Informatica®

Informatica® Cloud Data Integration

IBM MQ Connector

Informatica Cloud Data Integration IBM MQ Connector
July 2024

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Preface

Use IBM MQ Connector to learn how to read or write to IBM MQ by using Data Integration. Learn to create an IBM MQ connection, develop, and run mappings and mapping tasks in Data Integration.

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CHAPTER 1

Introduction to IBM MQ Connector

You can use IBM MQ Connector to connect to IBM MQ from Data Integration. You can create an IBM MQ connection and use the connection in mappings and mapping tasks.

You can use IBM MQ objects as sources and targets in mappings and mapping tasks.

When you run an IBM MQ mapping or mapping task, you can read or write messages to IBM MQ based on the defined data logic and the configured IBM MQ connection.

Data integration using IBM MQ Connector

You can read data from messages in a queue, transform the data according to your business rules, and then write the data to a target message queue by using IBM MQ Connector.

You can read or write data to IBM MQ in the delimited flat file, fixed-width flat file, or XML format. When you read from or write data to IBM MQ, you read data from or write data to the message header and message data components of an IBM MQ message.

When you run a mapping or mapping task, IBM MQ Connector interacts with the following components of the IBM MQ architecture:

- Queue manager
- Message queue
- IBM MQ messages

Queue manager

An application connects to a queue manager to send or receive messages through a message queue.

For example, IBM MQ Connector uses a queue manager to read source messages from a queue and write target messages to a queue. All message queues in an IBM MQ system belong to a queue manager. The queue manager provides functions to administer queues, create new queues, or control the operation of the queue manager.

Message queue

A message queue is a destination to which messages can be sent. One program sends a message to another by putting the message on a message queue. The message remains on the queue until the receiving application retrieves it.

For example, IBM MQ Connector reads messages from a queue and writes messages to a queue. The queue can either be a volatile buffer area in the memory of a computer or a data set on a permanent storage device set aside by the queue manager to hold messages.

IBM MQ messages

An IBM MQ message is a collection of data that one program sends to another program.

An IBM MQ message contains the following components:

- Message header
- Message data

Message header

The message header component contains data about the message on the queue. Message header data includes a message identification number, message format information, and other message descriptor data.

The following table lists all the fields in the message header component and the corresponding data types:

IBM MQ Message Header Field	Data type	Description
Strucid	String	Structure identifier
Version	Integer	Structure version number
Report	Integer	Options for report messages
Msgtype	Integer	Message type
Expiry	Integer	Message lifetime
Feedback	Integer	Feedback or reason code
Encoding	Integer	Data encoding
Codedcharsetid	Integer	Coded character set identifier
Format	String	Format name
Priority	Integer	Message priority
Persistence	Integer	Message persistence
Msgid	Binary	Message identifier
Correlid	Binary	Correlation identifier
Backoutcount	Integer	Backout counter

IBM MQ Message Header Field	Data type	Description
Replytoq	String	Name of reply queue
Replytoqmgr	String	Name of reply queue manager
Useridentifier	String	User identifier
Accountingtoken	Binary	Accounting token
Applidentitydata	String	Application data relating to identity
Putappltype	Integer	Type of application that put the message on queue
Putapplname	String	Name of application that put the message on queue
Putdate	String	Date when message was put on queue
Puttime	String	Time when message was put on queue
Applorigdata	String	Application data relating to origin
Groupid	Binary	Group identifier
Msgseqnumber	Integer	Sequence number of logical messages within group
Offset	Integer	Offset of data in physical message from start of logical message
Msgflags	Integer	Message flags
Originallength	Integer	Length of original message

Message data

Message data is the application data or the contents of the message body.

For example, if an application sends a list of customer names to another application, the customer names comprise the message data component of the message. The content and format of the message data is defined by the application that uses the message queue. IBM MQ does not enforce any structure on the content and format of the message data.

IBM MQ Connector assets

Create assets in Data Integration to integrate data using IBM MQ Connector.

When you use IBM MQ 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 IBM MQ Connector

Before you use IBM MQ Connector to read from or write to IBM MQ, the organization administrator needs to perform the prerequisite tasks.

- Copy the required JAR files for IBM MQ Connector.
- Verify that you have the following authorities on the message queue in Queue Manager to read from or write to IBM MQ:
  - Browse authority to browse messages on a queue.
  - Display and Inquire authorities to display the attributes or status of the object.
  - Get authority to read data from IBM MQ.
  - Put authority to write data to IBM MQ.
- Verify that you have the following authorities on the Queue Manager component in the IBM MQ server to read from or write to IBM MQ:
  - Connect authority to connect to the Queue Manager component.
  - Display and Inquire authorities to display the attributes or status of the object.
- Verify that you have the following authorities for the SYSTEM.ADMIN.COMMAND.QUEUE and SYSTEM.DEFAULT.MODEL.QUEUE system queues:
  - Display and Inquire authorities to display the attributes or status of the object.
  - Get authority to read data from IBM MQ.
  - Put authority to write data to IBM MQ.

For more information about the required authorities, see Setting authorities to access IBM MQ objects.

Copy the IBM MQ JAR files

Before you establish an IBM MQ connection to connect to IBM MQ, you need to copy the required JAR files to run IBM MQ mappings.

1. Copy the following JAR files from the IBM MQ client:
   - com.ibm.mq.jar
   - com.ibm.mq.headers.jar
   - com.ibm.mq.jmqi.jar
   - com.ibm.mq.pcf.jar
2. Paste the copied files to the following directory:
   `<Secure Agent installation directory>/downloads/package-ibmmq.<Version number>/package/ibmmq/thirdparty/informatica.ibmmq`
3. Edit and save the Secure Agent properties to spawn a new Data Integration Server.

CHAPTER 2

IBM MQ connections

Create an IBM MQ connection to connect to IBM MQ so that the Secure Agent can read data from or write data to IBM MQ.

You create an IBM MQ connection on the **Connections** page. After you create a connection, it becomes available to all users who have access to the organization.

Use the connection to specify sources and targets in mappings or mapping tasks.

IBM MQ connection properties

When you set up an IBM MQ connection, configure the connection properties.

The following table describes the IBM MQ 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	The IBM MQ connection type.
Runtime Environment	The name of the runtime environment where you want to run the tasks. Select the Secure Agent from the list as the runtime environment.
Host	The machine that hosts the Queue Manager component.
Port	The port number that connects to the Queue Manager component.
User Name	The user name to connect to the connection channel of the Queue Manager component. Don't specify the user name when the channel authentication of the Queue Manager component is not enabled.
Password	The password to connect to the connection channel of the Queue Manager component. Don't specify the password when the channel authentication of the Queue Manager component is not enabled.

Property	Description
Queue Manager	The Queue Manager component from which queues need to be listed to send or receive messages.
Channel	The server-connection channel that connects to a queue in the Queue Manager. If you don't enable the channel authentication of the Queue Manager component, the default user account for the IBM MQ service writes data to the target.
Code Page	The code page of the Queue Manager component that the Secure Agent uses to read from or write to IBM MQ. Select one of the following code pages from the list: - UTF-8 - UTF-16 - MS Windows Latin 1 Default is UTF-8.
SSL	Specifies whether the connection uses an SSL socket to connect to IBM MQ. Default is disabled.
Truststore File Path	The path and file name of the truststore file that contains the SSL certificate to connect to IBM MQ. Specify both the directory and file name in the following format: `/root/<folder name>/<truststore file name>.jks`
Truststore Password	The password to access the truststore file that contains the SSL certificate.
Keystore File Path	The path and file name of the SSL keystore file that contains private keys and SSL certificates to establish a two-way secure communication with IBM MQ. Specify both the directory and file name in the following format: `/root/<folder name>/<keystore file name>.jks` **Note:** To establish a two-way secure communication with IBM MQ, you also need to enter values in the **Truststore File Path**, **Truststore Password**, and **Keystore Password** fields.
Keystore Password	The password to access the keystore file that contains the SSL certificate.

CHAPTER 3

Mappings and mapping tasks with IBM MQ Connector

Use the Data Integration Mapping Designer to create a mapping. When you create a mapping, configure a source or target to represent an IBM MQ object.

Describe the flow of data from the source to the target along with the required transformations before the agent writes data to the IBM MQ target. When you create a mapping task, select the configured mapping that you want to use. Use the Mapping Task wizard to create a mapping task. Validate and run the mapping to read data from sources and write to a target. The mapping task processes data based on the data flow logic you define in the mapping.

IBM MQ sources in mappings

To read data from IBM MQ, configure an IBM MQ object as the Source transformation in a mapping. Enable partitioning when you configure the Source transformation in the Mapping Designer to optimize the performance of the mapping task.

Specify the name and description of the IBM MQ source. Configure the source and advanced properties for the source object.

The following table describes the source properties that you can configure for an IBM MQ source:

Property	Description
Connection	Name of the source connection. You can select an existing connection, create a new connection, or define parameter values for the source connection property. If you want to overwrite the source connection properties at runtime, select the **Allow parameter to be overridden at run time** option. Specify the parameter file directory and name in the advanced session properties.
Source Type	Type of the source object. Select one of the following source types: - Single Object - Parameter Default is Single Object.

Property	Description
Parameter	A parameter file where you define values that you want to update without having to edit the task. Select an existing parameter for the source object or click **New Parameter** to define a new parameter for the source object. The **Parameter** property appears only if you select parameter as the source type. If you want to overwrite the parameter at runtime, select the **Allow parameter to be overridden at run time** option.
Object	Name of the IBM MQ source object. Specify the source object that you want to use. You can also select an existing object from the list.
Filter	Not applicable.
Sort	Not applicable.

The following table describes the advanced source properties that you can configure for an IBM MQ source:

Property	Description
Destructive Read	Determines whether Data Integration permanently deletes messages from the source after it reads the messages. If you select this option, specify the directory of the cache folder where you want to store messages in the **Recovery Cache Folder** field. Default is disabled.
Realtime	Specifies whether Data Integration reads the messages from the message data component in real time. If you select this option, Data Integration continues to read messages from the message data component and does not terminate the mapping. Default is disabled. To read messages in real time, select **Source** as the commit type and set a commit interval in the **Advanced Session Properties** section in the mapping task.
Recovery Cache Folder	The directory of the cache folder where the recovery files are created when the mapping runs with the **Destructive Read** option enabled. The recovery file stores messages that Data Integration deletes from the IBM MQ source. Specify the directory of the recovery cache folder in the following format: `/root/<folder name>/`
Tracing Level	Determines the amount of detail that appears in the log file. Select one of the following options: - Terse - Normal - Verbose Initialization - Verbose Data Default is Normal.

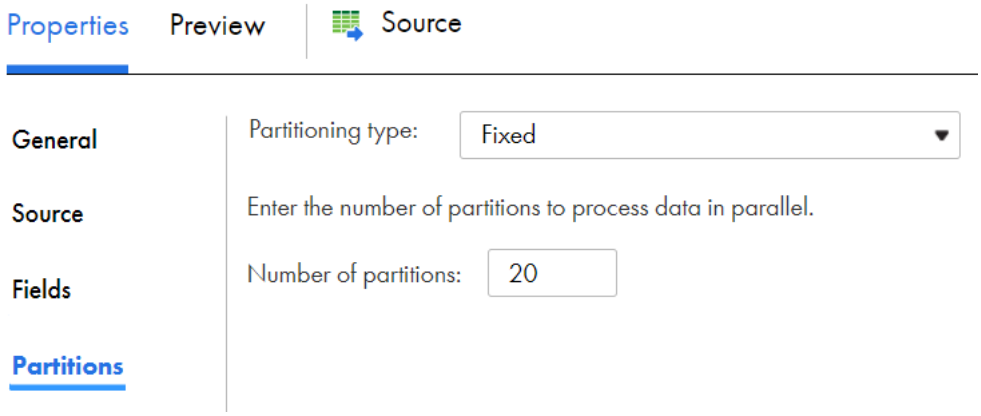
Fixed partitioning

You can configure fixed partitioning to optimize the performance of mapping tasks when you read data from IBM MQ sources.

When you run a mapping task enabled for fixed partitioning, the Secure Agent distributes the source data across the partitions to read data in parallel based on the number of partitions that you specify in the Source transformation.

To configure fixed partitioning, on the **Partitions** tab, select fixed partitioning and enter the number of partitions based on the amount of data that you want to read. By default, the value is one. The maximum number of partitions you specify must not exceed 25.

The following image shows the configured fixed partitioning:



IBM MQ targets in mappings

To write data to an IBM MQ database, configure an IBM MQ object as the target in a mapping.

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

The following table describes the target properties that you can configure for an IBM MQ target:

Property	Description
Connection	Name of the target connection. You can select an existing connection, create a new connection, or define parameter values for the target connection property. To overwrite the target connection properties at runtime, select the **Allow parameter to be overridden at run time** option.
Target Type	Type of the IBM MQ target object. Select one the following target types: - Single Object - Parameter Default is Single Object.

Property	Description
Object	Name of the IBM MQ target object. Specify the target object that you want to create. You can also select an existing object from the list.
Parameter	A parameter file where you define values that you want to update without having to edit the task. Select an existing parameter for the target object or click **New Parameter** to define a new parameter for the target object. The **Parameter** property appears only if you select parameter as the target type. If you want to overwrite the target object at runtime, select the **Allow parameter to be overridden at run time** option. When the task runs, the agent uses the parameters from the file that you specify in the advanced session properties.
Operation	Type of the target operation. You can perform only the insert operation on an IBM MQ target.

The following table describes the advanced target properties that you can configure for an IBM MQ target:

Property	Description
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. If you select the Forward Rejected Rows option, the Secure Agent flags the rows for reject and writes them to the reject file. If you do not select the Forward Rejected Rows option, the Secure Agent drops the rejected rows and writes them to the session log file. The Secure Agent does not write the rejected rows to the reject file.

Transformations in mappings

In addition to the Source and Target transformations, you can configure different transformations when you create an IBM MQ mapping.

You can configure the following transformations in IBM MQ mappings:

- Aggregator
- Expression
- Filter
- Hierarchy Parser
- Joiner
- Router

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

Rules and guidelines for IBM MQ objects

Consider the following rules and guidelines for the IBM MQ objects in mappings and mapping tasks:

- When you import queues in the IBM MQ mapping, the import operation might fail with a connection error. For more information about the connection error and steps to avoid this error, see IBM MQ reason code 2059 in the IBM MQ documentation.
- When you import an IBM message queue, ensure that the queue name does not contain a forward slash or percentage character.
- A mapping that reads from two queues with identical names but different special characters in the same position fails.
  For example, if one queue name contains an underscore character while the other queue name contains a dot character in the same position.

  For instance, if one queue name is "INFA_1" and the other queue name is "INFA.1", the mapping fails.
- A mapping might fail intermittently when you read or write messages to IBM MQ and the connection count for the server-connection channel in the Queue Manager component exceeds the maximum limit.
  For more information about this error and the maximum limit of the connection count, see Server-connection channel limits in the IBM MQ documentation.
- When you run a mapping to read messages in real time, consider the following rules and guidelines:
  - A mapping configured with the Aggregator or Joiner transformation fails.
  - A mapping fails when you set the **Recovery Strategy** session property to **Resume from last checkpoint** in the mapping task.

CHAPTER 4

Data type reference

Data Integration uses the following data types in mappings and mapping tasks with IBM MQ:

IBM MQ native data types

IBM MQ 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.

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.

IBM MQ and transformation data types

Use only the supported IBM MQ data types in a mapping to read from or write to IBM MQ.

The following table lists the IBM MQ data types that Data Integration supports and the corresponding transformation data types:

IBM MQ data type	Range and Description	Transformation data type	Range and Description
MQBYTE	1 to 104,857,600 bytes	Binary	1 to 104,857,600 bytes
MQCHAR	1 to 104,857,600 characters Fixed-length or varying-length string.	String	1 to 104,857,600 characters
MQHEX	1 to 104,857,600 characters Fixed-length or varying-length string.	String	1 to 104,857,600 characters
MQLONG	Precision 10, scale 0	Integer	Precision 10, scale 0

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