

# Oracle® Cloud

## Using the BigQuery Adapter with Oracle Integration 3



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# About This Content

This guide describes how to configure this adapter as a connection in an integration in Oracle Integration.

## Audience

This guide is intended for developers who want to use this adapter in integrations in Oracle Integration.

## Documentation Accessibility

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## Related Resources

See these Oracle resources:

- Oracle Cloud at <http://cloud.oracle.com>
- *Using Integrations in Oracle Integration 3*
- *Using the Oracle Mapper with Oracle Integration 3*
- Oracle Integration documentation on the Oracle Help Center.

## Conventions

The following text conventions are used in this document.

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

# 1

## Understand the BigQuery Adapter

Review the following topics to learn about the BigQuery Adapter and how to use it as a connection in integrations in Oracle Integration. A typical workflow of adapter and integration tasks is also provided.

### Topics:

- [BigQuery Adapter Capabilities](#)
- [BigQuery Adapter Restrictions](#)
- [What Application Version Is Supported?](#)
- [Workflow to Create and Add a BigQuery Adapter Connection to an Integration](#)

## BigQuery Adapter Capabilities

The BigQuery Adapter enables you to integrate Google BigQuery with Oracle Integration. BigQuery is a cloud-based analytics database service that allows you to load, insert, query, and extract large volumes of data efficiently.

You can configure the BigQuery Adapter as an invoke connection in an integration.

The BigQuery Adapter provides the following capabilities:

### General Capabilities

- Supports integration with Google BigQuery projects, datasets, and tables.
- Supports Authorization Code Credentials authentication, including Proof Key for Code Exchange (PKCE) support for enhanced OAuth security.
- Supports execution of operations in synchronous and asynchronous modes.
- Supports validating SQL queries during design time.

### Supported Modules

The BigQuery Adapter currently supports the following three modules:

- Bulk Load/Extract:
  - Bulk load: Loads data from Google Storage into a BigQuery table.
  - Extract: Extracts data from a BigQuery table to Google Storage.
  - Job-related operations:
    - \* Check job status
    - \* List jobs
    - \* Cancel a job
    - \* Delete a job
- Query:

- Executes SQL queries against BigQuery tables.
- Supports the following queries:
  - \* Synchronous queries
  - \* Asynchronous queries
- Retrieves query execution status and query results.
- Operation on Table:
  - Lists data present in a BigQuery table.
  - Inserts data into tables:
    - \* Inserts a single row
    - \* Inserts multiple rows

The BigQuery Adapter is one of many predefined adapters included with Oracle Integration. See the Adapters page in the Oracle Help Center.

## BigQuery Adapter Restrictions

Note the following BigQuery Adapter restrictions.

- Only DML and DQL statements are supported.
- Only named-query parameters are supported. Positional-query parameters are not supported.

### Note

There are overall service limits for Oracle Integration. A service limit is the quota or allowance set on a resource. See [Service Limits](#).

## What Application Version Is Supported?

For information about which application version is supported by this adapter, see the [Connectivity Certification Matrix](#).

## Workflow to Create and Add a BigQuery Adapter Connection to an Integration

You follow a very simple workflow to create a connection with an adapter and include the connection in an integration in Oracle Integration.

This table lists the workflow steps for both adapter tasks and overall integration tasks, and provides links to instructions for each step.

Step	Description	More Information
1	Decide where to work	<ul style="list-style-type: none"> <li>• <a href="#">Work in a project</a> (see why working with projects is preferred in <i>Using Integrations in Oracle Integration 3</i>).</li> <li>• <a href="#">Work outside a project</a>.</li> </ul>

Step	Description	More Information
2	Create the adapter connections for the applications you want to integrate. The connections can be reused in multiple integrations and are typically created by the administrator.	<a href="#">Create a BigQuery Adapter Connection</a>
3	Create the integration. When you do this, you add trigger (source) and invoke (target) connections to the integration.	Understand Integration Creation and Best Practices in <i>Using Integrations in Oracle Integration 3</i> and <a href="#">Add the BigQuery Adapter Connection to an Integration</a>
4	Map data between the trigger connection data structure and the invoke connection data structure.	Map Data in <i>Using Integrations in Oracle Integration 3</i>
5	(Optional) Create lookups that map the different values used by those applications to identify the same type of object (such as gender codes or country codes).	Manage Lookups in <i>Using Integrations in Oracle Integration 3</i>
6	Activate the integration.	Activate an Integration in <i>Using Integrations in Oracle Integration 3</i>
7	Monitor the integration on the dashboard.	Monitor Integrations During Runtime in <i>Using Integrations in Oracle Integration 3</i>
8	Track payload fields in messages during runtime.	Assign Business Identifiers for Tracking Fields in Messages and Track Integration Instances in <i>Using Integrations in Oracle Integration 3</i>
9	Manage errors at the integration level, connection level, or specific integration instance level.	Manage Errors in <i>Using Integrations in Oracle Integration 3</i>

# 2

## Create a BigQuery Adapter Connection

A connection is based on an adapter. You define connections to the specific cloud applications that you want to integrate.

### Topics:

- [Prerequisites for Creating a Connection](#)
- [Create a Connection](#)

## Prerequisites for Creating a Connection

You must satisfy the following prerequisites to create a connection with the BigQuery Adapter:

- Access to Google Cloud Console.
- A Google Cloud project with BigQuery enabled.
- The project ID of the Google Cloud project.
- An OAuth 2.0 client created in Google Cloud.
- Client ID and client secret (visible only once during creation).
- Required OAuth scopes. If multiple scopes are provided, separate them with a space, as defined in the BigQuery API documentation. See [OAuth 2.0 Scopes for Google APIs](#).
- Oracle Integration redirect URI added to the OAuth client configuration.
- Create datasets and tables. See [Create and use tables](#).

### Locate the Project ID

1. Sign in to the **Google Cloud Console**.
2. Navigate to **APIs & Services** (API Console).
3. From the project selector at the top, click **Manage all projects**.  
The list of projects is displayed.
4. Locate your project in the list and note the corresponding project ID.

### Create an OAuth Client in Google Cloud

To configure Authorization Code Credentials:

1. Navigate to **APIs & Services**, then select **Credentials**.
2. Click **Create Credentials**, and select **OAuth client ID**.
3. Select **Web Application** as the application type.
4. Enter a name for the OAuth client.
5. Add the Oracle Integration redirect URI to the authorized redirect URIs list.
6. Click **Create** to complete the configuration.



**Note****(Important)**

- The client secret is displayed only once during creation.
- You can create multiple client secrets, but each secret is visible only at creation time.

**Create a Dataset in BigQuery**

1. Sign in to the Google Cloud Console.
2. Navigate to **BigQuery**.
3. In the Explorer pane, select your project.
4. Click **Create Dataset**.
5. Enter the following details:
  - **Dataset ID** (must be unique within the project)
  - **Data location** (select your region)
6. (Optional) Configure the following:
  - Default table expiration
  - Access controls
  - Encryption settings
7. Click **Create Dataset**.  
The dataset is now available under your project.

**Create a Table in BigQuery**

1. Sign in to the Google Cloud Console.
2. Navigate to **BigQuery**.
3. Select the required dataset.
4. Click **Create Table**.
5. Enter the table name.
6. Define the schema (field names, data types, and modes).
7. Click **Create Table**.


## Create a Connection

Before you can build an integration, you must create the connections to the applications with which you want to share data.

**Note**

You can also create a connection in the integration canvas. See Define Inbound Triggers, Outbound Invokes, and Actions.

To create a connection in Oracle Integration:

1. Decide where to start:
  - Work in a project (see why working with projects is preferred).
    - a. In the navigation pane, click **Projects**.
    - b. Select the project name.
    - c. Click **Integrations** .
    - d. In the **Connections** section, click **Add** if no connections currently exist or **+** if connections already exist. The Create connection panel opens.
  - Work outside a project.
    - a. In the navigation pane, click **Design**, then **Connections**.
    - b. Click **Create**. The Create connection panel opens.
2. Select the adapter to use for this connection. To find the adapter, scroll through the list, or enter a partial or full name in the **Search** field.
3. Enter the information that describes this connection.

Element	Description
<b>Name</b>	Enter a meaningful name to help others find your connection when they begin to create their own integrations.
<b>Identifier</b>	Automatically displays the name in capital letters that you entered in the <b>Name</b> field. If you modify the identifier name, don't include blank spaces (for example, SALES OPPORTUNITY).
<b>Role</b>	<p>Select the role (direction) in which to use this connection.</p> <p><b>Note:</b> <i>Only</i> the roles supported by the adapter you selected are displayed for selection. Some adapters support all role combinations (trigger, invoke, or trigger and invoke). Other adapters support fewer role combinations.</p> <p>When you select a role, only the connection properties and security policies appropriate to that role are displayed on the Connections page. If you select an adapter that supports both invoke and trigger, but select only one of those roles, you'll get an error when you try to drag the adapter into the section you didn't select.</p> <p>For example, assume you configure a connection for the Oracle Service Cloud (RightNow) Adapter as only an <b>invoke</b>. Dragging the adapter to a <b>trigger</b> section in the integration produces an error.</p>
<b>Keywords</b>	Enter optional keywords (tags). You can search on the connection keywords on the Connections page.
<b>Description</b>	Enter an optional description of the connection.

Element	Description
<b>Share with other projects</b>	<p><b>Note:</b> This field only appears if you are creating a connection in a project.</p> <p>Select to make this connection publicly available in other projects. Connection sharing eliminates the need to create and maintain separate connections in different projects.</p> <p>When you configure an adapter connection in a different project, the <b>Use a shared connection</b> field is displayed at the top of the Connections page. If the connection you are configuring matches the same type and role as the publicly available connection, you can select that connection to reference (inherit) its resources.</p> <p>See <a href="#">Add and Share a Connection Across a Project</a>.</p>

4. Click **Create**.

Your connection is created. You're now ready to configure the connection properties, security policies, and (for some connections) access type.

5. Follow the steps to configure a connection.

The connection property and connection security values are specific to each adapter. Your connection may also require configuration with an access type such as a private endpoint or an agent group.

6. Test the connection.

## Configure Connection Properties

Enter connection information so your application can process requests.

1. Go to the **Properties** section.
2. Enter the Google Cloud project ID.

## Configure Connection Security

Configure security for your BigQuery Adapter connection.

1. Go to the **Security** section.

The BigQuery Adapter supports Authorization Code Credential-based authentication.

2. In the **Google Client id** field, enter the client ID that you obtained after completing the steps in the prerequisites section. See [Prerequisites for Creating a Connection](#).

3. In the **Google Client secret** field, enter the client secret that you obtained after completing the steps in the prerequisites section. See [Prerequisites for Creating a Connection](#).

The client secret is displayed only once during OAuth client creation in Google Cloud.

4. In the **Scope** field, enter the required OAuth scopes for BigQuery. See [OAuth 2.0 Scopes for Google APIs](#).

5. Click **Provide Consent** to verify the connection properties and obtain an access token.

The Google account sign-in page is displayed.

6. Enter your Google account credentials.

Once you see an `access allowed` message, you can test the connection.

7. If you want to enable the PKCE security extension, expand **Optional security**.
8. From the **Use PKCE (Proof Key for Code Exchange)** list, select **Yes** to optionally enable the PKCE extension for the OAuth authorization code flow. When enabled, Oracle Integration generates and includes the code challenge and code verifier in the authorization and token requests, respectively. The code challenge method used is always S256. PKCE adds an additional layer of security to the authorization flow for servers that support it.

For information on PKCE, see [What is PKCE?](#).

## Test the Connection

Test your connection to ensure that it's configured successfully.

1. In the page title bar, click **Test**. What happens next depends on whether your adapter connection uses a Web Services Description Language (WSDL) file. Only some adapter connections use WSDLs.

If Your Connection...	Then...
Doesn't use a WSDL	The test starts automatically and validates the inputs you provided for the connection.
Uses a WSDL	A dialog prompts you to select the type of connection testing to perform: <ul style="list-style-type: none"> <li>• <b>Validate and Test:</b> Performs a full validation of the WSDL, including processing of the imported schemas and WSDLs. Complete validation can take several minutes depending on the number of imported schemas and WSDLs. No requests are sent to the operations exposed in the WSDL.</li> <li>• <b>Test:</b> Connects to the WSDL URL and performs a syntax check on the WSDL. No requests are sent to the operations exposed in the WSDL.</li> </ul>

2. Wait for a message about the results of the connection test.
  - If the test was successful, then the connection is configured properly.
  - If the test failed, then edit the configuration details you entered. Check for typos and verify URLs and credentials. Continue to test until the connection is successful.
3. When complete, click **Save**.

# 3

## Add the BigQuery Adapter Connection to an Integration

When you drag the BigQuery Adapter into the invoke area of an integration, the Adapter Endpoint Configuration Wizard is invoked. This wizard guides you through configuration of the BigQuery Adapter endpoint properties.

The following sections describe the wizard pages that guide you through configuration of the BigQuery Adapter as an invoke in an integration.

### Topics:

- [Invoke Basic Info Page](#)
- [Invoke Configuration Page](#)
- [Summary Page](#)

## Invoke Basic Info Page

Specify a name, description, object, and action on the Basic Info page of each invoke connection in your integration.

Element	Description
<b>What do you want to call your endpoint?</b>	Provide a meaningful name so that others can understand the connection. For example, if you are creating a database connection for adding new employee data, you may want to name it <code>CreateEmployeeInDB</code> . You can include English alphabetic characters, numbers, underscores, and dashes in the name. You cannot include the following: <ul style="list-style-type: none"><li>• Blank spaces (for example, <code>My Inbound Connection</code>)</li><li>• Special characters (for example, <code>#;83&amp;</code> or <code>right()now4</code>) except underscores and hyphens</li><li>• Multibyte characters</li></ul>
<b>What does this endpoint do?</b>	Enter an optional description of the connection's responsibilities.
<b>Select Module</b>	Select one of the following modules. <ul style="list-style-type: none"><li>• <b>Bulk Load/Extract</b></li><li>• <b>Query</b></li><li>• <b>Operation on Table</b></li></ul>

Element	Description
<b>Action</b>	<p>Select one of the following actions. The actions available are based on the module you selected.</p> <p>If you selected <b>Bulk Load/Extract</b>:</p> <ul style="list-style-type: none"> <li>Initiate Bulk Load/Extract</li> <li>Get Job Status</li> <li>List All Jobs</li> <li>Cancel Job</li> <li>Delete Job</li> </ul> <p>If you selected <b>Query</b>:</p> <ul style="list-style-type: none"> <li>Get Query Status/Results by Job ID</li> <li>Query</li> </ul> <p>If you selected <b>Operation on Table</b>:</p> <ul style="list-style-type: none"> <li>List Table Data</li> <li>Insert Rows in Table</li> </ul>

## Invoke Configuration Page

Configure the action you selected on the Basic Info page.

- [Initiate Bulk Load/Extract](#)
- [Get Query Status/Results by Job ID](#)
- [Query](#)

### Initiate Bulk Load/Extract

Element	Description
<b>Select Job Type</b>	<p>If you select <b>Extract</b>, specify/select the following values:</p> <ul style="list-style-type: none"> <li><b>Select Dataset ID</b></li> <li><b>Select Source Table ID</b></li> <li><b>Select Google Cloud Storage Bucket</b></li> <li><b>Provide File Name</b></li> <li><b>Destination Format</b></li> </ul> <p>If you select <b>Load</b>, specify/select the following values:</p> <ul style="list-style-type: none"> <li><b>Select Dataset ID</b></li> <li><b>Select Destination Table ID</b></li> <li><b>Select Google Cloud Storage Bucket</b></li> <li><b>Source Format</b></li> </ul>
<b>Select Dataset ID</b>	Select the BigQuery dataset that contains the source or destination table for the load or extract operation. The list of datasets is retrieved from the configured Google Cloud project.
<b>Select Source Table ID</b>	Select the BigQuery table from which to extract data. This field is displayed when <b>Extract</b> is selected as the job type.
<b>Select Destination Table ID</b>	Select the BigQuery table into which to load data. This field is displayed when <b>Load</b> is selected as the job type.
<b>Select Google Cloud Storage Bucket</b>	Select the Google Cloud Storage bucket to use as the source location for load operations or the destination location for extract operations.
<b>Provide File Name</b>	Enter the name of the file to create (for extract) or reference (for load) in the selected Google Cloud Storage bucket.

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Element	Description
<b>Source Format</b>	Select the format of the source file to load into BigQuery (for example, CSV, JSON, Avro, or other supported formats).
<b>Destination Format</b>	Select the format in which to write the extracted data to the Google Cloud Storage bucket (for example, CSV, JSON, Avro, or other supported formats).

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#### Get Query Status/Results by Job ID

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Element	Description
<b>Provide SQL Query</b>	Enter a SQL query to retrieve data from BigQuery tables. <b>Note:</b> You must provide the same SQL query that was configured during the query operation.

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#### Query

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Element	Description
<b>Request Type</b>	<ul style="list-style-type: none"><li>• <b>Synchronous</b></li><li>• <b>Asynchronous</b></li></ul>

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Element	Description
<b>Provide SQL Query</b>	<p>Enter the SQL statement to execute against the selected BigQuery dataset and tables. The query must follow BigQuery standard SQL syntax.</p> <p>Example query:</p> <pre>"UPDATE `{{projectId}}.{{datasetID}}.{{tableID}}` SET Price = @new_price WHERE ProductID = @pid"</pre> <p>Example query parameters format (named parameters):</p> <pre>{   "queryParameters": [     {       "name": "new_price",       "parameterType": {         "type": "NUMERIC"       },       "parameterValue": {         "value": "26"       }     },     {       "name": "pid",       "parameterType": {         "type": "INT64"       },       "parameterValue": {         "value": "1"       }     }   ] }</pre>

**Note**

**(Important):** If you select the **Test Query** option during design time, the query is executed immediately.

- If the query modifies data (INSERT, DELETE, or UPDATE), the table is altered at design time.

Be cautious when testing queries during adapter configuration.

Perform **List Table Data**:

Element	Description
<b>Select Dataset ID</b>	Select the BigQuery dataset that contains the table from which you want to retrieve data.



Element	Description
Select Table ID	Select the BigQuery table whose data you want to list.

Perform **Insert rows in table**:

Element	Description
Select Dataset ID	Select the BigQuery dataset that contains the table into which to insert rows.
Select Table ID	Select the BigQuery table into which to insert one or more rows during runtime.

## Summary Page

You can review the specified adapter configuration values on the Summary page.

Element	Description
Summary	<p>Displays a summary of the configuration values you defined on previous pages of the wizard.</p> <p>The information that is displayed can vary by adapter. For some adapters, the selected business objects and operation name are displayed. For adapters for which a generated XSD file is provided, click the XSD link to view a read-only version of the file.</p> <p>To return to a previous page to update any values, click the appropriate tab in the left panel or click <b>Go back</b>.</p> <p>To cancel your configuration details, click <b>Cancel</b>.</p>