



Informatica® Cloud Data Integration

Greenplum Connector

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Preface

Use *Greenplum Connector* to learn how to read from or write to Greenplum by using Cloud Data Integration. Learn to create a connection, develop mappings, and run mapping tasks and dynamic mapping tasks in Cloud Data Integration.

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CHAPTER 1

Introduction to Greenplum Connector

Greenplum Connector provides connectivity between Cloud Data Integration and the Greenplum database.

You can configure mappings in Cloud Data Integration to read data from or write data to Greenplum.

When you run a Greenplum mapping to read data from Greenplum, the Secure Agent invokes the Greenplum database parallel file server, gpfdist, to read data. You can switch mappings to advanced mode to include transformations and functions that enable advanced functionality.

When you run a Greenplum mapping task to write data to Greenplum, the Secure Agent creates a control file to provide load specifications to the Greenplum gpload bulk loading utility, invokes the Greenplum gpload bulk loading utility, and writes data to the named pipe. The Greenplum gpload bulk loading utility launches gpfdist, which is Greenplum's file distribution program, that reads data from the named pipe and loads data into the Greenplum target.

You can use the Greenplum database to store and analyze terabyte to petabytes of data on large clusters of powerful and inexpensive servers, storage, and ethernet switches. You can also read data from any source system and use Greenplum Connector to load data into the Greenplum distributed storage system.

Greenplum Connector assets

Create assets in Data Integration to integrate data using Greenplum Connector.

When you use Greenplum Connector, you can include the following Data Integration assets:

- Dynamic mapping task
- Mapping
- Mapping task

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

Administration of Greenplum Connector

Before you can use Greenplum Connector from a Linux machine, you must perform the following tasks:

Install the Greenplum Loaders

Install the Greenplum Loaders package on the Secure Agent machine. The loaders package contains the gpload utility.

You can download the Greenplum loaders package from the Pivotal Greenplum website.

Download the DataDirect Greenplum JDBC Driver on Linux

1. Download the DataDirect Greenplum JDBC driver version 6.x from the Pivotal Greenplum website.
2. Copy the Greenplum JDBC driver to the following directory on the Secure Agent machine: <Secure Agent installation directory>/apps/Data_Integration_Server/ext/deploy_to_main/bin/rdtm-extra/Greenplum
Note: You must create the deploy_to_main/bin/rdtm-extra directory manually.
3. Restart the Secure Agent.

Download and install the DataDirect Greenplum ODBC driver on Linux

1. Download the DataDirect Greenplum ODBC driver version 7.1.6 from the Pivotal website and install the DataDirect Greenplum ODBC driver on the Secure Agent machine.
2. Add the following driver entries to the odbcinst.ini file in the following directory: <Secure Agent installation directory>/odbcinst.ini

Use the following syntax:

```
[DataDirect 7.1 Greenplum Wire Protocol]
Driver=<ODBC driver path>/lib/ddgplm27.so
Setup=<ODBC driver path>/lib/ddgplm27.so
DriverODBCVer=<ODBC Driver version>
HelpRootDirectory=<ODBC Driver path>/help
```

For example:

```
[DataDirect 7.1 Greenplum Wire Protocol]
Driver=/opt/Progress/DataDirect/Connect64_for_ODBC_71/lib/ddgplm27.so
Setup=/opt/Progress/DataDirect/Connect64_for_ODBC_71/lib/ddgplm27.so
APILevel=0
ConnectFunctions=YYY
DriverODBCVer=3.52
FileUsage=0
HelpRootDirectory=/opt/Progress/DataDirect/Connect64_for_ODBC_71/help
SQLLevel=0
```

3. Set the GPHOME_LOADERS, PATH, and LD_LIBRARY_PATH environmental variables for the driver. Perform the following tasks:
 - a. Set the GPHOME_LOADERS environmental variable to the directory that contains the Greenplum loader libraries. Using a C shell, type:

```
setenv GPHOME_LOADERS /export/qa_adp/thirdparty/greenplum/rhel.64/loaders
```

- b. Set the PATH environmental variable to the directory that contains the Greenplum loader libraries. Using a C shell, type:

```
setenv PATH ${GPHOME_LOADERS}/bin:${PATH}
```

- c. Set the `LD_LIBRARY_PATH` environmental variable to include the following directories that contain the Greenplum drivers and the DataDirect Greenplum ODBC libraries. Using a C shell, type:

```
setenv LD_LIBRARY_PATH .:${GPHOME_LOADERS}/lib:/export/qa_adp/thirdparty/  
greenplum/rhel.64/loaders/ext/python/lib  
setenv LD_LIBRARY_PATH /opt/Progress/DataDirect/Connect64_for_ODBC_71/  
lib:$LD_LIBRARY_PATH
```

4. Restart the Secure Agent after you update the environment variables.

Download and install the DataDirect Greenplum JDBC driver on Windows

1. Download the DataDirect Greenplum JDBC driver version 6.x from the Pivotal Greenplum website.
2. Copy the Greenplum JDBC driver to the following directory on the Secure Agent machine:

```
<Secure Agent installation directory>\apps\Data_Integration_Server\ext\deploy_to_main\bin  
\rdtm-extra\Greenplum
```

You must create the `deploy_to_main\bin\rdtm-extra\Greenplum` directory manually.

3. Restart the Secure Agent.

Download and install the DataDirect Greenplum ODBC driver on Windows

1. Download the DataDirect Greenplum ODBC driver version 7.1.6 from the Pivotal website and install the DataDirect Greenplum ODBC driver on the Secure Agent machine.
2. Install Python 2.5.4 32-bit.
3. Install the 5.18 Greenplum Clients software for Windows.
4. Install the 5.18 Greenplum loaders software for Windows.
5. Set the following environmental variables for the driver:

- a. Set the `GPHOME_LOADERS` environment variable to the folder that contains the Greenplum loader libraries:

For example, Set `GPHOME_LOADERS = C:\Program Files (x86)\Greenplum\greenplum-loaders-5.18.0`

- b. Set the `GPHOME_CLIENTS` environment variable to the folder that contains the Greenplum clients libraries:

For example, set `GPHOME_CLIENTS=C:\Program Files (x86)\Greenplum\greenplum-clients-5.18.0\`

- c. Set the `PYTHONPATH` environment variable:

Set `PYTHONPATH=%GPHOME_LOADERS%\bin\lib`

- d. Set the `DDCPATH` environment variable to the folder containing the DataDirect libraries.

For example, `DDCPATH=C:\Program Files\Progress\DataDirect
\Connect64_for_ODBC_71\drivers;C:\Program Files\Progress\DataDirect
\Connect64_for_ODBC_71\jre\bin;C:\Program Files\Progress\DataDirect
\Connect64_for_ODBC_71\jre\bin\server`

- e. Set the Path environment variable to the folder that contains the Greenplum clients, Greenplum loaders, Python and Greenplum ODBC Datadirect driver libraries:

For example, Path=C:\Python25;C:\Program Files (x86)\Greenplum\greenplum-loaders-5.18.0\lib;C:\Program Files (x86)\Greenplum\greenplum-loaders-5.18.0\bin;C:\Program Files (x86)\Greenplum\greenplum-clients-5.18.0\lib;C:\Program Files (x86)\Greenplum\greenplum-clients-5.18.0\bin;%DDCPATH%

Database privileges

Before you use Greenplum Connector, verify that you have the following database privileges:

- Read permission to read data from Greenplum.
- Write permission to write data to Greenplum.
- Privileges to create the external table.

CHAPTER 2

Greenplum connections

Create a Greenplum connection to read from or write data to Greenplum.

When you configure a Greenplum connection, you define the connection attributes that the gpload utility uses to connect to the Greenplum database. You can use Greenplum connections to specify sources or targets in mappings and mapping tasks. You can parameterize the Greenplum connection in the Source or Target transformation.

Create a connection and associate it with a mapping or mapping task. You can create a Greenplum connection on the **Connections** page and use it in the Mapping Designer when you create a mapping. The connection becomes available to the entire organization.

Greenplum connection properties

When you set up a Greenplum connection, you must configure the connection properties.

The following table describes the Greenplum connection properties:

Connection property	Description
Runtime Environment	The name of the runtime environment where you want to run the tasks. You can specify a Secure Agent, Hosted Agent, or serverless runtime environment.
Host Name	Host name or IP address of the Greenplum server.
Port	Greenplum server port number. If you enter 0, the gpload utility reads from the environment variable \$PGPORT. Default is 5432.
Database	Name of the database.
Schema	Name of the schema that contains the metadata for Greenplum sources or targets. Default is public.
Certificate Path	Path where the SSL certificates for the Greenplum server are stored. Specify the path if you want to establish secure communication between the gpload utility and the Greenplum server over SSL. For information about the files that need to be available in the certificates path, see the gpload documentation. Note: SSL configuration is applicable only for the Greenplum writer.

Connection property	Description
Metadata Additional Connection Configuration	Additional metadata connection properties that you want to use. Use the following format: <parameter name1>=<value1>, <parameter name2>=<value2>
Driver Name	The driver name. Specify DataDirect 7.1 Greenplum Wire Protocol.
User Name	User name with permissions to access the Greenplum database.
Password	Password to connect to the Greenplum database.

CHAPTER 3

Mappings and mapping tasks with Greenplum Connector

When you create a mapping, you can configure a Source or Target transformation to represent a Greenplum object.

Greenplum source and target objects represent metadata for Greenplum tables. You can define properties in the mapping to determine how the gpload utility reads or writes data to Greenplum. When you run a mapping, the Secure Agent invokes the gpload utility to read data from or load data to Greenplum.

In advanced mode, the Mapping Designer updates the mapping canvas to include transformations and functions that enable advanced functionality.

Greenplum sources in mappings

To read data from Greenplum, configure a Greenplum object as a source in the mapping.

Specify the name and description of the Greenplum source. Configure the source and advanced properties for the source object. You can parameterize the source object name.

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

Property	Description
Connection	Name of the source connection.
Source Type	Type of the source object. Select Single, Multiple, or Parameter.
Object	The source object.

The following table describes the Greenplum Query options:

Property	Description
Filter	<p>Filters records based on the filter condition you specify. Specify the source field and configure the operator and value to use in the filter.</p> <p>You can specify the following filter conditions:</p> <ul style="list-style-type: none"> - Not Parameterized. Specify the source field and configure the operator and value to use in the filter. - Completely Parameterized. Use a parameter for a filter expression and define the filter expression in the task. - Advanced. Create a filter expression using the expression editor.
Sort	Not applicable.

The following table describes the Greenplum advanced source properties:

Property	Description
Pipe Directory Path	<p>The file system location where the pipes that are used for data transfer are created.</p> <p>Default is <code>\$PMRootDir/Temp</code>.</p>
Delimiter	<p>Separates successive input fields.</p> <p>For data in the text format, use any 7-bit ASCII value except a-z, A-Z, and 0-9.</p> <p>For data in the CSV format, use any 7-bit ASCII value except \n, \r, and \\. Default is pipe ().</p> <p>You can also specify a non-printable ASCII character through an escape sequence by using the decimal representation of the ASCII character. For example, \014 represents the shift out character.</p>
Null Value	<p>String that represents a null value.</p> <p>In the source data, any data item that matches the string is treated as a null value.</p> <p>Default is backslash N (\N).</p>
Escape Character	<p>Character that treats special characters in the data as regular characters.</p> <p>In the text format, special characters comprise delimiter and escape characters.</p> <p>In the CSV format, special characters comprise quotes and escape characters.</p> <p>Use any 7-bit ASCII value as an escape character.</p> <p>Default is backslash (\).</p> <p>Note: You can improve the task performance if the data does not contain escape characters.</p>
SQL Query Override	<p>Overrides the schema specified in the Greenplum connection object. If you do not configure this property, the Data Secure Agent uses the schema value specified in the Greenplum connection object.</p>
Owner Name	The schema name in Greenplum.
Source Table Name	Overrides the default Greenplum source table name.
PreSQL	The SQL command to run before reading data from the source.
PostSQL	The SQL command to run after reading data from the source.

Property	Description
GPFDist Port	The HTTP port on which gpfdist serves files. Default is 39871.
GPFDIST Log File	The fully qualified path and log file name for the standard output message logs. Default is INFAGPFDistLogfile.out.
GPFDIST Timeout	The time allowed for Greenplum Database to establish a connection to a gpfdist process. Default is 60 seconds. Allowed values are 2 to 7200 seconds (2 hours).
GPFDist Maximum Line Length	The integer that specifies the maximum length of a line in the XML transformation data that is passed to gpload. Default is 32768. Valid range is 32 K to 256 MB, with the upper limit at 1 MB on Windows operating systems.)
Encoding	Character set encoding of the source data. Greenplum Connector supports only the UTF-8 character set encoding.
GPFDist Logging	Sets the logging level for the gpload utility. You can specify from the following logging options: <ul style="list-style-type: none"> - None - Verbose. Shows the progress and status messages. - Very Verbose. Shows all the output messages generated by this utility.
Tracing Level	Determines the amount of detail that appears in the log for the source. You can choose Terse, Normal, Verbose Initialization, or Verbose Data tracing level. Default is Normal.

Greenplum targets in mappings

To write data to Greenplum, configure a Greenplum object as a target in the mapping.

Specify the name and description of the Greenplum target. Configure the target and advanced properties for the target object.

You can parameterize the target object name.

The following table describes the target properties that you can configure in a Target transformation:

Property	Description
Connection	Name of the target connection.
Target Type	Type of the target object. Select Single Object or Parameter.
Object	Target object for a single target. If you select parameter, define a name and type of data object.
Operation	The target operation.

The following table describes the Greenplum advanced target properties:

Property	Description
Method	<p>Determines how the gpload utility processes the data from the named pipe.</p> <p>You can select from the following methods:</p> <ul style="list-style-type: none"> - Insert. Inserts rows into the target. - Update. Updates rows in the target. - Merge. If the rows exist in the target, updates the existing rows. If the rows do not exist in the target, inserts the rows into the target.
Match Columns	<p>Matches rows based on the comma-separated list of column names. Enclose the column names in single quotation marks and ensure that there are no leading or trailing spaces between the column names.</p>
Update Columns	<p>Updates the columns specified in the comma-separated list of column names. Enclose the column names in single quotes and ensure that there are no leading and trailing spaces between the column names.</p>
Update Condition	<p>Updates a row based on the condition that you specify. The gpload utility performs an update or merge operation based on the update condition.</p>
Format	<p>The Secure Agent writes data in a format that is compatible with the gpload utility.</p> <p>Select one of the following values:</p> <ul style="list-style-type: none"> - Text. In the text format, the Secure Agent separates data using the delimiter character that you specify in the task properties. <p>If the data contains the delimiter or escape characters specified in the task properties, you can choose to ignore the escape character or specify delimiter and escape character values that are not a part of the data.</p> <ul style="list-style-type: none"> - CSV. In the CSV format, the Secure Agent encloses the data with the quote character that you specify in the task properties. The Secure Agent also separates the data using the delimiter character specified in the task properties. <p>If the data contains the quote or escape characters specified in the task properties, you can choose to ignore the escape character or specify quote and escape character values that are not a part of the data.</p> <p>Default is Text.</p> <p>Note: If the data contains newline characters, you must use the CSV format. If you use the text format and the data contains newline characters, the data after the newline character is treated as a new record. In such situations, the gpload utility might reject or insert incorrect data into the tables.</p>
Delimiter	<p>Separates successive input fields.</p> <p>For data in the text format, use any 7-bit ASCII value except a-z, A-Z, and 0-9.</p> <p>For data in the CSV format, use any 7-bit ASCII value except \n, \r, and \\. Default is pipe ().</p> <p>You can also specify a non-printable ASCII character through an escape sequence by using the decimal representation of the ASCII character. For example, \014 represents the shift out character.</p>
Escape	<p>Character that treats special characters in the data as regular characters.</p> <p>In the text format, special characters comprise delimiter and escape characters.</p> <p>In the CSV format, special characters comprise quotes and escape characters.</p> <p>Use any 7-bit ASCII value as an escape character.</p> <p>Default is backslash (\).</p> <p>Note: You can improve the task performance if the data does not contain escape characters.</p>

Property	Description
Skip Escaping	Skips escaping special characters in the data. Clear this option to treat special characters in the data as regular characters.
Null As	String that represents a null value. In the source data, any data item that matches the string is treated as a null value. Default is backslash N (\N).
Quote	Character that encloses the data in the CSV format. The Secure Agent encloses data by the specified character and passes the data to the gpload utility. The quote character is ignored for data in the text format. Use any 7-bit ASCII value that is not equal to the delimiter or null value. Default is double quotes (").
Error Limit	For each Greenplum segment, across all partitions if pass-through partitioning is used, the number of rows that the gpload utility discards or logs in the error table because of format errors. The gpload utility fails the session if the error limit is reached for any Greenplum segment. Default is zero. The maximum error limit is 2,147,483,647.
Error Table	Name of the error table where the gpload utility logs rejected rows when reading data that is processed by the Secure Agent. The naming convention for the table name is <schema name>.<table name>, where schema name is the name of the schema that contains the table. Note: For Greenplum server versions 5.0 and later, LOG_ERRORS are generated instead of an error table. For more information, see the Greenplum documentation.
Greenplum Pre SQL	The SQL command to run before loading data to the target.
Greenplum Post SQL	The SQL command to run after loading data to the target.
Reuse Table	Determines if the gpload utility drops the external table objects and staging table objects it creates. The gpload utility reuses the objects for future load operations that use the same load specifications. Default is unchecked.
Truncate Target Option	Truncates the Greenplum target table before loading data to the target.
Greenplum Target Table	Overrides the default target table name.
Greenplum Loader Logging	Sets the logging level for the gpload utility. You can select one of the following values: - None - Verbose - Very Verbose Default is None.
Greenplum gpfdist Timeout	The number of seconds that elapse before the gpfdist process times out when attempting to connect to the target. The default value is 30 seconds.

Property	Description
Window Pipe Buffer Size	The size (in kilobytes) that the Secure Agent allocates to buffer data before writing to the Greenplum bulk loader. Enter a value between 1 and 2048. The default value is 2048 KB. You might need to test different settings for optimal performance. This attribute is applicable for Informatica servers that run on Windows.
Delete Control File	Determines if the Secure Agent must delete the gpload control file after the task is complete. Default is selected.
Gpload Log File Location	The file system location where the gpload utility generates the gpload log file. Default is \$PMRootDir/Temp.
Gpload Control File Location	The file system location where the Secure Agent generates the gpload control file. Default is \$PMRootDir/Temp.
Encoding	Character set encoding of the source data. Greenplum Connector supports only the UTF-8 character set encoding.
Pipe Location	The file system location where the pipes that are used for data transfer are created. Default is \$PMRootDir/Temp.
Schema Override	Overrides the schema specified in the Greenplum connection object. If you do not configure this property, the Data Secure Agent uses the schema value specified in the Greenplum connection object.
Max_Line_Length	The integer that specifies the maximum length of a line in the XML transformation data that is passed to gpload.
Success File Directory	Not applicable.
Error File Directory	Not applicable.
Forward Rejected Rows	Not applicable.

Match and update columns

Before you run a session that loads data to a Greenplum target, you can configure the match and update columns.

Match Columns

You can specify the columns to use as the join condition for the update. The attribute value in the specified target columns must be equal to that of the corresponding source data columns in order for the row to be updated in the target table. You must specify the match columns if the method to process data from the named pipe is update or merge.

Update Columns

You can specify the columns to update for the rows that meet the criteria for match columns and the update column property. Update columns cannot be columns that are used for the Greenplum distribution key for the

table. You must specify the match columns if the method to process data from the named pipe is update or merge.

The following table describes the session properties you can configure for match and update columns:

Target Property	Description
Match Column	Matches rows based on the comma-separated list of column names. Enclose the column names in double quotes and ensure that there are no leading and trailing spaces between the column names.
Update Column	Updates the columns specified in the comma-separated list of column names. Enclose the column names in double quotes and ensure that there are no leading and trailing spaces between the column names.

Error handling for Greenplum targets

You can set the error limit for a Greenplum segment to specify the number of rows that the gpload utility can discard before it fails a session. If you specify an error table, the gpload utility logs the discarded rows in the error table.

The error limit includes rows with format errors. The default value is 0. By default, the gpload utility stops a session when it encounters a row with format errors.

Use the following naming convention for the error table name: `<schema name>.<table name>`

If you do not specify a schema name, the gpload utility creates the error table in the public schema. The error table format is predefined in the Greenplum database.

- If the table does not exist, the gpload utility creates the table based on the predefined format.
- If the specified table exists in the schema, but the table is not in the prescribed format, the session fails.
- If a session fails, see the error table for more information about the errors.
- If you run the session again, the gpload utility appends the discarded rows to the error table.

For more information about the error tables, see the Greenplum documentation.

You can view load statistics in the session log. The gpload utility writes the error messages to the gpload log. The Secure Agent reads the gpload log and writes the errors to the session log. The gpload utility writes the error messages to the gpload log at the following location:

```
$INFA_HOME/server/infa_shared/temp
```

CHAPTER 4

Data type reference

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

Greenplum Native Data Types

Greenplum data types appear in the Source and Target transformations when you choose to edit metadata for the fields.

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 runtime environment uses to move data across platforms. Transformation data types appear in all transformations in mappings, and mapping tasks.

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

Greenplum and transformation data types

When you import Greenplum tables, the ODBC data types corresponding to the Greenplum data types appear. The Secure Agent writes the data to the Greenplum writer as ODBC data type. The Greenplum writer writes the data into the gpload utility and the gpload utility converts the data type to the Greenplum data type before it writes to the Greenplum database.

The following table lists the Greenplum data types that the runtime environment supports and the corresponding ODBC and transformation data types:

Greenplum Data Type	ODBC Data Type	Transformation Data Type
Bigint	Bigint	Bigint
Bigserial	Bigint	Bigint
Boolean	Boolean	String
Character	Default is Char. For multibyte character, use Nchar.	String
Character varying	Default is Varchar. For multibyte character, use Nvarchar.	String
Date	Date	Date/Time

Greenplum Data Type	ODBC Data Type	Transformation Data Type
Double precision	Double or Float	Double
Integer	Integer	Integer
Numeric	Numeric	Decimal
Real	Real	Double
Serial	Integer	Integer
Smallint	Tinyint	Integer
Text	Text	Text
Time	Time. Precision is 6.	Date/Time
Timestamp	Timestamp. Precision is 6.	Date/Time

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