



Informatica® PowerExchange for Db2
Warehouse

10.4.0

User Guide for PowerCenter

Informatica PowerExchange for Db2 Warehouse User Guide for PowerCenter

10.4.0

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Preface

Use the *Informatica® PowerExchange® for Db2 Warehouse User Guide for PowerCenter®* to learn how to read from and write to IBM Db2 Warehouse by using PowerCenter Client. Learn to create a Db2 Warehouse connection, develop mappings, and run sessions in an Informatica domain.

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CHAPTER 1

Introduction to PowerExchange for Db2 Warehouse

This chapter includes the following topics:

- [PowerExchange for Db2 Warehouse Overview, 7](#)
- [Introduction to Db2 Warehouse, 7](#)

PowerExchange for Db2 Warehouse Overview

You can use PowerExchange for Db2 Warehouse to securely read data from or write data to IBM Db2 Warehouse.

You can use the Designer to import Db2 Warehouse tables as sources and target definitions. The sources and targets definitions represent tables in Db2 Warehouse.

Configure a Db2 Warehouse database connection in a mapping to read data from and write to Db2 Warehouse.

Example

You work as a data analyst in a retail corporation that has outlets across various countries. You want to assess your retail store performance across geographical distributions and produce a report that identifies the likelihood of future sales outcomes based on existing data. You want to use the built-in analytics, predictive modeling, and business intelligence tools in Db2 Warehouse. The solution speeds up the process and helps you analyze your data and get precise insights quickly.

You design a mapping to read data from Salesforce and other transactional systems and aggregate the data. Use PowerExchange for Db2 Warehouse to write aggregated data to Db2 Warehouse and then use the predictive modeling algorithms to identify your potential stores across geographical locations, track your leads, and come up with a future course of action.

Introduction to Db2 Warehouse

The IBM Db2 Warehouse is a fast, fully managed, high-performance, data warehouse, and analytics service with independent scaling of storage and compute. IBM Db2 Warehouse integrates database, server, and storage in a single system.

CHAPTER 2

PowerExchange for Db2 Warehouse Configuration

This chapter includes the following topics:

- [PowerExchange for Db2 Warehouse Configuration Overview, 8](#)
- [Prerequisites, 8](#)
- [Registering the PowerExchange for Db2 Warehouse Plug-in, 9](#)
- [Configuring a Db2 Warehouse Data Source on Windows, 9](#)
- [Configuring a Db2 Warehouse Data Source on UNIX, 13](#)
- [Configure the Environment Variables for PowerCenter Integration Service, 13](#)

PowerExchange for Db2 Warehouse Configuration Overview

PowerExchange for Db2 Warehouse installs with PowerCenter.

To configure PowerExchange for Db2 Warehouse, complete the following steps:

1. Complete the prerequisites.
2. Register the PowerExchange for Db2 Warehouse plug-in with the PowerCenter repository.

Prerequisites

Before you configure PowerExchange for Db2 Warehouse, complete the following tasks:

- Install or upgrade PowerCenter.
- Install the IBM Data Server Driver Package.
- Verify that the Db2 Warehouse database user can perform the following operations on the database:
 - CREATE EXTERNAL TABLE
 - DELETE
 - DROP

- INSERT
- MERGE
- SELECT
- TRUNCATE
- UPDATE
- VIEW

Registering the PowerExchange for Db2 Warehouse Plug-in

To register the plug-in, the repository must be running in exclusive mode. Use the Informatica Administrator or the *pmrep* RegisterPlugin command to register the plug-in.

The plug-in file for PowerExchange for Db2 Warehouse is *Db2Warehouse.xml*. When you install the Service component, the installer copies *Db2Warehouse.xml* to the following directory:

```
<PowerCenter Installation Directory>\server\bin\Plugin
```

Note: If you do not have the correct privileges to register the plug-in, contact the user who manages the PowerCenter Repository Service.

Configuring a Db2 Warehouse Data Source on Windows

Install and configure the 32-bit IBM Data Server Driver Package on the Windows machines where you install the PowerCenter Client. Install the 32-bit IBM Data Server Driver Package on each PowerCenter Client machine that accesses the Db2 Warehouse database. Use the Microsoft ODBC Data Source Administrator to configure ODBC connectivity. Use the Workflow Manager to create a database connection object for the Db2 Warehouse database.

Configuring ODBC Connectivity

You can configure ODBC connectivity to a Db2 Warehouse database.

To establish an ODBC connection to connect to Db2 Warehouse on Windows, install the 32-bit IBM Data Server Driver Package 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. Create an 32-bit ODBC data source for each Db2 Warehouse database that you want to access.

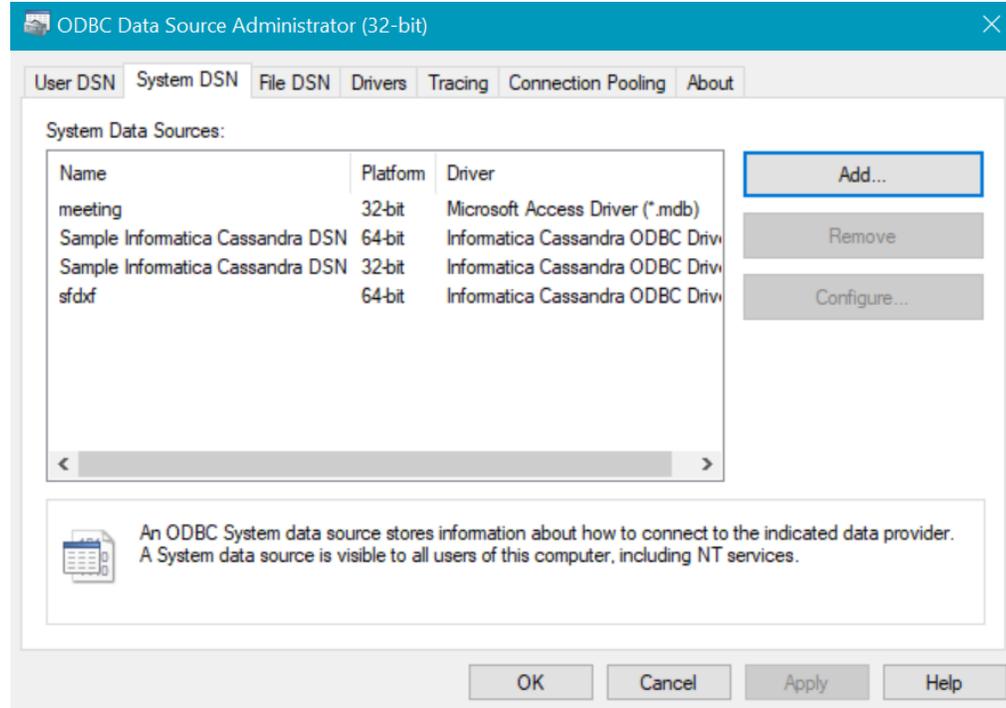
The following steps provide a guideline for configuring ODBC connectivity. For specific instructions, see IBM Data Server Driver documentation.

1. Click **Start > Control Panel**.
2. Click **Administrative Tools**.
3. Click **Data Sources (ODBC)**.

The **ODBC Data Source Administrator** dialog box appears.

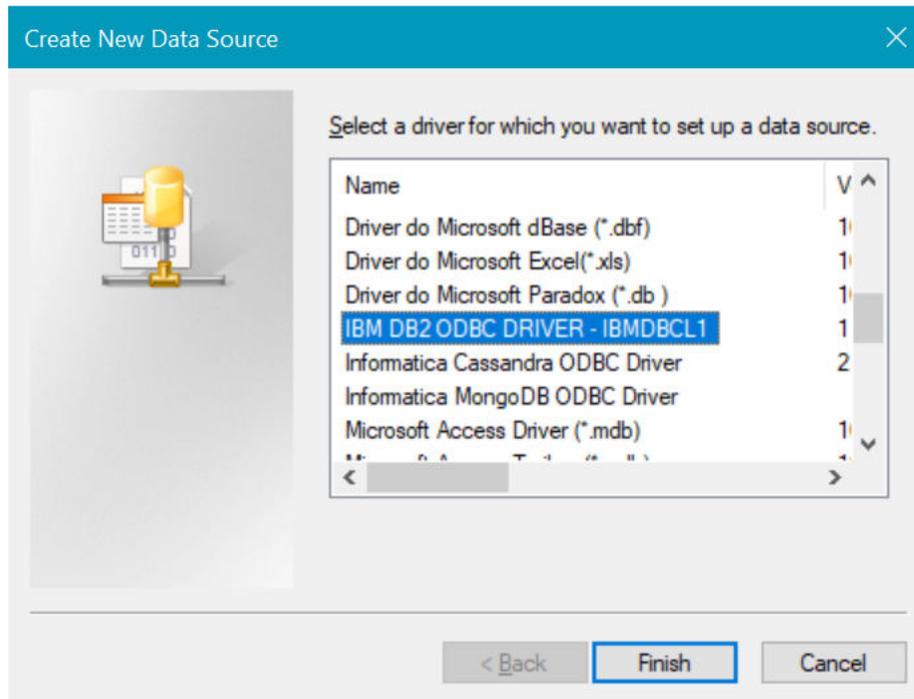
4. Click the **System DSN** tab.

The **System DSN** tab appears. The following image shows the System DSN tab on the ODBC Data Source Administrator (32-bit) dialog box:



5. Click **Add**.

The **Create New Data Source** dialog box appears. The following image shows the Create New Data Source dialog box where you can select the IBM Data Server Driver:



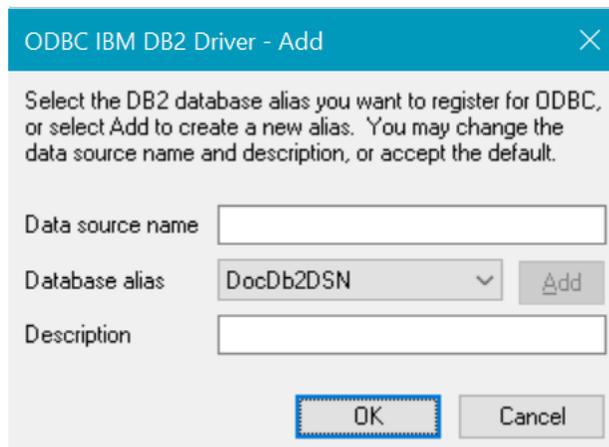
6. Select **IBM DB2 ODBC DRIVER - IBMDBCL1** to set up the data source.

Note: **IBMDBCL1** is the default IBM data server driver copy name. You can configure the IBM data server driver copy name when you install the IBM Data Server Driver Package.

7. Click **Finish**.

The **ODBC IBM DB2 Driver - Add** dialog box appears.

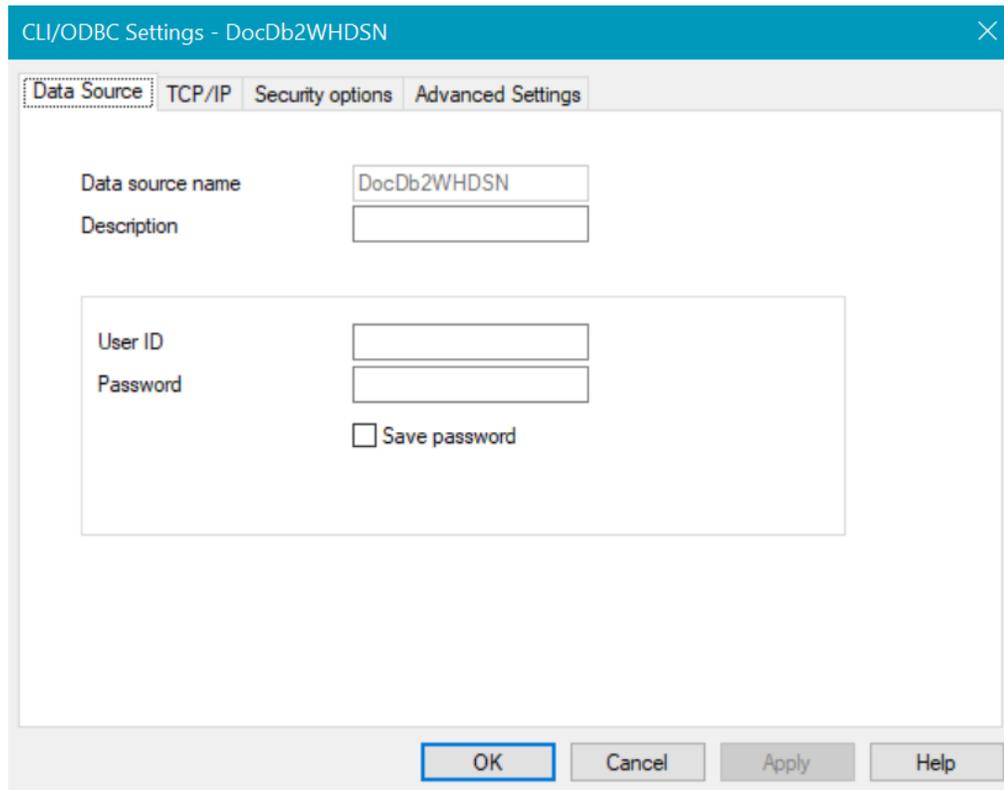
The following image shows the connection properties in the **ODBC IBM DB2 Driver - Add** dialog box:



8. Enter a name for the new ODBC data source.
9. Select a database alias for Db2 Warehouse or click **Add** to add a new database alias.

The **CLI/ODBC Settings** dialog box appears.

The following image shows the connection properties in the **CLI/ODBC Settings** dialog box:



10. On the **Data Source** tab, specify the **User ID** and **Password** of the Db2 Warehouse database that you want to connect to.
11. On the **Advanced Settings** tab, click **Add**.
The **Add CLI Parameter** dialog box appears.
12. Add the following CLI parameters and the values for each parameter:

CLI Parameter Name	Value
Database	Database on the Db2 Warehouse that you want to connect to.
Hostname	Host name or IP address of the Db2 Warehouse system that you want to connect to.
Port	Port number of the Db2 Warehouse system that you want to connect to.

13. Click **OK**.
14. Verify that you can connect to the Db2 Warehouse database.
You can use the Microsoft ODBC Data Source Administrator to test the connection to the database. To test the connection, select the Db2 Warehouse data source and click Configure. On the Testing tab, click Test Connection and enter the connection information for the Db2 Warehouse schema.

Configuring a Db2 Warehouse Data Source on UNIX

Install and configure the 64-bit IBM Data Server Driver package on the UNIX machine where the PowerCenter Integration Service process runs. Use the IBM Data Server Driver to configure the Db2 Warehouse data source details in the `odbcinst.ini` file.

Configuring ODBC Connectivity

You can configure ODBC connectivity to a Db2 Warehouse database.

The following steps provide a guideline for configuring ODBC connectivity. For specific instructions, see the IBM Data Server Driver documentation .

1. To configure connectivity for the integration service process, log in to the machine as a user who can start a service process.
2. Set the `ODBCINST` environmental variable for the IBM Data Server Driver. To set the `ODBCINST` environment variable, use the following syntax:

```
setenv ODBCINST $INFA_HOME/ODBC7.1
```

3. Edit the existing `odbcinst.ini` file.

Add an entry for the Db2 Warehouse data source under the section `[ODBC Data Sources]` and configure the data source.

For example:

```
[IBM DATASERVER DRIVER]
Driver=<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/
clidriver/lib/libdb2.so
Setup=<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/
clidriver/lib/libdb2.so
APILevel=0
ConnectFunctions=YYY
DriverODBCVer=3.52
FileUsage=0
```

For more information about IBM Data Server Driver connectivity, see the IBM Data Server Driver documentation.

4. Restart the Informatica services.

Configure the Environment Variables for PowerCenter Integration Service

1. In the Administrator tool Domain Navigator, select the PowerCenter Integration Service.
2. Click the **Processes** tab on the right pane.
3. Click **Edit** in the **Environment Variables** section.

4. Define the following environment variables and values:

Property	Value
export DB2_CLI_DRIVER_INSTALL_PATH	<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/clidriver
export LD_LIBRARY_PATH	<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/clidriver/lib:\$LD_LIBRARY_PATH
export LIBPATH	<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/clidriver/lib:\$LIBPATH
export PATH	<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/clidriver/bin:\$PATH
export PATH	<IBM Data Server Driver installation directory>/db2_cli_odbc_driver/odbc_cli/clidriver/adm:\$PATH

5. Restart the PowerCenter Integration Service.

CHAPTER 3

Db2 Warehouse Sources and Targets

This chapter includes the following topics:

- [Db2 Warehouse Sources and Targets Overview, 15](#)
- [Source Qualifier Properties, 15](#)
- [Importing Db2 Warehouse Source Definitions, 16](#)
- [Importing Db2 Warehouse Target Definitions, 16](#)
- [Rules and Guidelines for Db2 Warehouse, 17](#)

Db2 Warehouse Sources and Targets Overview

Db2 Warehouse source and target definitions represent metadata for Db2 Warehouse tables. When you import Db2 Warehouse definitions, you can choose to preview data in the tables.

Source Qualifier Properties

You can configure source qualifier properties to sort the number of input ports and to retrieve distinct data from a Db2 Warehouse source. You can override the values in the session properties.

The following table describes the source qualifier properties:

Source Options	Description
Select Distinct	Selects unique values. Db2 Warehouse ignores trailing spaces. Therefore, the PowerCenter Integration Service might extract fewer rows than expected.
Source Filter	Reduces the number of rows the PowerCenter Integration Service queries. Use the following syntax: <code><table name>."<field name>" <operator> <value></code> The filter condition is case sensitive.

Source Options	Description
Number of Sorted Ports	Number of columns used when sorting rows queried from the source. The PowerCenter Integration Service adds an ORDER BY clause to the default query when it reads source rows. The ORDER BY clause includes the number of ports specified, starting from the top of the transformation. When you specify the number of sorted ports, the database sort order must match the session sort order. Default is 0.
SQL Query	Overrides the default query. Enclose column names in double quotes. The SQL query is case sensitive.

Importing Db2 Warehouse Source Definitions

To create a Db2 Warehouse source definition, use the Source Analyzer to import source metadata with the Db2 Warehouse relational data source.

1. In the Source Analyzer, click **Sources > Import from Database**.
2. Select the Db2 Warehouse data source used to connect to the source database.
If you need to create or modify a Db2 Warehouse data source, click the **Browse** button to open the ODBC Administrator. Create the Db2 Warehouse data source and click **OK**. Select the new Db2 Warehouse data source.
3. Enter a database user name and password to connect to the database.
Note: The user must have the appropriate database permissions to view the object.
You may need to specify the owner name for database objects you want to use as sources. If you want to import tables for all the owners, click **All**.
4. Optionally, use the search field to limit the number of tables that appear.
5. Click **Connect**.
6. Scroll down through the list of sources to find the source you want to import. Select the relational object or objects you want to import.
You can hold down the Shift key to select a block of sources within one folder or hold down the Ctrl key to make non-consecutive selections within a folder. You can also select all tables within a folder by selecting the folder and clicking **Select All**. Use the **Select None** button to clear all highlighted selections.
7. Click **OK**.

The source definition appears in the Source Analyzer. In the Navigator, the source definition appears in the Sources node of the active repository folder under the source database name.

Importing Db2 Warehouse Target Definitions

To create a Db2 Warehouse target definition, use the Target Designer to import source metadata with the Db2 Warehouse relational data source.

1. In the Target Designer, click **Targets > Import from Database**.

2. Select the Db2 Warehouse data source used to connect to the target database.
If you need to create or modify a Db2 Warehouse data source, click the **Browse** button to open the ODBC Administrator. Create the Db2 Warehouse data source and click **OK**. Select the new Db2 Warehouse data source.
3. Enter the user name and password to connect to the database, and click **Connect**.
If you are not the owner of the table you want to use as a target, specify the owner name. If you want to import tables for all the owners, click **All**.
4. Drill down through the list of database objects to view the available tables as targets.
5. Select the relational table or tables to import the definitions into the repository.
You can hold down the Shift key to select a block of tables, or hold down the Ctrl key to make non-consecutive selections. You can also use the **Select All** and **Select None** buttons to select or clear all available targets.
6. Click **OK**.
The selected target definitions appear in the Navigator under the Targets node.

Rules and Guidelines for Db2 Warehouse

When you enforce a primary key constraint in the IBM Integrated Analytics system (IIAS) table and write data to it from a flat file or IIAS table, ensure that data does not contain duplicate records. When there are duplicate records, the Integration Service fails to insert the duplicate records into the IIAS table and rejects all records

CHAPTER 4

Db2 Warehouse Sessions and Workflows

This chapter includes the following topics:

- [Db2 Warehouse Connections, 18](#)
- [Configure Db2 Warehouse Source Session Properties, 19](#)
- [Parameterization for Db2 Warehouse Sources, 20](#)
- [Configure Db2 Warehouse Target Session Properties, 21](#)
- [Partitioning, 22](#)
- [Parameterization for Db2 Warehouse Targets, 23](#)

Db2 Warehouse Connections

Use a relational connection object for each Db2 Warehouse source or target that you want to access.

The relational database connection defines how the PowerCenter Integration Service accesses the underlying database for Db2 Warehouse. When you configure a Db2 Warehouse connection, you specify the connection attributes that the PowerCenter Integration Service uses to connect to Db2 Warehouse.

PowerExchange for Db2 Warehouse Connections

The following table describes the Db2 Warehouse connection properties that you must configure:

Property	Description
User Name	Database user name with the appropriate read and write database permissions to access Db2 Warehouse.
Use Parameter in Password	Indicates the password for the database user name is a session parameter, <i>\$ParamName</i> . Define the password in the workflow or session parameter file, and encrypt it by using the <i>pmpasswd</i> CRYPT_DATA option. Default is disabled.
Password	Password for the database user name.
Connect String	ODBC data source to connect to Db2 Warehouse.

Property	Description
Database Name	Database name of Db2 Warehouse that you want to connect to.
Schema Name	The schema name in Db2 Warehouse from where you want to fetch the metadata.
Server Name	Host name of Db2 Warehouse.
Port Number	Network port number used to connect to the Db2 Warehouse server.
Driver Name	Specify the name of the IBM Data Server Driver that you configured in the <code>odbcinst.ini</code> file. For example, IBM DB2 ODBC DRIVER - IBMDBCL1.
Advanced connection properties	Optional. Additional connection parameters that you want to use. Specify the connection parameters as key-value pairs in the following format, and separate each key-value pair with a semicolon: <code><param1>=<value>;<param2>=<value>;<param3>=<value>...</code>

Creating a Db2 Warehouse Connection

Create a Db2 Warehouse connection before you run a Db2 Warehouse session.

1. In the Workflow Manager, connect to a repository.
2. Click **Connections > Relational**.
The **Relational Connection Browser** dialog box appears.
3. Click **New**.
The **Select Subtype** dialog box appears.
4. Select **Db2 Warehouse Connection** from the **Select Subtype** list.
5. Click **OK**.
The **Connection Object Definition** dialog box appears.
6. Enter the connection properties.
7. Click **OK**.
The Db2 Warehouse connection appears in the Connection Browser list.

Configure Db2 Warehouse Source Session Properties

You can configure the session properties for a Db2 Warehouse source on the Mapping tab. Define the properties for each source instance in the session.

The following table describes the session properties that you can configure for a Db2 Warehouse source session:

Property	Description
Delimiter	Delimiter separates successive input fields in the Db2 Warehouse external table. You can enter any value supported by Db2 Warehouse. The value can be a part of the data for the Db2 Warehouse source. Default is the pipe () character.
Null Value	NullValue parameter of the Db2 Warehouse external table. The PowerCenter Integration Service uses the NullValue internally. Maximum value is one character. Default is NULL.
Escape Character	Escape character of an external table. If the data contains NULL, CR, and LF characters in the Char or Varchar field, you need to add an escape character in the source data before extracting. Enter an escape character before the data. The supported escape character is backslash (\).
Socket Buffer Size	Set the socket buffer size to 25 to 50 % of the DTM buffer size to increase session performance. You might need to test different settings for optimal performance. Enter a value between 4096 and 2147483648 bytes. Default is 8388608 bytes.
Db2 Warehouse Pre SQL	SQL statement that the PowerCenter Integration Service executes before extracting data from the source.
Db2 Warehouse Post SQL	SQL statement that the PowerCenter Integration Service executes after extracting data from the source.
Pipe Directory Path	Path for the PowerCenter Integration Service to create the pipe for the external table. If you do not specify the path, the PowerCenter Integration Service uses the <code>\$PMTempDir</code> directory to create the pipe for the external table.

Parameterization for Db2 Warehouse Sources

You can parameterize Db2 Warehouse session properties to override the session properties during run time.

For example, you want to extract data from a customers table. The customers table has multiple schemas that contain customer information for different countries. You want to use one mapping to extract data from multiple schemas based on the country name instead of creating different mappings for different schemas. In this case, you can parameterize the owner name and source table name in the session properties, and use the same mapping to extract data from multiple schemas.

You can parameterize the following session properties for Db2 Warehouse sources:

- Delimiter
- EscapeCharacter
- NullValue
- Owner Name
- Db2 Warehouse Pre SQL
- Db2 Warehouse Post SQL

- Source Filter
- Source Table Name
- SQL Query
- User Defined Join

Configure Db2 Warehouse Target Session Properties

You can configure the session properties for Db2 Warehouse targets in the Transformations view on the Mapping tab. Define the properties for each target instance in the session.

The following table describes the session properties that you can configure for a Db2 Warehouse target session:

Property	Description
Insert	Inserts all rows to the Db2 Warehouse target. Default is true.
Delete	Deletes rows from the Db2 Warehouse target. If you select DELETE, you need to select Delete for the Treat source rows as session property in the Properties page.
Update	Updates rows in the Db2 Warehouse target. If you select UPDATE, you need to select Update for the Treat source rows as session property in the Properties page. You can select one of the following modes: <ul style="list-style-type: none"> - Update as Update. PowerExchange for Db2 Warehouse updates all rows flagged for update if the entries exist. - Update else Insert. PowerExchange for Db2 Warehouse first updates all rows flagged for update if the entries exist in the target. If the entries do not exist, PowerExchange for Db2 Warehouse inserts the entries. - Update as Insert. PowerExchange for Db2 Warehouse inserts all rows flagged for update if the entries do not exist in the target.
Truncate Target Table Option	The PowerCenter Integration Service truncates the target before loading. Run the truncate table command. Default is disabled. If you specify an SQL statement in the Pre-SQL property, the PowerCenter Integration Service runs the SQL statement before the table is truncated.
Delimiter	Delimiter separates successive input fields in the Db2 Warehouse external table. You can enter any value supported by Db2 Warehouse. The value must not be a part of the input data. Default is the pipe () character.
Null Value	NullValue parameter of the Db2 Warehouse external table. The PowerCenter Integration Service uses the NullValue internally. Maximum value is one character. Default is NULL.
Escape Character	Escape character of the external table. If the data contains NULL, CR, and LF characters in the Char or Varchar field, you need to add an escape character for these fields before loading. Enter a backslash (\) as the escape character. Default is blank.

Property	Description
Quoted Value	<p>QUOTEDVALUE parameter of the external table. Select SINGLE or DOUBLE to enclose the field in single or double quotes.</p> <p>Select NO to omit quotes. Default is NO.</p> <p>The quoted value is not a part of the data.</p>
Socket Buffer Size	<p>Set the socket buffer size to 25 to 50 % of the DTM buffer size to increase session performance. You might need to test different settings for optimal performance.</p> <p>Enter a value between 4096 and 2147483648 bytes.</p> <p>Default is 8388608 bytes.</p>
Db2 Warehouse Pre SQL	<p>SQL statement that the PowerCenter Integration Service executes before loading data into the target.</p>
Db2 Warehouse Post SQL	<p>SQL statement that the PowerCenter Integration Service executes after loading data into the target.</p>
Pipe Directory Path	<p>Path for the PowerCenter Integration Service to create the pipe for the external table. If you do not specify the path, the PowerCenter Integration Service uses the <code>\$PMTempDir</code> directory to create the pipe for the external table.</p>
Error Log Directory Name	<p>Error log directory can reside on the machine where the PowerCenter Integration Service runs. For example, you can use the following directory:</p> <p><code>\$PMBadFileDir</code></p> <p>The PowerCenter Integration Service creates a bad file in the error log directory if the data is not valid.</p>

Partitioning

When you read from Db2 Warehouse, you can configure key range partitioning to optimize the session performance at run time.

When you configure key range partitioning for a Db2 Warehouse Source Qualifier transformation, the PowerCenter Integration Service distributes rows of data based on a port or set of ports that you define as the partition key. You can define a range of values for each port. The PowerCenter Integration Service uses the key and ranges to send rows to the appropriate partition. You can specify SQL query and source filter conditions in the Db2 Warehouse session properties to override the SQL query and source filter condition that you specified in the source qualifier. The PowerCenter Integration Service uses the SQL query and source filter condition you specify in the session properties when it reads data from the source.

To configure key range 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 **Key Range** for each of the partitions.

Based on the number of 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 SQL query and source filter for each of the partitions. The PowerCenter Integration Service uses the SQL query and source filter conditions you specify to pass data through the appropriate partition.

Parameterization for Db2 Warehouse Targets

You can parameterize Db2 Warehouse session properties to override the session properties during run time.

For example, you want to load data to a sales table. The sales table has multiple schemas to store sales information for different countries. You want to use one mapping to load data to multiple schemas based on the country name instead of creating different mappings for different schemas. In this case, you can parameterize the target table name and table name prefix in the session properties, and use the same mapping to load data to multiple schemas.

You can parameterize the following session properties for Db2 Warehouse targets:

- Db2 Warehouse Post SQL
- Db2 Warehouse Pre SQL
- Delimiter
- Error Log Directory Name
- Escape Character
- Null Value
- Pipe Directory Path
- Socket Buffer Size
- Table Name Prefix
- Target Table Name

APPENDIX A

Data Type Reference

This appendix includes the following topic:

- [Db2 Warehouse and Transformation Data Types, 24](#)

Db2 Warehouse and Transformation Data Types

PowerCenter uses the following data types in Db2 Warehouse mappings:

- Db2 Warehouse native data types. Db2 Warehouse data types appear in Db2 Warehouse 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.

The following table lists the Db2 Warehouse data types that PowerCenter supports and the corresponding transformation data types:

Db2 Warehouse Data Type	Transformation Data Type	Range
BIGINT	Bigint	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 Precision 19
BINARY	Binary	1 to 255 characters
BOOLEAN	String(1)	0 or 1.
CHAR	String	1 to 254 characters
DATE	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
DECIMAL	Decimal	Precision 28, scale 0 to 28
DOUBLE	Double	Precision 15

Db2 Warehouse Data Type	Transformation Data Type	Range
FLOAT	Double	Precision 15
GRAPHIC	Nstring	1 to 127 characters
INTEGER	Integer	-2,147,483,648 to 2,147,483,647 Precision 10
NUMERIC	Decimal	Precision 28, scale 0 to 28
REAL	Double	Precision 15
SMALLINT	Small integer	-32,768 to 32,767 Precision 5
TIME	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
TIMESTAMP	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
VARBINARY	Binary	1 to 32592 characters
VARCHAR	String	1 to 32592 characters
VARGRAPHIC	Nstring	1 to 16296 characters

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