

Oracle® Cloud

Using the Azure Storage Adapter with Oracle Integration 3



F86024-05
April 2024



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F86024-05

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Preface

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



Note:

The use of this adapter may differ depending on the features you have, or whether your instance was provisioned using Standard or Enterprise edition. These differences are noted throughout this guide.

Topics:

- [Audience](#)
- [Documentation Accessibility](#)
- [Diversity and Inclusion](#)
- [Related Resources](#)
- [Conventions](#)

Audience

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

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Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation.

We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

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
boldface	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 Azure Storage Adapter

Review the following topics to learn about the Azure Storage 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:

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

Azure Storage Adapter Capabilities

The Azure Storage Adapter enables you to create an integration in Oracle Integration that connects to the Azure Storage platform. You can configure the Azure Storage Adapter as an invoke connection in an integration in Oracle Integration.

The Azure Storage Adapter provides the following capabilities:

- Provides support to perform Azure Blob storage operations such as Put, Get, Delete, Copy, Abort, Lease, Snapshot, Set, and so on. See [Invoke Basic Info Page](#).
- Provides support to perform Azure Container operations such as Create, Get, Delete, Lease, and Set.
- Facilitates private access to the Azure Storage platform through the connectivity agent.
- Authenticates connections using the OAuth 2.0 Client Credentials security policy.
- Supports XML message format for the Set Blob Tags and Set Blob Service Properties actions.

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

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 an Azure Storage 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	Access Oracle Integration.	Go to https://instance_URL/ic/home
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.	Create an Azure Storage Adapter Connection
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 Add the Azure Storage Adapter Connection to an Integration
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 an Azure Storage 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](#)
- [Upload a Certificate to Connect with External Services](#)
- [Refresh Integration Metadata](#)

Prerequisites for Creating a Connection

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

- Have an Azure subscription.
- [Get the Storage Account Name](#)
- Register an application in the Azure portal and obtain the tenant ID and client ID. See [Register an Application](#)
- [Create a New Client Secret](#)

Get the Storage Account Name

Get the storage account name.

1. If you don't have a storage account, first create a storage account in the Azure portal. See [Create a storage account](#).
2. If you already have a storage account, perform the following steps to get the storage account name.
 - a. Log in to your Azure account at `portal.azure.com`.
 - b. In the Azure portal, click **Storage accounts**. If you can't find it, use the search bar or locate it in the **All Services** section.
 - c. Select the required storage account in the list.
 - d. The storage account name is displayed at the top of the **Overview** tab on the storage account's details page.

Register an Application

Register an application in the Azure portal, and obtain the tenant ID and client ID.

1. Log in to the Azure portal.

2. Navigate to **Identity**, then **Applications**, and then **App registrations**.
3. Click **New registration**.
4. Enter a name for the application, and select a supported account type.
5. Click **Register**.

The tenant ID and client ID are displayed.

6. Copy the values for the tenant ID and client ID.

You'll need to enter those values on the Connections page when you configure security for your Azure Storage Adapter connection in Oracle Integration.

Create a New Client Secret

Create a new client secret.

1. Log in to the Azure portal.
2. Navigate to **Identity**, then **Applications**, and then to **App registrations**.
3. Select the application that you registered. See [Register an Application](#).
4. Click **Certificates & secrets**.
5. Click **Client secrets**, and then click **New client secret**.
6. Enter a description of the secret, and select a duration.
7. Click **Add**.

The client secret is displayed in the **Value** column.

8. Copy the client secret from the **Value** column.

You'll need to enter the client secret on the Connections page when you configure security for your Azure Storage Adapter connection in Oracle Integration. See [Configure Connection Security](#).

Create a Connection

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

To create a connection in Oracle Integration:

1. In the navigation pane, click **Design**, then **Connections**.
2. Click **Create**.

Note:

You can also create a connection in the integration canvas. See [Define Inbound Triggers and Outbound Invokes](#).

3. In the Create connection panel, 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.
4. Enter the information that describes this connection.

Element	Description
Name	Enter a meaningful name to help others find your connection when they begin to create their own integrations.
Identifier	Automatically displays the name in capital letters that you entered in the Name field. If you modify the identifier name, don't include blank spaces (for example, SALES OPPORTUNITY).
Role	<p>Select the role (direction) in which to use this connection (trigger, invoke, or both). Only the roles supported by the adapter are displayed for selection. 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 invoke. Dragging the adapter to a trigger section in the integration produces an error.</p>
Keywords	Enter optional keywords (tags). You can search on the connection keywords on the Connections page.
Description	Enter an optional description of the connection.
Share with other projects	<p>Note: 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 Use a shared connection 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. See Add and Share a Connection Across a Project.</p>

5. Click **Create**.

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

Configure Connection Properties

Enter connection information so your application can process requests.

1. Go to the **Properties** section.

2. In the **Storage Account Name** field, enter a storage account name that you obtained after performing the prerequisite steps. See [Prerequisites for Creating a Connection](#).
3. In the **Tenant ID** field, enter the tenant ID that you obtained after performing the prerequisite steps. See [Prerequisites for Creating a Connection](#).

Configure Connection Security

Configure security for your Azure Storage Adapter connection.

1. Go to the **Security** section.
The **Security Policy** field shows **Azure Storage Authentication/Authorization Policy**. This value cannot be changed.
2. In the **Client Id** field, enter the client ID that you obtained after performing the prerequisite steps. See [Prerequisites for Creating a Connection](#).
3. In the **Client Secret** field, enter the client secret that you obtained after performing the prerequisite steps. See [Prerequisites for Creating a Connection](#).

Configure the Endpoint Access Type

Configure access to your endpoint. Depending on the capabilities of the adapter you are configuring, options may appear to configure access to the public internet, to a private endpoint, or to an on-premises service hosted behind a fire wall.

Select the Endpoint Access Type

Select the option for accessing your endpoint.

Option	This Option Appears If Your Adapter Supports ...
Public gateway	Connections to endpoints using the public internet.
Connectivity agent	<p>Connections to on-premises endpoints through the connectivity agent.</p> <ol style="list-style-type: none"> 1. Click Associate agent group. The Associate agent group panel appears. 2. Select the agent group, and click Use. <p>To configure an agent group, you must download and install the on-premises connectivity agent. See Download and Run the Connectivity Agent Installer and About Creating Hybrid Integrations Using Oracle Integration in <i>Using Integrations in Oracle Integration 3</i>.</p>

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"> • Validate and Test: 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. • Test: Connects to the WSDL URL and performs a syntax check on the WSDL. No requests are sent to the operations exposed in the WSDL.

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**.

Upload a Certificate to Connect with External Services

Certificates allow Oracle Integration to connect with external services. If the external service/endpoint needs a specific certificate, request the certificate and then import it into Oracle Integration.

If you make an SSL connection in which the root certificate does not exist in Oracle Integration, an exception error is thrown. In that case, you must upload the appropriate certificate. A certificate enables Oracle Integration to connect with external services. If the external endpoint requires a specific certificate, request the certificate and then upload it into Oracle Integration.

1. Sign in to Oracle Integration.
2. In the navigation pane, click **Settings**, then **Certificates**.
All certificates currently uploaded to the trust store are displayed on the Certificates page.
3. Click **Filter**  to filter by name, certificate expiration date, status, type, category, and installation method (user-installed or system-installed). Certificates installed by the system cannot be deleted.

Name	Type	Category	Status
akt_ppgPublic	PGP	Public	Configured
akt_ppgPrivate	PGP	Private	Configured
testppgpublic	PGP	Public	Configured
testppgsecret	PGP	Private	Configured
elq_cert1	X.509	Trust	Configured
Eqir_CloudCA	SAML	Message Protection	Configured
qa_lan	X.509	Trust	Configured
OpportunityServiceSoapHttpPort	X.509	Trust	Configured
DigiCertCA2	X.509	Trust	Configured
SG-Utilities	X.509	Trust	Configured
app_elq_p01	X.509	Trust	Configured

4. Click **Upload** at the top of the page. The Upload certificate panel is displayed.
5. Enter an alias name and optional description.
6. In the **Type** field, select the certificate type. Each certificate type enables Oracle Integration to connect with external services.
 - Digital Signature
 - X.509 (SSL transport)
 - SAML (Authentication & Authorization)
 - PGP (Encryption & Decryption)
 - Signing key

Digital Signature

The digital signature security type is typically used with adapters created with the Rapid Adapter Builder. See Learn About the Rapid Adapter Builder in Oracle Integration in *Using the Rapid Adapter Builder with Oracle Integration 3*.

1. Click **Browse** to select the digital certificate. The certificate must be an X509Certificate. This certificate provides inbound RSA signature validation. See Implement Digital Signature Validation (RSA) in *Using the Rapid Adapter Builder with Oracle Integration 3*.
2. Click **Upload**.

X.509 (SSL transport)

1. Select a certificate category.
 - a. **Trust:** Use this option to upload a trust certificate.
 - i. Click **Browse**, then select the trust file (for example, .cer or .crt) to upload.
 - b. **Identity:** Use this option to upload a certificate for two-way SSL communication.
 - i. Click **Browse**, then select the keystore file (.jks) to upload.

- ii. Enter the comma-separated list of passwords corresponding to key aliases.

 **Note:**

When an identity certificate file (.jks) contains more than one private key, all the private keys must have the same password. If the private keys are protected with different passwords, the private keys cannot be extracted from the keystore.

- iii. Enter the password of the keystore being imported.
- c. Click **Upload**.

SAML (Authentication & Authorization)

1. Note that **Message Protection** is automatically selected as the only available certificate category and cannot be deselected. Use this option to upload a keystore certificate with SAML token support. Create, read, update, and delete (CRUD) operations are supported with this type of certificate.
2. Click **Browse**, then select the certificate file (.cer or .crt) to upload.
3. Click **Upload**.

PGP (Encryption & Decryption)

1. Select a certificate category. Pretty Good Privacy (PGP) provides cryptographic privacy and authentication for communication. PGP is used for signing, encrypting, and decrypting files. You can select the private key to use for encryption or decryption when configuring the stage file action.
 - a. **Private:** Uses a private key of the target location to decrypt the file.
 - i. Click **Browse**, then select the PGP file to upload.
 - ii. Enter the PGP private key password.
 - b. **Public:** Uses a public key of the target location to encrypt the file.
 - i. Click **Browse**, then select the PGP file to upload.
 - ii. In the **ASCII-Armor Encryption Format** field, select **Yes** or **No**.
 - **Yes** shows the format of the encrypted message in ASCII armor. ASCII armor is a binary-to-textual encoding converter. ASCII armor formats encrypted messaging in ASCII. This enables messages to be sent in a standard messaging format. This selection impacts the visibility of message content.
 - **No** causes the message to be sent in binary format.
- iii. From the **Cipher Algorithm** list, select the algorithm to use. Symmetric-key algorithms for cryptography use the same cryptographic keys for both encryption of plain text and decryption of cipher text. The following supported cipher algorithms are FIPS-compliant:
 - AES128
 - AES192
 - AES256

- TDES
- c. Click **Upload**.

Signing key

A signing key is a secret key used to establish trust between applications. Signing keys are used to sign ID tokens, access tokens, SAML assertions, and more. Using a private signing key, the token is digitally signed and the server verifies the authenticity of the token by using a public signing key. You must upload a signing key to use the OAuth Client Credentials using JWT Client Assertion and OAuth using JWT User Assertion security policies in REST Adapter invoke connections. Only PKCS1- and PKCS8-formatted files are supported.

1. Select **Public** or **Private**.
2. Click **Browse** to upload a key file.
If you selected **Private**, and the private key is encrypted, a field for entering the private signing key password is displayed after key upload is complete.
3. Enter the private signing key password. If the private signing key is not encrypted, you are not required to enter a password.
4. Click **Upload**.

Refresh Integration Metadata


You can manually refresh the currently-cached metadata available to adapters that have implemented metadata caching.

Metadata changes typically relate to customizations of integrations, such as adding custom objects and attributes to integrations. There may also be cases in which integrations have been patched, which results in additional custom objects and attributes being added. This option is similar to clearing the cache in your browser. Without a manual refresh, a staleness check is only performed when you drag a connection into an integration. This is typically sufficient, but in some cases you may know that a refresh is required. For these cases, the **Refresh Metadata** menu option is provided.



Note:

The **Refresh Metadata** menu option is only available with adapters that have implemented metadata caching.

1. In the navigation pane, click **Design**, then **Connections**.
2. Hover over the connection to refresh.
3. Click **Actions** , then select **Refresh metadata**.
A message is displayed indicating that the refresh was successful.

3

Add the Azure Storage Adapter Connection to an Integration

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

The following sections describe the wizard pages that guide you through configuration of the Azure Storage 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, resource and operation type on the Basic Info page of each invoke connection in your integration.

Element	Description
What do you want to call your endpoint?	Provide a meaningful name so that others can understand the responsibilities of this connection. For example, if you are creating an invoke connection to delete a blob, you may want to name it <code>InvokeDelBlobs</code> . You can include English alphabetic characters, numbers, underscores, and hyphens in the name. You can't include the following characters: <ul style="list-style-type: none">• No blank spaces (for example, <code>My Inbound Connection</code>)• No special characters (for example, <code>#;83&</code> or <code>right(now4)</code>) except underscores and hyphens• No multibyte characters
What does this endpoint do?	Enter an optional description of the connection's responsibilities.
Select Resource	Select a resource: <ul style="list-style-type: none">• Blobs• Containers• Account

Element	Description
Action	<p>Select an operation type:</p> <ul style="list-style-type: none"> • Put Blob • Put Blob From URL • Get Blob • Set Blob Tags • Get Blob Properties • Delete Blob • Undelete Blob • Set Blob Properties • Set Blob Metadata • Get Blob Metadata • Snapshot Blob • Copy Blob • Copy Blob from URL • Abort Copy Blob • Set Blob Tier • Lease Blob • Set Legal Hold • Set Immutability Policy • Delete Immutability Policy • Create Container • Delete Container • Get Container Properties • Get Container Metadata • Set Container Metadata • Lease Container • Set Blob Service Properties <p>The operations available for selection are based on the resource (that is, Blobs, Containers, or Account) selected.</p>

Invoke Configuration Page

Enter the following details on the Configuration page.

Element	Description
Container Name	Enter the name of the container within the storage account where you want to store your data or blobs.
Blob Name	Specify the name of the specific blob within the selected container.
Delete after download (Displays if you select Blobs and Get Blob on the Basic Info page.)	Select the check box to delete the blob from the Azure portal after downloading.

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 Go back.</p> <p>To cancel your configuration details, click Cancel.</p>

4

Implement Common Patterns Using the Azure Storage Adapter

You can use the Azure Storage Adapter to implement the following common pattern.

Topics:

- [Download a CSV File from the Azure Portal and Add It to a Table in a PostgreSQL Database](#)



Note:

Oracle Integration offers a number of prebuilt integrations, known as *recipes*, that provide you with a head start in building your integrations. You can start with a recipe, and then customize it to fit your needs and requirements. Depending upon the solution provided, a variety of adapters are configured in the prebuilt integrations.

See the Recipes and Accelerators page on the Oracle Help Center.

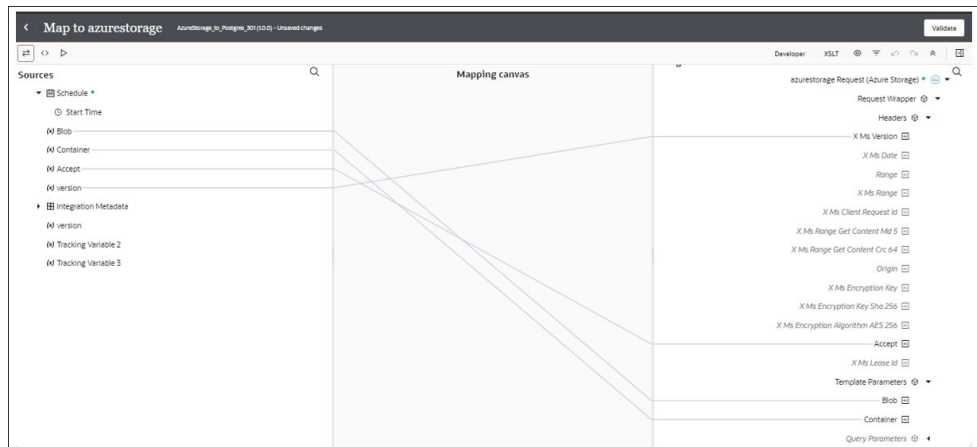
Download a CSV File from the Azure Portal and Add It to a Table in a PostgreSQL Database

You can download a CSV file (blob) from the Azure portal using the Azure Storage Adapter (Get Blob operation) and add it to a table in a PostgreSQL database.

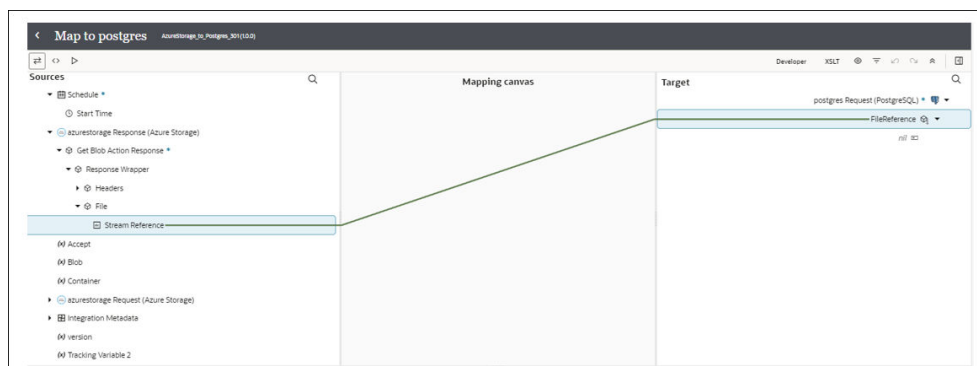
This implementation pattern provides an overview of the steps.

1. Create the Azure Storage Adapter and PostgreSQL Adapter connections.
2. Create a schedule integration.
3. Configure schedule parameters:
 - Accept
 - Blob
 - Container
 - version
4. Drag an Azure Storage Adapter into the integration canvas.
5. Configure the Azure Storage Adapter endpoint:
 - a. On the Basic Info page, provide the endpoint name, select **Blobs** in the **Select Resource** field, and select the **Get Blob** action.
 - b. On the Configuration page, add a container name and a blob name.

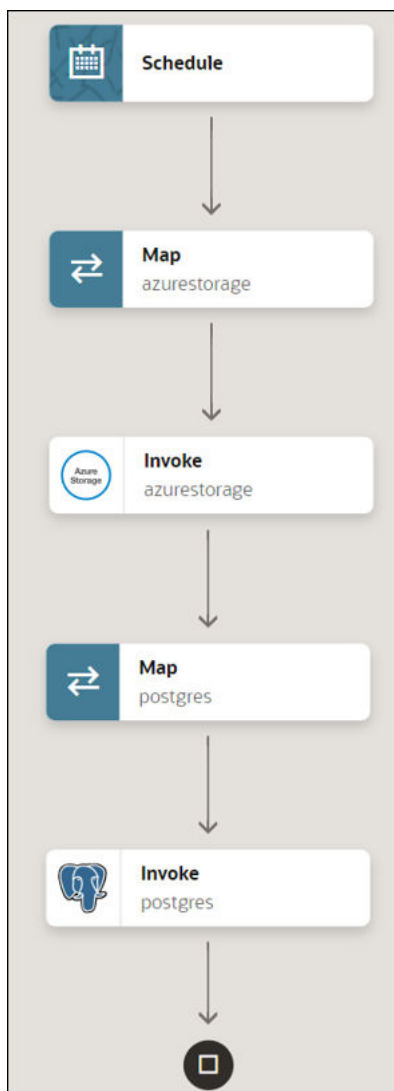
- c. On the Summary page, review your selections.
6. In the mapper, map the **Schedule** parameter elements from the schedule source to the equivalent fields in Azure Storage, and click **Validate**.



7. Drag a PostgreSQL Adapter in the integration.
8. Configure the PostgreSQL Adapter endpoint:
 - a. On the Basic Info page, provide an endpoint name and select **Perform Bulk Data Import Operation** in the **What operation do you want to perform?** field.
 - b. On the Bulk load from File to table page, select **comma** as a delimiter, select **public** as a schema, and select the table that's in the database in the **Select table** field.
 - c. On the Summary page, review your selections.
9. In the mapper, map **Stream Reference** from **Get Blob Action Response** to **FileReference** in **PostgreSQL Request**, and click **Validate**.



The completed integration looks as follows.



10. Add the tracking variable, save, and activate the integration.
11. At runtime, provide the valid values for **accept**, **container**, **blob**, and **version** in the request.
12. As a result, the blob available in the Azure portal in the specified container is added into the table in the PostgreSQL database.