier, and two Snowflake tables have similar column names, you must manually add the table name in the native filter expression and run the mapping.
- To define a join or filter condition using the Native Expression, select the fields and define the query syntax for the join or filter. You must specify only the condition and not the type of join in the query. The condition you specify in the text box for the native expression is appended to the join or filter condition. Only the inner join is supported for a native expression.

Snowflake Mapping Example

An enterprise application uses the SQL server to store the customer transaction details. You use the Snowflake data warehouse to analyze the customer ID, customer name, item purchased, and price. You extract the customer transaction details from an SQL server source, and load the transactions to the target table in Snowflake.

The following procedure shows how to move data from the SQL server to Snowflake:

1. Import the SQL server source.
2. Import a Snowflake target.
3. Create a mapping with an SQL server source and a Snowflake target.
   The following image shows the example mapping:



CUSTOMER (Microsoft S...
Source Definition

K.	Name	Datatype
🔑	CUSTOMER_ID	varchar
	CUSTOMER_N...	varchar
🔑	ITEM_PURCHA...	varchar
	PRICE	float

SQ_CUSTOMER
Source Qualifier

Name	Datatype
CUSTOMER_ID	string
CUSTOMER_...	string
ITEM_PURCH...	string
PRICE	double

SCDW_CUSTOMER (Sn...
Target Definition

K.	Name	Datatype
	CUSTOMER_ID	VARCHA
	CUSTOMER_N...	VARCHA
	ITEM_PURCHA...	VARCHA
	PRICE	DOUBLE

4. Create a session and configure it to load the data to the Snowflake target.
   The mapping contains the following objects:

   Source Definition

   The mapping source definition is a relational SQL database. In the **Source Analyzer**, import the SQL server source. The PowerCenter Integration Service reads the customer transaction details from the SQL server source.

   The following table describes the structure of the source definition called CUSTOMER:

Field	Data Type
CUSTOMER_ID	Varchar
CUSTOMER_NAME	Varchar
ITEM_PURCHASED	Varchar
PRICE	Float

   Mapping Target

   The mapping contains a Snowflake target definition.

   In the **Target Designer**, import a Snowflake target definition.

The following table describes the structure of the target definition called SCDW_CUSTOMER:

Field	Data Type
CUSTOMER_ID	Varchar
CUSTOMER_NAME	Varchar
ITEM_PURCHASED	Varchar
PRICE	Double

CHAPTER 5

Snowflake Sessions

This chapter includes the following topics:

Snowflake Sessions Overview

After you create mappings, you can create a session to extract and load data.

You must configure a Snowflake connection in the **Workflow Manager** to extract data from or load data to a Snowflake table. You can define properties in a session to determine how the PowerCenter Integration Service must extract data from a Snowflake source or load data to a Snowflake target.

Snowflake Connection Properties

When you configure a Snowflake connection, you define the connection attributes that the PowerCenter Integration Service uses to connect to the Snowflake database.

The following table describes the Snowflake connection properties:

Connection Property	Description
Username	The user name to connect to the Snowflake account.
Password	The password to connect to the Snowflake account.
Account	The name of the Snowflake account.
Warehouse	The Snowflake warehouse name.
Role	The Snowflake role assigned to the user.

Additional JDBC URL Parameters
Specify the database and schema for the Snowfalke tbale that you wnat to override at runtime, enter the database and schema name in the following format:
	The additional JDBC connection parameters that PowerCenter Integration Service uses to connect to a Snowflake database.
	Enter one or more JDBC connection parameters in the following format:
	`<param1>=<value>&<param2>=<value>&<param3>=<value>....`
	For example:
	`user=jon&warehouse=mywh&db=mydb&schema=public`
	Specify the database and schema that you want to filter out while importing the object in the Designer. Enter the database and schema name in the following format:
	`DB=<DB name>&Schema=<schema_name>`
	Note: If you do not specify the database and schema, all the database and schemes are displayed while importing the tables. If you have specified the database and schema in the connection and in the mapping advanced properties, while running the mapping, the PowerCenter Integration Service honors the attributes in the mapping advanced properties first, followed by the connection properties, and then the imported object metadata in the mapping.
	To override the database and schema name used to create temporary tables in Snowflake, enter the database and schema name in the following format:
	`ProcessConnDB=<DB name>&ProcessConnSchema=<schema_name>`
	To access Snowflake through Okta SSO authentication, enter the web-based IdP implementing SAML 2.0 protocol in the following format:
	`authenticator=https://<Your_Okta_Account_Name>.okta.com`
	Note: Microsoft ADFS is not supported.
	For more information about configuring Okta authentication, see the following website: https://docs.snowflake.net/manuals/user-guide/admin-security-fed-auth-configure-snowflake.html#configuring-snowflake-to-use-federated-authentication
	To optimize the throughput of a Snowflake reader partition, enter the client memory and the value in the following format:
	`CLIENT_MEMORY_LIMIT=<x>`
	where the value of x is 1024 MB + (160 MB * Number of partitions)

Configuring a Snowflake Connection

Configure a Snowflake connection in the Workflow Manager to define the connection attributes that the PowerCenter Integration Service uses to connect to the Snowflake database.

1. In the Workflow Manager, click **Connections** > **Application**.

   The **Application Connection Browser** dialog box appears.
2. Click **New**.

   The **Select Subtype** dialog box appears.
3. Select **SnowflakeCloudDataWarehouse** and click **OK**.

   The **Application Connection Editor** dialog box appears.
4. Enter a name for the Snowflake connection.
5. Enter the application properties for the connection.
6. Enter the Snowflake connection attributes.
7. Click **OK** to create a Snowflake connection.

Configure Snowflake Source Session Properties

You can configure the session properties for a Snowflake source on the **Workflow Manager** tab. Define the properties for the source instance in the session.

The following table describes the session properties that you can configure for a Snowflake source session:

Session Property	Description
Database	Overrides the database name specified in the connection.
Schema	Overrides the schema name specified in the connection.
Warehouse	Overrides the Snowflake warehouse name specified in the connection.
Role	Overrides the Snowflake user role specified in the connection.
Pre SQL	SQL statement that the PowerCenter Integration Service executes before extracting data from the source. For example, if you want to update records in the database before you extract the records from the table, specify a pre-SQL statement. You can use the SQL editor to enter the pre-SQL statement.
Post SQL	SQL statement that the PowerCenter Integration Service executes after extracting data from the source. For example, if you want to delete some records after the latest records load, specify a post-SQL statement. You can use the SQL editor to enter the post-SQL statement.
Table Name	Overrides the table name of the imported Snowflake source table.
SQL Override	Overrides the default SQL query used to extract data from the Snowflake source.

Session Property	Description
Filter Override Type	The type of filter expression that you want to override in the source qualifier. You can select Native or Platform filter expression type to override. Default is None.
Filter Override	The filter condition that overrides the filter condition you specify in the source qualifier. After you select Native or Platform Filter Override Type, specify the filter condition to override in the source qualifier.

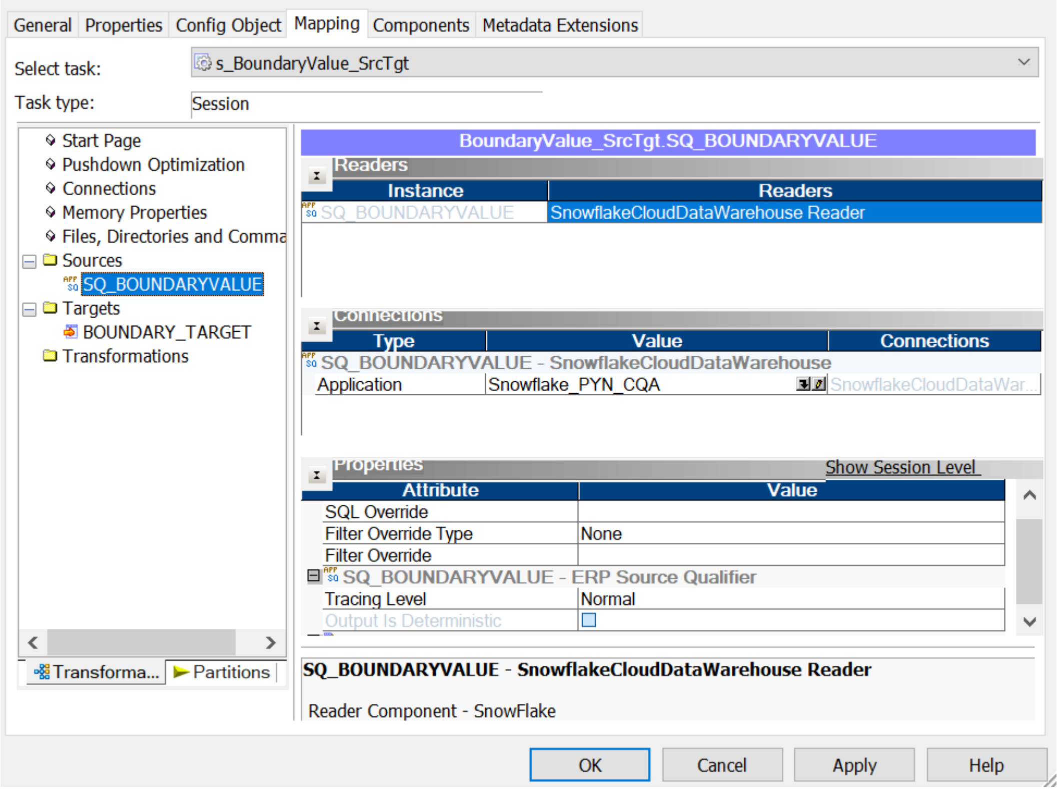
Filter Override

When you read data from a Snowflake source, you can specify the filter override type and filter override condition in the Snowflake source session properties to override the filter condition you specify in the source qualifier.

You must select the corresponding Native or Platform expression as the **Filter Override Type** in the Snowflake source session properties based on the expression used in the source qualifier. Default is None.

After you select the filter expression, specify the filter condition in the **Filter Override** field. When you run the session, the PowerCenter overrides the filter condition you specify in the source qualifier and uses the condition you specified in the session properties to filter the Snowflake data.

The following image shows the filter override type and the filter override condition fields in the Snowflake source session properties:



Select task: s_BoundaryValue_SrcTgt

Task type: Session

BoundaryValue_SrcTgt.SQ_BOUNDARYVALUE

Readers

Instance	Readers
SQ_BOUNDARYVALUE	SnowflakeCloudDataWarehouse Reader

Connections

Type	Value	Connections
SQ_BOUNDARYVALUE - SnowflakeCloudDataWarehouse		
Application	Snowflake_PYN_CQA	SnowflakeCloudDataWar...

Properties

Attribute	Value
SQL Override	
Filter Override Type	None
Filter Override	
SQ_BOUNDARYVALUE - ERP Source Qualifier	
Tracing Level	Normal
Output Is Deterministic	□

SQ_BOUNDARYVALUE - SnowflakeCloudDataWarehouse Reader

Reader Component - SnowFlake

Configure Snowflake Target Session Properties

You can configure the session properties for a Snowflake target on the **Workflow Manager** tab. Define the properties for the target instance in the session.

The following table describes the session properties that you can configure for a Snowflake target session:

Session Property	Description
Database	Overrides the database name specified in the connection.
Schema	Overrides the schema name specified in the connection.
Warehouse	Overrides the Snowflake warehouse name specified in the connection.
Role	Overrides the Snowflake user role specified in the connection.
Pre SQL	SQL statement that the PowerCenter Integration Service executes before extracting data from the source. For example, if you want to assign sequence object to a primary key field of the target table before you load data to the table, specify a pre-SQL statement. You can use the SQL editor to enter the pre-SQL statement.
Post SQL	SQL statement that the PowerCenter Integration Service executes after extracting data from the source. For example, if you want to alter the table created by using create target option and assign constraints to the table before you load data to the table, specify a post-SQL query. You can use the SQL editor to enter the post-SQL statement.
Batch Row Size	The number of rows that the PowerCenter Integration Service writes to a file. When the number of rows written to the file reaches the value specified, the PowerCenter Integration Service flushes the data queue and starts processing the write commands.
Number of local staging files	The number of files that represents a single batch of data. The default number of files is 64. After the PowerCenter Integration Service uploads the specified number of local staging files to the Snowflake user stage, Snowflake unloads the data to the target table.
Truncate Target Table	Truncates the database target table before inserting new rows. Select one of the following options: - True. Truncates the target table before inserting all rows. - False. Inserts new rows without truncating the target table. Default is false.

Additional Write Runtime Parameters	Specify additional runtime parameters.
	For example, if you want to specify the user-defined stage in the Snowflake database to upload the local staging files, specify the name of the stage location in the following format:
	`remoteStage=REMOTE_STAGE`
	If you want to optimize the write performance, you can choose to compress files before writing to Snowflake tables. You can set the compression parameter to On or Off, for example:
	`Compression=On`
	By default, compression is on.
	When you write data that contains error records to a Snowflake target, the mapping does not fail. To fail the mapping, you can set the following flag:
	`on_error=ABORT_STATEMENT&oneBatch=true`
	Separate multiple runtime parameters with &.

Session Property	Description
Table Name	Overrides the table name of the Snowflake target table.
INSERT	Inserts all rows to the Snowflake target. You must select the INSERT option before you run a session. Default is true.
DELETE	Deletes rows from the Snowflake target. If you select DELETE, you need to select **Delete** for the **Treat Source Rows As** session property in the **Properties** page.
UpdateMode	Updates rows in the Snowflake target. If you select UPDATE, you need to select **Update** for the **Treat Source Rows As** session property in the **Properties** page. **Note:** You can perform Update as update or Update else insert operation.
UPDATE	Loads data to the target based on the mode you specify. Select one of the following modes: - Update as Update. Updates all rows flagged for update. - Update else Insert. Updates all rows flagged for update if they exist in the target and then inserts any remaining rows marked for insert. - Update as Insert. Updates all rows flagged for update as inserts.
Rejected File Path	The absolute path that includes the directory and the file name that the Integration Service uses to store the rejected records. Consider the following rules before you specify the rejected file path: - If you do not specify the rejected file path, the Integration Service does not write the rejected records. - If you specify the rejected file path, the Integration Service writes the file in the directory and file name that you specify. If the file already exists, the Integration Service appends the records to that file. - If you specify the rejected file path, but when there are no rejected records, the Integration Service creates an empty file.
Update Override	Overrides the default update query generated by the PowerCenter Integration Service in the Update Strategy transformation with the update query that you specified. For more information, see "Rules and Guidelines for Configuring Update Override" on page 34

Rules and Guidelines for Configuring Update Override

Consider the following rules when you want to use the update override session property for a Snowflake target:

- Select **Update** for the **Treat source rows as** session property in the **Properties** page.
- Select **Update as Update** for the **UpdateMode** session property in the **Mapping** page.
- Specify the update query in the following format:

```
UPDATE <Target table name> SET <Target table name>.<Column1> = :TU.<Column1>, <Target
table name>.<Column2> = :TU.<Column2>, … <Target table name>.<ColumnN>
= :TU.<ColumnN> FROM :TU WHERE <Target table name>.<Update Column1> = :TU.<Update
Column1> AND <Target table name>.<Update Column2> = :TU.<Update Column2> AND …
<Target table name>.<Update ColumnN> = :TU.<Update ColumnN>
```

- Column names for :TU must match the target table column names.

- You must specify the update query with a valid SQL syntax because PowerExchange for Snowflake replaces :TU with a temporary table name and does not validate the update query.
- You cannot change the order of the column mappings using the update override.
- You cannot use unconnected fields to the target in the update query.

Configuring the CSV File Size

When you create a mapping to write to Snowflake, you can specify the size of the local staging .csv file in bytes. Specify the local staging file size property, csvFileSize, in the **Additional Write Runtime Parameters** field in the advanced Snowflake target properties. The default file size is 50 MB.

If the intended date size is 50 MB, calculate the csvFileSize value in bytes, for example 50*1024*1024 and then specify 52428800 as the csvFileSize. It is recommended that you configure the right combination of the number of local staging files and csvFileSize while writing data to Snowflake for better performance.

Configure Loader Properties as Additional Runtime Parameters

You can configure write properties to load data to Snowflake in the **Additional Write Runtime Parameters** field in the advanced target properties of the Snowflake target.

The following table lists some of the additional runtime parameters that you can specify to load data to Snowflake:

Property	Supported Type	Description	Default Value
oneBatch	Boolean	Process all data in a single batch.	false
remoteStage	String	Specifies to use internal stage. **Note:** External stage is not supported.	"~"(user stage)
onError	String	Specifies the action to perform when an error is encountered while loading data from a file. For example, `on_error option ABORT_STATEMENT|CONTINUE|SKIP_FILE`	CONTINUE
compressFileByPut	Boolean	Compress file by PUT.	false
compressDataBeforePut	Boolean	Compress data before PUT. The loader compresses the data to a gzip format before uploading the data.	true
copyEmptyFieldAsEmpty	Boolean	The COPY command option to set incoming empty fields as null.	-

When you set the values in the additional runtime parameters field, every configured partition initializes a new loader instance and the configured values apply similarly across all the partitions.

Example 1

You want to compress files by using the Put command before loading data to Snowflake.

Specify the following compression option: `compressDataBeforePut=false&compressFileByPut=true`

If you specify both the options as true, Snowflake considers the `compressDataBeforePut` option.

Example 2

You want to replace the incoming fields with empty values as NULL while loading the data to Snowflake.

Specify the `copyEmptyFieldAsEmpty Boolean` option and set the value to true or false based on your requirement.

Consider the following scenarios before you configure the `copyEmptyFieldAsEmpty Boolean` parameter:

- If you do not configure this parameter, Null values are received as NULL, and empty values are received as Empty. This is the default behavior.
- If you set the parameter `copyEmptyFieldAsEmpty=false`, Null values as received as Null and empty values are received as Null.
- If you set the parameter `copyEmptyFieldAsEmpty=true`, Null values are received as empty, while empty values are received as empty.

Parameterizable Session Properties

You can parameterize the Snowflake connection and session properties.

You can create a configuration file with the connection and session properties that you want to override at run time.

Lookups

You can create a connected or unconnected pipeline Lookup transformation.

You can only create a cached pipeline lookup or unconnected lookup. When you create a cached lookup, the performance increases because the Integration Service caches a large lookup source or small lookup tables. When you cache the lookup source, the Integration Service queries the lookup cache instead of querying the lookup source for each input row.

Pipeline Lookups

You can create a pipeline Lookup transformation to perform a lookup on a Snowflake table. A pipeline Lookup transformation has a source qualifier as the lookup source.

When you configure a pipeline Lookup transformation, the lookup source and source qualifier are in a different pipeline from the Lookup transformation. The source and source qualifier are in a partial pipeline that contains no target. The PowerCenter Integration Service reads the source data in this pipeline and passes the data to the Lookup transformation to create the cache.

For more information, see the topic "Pipeline Lookups" in the *PowerCenter Transformation Guide*.

Unconnected Lookups

You can configure an unconnected lookup transformation for the source qualifier in a mapping.

An unconnected Lookup transformation is a Lookup transformation that is not connected to any source, target, or transformation in the pipeline.

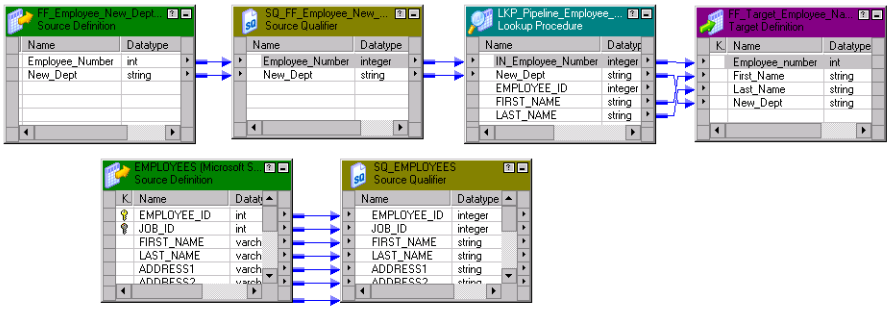
An unconnected Lookup transformation receives input values from the result of a :LKP expression in another transformation. The Integration Service queries the lookup source or cache based on the lookup ports and condition in the Lookup transformation and passes the returned value to the port that contains the :LKP expression. The :LKP expression can pass lookup results to an expression in another transformation.

Example Scenario of a Pipeline Lookup Transformation in a Mapping

A mapping that contains a pipeline Lookup transformation includes a partial pipeline that contains the lookup source and source qualifier. The partial pipeline does not include a target. The Integration Service retrieves the lookup source data in this pipeline and passes the data to the lookup cache.

The partial pipeline is in a separate target load order group in session properties. You can create multiple partitions in the pipeline to improve performance. You can not configure the target load order with the partial pipeline.

The following mapping shows a mapping that contains a pipeline Lookup transformation and the partial pipeline that processes the lookup source:



The mapping contains the following objects:

- The lookup source definition and source qualifier are in a separate pipeline. The Integration Service creates a lookup cache after it processes the lookup source data in the pipeline.
- A flat file source contains new department names by employee number.
- The pipeline Lookup transformation receives Employee_Number and New_Dept from the source file. The pipeline Lookup performs a lookup on Employee_ID in the lookup cache. It retrieves the employee first and last name from the lookup cache.
- A flat file target receives the Employee_ID, First_Name, Last_Name, and New_Dept from the Lookup transformation.

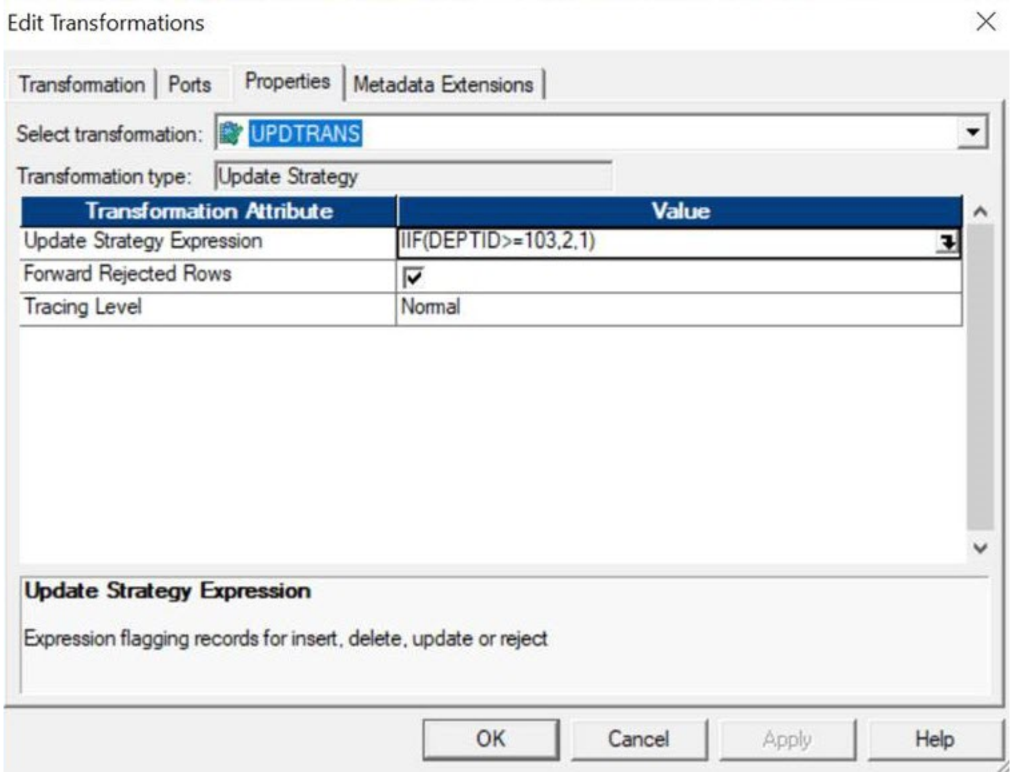
Update Strategy Transformation

You can configure an Update Strategy transformation for a Snowflake mapping.

When you configure an Update Strategy transformation, you can flag all rows for insert, delete, update, or reject. The Update Strategy transformation takes precedence over the update strategy you specify in the Snowflake session properties.

Specify the operation that you need to perform on the rows in the **Update Strategy Expression** field of the Update Strategy transformation.

The following image shows the Update Strategy Expression transformation attribute and the corresponding value for the update strategy:



Select transformation: UPDTRANS

Transformation type: Update Strategy

Transformation Attribute	Value
Update Strategy Expression	IIF(DEPTID>=103,2,1)
Forward Rejected Rows	☑
Tracing Level	Normal

Update Strategy Expression

Expression flagging records for insert, delete, update or reject

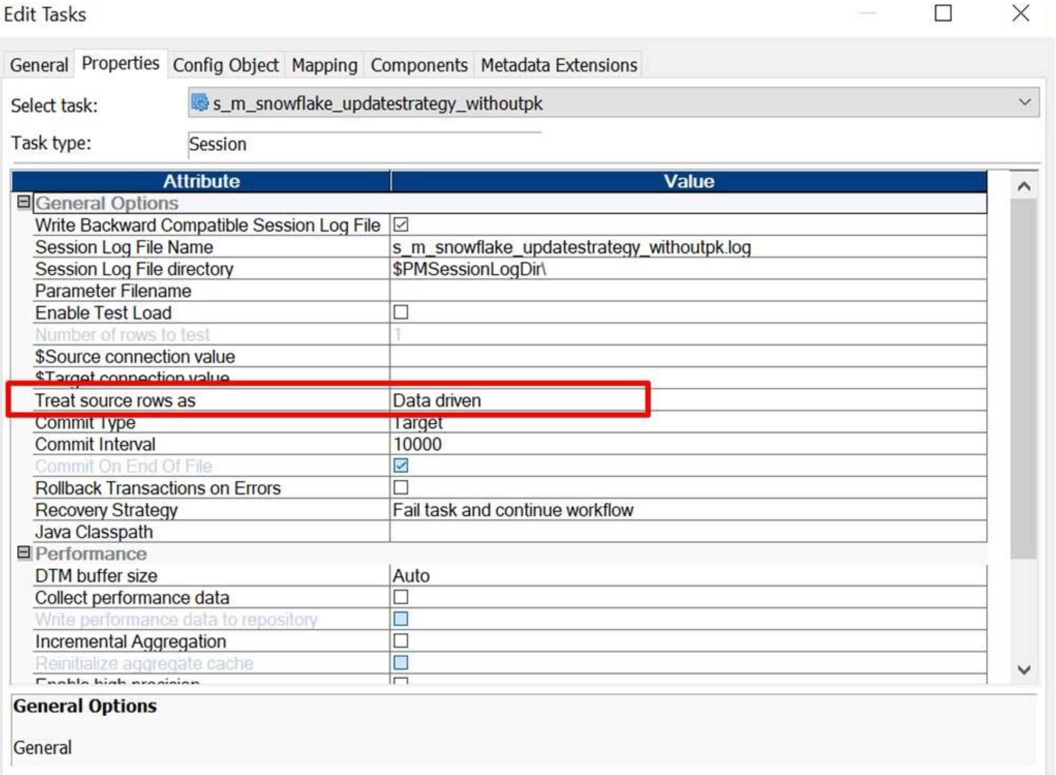
The following table lists the constants for each database operation and their numeric equivalent:

Operation	Constant	Numeric Value
Insert	DD_INSERT	0
Update	DD_UPDATE	1
Delete	DD_DELETE	2
Reject	DD_REJECT	3

The Integration Service uses the Update Strategy Expression that you specify in the Update Strategy transformation to determine how to flag rows for insert, delete, update, or reject. The Integration Service treats any other value as an insert.

If the mapping for the session contains an Update Strategy transformation, the **Treat Source Rows As** session property is marked **Data Driven** by default.

The following image shows the **Treat source rows** as session property:



Edit Tasks

Select task: s_m_snowflake_updatestrategy_withoutpk

Task type: Session

Attribute	Value
⊟ General Options	
Write Backward Compatible Session Log File	☑
Session Log File Name	s_m_snowflake_updatestrategy_withoutpk.log
Session Log File directory	$PMSessionLogDir\
Parameter Filename	
Enable Test Load	□
Number of rows to test	1
$Source connection value	
$Target connection value	
Treat source rows as	Data driven
Commit Type	Target
Commit Interval	10000
Commit On End Of File	☑
Rollback Transactions on Errors	□
Recovery Strategy	Fail task and continue workflow
Java Classpath	
⊟ Performance	
DTM buffer size	Auto
Collect performance data	□
Write performance data to repository	□
Incremental Aggregation	□
Reinitialize aggregate cache	□
Enable high precision	□

General Options

General

Rules and Guidelines for Configuring an Update Strategy Transformation

Consider the following guidelines while you configure an Update Strategy transformation in a mapping to write data to Snowflake:

- When you specify an update strategy expression to update rows, the Integration Service updates rows flagged for update and inserts the remaining rows.
- When you specify an update strategy expression to update rows, but **UpdateMode** is selected for `Update as Update` in the Snowflake target session properties, the Integration Service considers the Snowflake target session property and updates all rows flagged for update.
- If you select the DD_REJECT operation in the update strategy expression and run a mapping, the session log does not include the rejected rows count in the target statistics. If you specified a rejected file path in the target session properties, the Integration Service does not add the rejected rows to this file.

Configuring an Update Strategy Transformation

1. In the Mapping Designer, add an Update Strategy transformation to a mapping.
2. Click **Layout** > **Link Columns**.
3. Drag all ports from another transformation representing data you want to pass through the Update Strategy transformation.

   In the Update Strategy transformation, the Designer creates a copy of each port you drag. The Designer also connects the new port to the original port. Each port in the Update Strategy transformation is a combination input/output port.

   Normally, you would select all of the columns destined for a particular target. After they pass through the Update Strategy transformation, this information is flagged for update, insert, delete, or reject.

4. Open the Update Strategy transformation and rename it.
5. Click the **Properties** tab.
6. Click the button in the **Update Strategy Expression** field.

   The Expression Editor appears.
7. Enter an update strategy expression to flag rows as inserts, deletes, updates, or rejects.
8. Validate the expression and click **OK**.
9. Click **OK**.
10. Connect the ports in the Update Strategy transformation to another transformation or a target instance.

Partitioning

When you read from and write data to Snowflake, you can configure pass-through partitioning to optimize the session performance at run time.

When you specify pass-through partitioning for a Snowflake Source Qualifier transformation, you can specify filter conditions in the Snowflake session properties to override the filter condition you specify in the source qualifier. The Integration Service uses the filter condition you specify in the session properties when it filters data from the source.

To configure pass-through partitioning, select the Source Qualifier transformation, and add a partition point from the **Mapping** tab of the session properties. Add the number of partitions you require and select the partition type as pass through for each of the partitions.

Based on the number or partitions you add, the PowerCenter Integration Service adds those many number of partition fields for the **Filter Override** attribute in the session properties. Specify the filter override condition for each of the partitions. The PowerCenter Integration Service uses the filter conditions you specify to pass data through the appropriate partition.

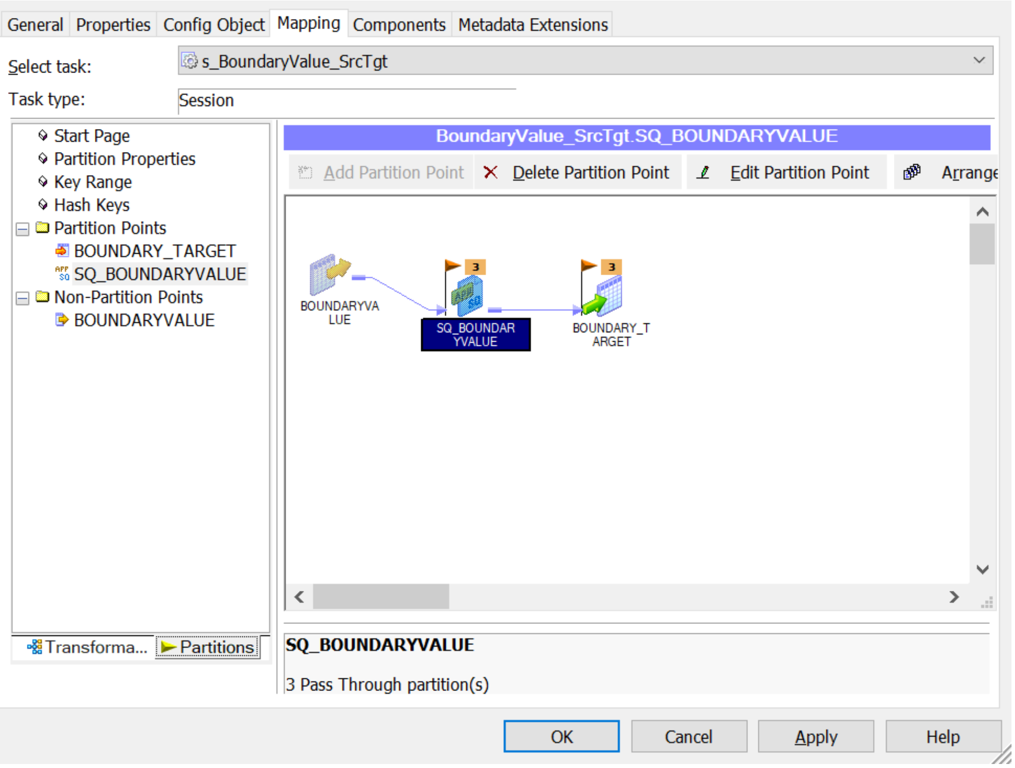
Similarly, you can specify SQL override conditions for each of the partitions in the Snowflake source session properties to override the default SQL query used to extract data from the Snowflake source.

Applying Filter Override Conditions for Partitions

Configure pass-through partitioning for a Snowflake session. After you add the number of partitions, you can specify a filter override condition for each of the partitions.

1. In the Workflow Designer, open the session properties.
2. On the **Partitions** view, click **Add Partition Point**.

The transformation name appears under the Partition Points node.



Select task: s_BoundaryValue_SrcTgt

Task type: Session

- Start Page
- Partition Properties
- Key Range
- Hash Keys
- Partition Points
  - BOUNDARY_TARGET
  - SQ_BOUNDARYVALUE
- Non-Partition Points
  - BOUNDARYVALUE

BoundaryValue_SrcTgt.SQ_BOUNDARYVALUE

SQ_BOUNDARYVALUE

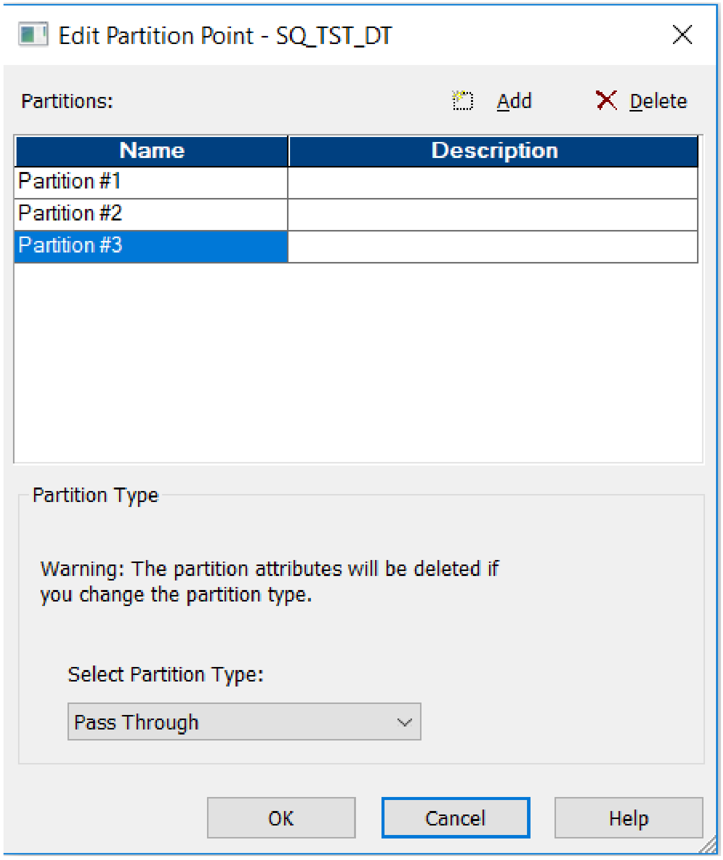
3 Pass Through partition(s)

3. Select the Source transformation, and click **Edit Partition Point**.

   The **Edit Partition Point** dialog box appears.

4. Click **Add** to add the partitions and enter a description for each partition.

5. Select the partition type as **Pass Through** for each of the partitions.



Edit Partition Point - SQ_TST_DT

Partitions:

Name	Description
Partition #1	
Partition #2	
Partition #3	

Partition Type

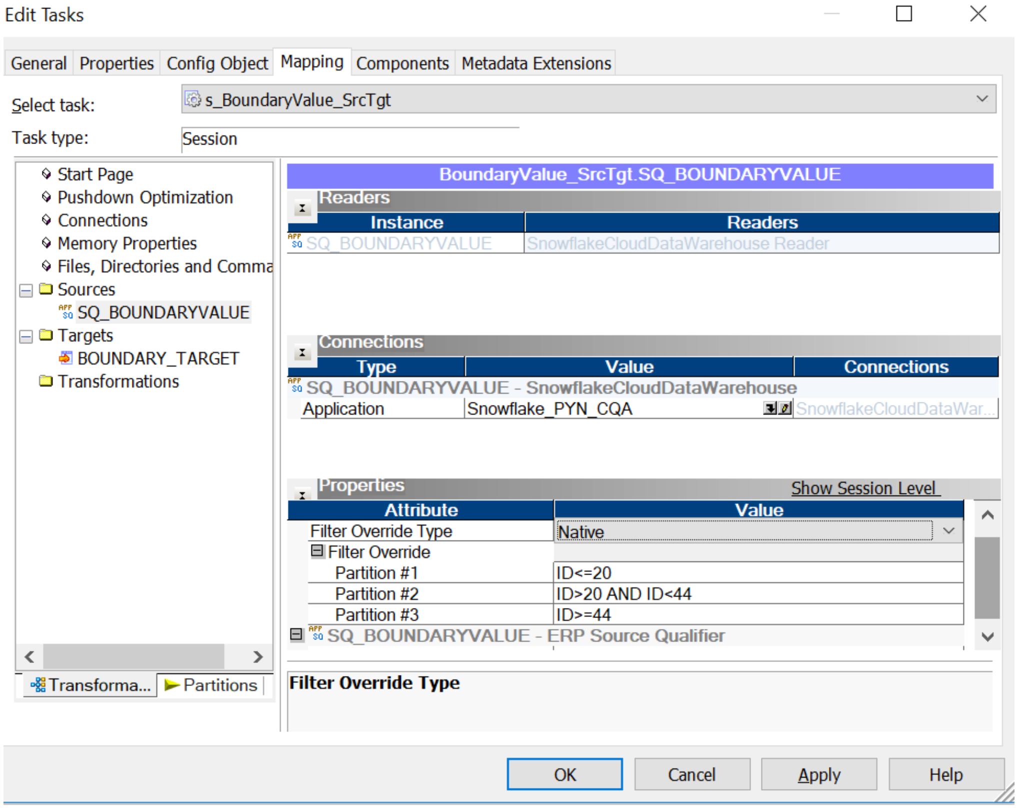
Warning: The partition attributes will be deleted if you change the partition type.

Select Partition Type: Pass Through

6. Click **OK**.
7. Click the **Transformations** tab in the session properties.

   Based on the number of partitions you create, those many number of partition fields appear for the filter override property.
8. Specify the filter override condition for each partition.

For example, in the following image, you can configure filter override conditions for each of the three partitions you configured:



Select task: s_BoundaryValue_SrcTgt

Task type: Session

BoundaryValue_SrcTgt.SQ_BOUNDARYVALUE

Readers

Instance	Readers
SQ_BOUNDARYVALUE	SnowflakeCloudDataWarehouse Reader

Connections

Type	Value	Connections
SQ_BOUNDARYVALUE - SnowflakeCloudDataWarehouse		
Application	Snowflake_PYN_CQA	SnowflakeCloudDataWar...

Properties

Attribute	Value
Filter Override Type	Native
Filter Override	
Partition #1	ID<=20
Partition #2	ID>20 AND ID<44
Partition #3	ID>=44
SQ_BOUNDARYVALUE - ERP Source Qualifier	

Filter Override Type

When you run the session, based on the condition you specify for each partition, the Integration Service passes all rows that contain customer IDs less than or equal to 20 to the first partition, all rows that contain customer IDs greater than 20 and lesser than 44 to the second partition, and all rows that contain customer IDs greater than or equal to 44 to the third partition.

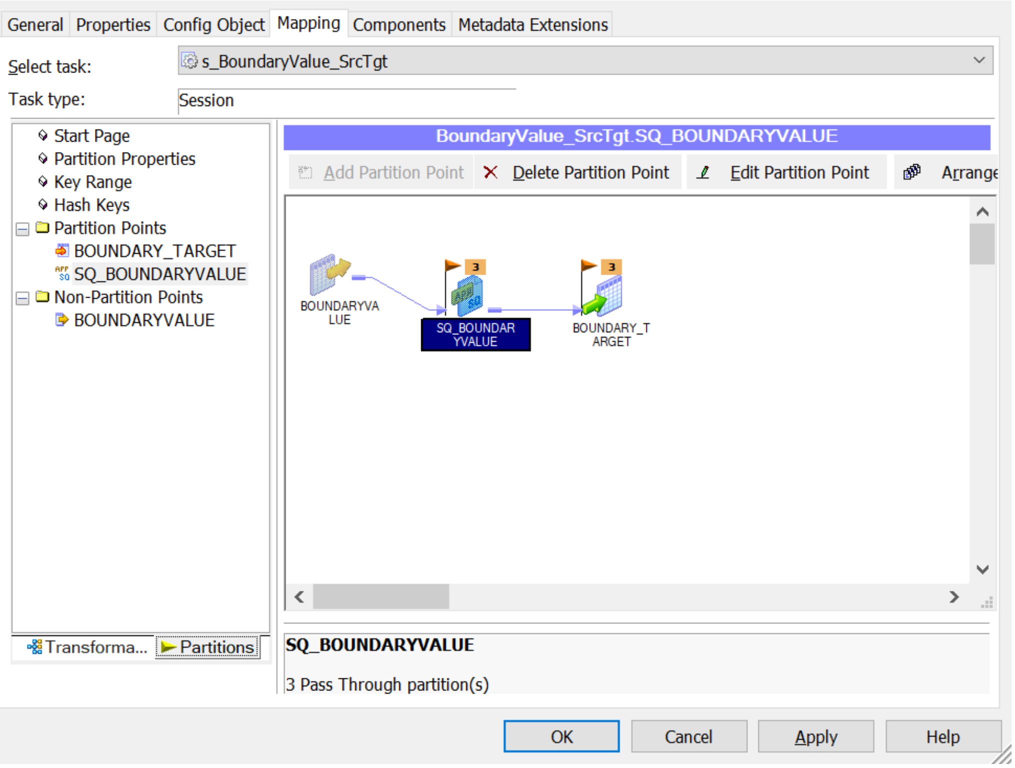
9. Click **OK**.

Applying SQL Override Conditions for Partitions

After you add the number of partitions, you can specify an SQL override condition for each of the partitions to override the default SQL query used to extract data from the Snowflake source.

1. In the Workflow Designer, open the session properties.
2. On the **Partitions** view, click **Add Partition Point**.

The transformation name appears under the Partition Points node.



Select task: s_BoundaryValue_SrcTgt

Task type: Session

SQ_BOUNDARYVALUE

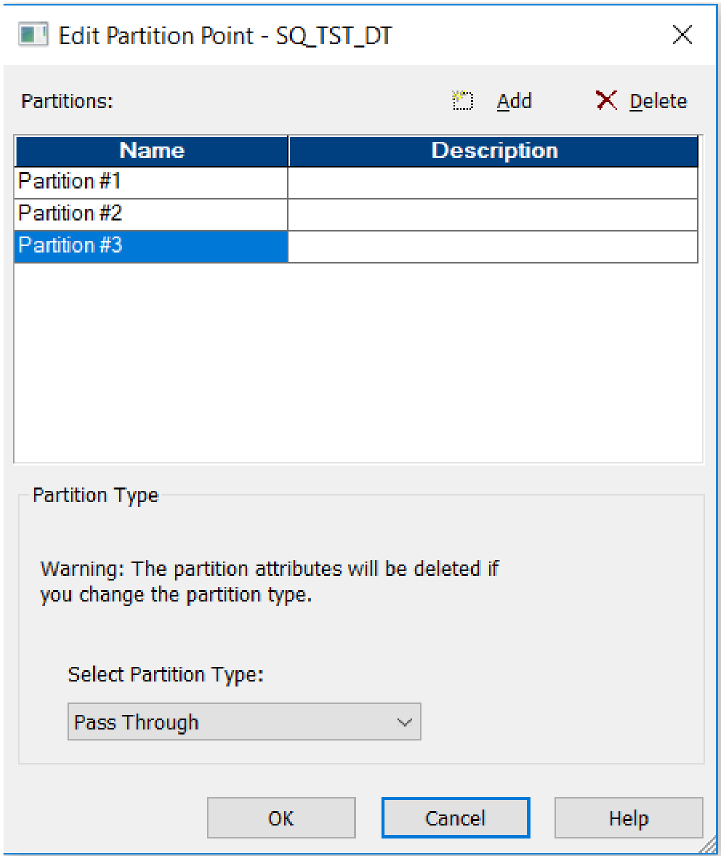
3 Pass Through partition(s)

3. Select the Source transformation, and click **Edit Partition Point**.

   The **Edit Partition Point** dialog box appears.

4. Click **Add** to add the partitions and enter a description for each partition.

5. Select the partition type as **Pass Through** for each of the partitions.



Edit Partition Point - SQ_TST_DT

Partitions:

Name	Description
Partition #1	
Partition #2	
Partition #3	

Partition Type

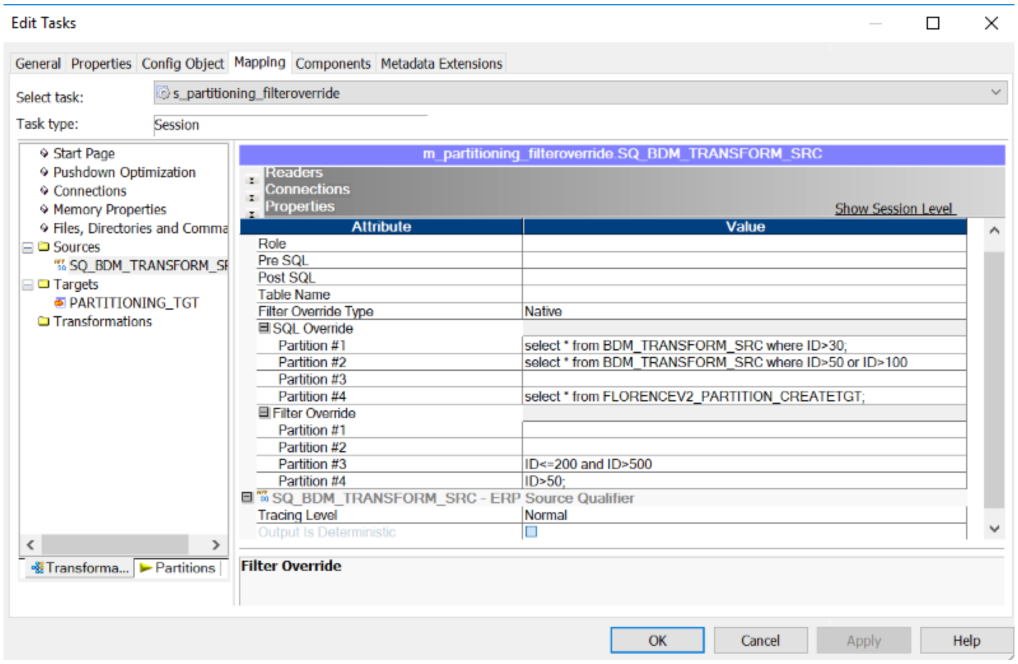
Warning: The partition attributes will be deleted if you change the partition type.

Select Partition Type: Pass Through

6. Click **OK**.
7. Click the **Transformations** tab in the session properties.

   Based on the number of partitions you create, those many number of partition fields appear for the SQL override property.
8. Specify the SQL override condition for each partition.

For example, the following image shows the SQL override condition for each of the configured partitions in the Snowflake source session properties:



Select task: s_partitioning_filteroverride

Task type: Session

m_partitioning_filteroverride.SQ_BDM_TRANSFORM_SRC

Attribute	Value
Role	
Pre SQL	
Post SQL	
Table Name	
Filter Override Type	Native
⊟ SQL Override	
Partition #1	select * from BDM_TRANSFORM_SRC where ID>30;
Partition #2	select * from BDM_TRANSFORM_SRC where ID>50 or ID>100
Partition #3	
Partition #4	select * from FLORENCEV2_PARTITION_CREATETGT;
⊟ Filter Override	
Partition #1	
Partition #2	
Partition #3	ID<=200 and ID>500
Partition #4	ID>50;
⊟ SQ_BDM_TRANSFORM_SRC - ERP Source Qualifier	
Tracing Level	Normal
Output Is Deterministic	□

Filter Override

9. Click **OK**.

Configure the Temporary Directory Location (Optional)

When you use SnowflakePowerExchange for Snowflake from PowerCenter to read from or write to Snowflake the Integration Service stages the data into the system temporary directory on the Informatica sever.

The default directory is `%temp%` for Windows and `/tmp` for Linux.

1. In the Administrator tool, navigate to the PowerCenter Integration Service for which you want to change the temporary directory location.
2. Click the **Processes** tab.
3. Click **Custom Properties**.
   The Edit Custom Properties dialog box appears.
4. Click **New** to add a new custom property.
5. Add the JVMOption custom property for the Data Integration Service and specify the value in the following format:
   `-Djava.io.tmpdir=<required temporary directory>`

   For example, enter the property name as **JVMOption1** and specify the value for the property as -*Djava.io.tmpdir=/opt/Informatica/tmp/*
6. Click **OK**.
7. Restart the PowerCenter Integration Service.

Note: The recommended minimal disk space for the temporary directory is 1 GB.

Rules and Guidelines for Snowflake Sessions

Use the following rules and guidelines when you create a session:

- You can read or write tables that are case-sensitive or that contain special characters, except for `@`, `~`, and `\`.
- When you enable partitioning for a Snowflake mapping, and specify both an SQL override condition and a filter condition, the Integration Service considers the SQL override condition over the filter condition.
- When you configure a custom SQL query to read data, and set an SQL override and filter override in the Snowflake source session properties, the Integration Service considers only the SQL override condition.
- You cannot configure a SQL override condition in a Lookup transformation.
- When you specify DD_REJECT as the Update Strategy transformation in a Snowflake mapping, the session does not log the rejected row count in the target statistics. The PowerCenter Integration Service also does not write the rejected rows to the rejected file path you specify.
- The TIMESTAMP_NTZ data type does not load correctly to the Snowflake target. Set the JDBC_TREAT_TIMESTAMP_NTZ_AS_UTC parameter to true in the **Additional JDBC URL Parameters** in the Snowflake connection and then write the data.
- When you configure a lookup, do not specify an override for the table name.
- The SQL override ports must be the same as the connected ports in the field mapping.

CHAPTER 6

Snowflake Pushdown Optimization

This chapter includes the following topics:

Snowflake Pushdown Optimization Overview

When you use the ODBC connection type in PowerCenter, you can configure pushdown optimization to push transformation logic to the source or target Snowflake database. Use pushdown optimization when you use database resources to improve mapping performance.

When you run a mapping configured for pushdown optimization, the PowerCenter Integration Service converts the transformation logic to an SQL query and sends the query to the Snowflake database. The Snowflake database runs the query.

You can configure full or source pushdown optimization for a Snowflake session that uses the ODBC connection type.

Pushdown Optimization Functions

When you use pushdown optimization, the PowerCenter Integration Service converts the expression in the transformation or workflow link by determining equivalent functions in the database.

The following table summarizes the availability of pushdown functions in a Snowflake database:

Function	Pushdown	Function	Pushdown	Function	Pushdown
ABORT()	-	INITCAP()	X	REG_MATCH()	-
ABS()	X	INSTR()	X	REG_REPLACE	-
ADD_TO_DATE()	X	IS_DATE()	-	REPLACECHR()	X
AES_DECRYPT()	-	IS_NUMBER()	-	REPLACESTR()	X
AES_ENCRYPT()	-	IS_SPACES()	-	REVERSE()	-
ASCII()	X	ISNULL()	X	ROUND(DATE)	-
AVG()	X	LAST()	-	ROUND(NUMBER)	X
CEIL()	X	LAST_DAY()	X	RPAD()	X
CHOOSE()	-	LEAST()	-	RTRIM()	X
CHR()	X	LENGTH()	X	SET_DATE_PART()	-
CHRCODE()	-	LN()	X	SIGN()	X
COMPRESS()	-	LOG()	X	SIN()	X
CONCAT()	X	LOOKUP	-	SINH()	X
COS()	X	LOWER()	X	SOUNDEX()	-
COSH()	X	LPAD()	X	SQRT()	X
COUNT()	X	LTRIM()	X	STDDEV()	X
CRC32()	-	MAKE_DATE_TIME()	-	SUBSTR()	X
CUME()	-	MAX()	X	SUM()	X
DATE_COMPARE()	X	MD5()	-	SYSDATE()	X
DATE_DIFF()	X	MEDIAN()	X	SYSTIMESTAMP()	X
DECODE()	X	METAPHONE()	-	TAN()	X
DECODE_BASE64()	-	MIN()	X	TANH()	X
DECOMPRESS()	-	MOD()	X	TO_BIGINT	X
ENCODE_BASE64()	-	MOVINGAVG()	-	TO_CHAR(DATE)	X
EXP()	X	MOVINGSUM()	-	TO_CHAR(NUMBER)	X
FIRST()	-	NPER()	-	TO_DATE()	X
FLOOR()	X	PERCENTILE()	-	TO_DECIMAL()	X

Function	Pushdown	Function	Pushdown	Function	Pushdown
FV()	-	PMT()	-	TO_FLOAT()	X
GET_DATE_PART()	X	POWER()	X	TO_INTEGER()	X
GREATEST()	-	PV()	-	TRUNC(DATE)	-
IIF()	X	RAND()	-	TRUNC(NUMBER)	X
IN()	X	RATE()	-	UPPER()	X
INDEXOF()	-	REG_EXTRACT()	-	VARIANCE()	X

Note: Columns marked with an X indicate that the PowerCenter Integration Service can push the function to the Snowflake database by using source-side or full pushdown optimization. Columns marked with a dash (-) symbol indicate that the PowerCenter Integration Service cannot push the function to the database.

Pushdown Optimization Operators

When you use pushdown optimization, the PowerCenter Integration Service converts the expression in the transformation or workflow link by determining equivalent operators in the database.

The following list summarizes the availability of pushdown operators in a Snowflake database:

+, -, *, /, %, ||, >, =, >=, <=, !=, AND, OR, NOT, ^=.

Pushdown Optimization Transformations

When you configure pushdown optimization for Snowflake, the PowerCenter Integration Service pushes the configured transformation to the database.

The PowerCenter Integration Service can push the following transformation logic to a Snowflake source or target:

Transformation	Pushdown Type
Aggregator	Source, Full
Expression	Source, Full
Filter	Source, Full
Joiner	Source, Full
Sorter	Source, Full

Transformation	Pushdown Type
Union	Source, Full
Router	Source, Full
Lookup	Source, Full
Update Strategy	Source, Full

Add the EXTODBC.DLL Entry

Before you use the Snowflake ODBC connection and configure pushdown optimization, you must add the required ODBCDLL entry in the `powrmart.ini` file of the PowerCenter Client.

1. Navigate to the following directory:

   ```
   <Informatica installation directory>\clients\PowerCenterClient\client\bin
   ```

2. In the `powrmart.ini` file, add the following entry:

   ```
   Snowflake=EXTODBC.DLL
   ```

Configuring the Snowflake ODBC Driver

You can set pushdown optimization for the ODBC connection type that uses the Snowflake ODBC driver.

To use an ODBC connection to connect to Snowflake, you must configure the Snowflake ODBC driver. PowerExchange for Snowflake supports Snowflake ODBC drivers on Windows and Linux.

After you install the driver, create an ODBC connection to connect to Snowflake from PowerCenter.

Configuring the Snowflake ODBC Driver on Windows

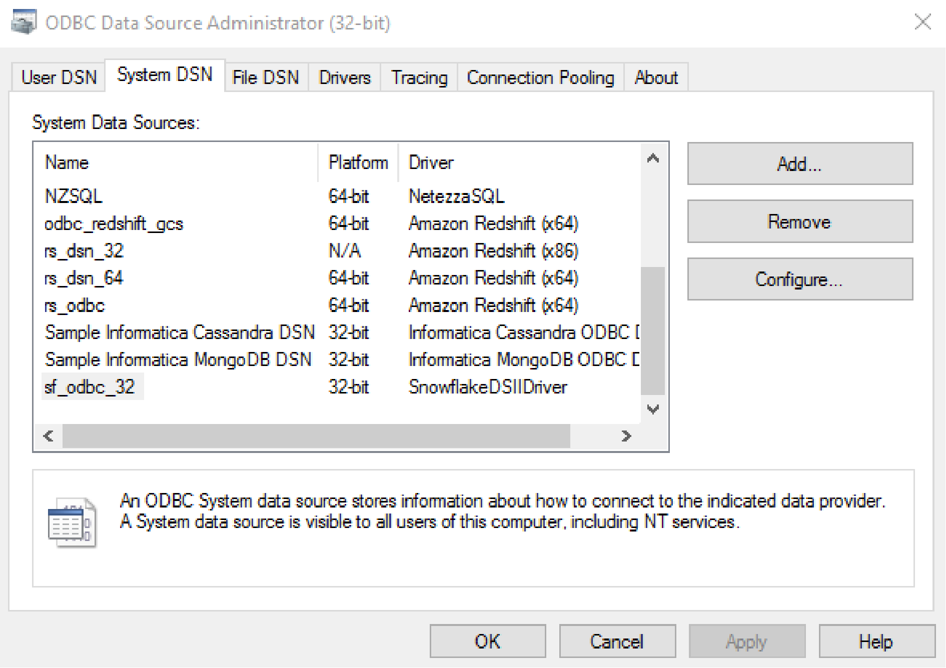
To establish an ODBC connection to connect to Snowflake on Windows, install the 64-bit Snowflake ODBC driver on the machine where the PowerCenter Integration Server runs and 32-bit ODBC driver on the machine where you install the PowerCenter Client.
After you install the driver, configure the Data Source Name (DSN) in the ODBC Data Source Administrator.

1. Download the 64-bit and 32-bit Snowflake ODBC drivers from the Snowflake web interface in your Snowflake account.
2. Install the 64-bit Snowflake ODBC driver on the machine that hosts the PowerCenter Integration Service and the 32-bit ODBC driver on the machine where you install the PowerCenter Client.
3. Open the following directory where you installed the ODBC data source file:
   - For 32-bit driver: `C:\WINDOWS\syswow64`
   - For 64-bit driver: `C:\WINDOWS\system32`
4. Run the `odbcad32.exe` file.

The **ODBC Data Sources Administrator** box appears.

5. Click **System DSN**.

   The **System DSN** tab appears.
   The following image shows the **System DSN** tab on the **ODBC Data Source Administrator** box:



System Data Sources:

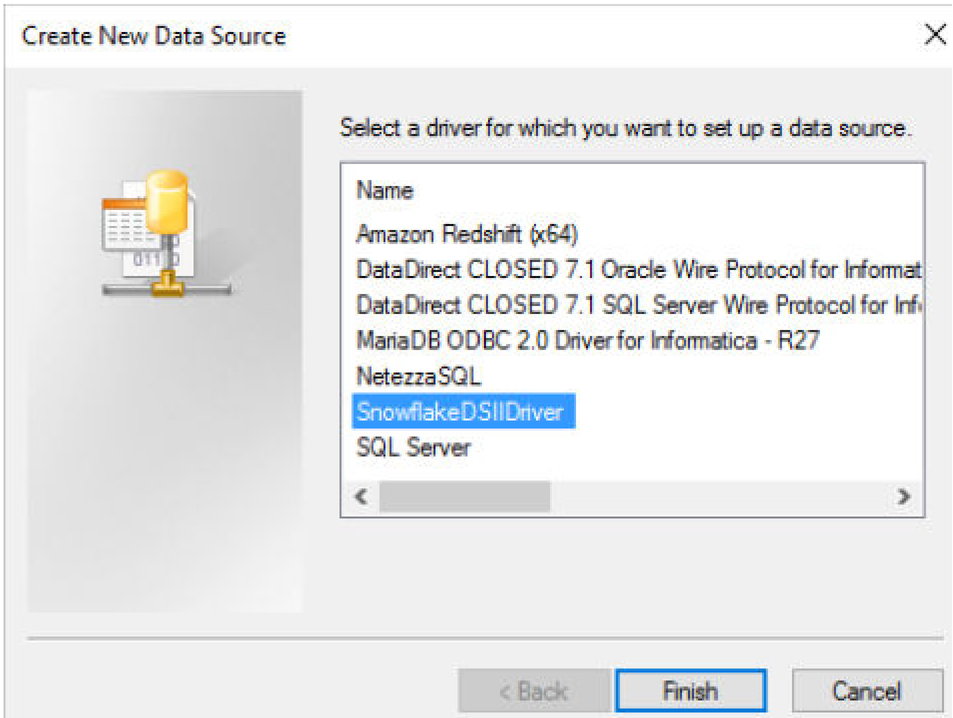
Name	Platform	Driver
NZSQL	64-bit	NetezzaSQL
odbc_redshift_gcs	64-bit	Amazon Redshift (x64)
rs_dsn_32	N/A	Amazon Redshift (x86)
rs_dsn_64	64-bit	Amazon Redshift (x64)
rs_odbc	64-bit	Amazon Redshift (x64)
Sample Informatica Cassandra DSN	32-bit	Informatica Cassandra ODBC [
Sample Informatica MongoDB DSN	32-bit	Informatica MongoDB ODBC D
sf_odbc_32	32-bit	SnowflakeDSIIDriver

An ODBC System data source stores information about how to connect to the indicated data provider. A System data source is visible to all users of this computer, including NT services.

6. Click **Add**.

   The **Create New Data Source** dialog appears.

The following image shows the Create New Data Source dialog box where you can select the Snowflake data source:



Create New Data Source

Select a driver for which you want to set up a data source.

Name
Amazon Redshift (x64)
DataDirect CLOSED 7.1 Oracle Wire Protocol for Informat
DataDirect CLOSED 7.1 SQL Server Wire Protocol for Inf
MariaDB ODBC 2.0 Driver for Informatica - R27
NetezzaSQL
SnowflakeDSIIDriver
SQL Server
< Back
Finish
Cancel

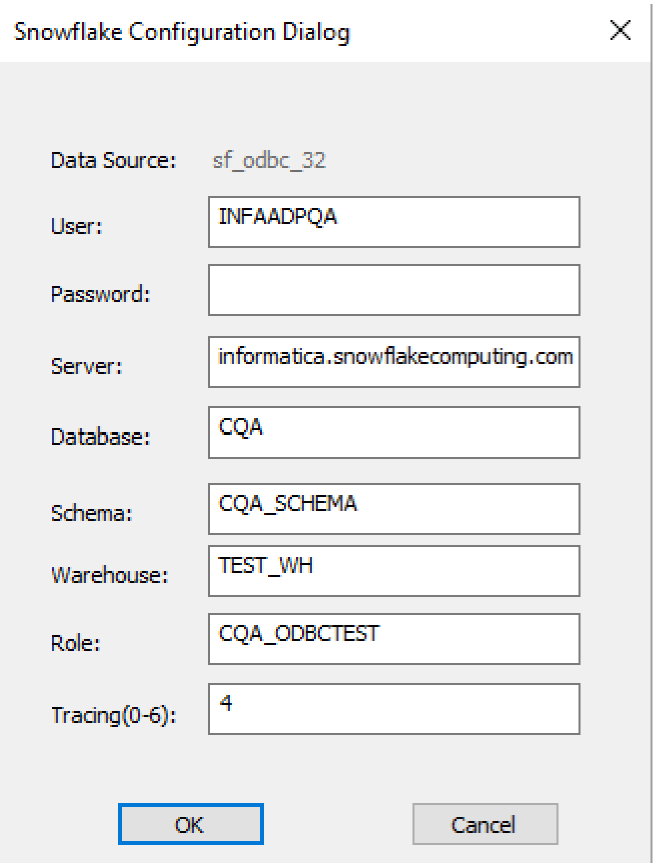
7. Select the **SnowflakeDSIIDriver** and click **Finish**.
8. Click **Configure**.

   The **Snowflake ODBC Driver DSN Setup** box appears.
9. Specify the following connection properties in the **Connection Settings** section:

Property	Description
Data Source	Name of the data source.
User	User name to access the Snowflake database.
Password	Password to access the Snowflake database.
Server	Domain name of your Snowflake account.
Database	Name of the Snowflake database.
Schema	Name of the Snowflake schema.
Warehouse	Name of the Snowflake warehouse.

Property	Description
Role	The Snowflake role assigned to user.
Tracing (0-6)	Determines the amount of detail that appears in the log file. - 0. Disable tracing. - 1. Fatal error tracing. - 2. Error tracing. - 3. Warning tracing. - 4. Info tracing. - 5. Debug tracing. - 6. Detailed tracing.

The following image shows the **Snowflake ODBC Driver DSN Setup** box where you can configure the connection settings:


Snowflake Configuration Dialog

Data Source: sf_odbc_32

User: INFAADPQA

Password:

Server: informatica.snowflakecomputing.com

Database: CQA

Schema: CQA_SCHEMA

Warehouse: TEST_WH

Role: CQA_ODBCTEST

Tracing(0-6): 4

10. Click **OK**.

    The Snowflake ODBC connection is configured successfully on Windows.

Configuring a Snowflake ODBC Driver on Linux

To establish an ODBC connection to connect to Snowflake on Linux, you must download the Snowflake ODBC (64-bit) driver on the machine that runs the PowerCenter Integration Service and configure the ODBC connection.

1. Download the 64-bit Snowflake ODBC driver from the Snowflake web interface in your Snowflake account.

2. Install the driver on the machine where the PowerCenter Integration Service runs.
3. Configure the `odbc.ini` file properties in the following format:

   ```
   [ODBC_SF]
   Driver=/usr/lib64/snowflake/odbc/lib/libSnowflake.so
   Description=
   Server=informatica.snowflakecomputing.com
   role=CQA_ODBCTEST
   database=CQA
   warehouse=TEST_WH
   schema=CQA_SCHEMA
   ```

   The following table describes each of the properties in the `odbc.ini` file:

Property	Description
ODBC Data Sources	Name of the data source.
Driver	Location of the Snowflake ODBC driver file.
Description	Description of the data source.
Server	Domain name of your Snowflake account.
Role	The Snowflake role assigned to user.
Database	Name of the Snowflake database.
Warehouse	Name of the Snowflake warehouse.
Schema	Name of the Snowflake schema.

4. In the source file, add the entries that you require to set the ODBCINI environment variable to the location of the `odbc.ini` file:

   ```
   setenv ODBCINI <$ODBC_HOME>/odbc.ini
   ```

5. Restart the PowerCenter Integration Service.

The Snowflake ODBC connection is configured successfully on Linux.

Pushdown Optimization Configuration Tasks

Configure pushdown optimization for a PowerCenter session that uses a Snowflake mapping. You can select full or source pushdown optimization.

After you configure the Snowflake ODBC driver, perform the following tasks to configure pushdown optimization:

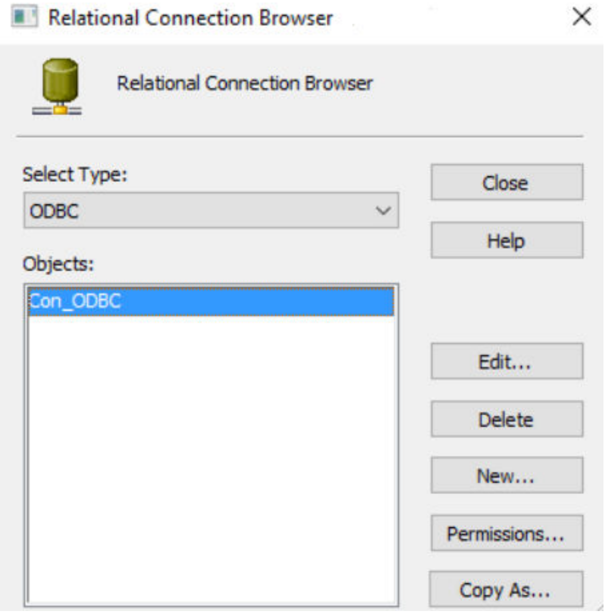
1. Create a Snowflake ODBC connection.
2. Configure pushdown optimization for a session that uses a Snowflake mapping.

Create a Snowflake ODBC Connection

Use the configured Snowflake ODBC driver to create an ODBC connection to connect to Snowflake from PowerCenter.

1. In the Workflow Manager, click **Connections**.
2. Select **Relational** from the list.

The **Relational Connection Browser** box appears.
The following image shows the **Relational Connection Browser** box:



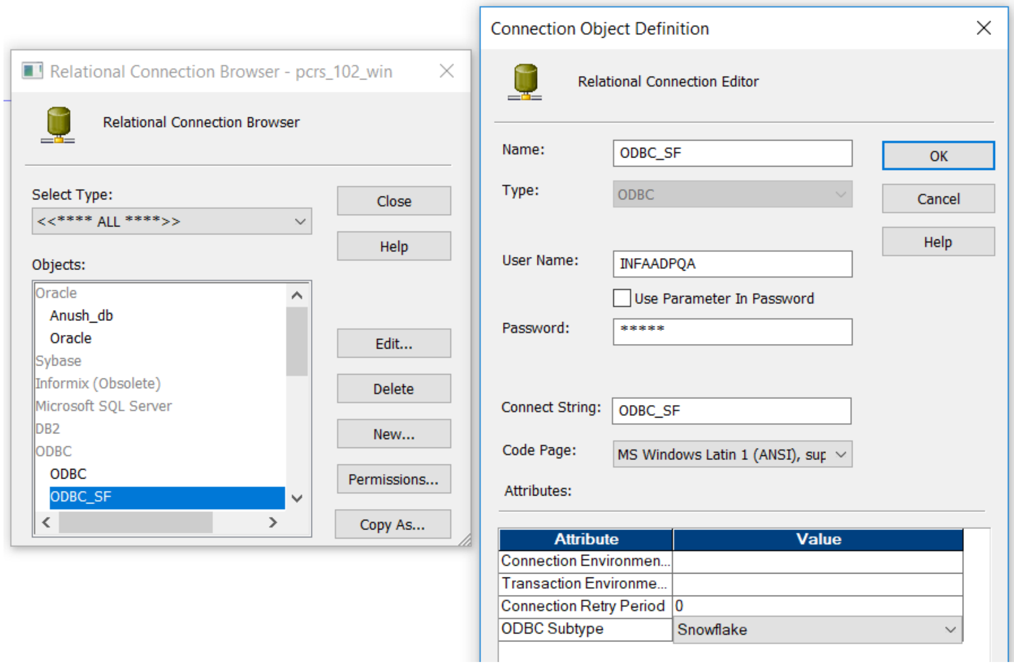
3. Select **Type** as **ODBC**.
4. Click **New**.

   The **Connection Object Definition** box appears.
5. Configure the relational connection properties.

   The following table lists the relational connection properties that you must configure:

Relational Connection Property	Description
Name	Name of the connection.
Type	The connection type. The value is set by default. You cannot edit this value.
User Name	The user name to log in to the Snowflake database.
Password	The password to the Snowflake database.
Connect String	Name of the ODBC data source name that you created for the Snowflake database.
Code Page	The code page that the PowerCenter Integration Service must use to read or write data.
Attributes	The **ODBC Subtype** attribute value. Select **Snowflake**.

The following image shows the **Relational Connection Browser** and **Relational Connection Editor** dialog boxes where you configure the connection properties:



Name:	ODBC_SF
Type:	ODBC
User Name:	INFAADPQA
□ Use Parameter In Password	
Password:	*****
Connect String:	ODBC_SF
Code Page:	MS Windows Latin 1 (ANSI), sup

Attribute	Value
Connection Environmen...	
Transaction Environme...	
Connection Retry Period	0
ODBC Subtype	Snowflake

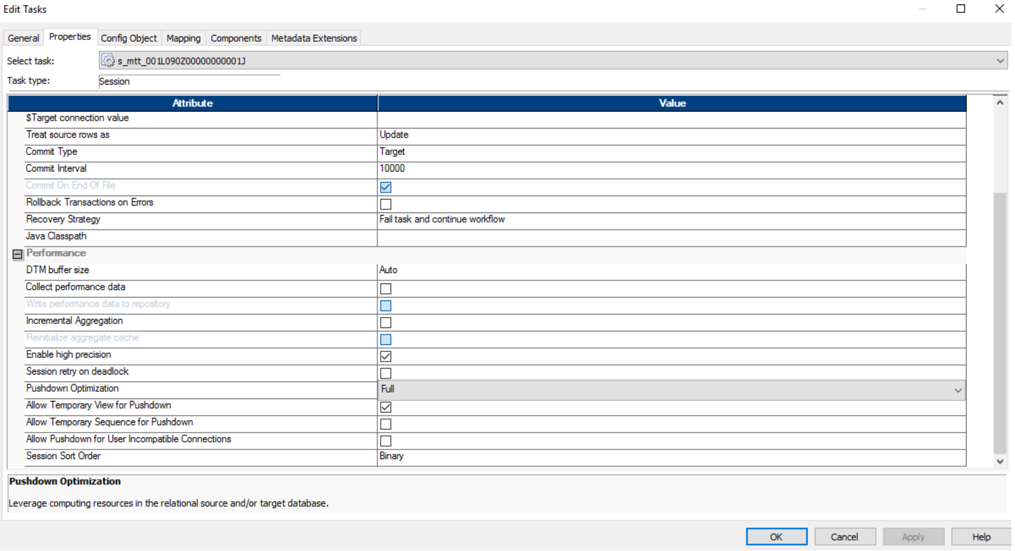
6. Click **OK**.

Configure a Session for Pushdown Optimization

To optimize the performance of the Snowflake session, configure full pushdown or source pushdown optimization in the session properties.

1. Open the session properties for the session that you created.
2. On the **Properties** tab, select the value of the **Pushdown Optimization** property as **Full** or **To Source**.

   The following figure shows the selected full pushdown optimization option:



Select task: s_mtt_001L090Z00000000001J

Task type: Session

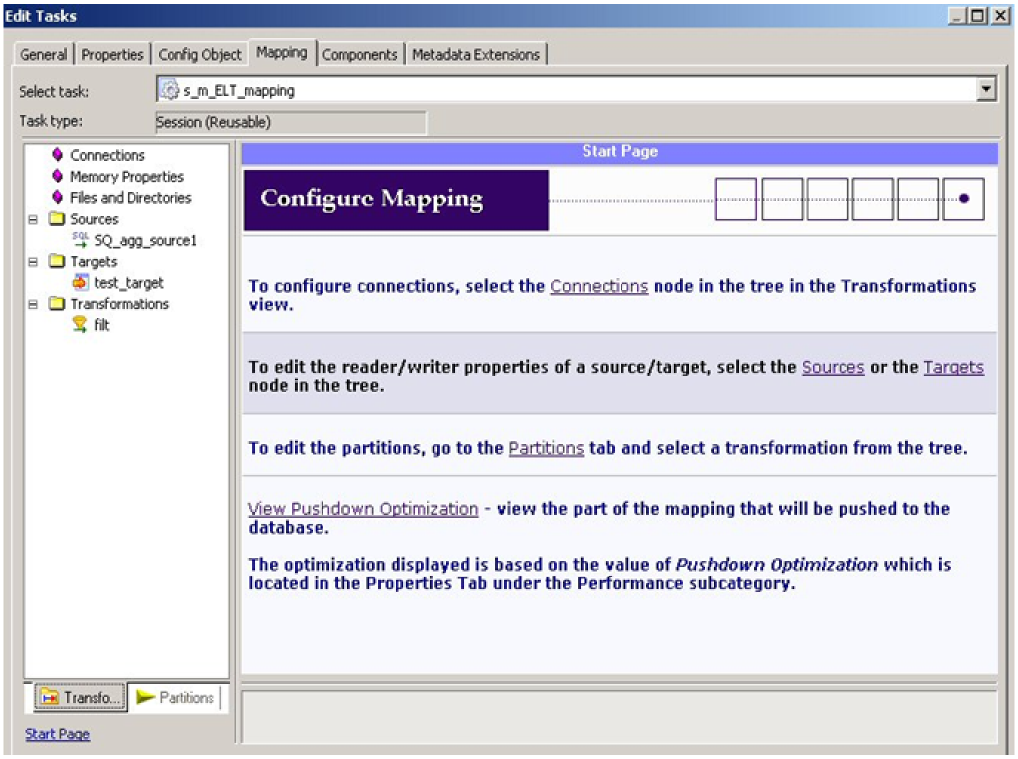
Attribute	Value
$Target connection value	
Treat source rows as	Update
Commit Type	Target
Commit Interval	10000
Commit On End Of File	☑
Rollback Transactions on Errors	□
Recovery Strategy	Fail task and continue workflow
Java Classpath	
Performance	
DTM buffer size	Auto
Collect performance data	□
Write performance data to repository	□
Incremental Aggregation	□
Reinitialize aggregate cache	□
Enable high precision	☑
Session retry on deadlock	□
Pushdown Optimization	Full
Allow Temporary View for Pushdown	☑
Allow Temporary Sequence for Pushdown	□
Allow Pushdown for User Incompatible Connections	□
Session Sort Order	Binary

Pushdown Optimization

Leverage computing resources in the relational source and/or target database.

3. Click the **Mapping** tab in the session properties.

The following figure shows the **Mapping** tab:



Select task: s_m_ELT_mapping

Task type: Session (Reusable)

Start Page

Configure Mapping

To configure connections, select the Connections node in the tree in the Transformations view.

To edit the reader/writer properties of a source/target, select the Sources or the Targets node in the tree.

To edit the partitions, go to the Partitions tab and select a transformation from the tree.

View Pushdown Optimization - view the part of the mapping that will be pushed to the database.

The optimization displayed is based on the value of *Pushdown Optimization* which is located in the Properties Tab under the Performance subcategory.

4. Click **Sources** and enter the database name in the **Owner Name** and **Source Table Name** fields in the following format: <`Databasename.Schemaname.Tablename`>

   For Targets, click **Targets** and enter the database name in the **Target Name Prefix** and **Target Table Name** fields in the following format: <`Databasename.Schemaname.Tablename`>

5. Click **View Pushdown Optimization** to view the full pushdown optimization logic.

   The **Pushdown Optimizer Viewer** window appears and displays the pushdown groups and the SQL that is generated to perform the transformation logic. It displays messages related to each pushdown group. It also displays numbered flags to indicate the transformations in each pushdown group.

Rules and Guidelines for Functions in Pushdown Optimization

Use the following rules and guidelines when you push functions to a Snowflake database:

- To push the TRUNC(DATE) function to the Snowflake database, you must define the date and format arguments.
- The Snowflake aggregate functions accept only one argument, which is a field set for the aggregate function. The PowerCenter Integration Service ignores any filter condition defined in the argument. Ensure that all fields mapped to the target are listed in the GROUP BY clause.
- To push the TO_CHAR() function to the Snowflake database, you must define the date and format arguments.

- When you push the SYSTIMESTAMP() and SYSDATE() functions to the Snowflake database, do not specify any format. The Snowflake database returns the complete time stamp.
- You cannot push the TO_BIGINT() or TO_INTEGER() function with more than one argument to the Snowflake database.
- When you push the REPLACECHR() or REPLACESTR() function to the Snowflake database, the PowerCenter Integration Service ignores the caseFlag argument.
  For example, both REPLACECHR(false, in_F_CHAR, 'a', 'b') and REPLACECHR(true, in_F_CHAR, 'a', 'b') return the same value.
- You cannot use millisecond and microsecond values when you push functions to the Snowflake database.
- You can use nanosecond values in the ADD_TO_DATE() and TRUNC(DATE) functions only.
- To push the TRUNC(DATE), GET_DATE_PART(), and DATE_DIFF() functions to the Snowflake database, you must use the following time formats as arguments:

  - D
  - DDD
  - HH
  - MI
  - MM
  - SS
  - YYYY

  For example, `TRUNC(<datefieldname>, 'dd')`.

  For information on date and time related functions, see the following website: https://docs.snowflake.net/manuals/sql-reference/functions-date-time.html#label-supported-date-time-parts

APPENDIX A

Snowflake Data Type Reference

This appendix includes the following topics:

Data Type Reference Overview

PowerCenter uses the following data types in Snowflake mappings:

- Snowflake native data types. Snowflake data types appear in Snowflake definitions in a mapping.
- Transformation data types. Set of data types that appear in the transformations. They are internal data types based on ANSI SQL-92 generic data types, which the PowerCenter Integration Service uses to move data across platforms. They appear in all transformations in a mapping.

When the PowerCenter Integration Service reads source data, it converts the native data types to the comparable transformation data types before transforming the data. When the PowerCenter Integration Service writes to a target, it converts the transformation data types to the comparable native data types.

Snowflake and Transformation Data Types

The following table lists the Snowflake data types that PowerCenter supports and the corresponding transformation data types:

Snowflake Data Type	Transformation Data Type	Range and Description
BINARY (VARBINARY)	Binary	Maximum value: 8,388,60 Default value is 8,388,60. **Note:** You can read and write data of Binary data type only in a native environment.
BOOLEAN	String	A Boolean attribute.
DATE	Datetime	Date and time values.

Snowflake Data Type	Transformation Data Type	Range and Description
FLOAT (DOUBLE, DOUBLE PRECISION, REAL, FLOAT, FLOAT4, FLOAT8)	Double	Floating point numbers with double-precision (64 bit). Maximum value: 1.7976931348623158e+307 Minimum value: -1.79769313486231E+307
NUMBER (DECIMAL, NUMERIC, INT, INTEGER, BIGINT, SMALLINT, TINYINT, BYTEINT)	Decimal	Number with 28-bit precision and scale. **Note:** You must enable high-precision in the PowerCenter session properties to use 28-bit precision. If you do not enable high precision, data is truncated. PowerExchange for Snowflake does not support Decimal values with precision that exceeds 28-bit because the maximum numeric precision that PowerCenter supports is 28 digits.
TIME	Datetime	Date and time values. **Note:** You can read and write data of Time data type only in a native environment.
TIMESTAMP_LTZ	Datetime	Date and time values.
TIMESTAMP_NTZ (TIMESTAMP_NTZ, datetime)	Datetime	Date and time values.
TIMESTAMP_TZ	Datetime	Date and time values.
VARCHAR (TEXT, CHAR, CHARACTER, STRING)	String	Maximum value: 16,777,216 Default value is 16,777,216.

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