



Informatica® PowerExchange for Microsoft
Azure Cosmos DB SQL API

10.2

User Guide

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Preface

The *Informatica PowerExchange® for Microsoft Azure Cosmos DB SQL API User Guide* provides information about reading data from and writing data to Cosmos DB. The guide is written for database administrators and developers who are responsible for developing mappings that read data from Cosmos DB and write data to Cosmos DB.

This guide assumes that you have knowledge of Informatica Developer, Cosmos DB, and the database engines and systems in your environment.

Informatica Resources

Informatica Network

Informatica Network hosts Informatica Global Customer Support, the Informatica Knowledge Base, and other product resources. To access Informatica Network, visit <https://network.informatica.com>.

As a member, you can:

- Access all of your Informatica resources in one place.
- Search the Knowledge Base for product resources, including documentation, FAQs, and best practices.
- View product availability information.
- Review your support cases.
- Find your local Informatica User Group Network and collaborate with your peers.

Informatica Knowledge Base

Use the Informatica Knowledge Base to search Informatica Network for product resources such as documentation, how-to articles, best practices, and PAMs.

To access the Knowledge Base, visit <https://kb.informatica.com>. If you have questions, comments, or ideas about the Knowledge Base, contact the Informatica Knowledge Base team at KB_Feedback@informatica.com.

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If you have questions, comments, or ideas about this documentation, contact the Informatica Documentation team through email at infa_documentation@informatica.com.

Informatica Product Availability Matrixes

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<https://network.informatica.com/community/informatica-network/product-availability-matrices>.

Informatica Velocity

Informatica Velocity is a collection of tips and best practices developed by Informatica Professional Services. Developed from the real-world experience of hundreds of data management projects, Informatica Velocity represents the collective knowledge of our consultants who have worked with organizations from around the world to plan, develop, deploy, and maintain successful data management solutions.

If you are an Informatica Network member, you can access Informatica Velocity resources at <http://velocity.informatica.com>.

If you have questions, comments, or ideas about Informatica Velocity, contact Informatica Professional Services at ips@informatica.com.

Informatica Marketplace

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If you are an Informatica Network member, you can use Online Support at <http://network.informatica.com>.

CHAPTER 1

Introduction to PowerExchange for Cosmos DB SQL API

This chapter includes the following topics:

- [PowerExchange for Microsoft Azure Cosmos DB SQL API Overview, 8](#)
- [Introduction to Cosmos DB, 9](#)

PowerExchange for Microsoft Azure Cosmos DB SQL API Overview

PowerExchange for Microsoft Azure Cosmos DB SQL API provides connectivity between Informatica and Cosmos DB. Use PowerExchange for Microsoft Azure Cosmos DB SQL API to extract and load Cosmos DB documents through the Data Integration Service.

You can use PowerExchange for Cosmos DB SQL API to read JSON documents from and write JSON documents to a collection in the Cosmos DB database. You can use PowerExchange for Cosmos DB SQL API to process large volumes of data.

You can use PowerExchange for Cosmos DB SQL API for the following data integration scenarios:

- Create a Cosmos DB data warehouse. You can aggregate data from Cosmos DB and other source systems, transform the data, and write the data to Cosmos DB.
- Migrate data from a relational database or other data sources to Cosmos DB. For example, you want to migrate data from a relational database to Cosmos DB. You can write data from multiple relational database tables with different schemas to the same Cosmos DB collection. A Cosmos DB collection contains the data in a Cosmos DB database.
- Move data between operational data stores to synchronize data. For example, an online marketplace uses a relational database as the operational data store. You want to use Cosmos DB instead of the relational database. However, you want to maintain the relational database along with Cosmos DB for a period of time. You can use PowerExchange for Cosmos DB SQL API to synchronize data between the relational data store and the Cosmos DB data store.
- Migrate data from Cosmos DB to a data warehouse for reporting. For example, your organization uses a business intelligence tool that does not support Cosmos DB. You must migrate the data from Cosmos DB to a data warehouse so that the business intelligence tool can use the data to generate reports.

Introduction to Cosmos DB

Cosmos DB is a globally distributed, document based, NoSQL database that maintains multiple data models.

A Cosmos DB database contains a set of collections. A collection is a set of documents and is similar to a table in a relational database. Cosmos DB stores records as documents that are similar to rows in a relational database. A document contains fields that are similar to columns in a relational database. A document can have a dynamic schema. A document in a collection does not need to have the same set of fields or structure as another document in the same collection. A document can also contain nested documents.

CHAPTER 2

PowerExchange for Microsoft Azure Cosmos DB SQL API Installation and Configuration

This chapter includes the following topics:

- [PowerExchange for Cosmos DB SQL API Installation and Configuration Overview, 10](#)
- [Prerequisites, 10](#)
- [Installing the Server Component, 11](#)
- [Installing the Client Component, 12](#)

PowerExchange for Cosmos DB SQL API Installation and Configuration Overview

You must configure PowerExchange for Cosmos DB SQL API before you can extract data from or load data to a Cosmos DB collection.

Prerequisites

You must perform the following prerequisites before you can use PowerExchange for Microsoft Azure Cosmos DB SQL API:

- Install or upgrade to Informatica 10.2.1
- Apply EBF-11602 on the machine on which you installed the Developer Tool and on the machine that hosts the Informatica services.

For more information about product requirements and supported platforms, see the Product Availability Matrix on Informatica Network:

<https://network.informatica.com/community/informatica-network/product-availability-matrices>

Installing the Server Component

You can install the server component on Linux machine.

Installing the Server Component on UNIX

If multiple nodes exist in your environment, you must first install the server component on the master gateway node. You can then install the server component on the other nodes in the domain.

Before you install, shut down the Informatica domain.

1. Delete the contents, including the hidden files and directories, from the following directories:

- \$INFA_HOME/services/work_dir
- \$INFA_HOME/tomcat/bin/workspace

2. Navigate to the root directory of the extracted installer files.

3. Enter `./install.sh` at the command prompt.

Note: The `install.sh` file must have executable permissions.

4. Enter the path to the Informatica installation directory.

By default, the server components are installed in the following location:

<User Home Directory>/Informatica/<version folder>

If you did not shut down the domain, a message appears asking you to shut down the domain.

5. Review the installation information and press **Enter** to begin the installation.
6. View or enter the domain information.

Property	Description
Domain Name	Name of the domain where Informatica services are installed. This field is read-only.
Node Name	Name of the node on which you are installing the PowerExchange for Cosmos DB server component. This field is read-only.
Domain User Name	User name of the administrator for the domain.
Domain Password	Password for the domain administrator.
Master Gateway Node	Indicates whether the node on which you are installing the server component is the master gateway node. Select from the following options: 1. Yes. Select Yes if the node is the master gateway node. 2. No. Select No for all other nodes on which you install the server component.

For more information about the tasks performed by the installer, view the installation log files.

Installing the Client Component

Install the client component on every Informatica Developer client machine that connects to the domain.

1. Delete the contents from the following directory:

`$INFA_HOME\clients\DeveloperClient\workspace`

2. Delete the configuration files and retain the `config.ini` file from the following directory:

`$INFA_HOME\clients\DeveloperClient\configuration`

3. Unzip the client installation archive and navigate to the root directory of the extracted installer files.

4. Run the `install.bat` script file.

The **Welcome** page appears.

5. Click **Next**.

The **Installation Directory** page appears.

6. Enter the absolute path to the Informatica installation directory. Click **Browse** to find the directory or use the default directory.

7. Click **Next**.

The **Pre-Installation Summary** page appears.

8. Verify that all installation requirements are met and click **Install**.

The installer shows the progress of the installation. When the installation is complete, the **Post-Installation Summary** page displays the status of the installation.

9. Click **Done** to close the installer.

For more information about the tasks performed by the installer, view the installation log files.

CHAPTER 3

PowerExchange for PowerExchange for Cosmos DB SQL API Connections

This chapter includes the following topics:

- [PowerExchange for Cosmos DB SQL API Connections Overview, 13](#)
- [PowerExchange for Cosmos DB SQL API Connection Properties, 14](#)
- [Creating a PowerExchange for Cosmos DB SQL API Connection, 14](#)

PowerExchange for Cosmos DB SQL API Connections Overview

To connect to a Cosmos DB collection, you must create a PowerExchange for Cosmos DB SQL API connection.

Use the Developer tool or Administrator tool to create a Cosmos DB connection.

PowerExchange for Cosmos DB SQL API Connection Properties

Use a Cosmos DB connection to connect to the Cosmos DB database. When you create a Cosmos DB connection, you enter information for metadata and data access.

The following table describes the Cosmos DB connection properties:

Property	Description
Name	Name of the Cosmos DB connection.
ID	String that the Data Integration Service uses to identify the connection. The ID is not case sensitive. It must be 255 characters or less and must be unique in the domain. You cannot change this property after you create the connection. Default value is the connection name.
Description	Description of the connection. The description cannot exceed 765 characters.
Location	The project or folder in the Model repository where you want to store the Cosmos DB connection.
Type	Select Microsoft Azure Cosmos DB SQL API.
Cosmos DB URI	The URI of Microsoft Azure Cosmos DB account.
Key	The primary and secondary key to which provides you complete administrative access to the resources within Microsoft Azure Cosmos DB account.
Database	Name of the database that contains the collections from which you want to read or write JSON documents.

Note: You can find the Cosmos DB URI and Key values in the **Keys** settings on Azure portal. Contact your Azure administrator for more details.

Creating a PowerExchange for Cosmos DB SQL API Connection

Create a connection to import a Cosmos DB collection into the Developer tool.

1. In the Developer tool, click **Window > Preferences**.
2. Select **Informatica > Connections**.
3. Expand the domain in the **Available Connections** list.
4. Select the connection type as **NoSQL > Microsoft Azure Cosmos DB SQL API**, and then click **Add**.
5. Enter a connection name.
6. Optionally, enter a connection ID, description, location, and the type of the connection.
7. Click **Next**.
8. Specify the **Cosmos DB URI**, **Key**, and **Database** you want to connect to.
9. Click **Test Connection** to verify if the connection to the Cosmos DB collection is successful.

10. Click **Finish**.

CHAPTER 4

PowerExchange for Microsoft Azure Cosmos DB SQL API Data Objects

This chapter includes the following topics:

- [PowerExchange for Cosmos DB SQL API Data Objects Overview, 16](#)
- [PowerExchange for Cosmos DB SQL API Data Object Properties, 17](#)
- [PowerExchange for Cosmos DB SQL API Data Object Read Operation Properties, 17](#)
- [Microsoft Azure Cosmos DB SQL API Data Object Write Operation Properties, 19](#)
- [Parameterization of Cosmos DB Data Objects, 19](#)
- [Creating a Cosmos DB Data Object, 20](#)
- [Creating a Cosmos DB Data Object Operation, 21](#)

PowerExchange for Cosmos DB SQL API Data Objects Overview

Use a Cosmos DB data object to import a Cosmos DB collection. Then, add the Cosmos DB collection to a Cosmos DB data object operation, and add the operation to a mapping to read or write data.

When you create a Cosmos DB connection, select the connection type as **NoSQL > Microsoft Azure Cosmos DB SQL API** and define the connection properties. Then, create a Cosmos DB data object for the Cosmos DB collection.

PowerExchange for Cosmos DB SQL API Data Object Properties

You can configure the Cosmos DB data object properties when you create the data object.

General Properties

The following table describes the general properties that you configure for Cosmos DB data objects:

Property	Description
Name	Name of the Cosmos DB data object.
Location	The project or folder in the Model repository where you want to store the Cosmos DB data object.
Connection	Name of the Cosmos DB connection that you created to connect to the Cosmos DB collection.

Object Properties

The following table describes the general properties that you configure for the Cosmos DB object:

Property	Description
Name	Name of the collection in the Model repository.
Description	Description of the collection in the Model repository. By default, the link to the collection in the Cosmos DB database appears.
Native Name	Name of the collection in the Cosmos DB database.
Path Information	Relative path of the collection in the Cosmos DB database.
Partition Key	The field name to identify the partition to perform the read operation.

PowerExchange for Cosmos DB SQL API Data Object Read Operation Properties

Cosmos DB data object read operation properties include run-time properties that apply to the Cosmos DB collection you add in the Cosmos DB data object.

The Developer tool displays advanced properties for the Cosmos DB data object operation in the **Advanced** view.

The following table describes the advanced property for a Cosmos DB data object read operation:

Property	Description
Throughput (RU/s)	<p>A positive integer and a multiple of 100. Request units processing per second. If you specify -1, the throughput is not altered during the read operation.</p> <p>400 is the minimum throughput from the third party for a non-partition collection. 1000 is the minimum throughput from the third party for a partition collection.</p>
Partition Key	<p>The field name to identify the partition to perform the read operation. You can specify any of the following values:</p> <ul style="list-style-type: none">- <All>. Reads data from all partitions.- Field name. Reads data from the field name partition. For example, you can read data from partition named on the City field, Boston. You can specify comma separated multiple field names.- null. Reads data from the partition named null.- <null>. Reads data from the null partition. Applicable for string data type. You should specify a string value with double quotes in a filter condition.
Page Size	<p>Number of documents to read per request. Default is 50.</p>
Filter Query Override	<p>A case-sensitive filter query with conditional and logical operators. Use the following syntax:</p> <p><objectName>.<columnName>="conditionValue"</p> <p>Example, Address.City="Boston"</p> <p>For more information about logical operators syntax, see <i>Microsoft Azure Cosmos DB SQL API Documentation</i>.</p>

Microsoft Azure Cosmos DB SQL API Data Object Write Operation Properties

Cosmos DB data object write operation properties include run-time properties that apply to the Cosmos DB collection you add in the Cosmos DB data object.

The Developer tool displays advanced properties for the Cosmos DB data object operation in the **Advanced** view. The following table describes the advanced properties for a Cosmos DB data object write operation:

Property	Description
Throughput (RU/s)	A positive integer and a multiple of 100. Request units processing per second. If you specify -1, the throughput is not altered during the write operation. 400 is the minimum throughput from the third party for a non-partition collection. 1000 is the minimum throughput from the third party for a partition collection.
Automatic ID Generation	Generate ID for the documents written to the target. Specify any of the following values: <ul style="list-style-type: none">- Enabled. Cosmos DB generates IDs for the documents.- Disabled. The source object provides IDs for the documents. The Data Integration Service rejects the rows if a Null value is provided to the ID port in the target or if you do not connect a port to the ID port in target.
Treat Source Rows As	Operation to perform. You can select Insert, Update, Upsert, or Delete. Note: You must connect the ID port and Partition Key port to perform Update, Upsert, or Delete operations. The Data Integration Service displays an exception if you do not connect the ID port or the partition key for Upsert and Update operations, whereas, the Delete operation fails. For Upsert and Update operations, in addition to the ports you want to update, you must connect all other ports a document contains. The values for the unconnected ports get deleted during Upsert and Update operations.

Parameterization of Cosmos DB Data Objects

You can parameterize the Cosmos DB connection and the Cosmos DB data object operation properties.

You can parameterize the following data object properties for Cosmos DB data objects:

- Connection
- Native Name to override the collection name.

You can parameterize the following data object read operation advanced properties for Cosmos DB data objects:

- Partition Key
- Page Size
- Throughput (RU/s)
- Filter Query Override

You can parameterize the following data object write operation advanced properties for Cosmos DB data objects:

- Throughput (RU/s)

- Automatic ID Generation
- Treat Source Rows As

For more information about mapping parameters, see the *Informatica Developer Mapping Guide*.

Creating a Cosmos DB Data Object

Create a Cosmos DB object to specify the Cosmos DB collection that you want to access to read or write data.

1. Select a project or folder in the **Object Explorer** view.
2. Click **File > New > Data Object**.
3. Select **Microsoft Azure Cosmos DB SQL API Data Object** and click **Next**.
The **New Microsoft Azure Cosmos DB SQL API Data Object** dialog box appears.
4. Enter a name for the data object.
5. Click **Browse** next to the **Location** option and select the target project or folder.
6. Click **Browse** next to the **Connection** option and select a Cosmos DB connection from which you want to import the Cosmos DB collection.
7. To add a Cosmos DB collection to the data object, click **Add** next to the **Resource** option.
The **Add Resource** dialog box appears.
8. Select the required connection under Package Explorer.
The list of collections appears.
9. Specify the document ID in the **Schema Document ID** field. The schema is fetched from the Cosmos DB collection based on the document ID you provide here.
10. Select the collection that contains the document ID you specified in **Schema Document ID**.
11. Click the selected collection row.
The document details appear under **Entity Information**.
12. Click **OK**.
13. Click **Finish**.

The data object appears under Data Objects in the project or folder in the **Object Explorer** view. The Data Object Read and Write operations are created by default.

Note: The schema or metadata for the read or write operations is derived based on the ID provided in the **Schema Document ID** field using the best match logic. For the provided ID, if a column 'C1' contains a value '123', the Data Integration Service interprets the value as Integer. If the derived data types do not match your requirements, you can modify the data types in read or write operations.

Creating a Cosmos DB Data Object Operation

Create a Cosmos DB data object operation from a Cosmos DB data object that contains a Cosmos DB collection.

Before you create a Cosmos DB data object operation, you must create a Cosmos DB data object with the Cosmos DB collection.

1. Select the data object in the **Object Explorer** view.
2. Right-click and select **New > Data Object Operation**.
The **Data Object Operation** dialog box appears.
3. Enter a name for the data object operation.
4. Select the type of data object operation. You can choose to create a read operation or a write operation.
5. Click **Add**.

The **Select a resource** dialog box appears.

6. Select the Cosmos DB collection for which you want to create the data object operation and click **OK**.
7. Click **Finish**.

The Developer tool creates the data object operation for the selected data object.

CHAPTER 5

PowerExchange for Microsoft Azure Cosmos DB SQL API Mappings

This chapter includes the following topics:

- [PowerExchange for Cosmos DB Mappings Overview, 22](#)
- [Mapping Validation and Run-time Environments, 22](#)

PowerExchange for Cosmos DB Mappings Overview

After you create a Cosmos DB data object read or write operation, you can create a mapping.

You can create an Informatica mapping containing a Cosmos DB data object read operation as the input, and a relational or flat file data object operation as the target. You can create an Informatica mapping containing objects such as a relational or flat file data object operation as the input, transformations, and a Cosmos DB data object write operation as the output to load data to Cosmos DB.

Validate and run the mapping. You can deploy the mapping and run it or add the mapping to a Mapping task in a workflow.

Mapping Validation and Run-time Environments

You can validate and run mappings in the native environment or Spark engine.

The Data Integration Service validates whether the mapping can run in the selected environment. You must validate the mapping for an environment before you run the mapping in that environment.

Native environment

You can configure the mappings to run in the native or Hadoop environment. When you run mappings in the native environment, the Data Integration Service processes and runs the mapping.

Spark Engine

When you run mappings on the Spark engine, the Data Integration Service pushes the mapping to a Hadoop cluster and processes the mapping on a Spark engine. The Data Integration Service generates an execution plan to run mappings on the Spark engine.

For more information about the Hadoop environment and Spark engine, see the *Informatica Big Data Management™ Administrator Guide*.

APPENDIX A

Cosmos DB Data Types Reference

This appendix includes the following topics:

- [Cosmos DB Data Types Reference Overview, 24](#)
- [Azure Cosmos DB and Transformation Data Types, 25](#)
- [Data Types Parsing for Cosmos DB, 25](#)

Cosmos DB Data Types Reference Overview

When you run the session to read data from or write data to Cosmos DB, the Data Integration Service converts the transformation data types to comparable native Cosmos DB data types.

Informatica Developer uses the following data types in Cosmos DB mappings:

- Cosmos DB native data types. Cosmos DB data types appear in the physical data object column properties.
- 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 Data Integration Service uses to move data across platforms. Transformation data types appear in all transformations in a mapping.

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

Azure Cosmos DB and Transformation Data Types

The following table compares the JSON data type to the transformation data type:

JSON Data Type	Transformation Data Type	Range and Description
boolean	integer	The default transformation type for boolean is integer. You can specify string data type with values of True and False. True is equivalent to the integer 1 and False is equivalent to the integer 0.
Number (double)	double	-1.79769313486231570E+308 to +1.79769313486231570E+308. Precision 15.
Number (float)	double	-1.79769313486231570E+308 to +1.79769313486231570E+308. Precision 15.
Number (int)	integer	-2,147,483,648 to 2,147,483,647 Precision 10, scale 0
Number (long)	bigint	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 Precision 19, scale 0.
string	string	1 to 104,857,600 characters.

See [“Data Types Parsing for Cosmos DB” on page 25](#) for more details.

Data Types Parsing for Cosmos DB

During the read or write operations, the Data Integration Service parses data based on the data types defined in the schema. If the data values do not match the data types defined in the schema, the Data Integration Service rejects the document.

The following table lists the data types allowed at run time for the numeric data types specified in the schema:

Data Type in Schema	Allowed Run-time Data
Integer	Short, Integer
BigInt or Long	Short, Integer, Long (Maximum precision 19)
Float	Short, Integer, Long, Float
Double	Short, Integer, Long, Float, Double
Decimal (Maximum precision 28)	Short, Integer, Long, Float, Double, Long
String	String

Note: PowerExchange for Cosmos DB SQL API does not support JSON nested document type field or array type field.

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