Informatica®

Informatica® Cloud Data Integration

Microsoft Fabric Data Warehouse Connector

Informatica Cloud Data Integration Microsoft Fabric Data Warehouse Connector
July 2024

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Preface

Use Microsoft Fabric Data Warehouse Connector to learn how to read or write to Microsoft Fabric Data Warehouse by using Data Integration. Learn to create a Microsoft Fabric Data Warehouse connection, develop, and run mappings and mappings in advanced mode, and tasks in Data Integration.

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CHAPTER 1

Introduction to Microsoft Fabric Data Warehouse Connector

You can use Microsoft Fabric Data Warehouse Connector to securely read data from and write data to Microsoft Fabric Data Warehouse from Data Integration.

Create a Microsoft Fabric Data Warehouse connection and use the connection as a source and as a target in mappings and mapping tasks.

You can switch mappings to advanced mode to include transformations and functions that enable advanced functionality. A mapping in advanced mode can run on an advanced cluster hosted on Microsoft Azure or a self-service cluster.

Microsoft Fabric Data Warehouse Connector assets

Create assets in Data Integration to integrate data using Microsoft Fabric Data Warehouse Connector.

When you use Microsoft Fabric Data Warehouse Connector, you can include the following Data Integration assets:

- Mapping
- Mapping task

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

Administration of Microsoft Fabric Data Warehouse Connector

Before you use Microsoft Fabric Data Warehouse Connector, an administrator needs to perform certain prerequisite tasks.

1. Configure the following prerequisites in Power BI:
    a. Create a workspace.

b. Create a warehouse in the workspace. Ensure that you have admin privileges to create the warehouse.
   For more information about how to create a workspace and warehouse, see the Microsoft Power BI documentation.

2. Configure the following prerequisites in the Azure portal:
   a. Create an application in Azure Active Directory and generate the client ID, tenant ID, and client secret.
   b. Create a security group in Azure Active Directory and add owners or members to the security group. For more information about how to add owners or members to the security group in Azure Active Directory, see the Microsoft Azure documentation.
3. Enable the Power BI service admin settings to allow the Azure Active Directory application to use the Power BI APIs.
4. Add the Azure Active Directory application to the workspace in Power BI.

CHAPTER 2

Microsoft Fabric Data Warehouse connections

Create a Microsoft Fabric Data Warehouse connection to securely read data from or write data to Microsoft Fabric Data Warehouse.

You can use a Microsoft Fabric Data Warehouse connection to specify sources and targets in mappings and mapping tasks.

Microsoft Fabric Data Warehouse connection properties

When you set up a Microsoft Fabric Data Warehouse connection, configure the connection properties.

The following table describes the basic connection properties:

Property	Description
Connection Name	Name of the connection. Each connection name must be unique within the organization. Connection names can contain alphanumeric characters, spaces, and the following special characters: _ . + -, Maximum length is 255 characters.
Description	Description of the connection. Maximum length is 4000 characters.
Type	Microsoft Fabric Data Warehouse
Runtime Environment	The name of the runtime environment where you want to run tasks. Select a Secure Agent, Hosted Agent, or serverless runtime environment.
SQL Connection String	The SQL connection string to connect to Microsoft Fabric Data Warehouse. Specify the connection string in the following format: `<Server>.datawarehouse.pbidedicated.windows.net`
Client ID	The application ID or client ID of your application registered in Azure Active Directory for service principal authentication.

Property	Description
Client Secret	The client secret for your application registered in Azure Active Directory.
Tenant ID	The tenant ID of your application registered in Azure Active Directory.
Workspace	The name of the workspace in Microsoft Fabric Data Warehouse that you want to connect.
Database	The name of the database in Microsoft Fabric Data Warehouse that you want to connect.

The following table describes the advanced connection property:

Property	Description
Schema Name	The name of the schema in Microsoft Fabric Data Warehouse where the tables are stored.

CHAPTER 3

Mappings and mapping tasks with Microsoft Fabric Data Warehouse Connector

You can configure a mapping to read from and write to Microsoft Fabric Data Warehouse tables.

You can configure a Source or Target transformation to represent a Microsoft Fabric Data Warehouse object. Add the Source and Target transformations in the mapping canvas and configure the Microsoft Fabric Data Warehouse source and target properties. Use the Data Integration Mapping Designer to define and configure a mapping for Microsoft Fabric Data Warehouse sources and targets.

In advanced mode, the Mapping Designer updates the mapping canvas to include transformations and functions that enable advanced functionality. When you run a mapping in advanced mode, Data Integration analyzes the data logic defined in the mapping to automatically assign data logic to run on an advanced cluster.

You can use Monitor to monitor the job.

Microsoft Fabric Data Warehouse sources in mappings

To read data from Microsoft Fabric Data Warehouse, configure a Microsoft Fabric Data Warehouse object as a source in a mapping or mapping in advanced mode.

Specify the name and description of the Microsoft Fabric Data Warehouse source. Configure the source and advanced properties for the source object.

The following table describes the source properties that you can configure for a Microsoft Fabric Data Warehouse source:

Property	Description
Connection	Name of the source connection. Select an existing connection, create a new connection, or define parameter values for the source connection property. If you want to overwrite the parameter at runtime, select the **Allow parameter to be overridden at run time** option when you create a parameter. When the task runs, the agent uses the parameters from the file that you specify in the task advanced session properties. Ensure that the parameter file is in the correct format. Specify the parameter file directory and name in the advanced session properties. When you switch between a non-parameterized and a parameterized Microsoft Fabric Data Warehouse connection, the advanced property values are retained.
Source Type	Type of the source object. Select Single Object, Query, or Parameter. Default is Single Object.
Parameter	A parameter file where you define values that you want to update without having to edit the task. The **Parameter** property appears only if you select the source type as **Parameter**. Select an existing parameter for the source object or click **New Parameter** to define a new parameter for the source object. If you want to overwrite the parameter at runtime, select the **Allow parameter to be overridden at run time** option when you create a parameter. When the task runs, the agent uses the parameters from the file that you specify in the task advanced session properties. Ensure that the parameter file is in the correct format.
Object	Name of the Microsoft Fabric Data Warehouse source object. Select the source object for a single source. You can also select an existing object from the list. Ensure that the table headers of the source object do not contain special characters.

The following table describes the query options that you can configure for a Microsoft Fabric Data Warehouse source:

Property	Description
Filter	Filters record based on the filter condition in a read operation. Click **Configure** to add conditions to filter records and reduce the number of rows that the Secure Agent reads from the source. Select the following filter conditions from the list: - Not parameterized. Uses a basic filter to specify the object, field, operator, and value to select specific records. - Completely parameterized. Not applicable - Advanced. Not applicable. Default is Not parameterized.
Sort	Not applicable.

The following table describes the advanced source properties that you can configure for a Microsoft Fabric Data Warehouse source:

Property	Description
Schema Name Override	Overrides the schema name configured in the source object and uses the specified schema name to read data at runtime.
Table Name Override	Overrides the table name configured in the source object and uses the specified table name to read data at runtime.
Pre SQL	The pre-SQL command to run on the Microsoft Fabric Data Warehouse source table before the Secure Agent reads the data. For example, if you want to update records in the database before you read the records from the table, specify a pre-SQL statement.
Post SQL	The post-SQL command to run on the Microsoft Fabric Data Warehouse table after the Secure Agent completes the read operation. For example, if you want to delete some records after the latest records are loaded, specify a post-SQL statement.
On Pre-Post SQL Error	Determines the behavior when a task that includes pre-SQL or post-SQL commands encounters errors. Select one of the following options: - **Continue**. The task continues regardless of errors. - **Stop**. The task stops when errors occur while running pre-SQL or post-SQL commands.
Tracing Level	Sets the amount of detail that appears in the log file. Select one of the following options from the list: - Terse - Normal - Verbose Initialization - Verbose Data Default is Normal.

Microsoft Fabric Data Warehouse targets in mappings

To write data to a Microsoft Fabric Data Warehouse, configure a Microsoft Fabric Data Warehouse object as a target in a mapping or mapping in advanced mode.

Specify the name and description of the Microsoft Fabric Data Warehouse target. Configure the target and advanced properties for the target object.

The following table describes the target properties that you can configure for a Microsoft Fabric Data Warehouse target:

Property	Description
Connection	Name of the target connection. Select an existing connection, create a new connection, or define parameter values for the target connection property. If you want to overwrite the target connection properties at runtime, select the **Allow parameter to be overridden at run time** option when you create a parameter. When the task runs, the agent uses the parameters from the file that you specify in the task advanced session properties. Ensure that the parameter file is in the correct format. Specify the parameter file directory and name in the advanced session properties. When you switch between a non-parameterized and a parameterized Microsoft Fabric Data Warehouse connection, the advanced property values are retained.
Target Type	Type of the Microsoft Fabric Data Warehouse target object. Select one of the following source types from the list: - Single Object. Select to specify a single Microsoft Fabric Data Warehouse object. - Parameter. Select to specify a parameter name. You can configure the target object in a mapping task associated with a mapping or mapping in advanced mode that uses this Target transformation. Default is Single Object.
Parameter	A parameter file where you define values that you want to update without having to edit the task. The **Parameter** property appears only if you select the target type as **Parameter**. Select an existing parameter for the target object or click **New Parameter** to define a new parameter for the target object. If you want to overwrite the target connection properties at runtime, select the **Allow parameter to be overridden at run time** option when you create a parameter. When the task runs, the agent uses the parameters from the file that you specify in the task advanced session properties. Ensure that the parameter file is in the correct format.
Object	Name of the Microsoft Fabric Data Warehouse target object. Specify the target object that you want to create. You can also select an existing object from the list.
Operation	Type of target operation. Select Insert, Update, Delete, or Data Driven. Default is Insert. You cannot perform data driven target operation in a mapping.
Data Driven Condition	The expression to flag rows for an insert, update, or delete operation when you select data driven as the operation.
Update Column	The temporary key column that identifies rows in the Microsoft Fabric Data Warehouse target table to update or delete data. **Note:** This property appears only if you select delete, update, or data driven operation in the **Operation** property.

The following table describes the advanced target properties that you can configure for a Microsoft Fabric Data Warehouse target:

Property	Description
Update Mode	Loads data to the target based on the mode you select. This property is applicable when you select the **Update** target operation. Select one of the following modes: - Update As Update. Updates all rows flagged for update if the entries exist. - Update Else Insert. The agent first updates all rows flagged for update if the entries exist in the target. If the entries do not exist, the agent inserts the entries.
Schema Name Override	Overrides the schema name configured in the target object and uses the specified schema name to write data at runtime.
Table Name Override	Overrides the table name configured in the target object and uses the specified table name to write data at runtime.
Staging Lakehouse Name	The name of the lakehouse where the data is staged in a temporary table before the data is written to the target.
Truncate Table	Truncates the target before inserting data to the target.
Pre SQL	The pre-SQL command to run on the Microsoft Fabric Data Warehouse target table before the Secure Agent writes the data.
Post SQL	The post-SQL command to run on the Microsoft Fabric Data Warehouse target table after the Secure Agent writes the data.
On Pre-Post SQL Error	Determines the behavior when a task that includes pre-SQL or post-SQL commands encounters errors. Select one of the following options: - **Continue**. The task continues regardless of errors. - **Stop**. The task stops when errors occur while running pre-SQL or post-SQL commands.
Forward Rejected Rows	Determines whether the transformation passes rejected rows to the next transformation or drops rejected rows. By default, the mapping task forwards rejected rows to the next transformation.

Rules and guidelines for mappings

Consider the following rules and guidelines for Microsoft Fabric Data Warehouse mappings:

General guidelines

- Ensure that the query you specify for the pre and post SQL statements are valid. Otherwise, the mapping fails.
- When you read from Microsoft Azure Synapse SQL and write to Microsoft Fabric Data Warehouse, the mapping fails.
- When you specify a custom query for a source object, ensure that the query does not contain a semicolon at the end of the SQL statement. Otherwise, the mapping fails.
- You cannot use input parameters in custom queries that read data from Microsoft Fabric Data Warehouse source objects.

- When you specify a single constant with the IIF condition in the data driven condition such as IIF(col_bigint>747654,DD_INSERT), the Secure Agent inserts the data into the target even for those rows that do not satisfy the condition.
- When you specify the DD_REJECT constant in the data driven condition, the Secure Agent does not log the rejected rows in the error file or the session log.
- When you configure a parameterized mapping with the **Create New at Runtime** option, enter the schema name/table name in the **Object** field in the Target transformation. The mapping validates the entry and throws a validation error if a table with the same name exists. However, if you enter only the table name and a table with the same name exists, the mapping does not validate the entry and inserts data to the existing table.
- A mapping that uses a MINUS operator in a custom query to read data from Microsoft Fabric Data Warehouse source objects fails at runtime. Use an EXCEPT operator instead of a MINUS operator.
- When you use an ORDER BY clause along with Join or Union clauses in a custom query to read data from Microsoft Fabric Data Warehouse source objects, ensure that you add "offset 0 rows" at the end of the query. Otherwise, the mapping fails.
- When you use a custom query in the Source transformation to call a stored procedure, the mapping fails at runtime.
- To avoid a Java heap size error when you write to Microsoft Fabric Data Warehouse, you need to allocate more memory to the DTM in the Secure Agent properties based on the amount of data that you want to write. Increase the -Xms and -Xmx values for the DTM in the JVM options in the system configuration details of the Secure Agent. The recommended -Xms value is 512 MB, while the recommended -Xmx value is 1024 MB.
- When you write to Microsoft Fabric Data Warehouse, the mapping fails if the table name or schema name contains unsupported special characters. However, the table name or schema name can contain the following special characters:

  - !,@,#,$,%,^,&,_,|,:,",?,>,<
- When you filter records in a read operation, you can use only the following filter operators:

  - Equals
  - Greater
  - Greater_or_equals
  - Less_or_equals
  - Less
  - Not_Equals

Data types

- When you write data to a Microsoft Fabric Data Warehouse target created at runtime, Float or Real data types are mapped to and written as Double data type in the target. To write Float or Real data types, use the **Edit Metadata** option to edit the data type in the Target transformation.
- When you read data of the Float or Real data type from a source and write to a target, the mapping might not accurately write the Float or Real data type to the target.
  For more information about writing the Float or Real data type to Microsoft Fabric Data Warehouse, see Float and Real (Transact-SQL) in the Microsoft documentation.

Parameterization

- When you use input parameters, specify the parameter name in the following format in a mapping task: $name$.
- You can't parameterize a target created at runtime using the parameter file.

- You can't use input parameters in a parameter file to parameterize the source filter and advanced properties at runtime.
- Ensure that you create the parameter before you override it using a parameter file.
- You can't parameterize only the connection. You can either parameterize both the connection and the object or only the object.
- When you parameterize the object, ensure that the metadata of the imported object matches the metadata fetched in the override.
- When you parameterize the connection or object, ensure that the connection or object that you want to override exists in Microsoft Fabric Data Warehouse.
- When you parameterize the connection and objects using the parameter file, ensure that the object name in the parameter file does not contain the schema name. If the connection in the parameter file doesn't contain the schema name, the mapping considers the schema name configured in the mapping task. To override the schema name, use the schema override property in the advanced properties.

Partitioning

You can't configure partitioning in a mapping.

CHAPTER 4

Migrating a mapping

You can configure a connection and mapping in one environment and then migrate and run the mapping in another environment.

After the migration, you can change the connection properties from the Administrator service, but you do not need to modify the mapping. Data Integration uses the configured runtime attributes from the earlier environment to run the mapping successfully in the new environment.

Migrate a mapping within the same path

If you want the migrated mapping to use the same object path as in the earlier environment, you must maintain the same schema and table in the Microsoft Fabric Data Warehouse account for both the earlier and the new environment.

For example, if you have two different accounts, Account1 used for Organization 1 and Account2 used for Organization 2, the object path for the schema and table must be the same in both the accounts:

Account1: DB1/SCHEMA1/TABLE1

Account2: DB1/SCHEMA1/TABLE1

You do not need to override the schema and table in the advanced properties.

Migrate a mapping to a different path

You can use a different object path to run the mapping from the new environment.

Before you migrate the mapping, you can change the object metadata, runtime attributes, or the connection attributes to reflect the object path in the migrated environment. You do not have to edit or update the mapping in the new environment.

As a rule, when you specify the schema or table in the advanced properties, connection, or object properties, Data Integration honors the attributes in the following order of precedence:

1. **Runtime advanced attributes**. The advanced properties such as schema and table in the Source or Target transformation in a mapping.
2. **Connection attributes**. Attributes such as database and schema set in the connection properties.
3. **Object metadata**. The object selected in the Source or Target transformation in a mapping.

Migration options

When you migrate to a different path, you can choose from one of the following options to update the object path:

Option 1. Update the connection properties to reference the new object

When you import the mapping from, for example, Org 1, into a new organization, for example, Org 2, you can change the existing connection in the **Review Connections** section to map to the connection that has access to the specified schema and table in Org 2.

Option 2. Override the properties from the advanced properties

Before the migration, specify the required schema and table name for the object in the new organization in the advanced properties of the Org 1 mapping.

After the migration, when you run the mapping, the Secure Agent uses the configured advanced parameters to override the object specified in the mapping imported from Org 1.

Option 3. Parameterize the properties in the mapping

You can choose to parameterize the advanced attributes, such as the schema and table name before the migration. You can configure input parameters, in-out parameters, and parameter files in the mapping. When you use a parameter file, you can save the parameter file on a local machine or in a cloud-hosted directory. After you migrate the mapping, do not edit or update the mapping. If you have used in-out parameters for the advanced attributes such as for the schema and table name, you can update these from the parameter file.

Parameterizing only the advanced properties, but not the object

You can choose to parameterize only the advanced properties before the migration, and use them at runtime. After the migration, when you run the mapping, the Secure Agent uses the value of the parameters specified in the advanced properties.

Parameterizing both the advanced properties and the object

When you parameterize both the advanced properties and the object, you can choose to select or deselect the Allow parameter to be overridden at runtime option.

Allow parameter to be overridden at runtime option is selected

When you parameterize both the advanced properties and the object or connection and select the **Allow parameter to be overridden at runtime** option before the migration, you must select a placeholder object in the object properties in the mapping and then specify an override to this placeholder object from the advanced properties. Ensure that the placeholder object contains the same metadata as the corresponding table that you specify as an override. When you run the mapping, the value specified in the advanced property overrides the placeholder object.

Allow parameter to be overridden at runtime option is not selected

When you parameterize both the advanced properties and the object or connection and do not select the **Allow parameter to be overridden at runtime** option before the migration, you do not need a placeholder object and the values specified in the advanced properties take precedence.

Migration restrictions

Consider some rules for some of the configurations before you migrate assets:

- Retain the following transformation, object type, and fields in the advanced properties of a mapping:

Transformations	Object type
Source	Single object, query
Target	Single object
Note: Advanced fields such as the schema and table name are supported for the Source and Target transformations.	

- If you use in-out parameters for the schema and table name and override these parameters from a parameter file, ensure that you define default values for the in-out parameter.

CHAPTER 5

Data type reference

Data Integration uses the following data types in mappings and mapping tasks with Microsoft Fabric Data Warehouse:

Microsoft Fabric Data Warehouse native data types

Microsoft Fabric Data Warehouse 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 Secure Agent uses to move data across platforms. Transformation data types appear in all transformations in a mapping in advanced mode.

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.

Microsoft Fabric Data Warehouse and transformation data types

Use only the supported Microsoft Fabric Data Warehouse data types in a mapping or mapping in advanced mode to read from and write to Microsoft Fabric Data Warehouse.

The following table lists the Microsoft Fabric Data Warehouse data types that Data Integration supports and the corresponding transformation data types:

Microsoft Fabric Data Warehouse Data Type	Transformation Data Type	Description
Bigint	Bigint	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
Bit	Integer	1, 0, or NULL
Char	String	1 to 8000 characters
Date	Date/Time	January 1, 1900 to December 31, 9999
Datetime2	Date/Time	1900-01-01 00:00:000000

Microsoft Fabric Data Warehouse Data Type	Transformation Data Type	Description
Decimal	Decimal	Maximum value: 9.999999999999998e+37 Minimum value: -9.999999999999998e+37
Float	Double	Precision 15, scale 0
Int	Integer	-2,147,483,648 to 2,147,483,647
Numeric	Decimal	Precision 1 to 28, scale 0 to 28
Real	Double	Precision 7, scale 0
Smallint	Integer	-32,768 to 32,767
Time	String	00:00:00.000 to 23:59:59.999
Uniqueidentifier	String	36 characters
Varbinary	Binary	1 to 8000 bytes
Varchar	String	1 to 8000 characters

CHAPTER 6

Troubleshooting

Use the following sections to troubleshoot errors in mappings.

Troubleshooting a mapping

The performance of a mapping that uses a Microsoft Fabric Data Warehouse connection is not optimal in the first few runs.

When you run a Microsoft Fabric Data Warehouse mapping, the performance is slow in the first few runs compared to subsequent runs. The slowdown occurs because of a third-party limitation related to the statistics that the query engine creates and optimizes in Microsoft Fabric Data Warehouse. Accurate statistics are crucial for optimal query performance in Microsoft Fabric Data Warehouse, and the initial mapping runs are necessary to generate and optimize these statistics.

For more information on this issue and its resolution, see the Microsoft Fabric Data Warehouse performance guidelines in the Microsoft documentation.

Mapping configured to read or write Date and Datetime data types fails.

A mapping in advanced mode fails in the following cases:

- Data is of the Date data type and the date is less than 1582-10-15.
- Data is of the Datetime data type and the timestamp is less than 1900-01-01T00:00:00Z.

To resolve this issue, specify the following spark session properties in the mapping task or in the custom properties file for the Secure Agent:

- `spark.sql.legacy.timeParserPolicy=LEGACY`
- `spark.sql.parquet.int96RebaseModeInWrite=LEGACY`
- `spark.sql.parquet.datetimeRebaseModeInWrite=LEGACY`
- `spark.sql.parquet.int96RebaseModeInRead=LEGACY`
- `spark.sql.parquet.datetimeRebaseModeInRead=LEGACY`

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