

# Oracle® Cloud

## Using the Microsoft SQL Server Adapter with Oracle Integration 3



F45567-06  
November 2025



Oracle Cloud Using the Microsoft SQL Server Adapter with Oracle Integration 3,

F45567-06

Copyright © 2022, 2025, Oracle and/or its affiliates.

Primary Author: Oracle Corporation

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software, software documentation, data (as defined in the Federal Acquisition Regulation), or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software," "commercial computer software documentation," or "limited rights data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle®, Java, MySQL, and NetSuite are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

# Contents

## About This Content

---

### 1 Understand the Microsoft SQL Server Adapter

---

Microsoft SQL Server Adapter Capabilities	1
Supported Data Types for SQL Stored Procedures	2
Microsoft SQL Server Adapter Restrictions	3
What Application Version Is Supported?	3
About Microsoft SQL Server Use Cases	3
Workflow to Create and Add a Microsoft SQL Server Adapter Connection to an Integration	4

### 2 Create a Microsoft SQL Server Adapter Connection

---

Prerequisites for Creating a Connection	1
Create a Connection	1
Configure Connection Properties	3
Configure Connection Security	3
Configure the Endpoint Access Type	4
Test the Connection	4
Upload a Certificate to Connect with External Services	5

### 3 Add the Microsoft SQL Server Adapter Connection to an Integration

---

Basic Information Page	1
Stored Procedure Page	2
SQL Statement Page	3
Polling Properties	4
Polling Page	4
Manage Tables Page	4
Relations Page	5
Polling Strategy and Options Page	5
Table Operation Page	6
Import Tables Page	6
Relationships Page	7

Create Relationship Page	7
Attribute Filtering Page	7
Operations on Table Page	8
Summary Page	9

## 4 Implement Common Patterns Using the Microsoft SQL Server Adapter

Define a Select Operation on Database Tables	1
--	---

## 5 Troubleshoot the Microsoft SQL Server Adapter

Connection Reset Exception During an Invoke	1
---	---

# 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

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

## Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## 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 Microsoft SQL Server Adapter

Review the following conceptual topics to learn about the Microsoft SQL Server 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:

- [Microsoft SQL Server Adapter Capabilities](#)
- [Microsoft SQL Server Adapter Restrictions](#)
- [What Application Version Is Supported?](#)
- [About Microsoft SQL Server Use Cases](#)
- [Workflow to Create and Add a Microsoft SQL Server Adapter Connection to an Integration](#)

## Microsoft SQL Server Adapter Capabilities

The Microsoft SQL Server Adapter enables you to integrate the Microsoft SQL Server database residing behind the firewall of your on-premises environment with Oracle Integration through use of the on-premises connectivity agent. Use the Microsoft SQL Server Adapter to poll for new and updated records for processing in Oracle Integration. For example, any new record added to the `Employee` table in your Microsoft SQL Server database can be synchronized with Oracle HCM Cloud using Oracle Integration. In addition, use the Microsoft SQL Server Adapter to execute SQL queries or stored procedures in the Microsoft SQL Server database. For example, quotes in Oracle CPQ Cloud can be created as `Orders` in the on-premises Microsoft SQL Server database by sending SQL statements or stored procedures using the Microsoft SQL Server Adapter.

The Microsoft SQL Server Adapter provides the following capabilities:

- Support for invocation of stored procedures in the Microsoft SQL Server database.
- Support for execution of DML statements and SQL queries such as `Select`, `Insert`, `Update`, and `Delete`.

Select the **Run a SQL Statement** option on the Basic Info page of the Adapter Endpoint Configuration Wizard to execute simple SQL queries. For complex SQL queries, use stored procedures by selecting the **Invoke a Stored Procedure** option on the Basic Info page of the Adapter Endpoint Configuration Wizard. Stored procedures can reduce the complexity of a SQL query.

- Support for connecting to a Microsoft Azure SQL Database. Connectivity is supported only through use of the connectivity agent and the Username Password Token security policy. Direct connectivity (that is, without the agent) is not supported.
- Support for generating XSD from PureSQL. This feature generates an XSD from a PureSQL statement provided by dynamically querying on the table.
- Support for polling new and updated records for processing in the Microsoft SQL Server database. The Microsoft SQL Server Adapter supports distributed polling. Distributed polling helps eliminate duplicate polling of the same records.
- Support for updating or inserting multiple records in a single request.

- Support for a logical delete polling strategy. This strategy involves updating a special field on each row once it is processed.
- Support for performing a `SELECT` operation against database tables.
- Support for processing message payloads up to 10 MB in size. In the case of polling, you must set the **Rejected Value** property to **REJECTED** on the Polling Strategy and Options page. If the incoming message is greater than the 10 MB threshold size, that particular record is updated to **REJECTED** instead of **READ**. If the outbound operation returns a response greater than the 10 MB threshold size, the response message is ignored and a fault response is sent to the calling client.

**Note**

In Java, Unicode characters are represented as 2 bytes.

**Note**

User-defined data types are not supported by the Microsoft SQL Server Adapter.

Microsoft SQL Server Adapter is one of many predefined adapters included with Oracle Integration. You can configure Microsoft SQL Server Adapter as a target or invoke connection in an integration in Oracle Integration.

## Supported Data Types for SQL Stored Procedures

The Microsoft SQL Server Adapter supports the following data types for SQL stored procedures.

SQL Data Type	XML Schema Type
BIGINT	long
BINARY	base64Binary
IMAGE	
TIMESTAMP	
VARBINARY	
BIT	boolean
CHAR	string
SQL_VARIANT	
SYSNAME	
TEXT	
UNIQUEIDENTIFIER	
VARCHAR	
XML (2005 only)	
DATETIME	dateTime
SMALLDATETIME	

SQL Data Type	XML Schema Type
DECIMAL	decimal
MONEY	
NUMERIC	
SMALLMONEY	
FLOAT	float
REAL	
INT	int
SMALLINT	short
TINYINT	unsignedByte

## Microsoft SQL Server Adapter Restrictions

Note the following Microsoft SQL Server Adapter restrictions.

- The Microsoft SQL Server Adapter can only be used with the on-premises connectivity agent.
- Special characters such as periods (.), ampersands (@), and so on are not recommended to be used in table names.
- The database password length cannot exceed 20 characters.
- Database schema names with hyphens (-) are not supported.
- User-defined data types are not supported by the Microsoft SQL Server Adapter.
- Direct connectivity to the Microsoft Azure SQL Database is not supported on either a private or public network. You must use the connectivity agent.
- If you are using a linked server with the Microsoft SQL Server Database, note that the use of a linked server is *not* certified with the Microsoft SQL Server Adapter.
- All integrations that include stored procedure, PureSQL, or operation on table database operations must finish within 240 seconds. Otherwise, the query times out and a `Limit Exceeded` error occurs.

### 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](#).

## About Microsoft SQL Server Use Cases

The Microsoft SQL Server can be used in scenarios such as the following:

You can create an integration that includes an SOAP Adapter connection on the source (inbound) side and a Microsoft SQL Server on the target (outbound) side. For example, when configuring the target Microsoft SQL Server, you can select a stored procedure that enables you to pass an employee ID as an input parameter from the SOAP Adapter to an on-premises SQL database to retrieve additional information about the employee (first name, last name, email ID, and so on). The request is sent to the on-premises agent for execution. The employee results are then returned to Oracle Integration.

## Workflow to Create and Add a Microsoft SQL Server 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.

Step	Description	More Information
1	Decide where to work	<ul style="list-style-type: none"> <li>Work in a project (see why working with projects is preferred in <i>Using Integrations in Oracle Integration 3</i>).</li> <li>Work outside a project.</li> </ul>
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 Microsoft SQL Server Adapter Connection</a>
3	Create the integration. When you do this, you add source and target connections to the integration.	Create Integrations and <a href="#">Add the Microsoft SQL Server Adapter Connection to an Integration</a>
4	Map data between the source connection data structure and the target connection data structure.	Map Data in <i>Using Integrations in Oracle Integration 3</i>
5	Specify the primary business identifier to track a field across an integration flow during runtime.	Assign Business Identifiers in <i>Using Integrations in Oracle Integration 3</i>
6	(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>
7	Activate the integration.	Manage Integrations in <i>Using Integrations in Oracle Integration 3</i>
8	Monitor the integration on the dashboard.	Monitor Integrations in <i>Using Integrations in Oracle Integration 3</i>
9	Track payload fields in messages during runtime.	Assign Business Identifiers for Tracking Fields in Messages and Manage Business Identifiers for Tracking Fields in Messages in <i>Using Integrations in Oracle Integration 3</i>
10	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 Microsoft SQL Server 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 Microsoft SQL Server Adapter:

- Ensure that you have write permissions on the database.
- Ensure that you have the required permissions to run stored procedures and packages and SQL statements against the Microsoft SQL Server.
- Know the database hostname or IP address and the port number.
- Know the database or instance name.
- Know the username and password for connecting to the database.


## 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.
<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 Add and Share a Connection Across a Project.</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 to specify properties for the Microsoft SQL Server Database or Microsoft Azure SQL Database to which to connect.
2. Enter the host name or IP address of the database server.
3. Enter the optional database server port number.
4. Enter the optional database name.

If you are connecting to a Microsoft Azure SQL Database on transport layer security (TLS) 1.2, with the connectivity agent installed using the JDK8 version, you must add an additional parameter with the database name:

```
CryptoProtocolVersion=TLSv1.2
```

For example:

```
database_name;CryptoProtocolVersion=TLSv1.2;
```

5. Enter the optional instance name.
6. From the **Encrypt Connection** list, select **Yes** if you want to encrypt your connection to the SQL Server or Microsoft Azure SQL instance. Selecting **Yes** causes the **Validate Server Certificate** list to be enabled.
7. From the **Validate Server Certificate** list, select **Yes** if you want to upload a certificate. See Upload an SSL Certificate.

## Configure Connection Security

Configure security for your Microsoft SQL Server Adapter connection.

1. Go to the **Security** section.
2. Enter your login credentials for the Microsoft SQL Server Database or Microsoft Azure SQL Database:
  - a. Note that only the Username Password Token security policy is supported. It cannot be deselected.
  - b. Enter a username and password to connect to the database.

## 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

1. Go to the **Access type** section.
2. Select the option for accessing your endpoint.

Option	This Option Appears If Your Adapter Supports ...
<b>Connectivity agent</b>	<p>Connections to on-premises endpoints through the connectivity agent.</p> <ol style="list-style-type: none"> <li>a. Click <b>Associate agent group</b>. The Associate agent group panel appears.</li> <li>b. Select the agent group, and click <b>Use</b>.</li> </ol> <p>To configure an agent group, you must download and install the on-premises connectivity agent. See <a href="#">Download and Run the Connectivity Agent Installer</a> and <a href="#">About Creating Hybrid Integrations Using Oracle Integration in <i>Using Integrations in Oracle Integration 3</i></a>.</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	<p>A dialog prompts you to select the type of connection testing to perform:</p> <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**.

## 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 certificate expiration date, status, and type. Certificates installed by the system cannot be deleted.
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 *RSA Signature Validation 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**.

# 3

## Add the Microsoft SQL Server Adapter Connection to an Integration

When you drag the Microsoft SQL Server Adapter into the trigger or invoke area of an integration, the Adapter Endpoint Configuration Wizard appears. This wizard guides you through the configuration of the Microsoft SQL Server Adapter endpoint properties.

These topics describe the wizard pages that guide you through configuration of the Microsoft SQL Server Adapter as a trigger and invoke in an integration.

### Note

Note the following details when using the merge operation with the Microsoft SQL Server Adapter.

- The Microsoft SQL Server Adapter relies on the primary key for all operations and does not support overwriting the primary key that is defined at the database level.
- Use stored procedures to handle custom logic for the merge operation on the attributes that do not have a primary key.

### Topics:

- [Basic Information Page](#)
- [Stored Procedure Page](#)
- [SQL Statement Page](#)
- [Polling Properties](#)
- [Summary Page](#)

## Basic Information Page

The Basic Info page appears when you drag an adapter onto the integration canvas. Review these topics to learn more about Microsoft SQL Server Adapter basic information settings.

Element	Description
<b>What do you want to call your endpoint?</b>	<p>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:</p> <ul style="list-style-type: none"><li>• Blank spaces (for example, <code>My DB Connection</code>)</li><li>• Special characters (for example, <code>#;83&amp; or righ(t)now4</code>)</li><li>• Multibyte characters</li></ul>

Element	Description
<b>What operation do you want to perform?</b>	<p>Select the type of operation for this connection to perform:</p> <ul style="list-style-type: none"> <li>• <b>Invoke a Stored Procedure:</b> Select to invoke a stored procedure in the database.</li> <li>• <b>Run a SQL Statement:</b> Select to run a SQL query against the database.</li> <li>• <b>Perform an Operation On a Table</b> — Select to perform one of the following operations on a table. You can update or insert multiple records in a single request. <ul style="list-style-type: none"> <li>– <b>Insert</b></li> <li>– <b>Update</b></li> <li>– <b>Insert or Update (Merge)</b></li> <li>– <b>Select</b></li> </ul> </li> </ul> <p><b>Note:</b> When operations in a SQL statement such as Update, Concat, and Merge accept values for the inbound invocation of an integration, they do not work. For example, the following query does not work:</p> <pre>select concat(empname, 'ss') from DB_AQ where empno=#empno</pre> <pre>select empno from DB_AQ where empname=concat(#empname, 'YY')</pre> <p>As a workaround, handle these scenarios during payload mapping. For example, perform a concatenation during mapping of the payload. The final output can then be passed as input to the SQL query.</p>

## Stored Procedure Page

Enter the stored procedure parameters.

### Note

- Stored procedures return binary large objects (for example, BLOB database data types) as base64Binary types in XML. Depending upon the use cases, these can be decoded during transformation using inbuilt functions such as decodeBase64 or can be passed as-is for downstream processing.
- Adapter input/output parameters are defined based on the stored procedure IN/OUT parameters. The IN parameter corresponds to the request and the OUT parameter is translated as the response.

Element	Description
<b>Select Schema</b>	Select a database schema from the list that includes the data you want to query (for example, you want to query details about an employee based on their employee ID). This action refreshes the page to display fields for selecting a package or procedure to invoke.

Element	Description
<b>Select Package</b>	Select the database package. This action refreshes the page to display the procedures available for the package.
<b>Select Procedure</b>	Displays the in (inbound), out (outbound), and in/out (inbound/outbound) parameters for the selected package.
<b>Arguments</b>	Display the in, out, and in/out parameters that are passed with this procedure.

## SQL Statement Page

Enter the SQL statement parameters. The Run a SQL Statement page is the wizard page that is displayed if you selected SQL statements as the operation type on the Basic Info page.

### Note

- Do not use schema/database names in SQL queries. Configure the details in the connection. For example:

```
Update HR.employee set HR.employee.first_name = 'Name' where
HR.employee.employee_id='1'
```

can be changed to a simple query, such as:

```
Update employee set first_name = 'Name' where employee_id='1'
```

where HR is used in the connection details. This restricts a user with specific privileges to a particular schema/database.

- When configuring the adapter as an invoke connection, ensure that proper spaces are provided between key words for a pure SQL statement. For example, the following statement fails during integration activation because there is no blank space between VALUES and (#.

```
INSERT INTO <table_name> VALUES(#EMPNO, #EMPNAME)
```

Add a blank space between VALUES and (#, and the statement is successfully processed.

```
INSERT INTO <table_name> VALUES (#EMPNO, #EMPNAME)
```

Element	Description
<b>SQL Query</b>	Identifies the SQL query.
<b>Status</b>	After you click <b>Validate SQL Query</b> , ensure the <b>Status</b> field displays Success!.

## Polling Properties

Import the tables and select the root database table for the service query.

**Note**

No order is maintained while polling records.

### Topics

- [Polling Page](#)
- [Manage Tables Page](#)
- [Relations Page](#)
- [Polling Strategy and Options Page](#)

## Polling Page

The following table describes the key information on the Polling page.

Element	Description
<b>Import Tables</b>	Imports tables and the root database table for the service query.
<b>Remove Tables</b>	Removes tables. Select <b>Remove Tables</b> , clear the checkbox to the right of the table you want to remove, and click <b>Ok</b> . You cannot remove the root database table.
<b>Review and Manage relationships reachable from the root database table.</b>	Appears after importing tables. Select <b>Edit</b> to open the Relations page where you can view, create, and remove relationships between tables.
<b>Review and verify the attributes created from the imported tables and relationships.</b>	Appears after importing tables. Select <b>Edit</b> to open the Attributes Filtering page where you can review, verify, select or deselect the attributes in the object model created from the imported tables and the defined relationships.
<b>Polling Strategy and Options</b>	Appears after importing tables. Select <b>Edit</b> to open the Polling Strategy and Options page where you can define the polling strategy and specify polling options.

## Manage Tables Page

The following table describes the key information on the Manage Tables page. The Manage Tables page appears when you select **Schema** on the Manage Tables page.

Element	Description
<b>Schema</b>	Selects the schema for the tables and views you are importing.

Element	Description
<b>Table Type</b>	The type of the table to which the schema or view is applied. The list allows these selections: <ul style="list-style-type: none"> <li>All — selects all available tables and views.</li> <li>Materialized View — selects materialized views.</li> <li>Materialized View Log — selects materialized view logs.</li> <li>Synonym — selects the alias for the schema object.</li> <li>Table — selects tables.</li> <li>View — selects views.</li> </ul>
<b>Table Name</b>	Specify the table name. Table names are case sensitive.
<b>Search</b>	Click to search for the specified table.
<b>Available Tables</b>	Lists the tables that meet the selection criteria.
<b>Selected Tables</b>	Lists your table selection.
<b>Primary Keys</b>	Appears when you select tables without a primary key defined. Selects the virtual primary key for the table. <b>Note:</b> Having the primary key at the database level is the best practice.

## Relations Page

The following table describes the key information on the Relations page. The Relations page appears when you select **Edit** for the Review and Manage relationships reachable from the root database table option on the adapter Poll for a New or Changed Records page.

Element	Description
<b>Create New</b>	Opens the Create Relation page with these options: <ul style="list-style-type: none"> <li>Parent Table — selects the parent table for the relationship between tables.</li> <li>Child Table — selects the child table for the relationship between tables.</li> <li>Relationship — defines the relationship between the parent and child tables.</li> <li>Attribute Name — Applies attributes to the table relationship.</li> <li>Mapping — Displays the mapping for the table relationship.</li> </ul>
<b>Detach</b>	Opens the Relationships list in a new window.

## Polling Strategy and Options Page

The following table describes the key information on the Polling Strategy and Options page. The Polling Strategy and Options page appears when you select **Edit** for Polling Strategy and Options on the adapter Poll for a New or Changed Records page.

Element	Description
<b>Logical Delete Field</b>	Selects a field in the root database table. To allow the selection, polling must be enabled in the Status column.

Element	Description
<b>Read Value</b>	Identifies the value that is used to indicate a row has been read. For example, PROCESSED. Surrounding quotes are not required.
<b>Unread Value</b>	Indicates the rows to process. Only rows with Logical Delete Field and column values that match the UnRead Value are read.
<b>Polling Frequency (Sec)</b>	Specifies the polling frequency for new records or events.
<b>Rejected Value</b>	Set to <b>REJECTED</b> . If the incoming message is greater than the threshold size, that particular record is updated to <b>REJECTED</b> instead of <b>READ</b> . If the outbound operation returns a response greater than the size allowed, the response message is ignored and a fault response is sent to the calling client.  For details about supported sizes, see Service Limits in <i>Provisioning and Administering Oracle Integration 3</i> .

## Table Operation Page

You can update or insert multiple records in a single request.

### Note

When you change the structure of a table (for example, you add or delete a column), you must re-import the table by doing a re-edit in the Adapter Endpoint Configuration Wizard. Go to the Import Tables page and re-import the same table, then click **OK > Next > Done** to complete the wizard. Only then are the table changes reflected in the integration.

### Topics:

- [Relationships Page](#)
- [Create Relationship Page](#)
- [Attribute Filtering Page](#)
- [Operations on Table Page](#)

## Import Tables Page

Filter and select the tables to import based on the selected schema. These tables are used to generate a SQL statement based on the operation selected.

You can import the following number of tables:

- A maximum of three tables for insert, update, and insert or update actions
- A maximum of five tables for the select - operation on table feature
- A maximum of five tables for the polling feature

Element	Description
<b>Schema</b>	Select the schema to use. The page is refreshed to display the tables available for selection.
<b>Name Filter</b>	Filter the display of tables.
<b>Available</b>	Select the tables on which to insert or update records.
<b>Selected</b>	Displays the selected tables.

## Relationships Page

Review the relationships between the selected tables and optionally create, remove, or rename relationships. These relationships are used in the insert or update SQL statements.

Element	Description
<b>Relationships Table</b>	Displays the relationships defined on the root database table and any related tables (one-to-one or one-to-many).
<b>Create</b>	Click to create new relationships.
<b>Remove</b>	Click to remove a selected relationship.
<b>Rename</b>	Click to rename a selected relationship.

## Create Relationship Page

Specify the parent and child relationships to use in the SQL statement.

Element	Description
<b>Parent Table</b>	Select the parent table.
<b>Child Table</b>	Select the child table.
<b>Mapping Type</b>	Select the mapping type (one-to-many, one-to-one, or one-to-one with the foreign key on the child table). For example, if you selected <b>Employees</b> as the parent table and <b>Departments</b> as the child table, the following options are displayed: <ul style="list-style-type: none"> <li>• <b>Employees has a 1:1 Relationship with Departments</b></li> <li>• <b>Employees has a 1:1 Relationship with Departments (Foreign Key on Child table)</b></li> <li>• <b>Employees has a 1:M Relationship with Departments</b></li> </ul>
<b>Parent and Child Table</b>	Associate the foreign key fields to the primary key fields.
<b>Relationship Name</b>	Optionally name the relationship (a default name is generated).

## Attribute Filtering Page

Filter out the attributes to exclude.

Element	Description
<b>Attributes Tree</b>	Deselect any attributes to exclude from the database query. You cannot exclude primary key attributes.

## Operations on Table Page

Select the database tables. To use the bulk extract feature, you must choose the **SELECT** operation from the **Perform an Operation On a Table** list on the Basic Info page.

### Operations on Table Page

Element	Description
<b>Schema</b>	Select the database schema that includes the tables to process.
<b>Table Name</b>	Enter a filter with which to search the schema (for example, %TAB to search for tables with TAB in the name).
<b>Table Type</b>	Specify the table type filter to get a subset of the appropriate database objects, then click <b>Search</b> . <ul style="list-style-type: none"> <li>• <b>ALL</b></li> <li>• <b>TABLE</b></li> <li>• <b>VIEW</b></li> </ul>
<b>Filter By</b>	Enter the initial letters to filter the display of table names.
<b>Table Names</b>	Select the tables to import. <b>Note:</b> It is recommended that you to import the tables together for the adapter to automatically recognize the relationship. If you import the tables separately, you must explicitly create the table relationship.
<b>Import Tables</b>	Click to import the tables. The page is refreshed for you to select the parent database table.
<b>Select the parent database table</b>	Select the parent (root) table from the list. If using multiple related tables, this is the top-level parent table in the relationship. After making your selection, the page is refreshed for you to view and edit the table relationships.
<b>Add    Remove Tables</b>	Click to add more tables or remove tables no longer in use.
<b>Review and manage parent database table relationships</b>	Click <b>Edit</b> to view and edit the table relationships. The relationships automatically identified by the adapter are displayed. See <a href="#">Review and manage parent database table relationships Option</a> .
<b>Review and filter columns from selected database tables</b>	Click <b>Edit</b> to view and edit the table attributes. You can deselect any attributes to exclude from the database queries. Primary key attributes cannot be excluded. See <a href="#">Review and filter columns from selected database tables Option</a> .
<b>Review and edit SQL query</b>	Click <b>Edit</b> to view and edit the default SQL query. See <a href="#">Review and edit SQL query Option</a> . <b>Note:</b> This field is available for a <code>Select</code> operation on the table.

### Review and manage parent database table relationships Option

**Table 3-1 - Review and manage parent database table relationships Option**

Element	Description
<b>Create New</b>	Click to create a new relationship.

**Table 3-1 (Cont.) - Review and manage parent database table relationships Option**

Element	Description
<b>Relations</b>	View the existing parent and child table relations automatically created by the adapter.

**Review and filter columns from selected database tables Option****Table 3-2 - Review and filter columns from selected database tables Option**

Element	Description
<b>Attributes Tree</b>	View and deselect attributes automatically created by the adapter.

**Review and edit SQL query Option****Note**

This is only applicable for a `select` operation on a table.

**Table 3-3 - Review and edit SQL query Option**

Element	Description
<b>SQL Edit</b>	Click to manually edit the query in the <b>SQL Query</b> field. Use this field to add any necessary arguments or parameters.
<b>Maximum Number of Records to be fetched</b>	Select the number of records to fetch with this SQL query.

## Summary Page

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

Element	Description
<b>Summary</b>	<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>

# 4

## Implement Common Patterns Using the Microsoft SQL Server Adapter

You can use the Microsoft SQL Server Adapter to implement the following common patterns.

### Topics:

- [Define a Select Operation on Database Tables](#)

#### 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.

## Define a Select Operation on Database Tables

You can define a `SELECT` operation to perform against database tables. This section provides a high level overview of creating an integration in which a Microsoft SQL Server Adapter is configured as an invoke connection to retrieve table records from the Microsoft SQL Server.

To define a `SELECT` operation on database tables:

1. Configure SOAP Adapter and Microsoft SQL Server Adapter connections.
2. Select **Application** in the Create integration panel.
3. Add and configure the SOAP Adapter as a trigger connection in the integration.  
The SOAP Adapter is configured to accept an input and return the response received from the invoke connection.
4. Add the Microsoft SQL Server Adapter as an invoke connection in the integration.  
This invokes the Adapter Endpoint Configuration Wizard.
5. On the Basic Info page, select **Perform an Operation On a Table** as the type of operation to perform and **Select** as the operation to perform on the table.
6. On the Operate On Table page, specify the schema and tables to import, and click **Import Tables**. For this example, the following values are specified.
  - **Schema:** HR
  - **Table Type:** TABLE
  - **Table Name:** %TAB
  - **Selected Tables:** **EMPLOYEE\_TAB** and **DEPARTMENT\_TAB**. The tables are imported together for the Microsoft SQL Server Adapter to recognize the relation between the tables.

Basic Info Invoke a Stor... Run a SQL St... **Operation On...** Summary

### Operation On Table

Search tables to import

Schema \*  
HR

Table Name  
%TAB

Table Type  
TABLE

Search

Filter By  
Name

Available Selected

DBAAS\_LOG\_TAB DEPARTMENT\_TAB  
DBAAS\_VIEW\_TAB EMPLOYEE\_TAB

>  
>|  
<  
<|

Import Tables

The page is refreshed for you to select the parent (root) database table.

7. Select the parent table (for this example, **DEPARTMENT\_TAB** is selected).

This page enables you to:

- View the automatically created table relationships and create new ones.
- View and deselect attributes.
- View and edit the automatically created SQL query.

**Operation On Table**

Select the parent database table

You must select the parent database table. If you are using multiple related tables, then this is the highest-level table (or top-level parent table) in the relationship tree. You can either add more tables or remove the ones that are no longer used.

--- select one ---

DEPARTMENT\_TAB

EMPLOYEE\_TAB

Add | Remove Tables

Review and manage parent database table relationships

Edit

You can review and manage all the relationships that are reachable from parent table. Relationship created via Adapter wizard are used by Adapter internally and doesn't have any impact on the database.

Review and filter columns from selected database tables

Edit

Use the Columns Filtering section to review and verify the columns in the object model created from the selected tables and the defined relationships. Deselect columns that you want to exclude from the database query.

Review and edit SQL Query

Edit

Use the SQL Query section to specify the selection criteria. You can add additional criteria's using Graphical Expression Builder or can define custom SQL select criteria using SQL Edit.

8. If you want to edit the automatically created SQL query, click **Edit** to the right of **Review and edit SQL Query**.
  - a. Click **Edit using Expression Builder**. You can also manually edit the SQL query by clicking **SQL Edit**.
  - b. Click **Add New** to add new criteria to the SQL query. The automatically created SQL query is displayed below the link.
  - c. Specify values for the following fields, and click **OK**.
    - **First Argument**
    - **Operator**
    - **Second Argument**

For example:

The criteria you specify are appended to the existing SQL query as part of a **WHERE** clause. Any additional SQL query criteria you specify are appended as part of an **AND** clause. For example:

```
SELECT DISTINCT t0.DEPTNO, t0.DEPTNAME, t0.LOC FROM DEPARTMENT_TAB t0, EMPLOYEE_TAB t1
WHERE ((t0.DEPTNO = #deptno) AND (t1.EMPID > 999)) AND (t1.DEPTNO = t0.DEPTNO)
```

- d. Click **OK**.
9. Click **Next**.
10. View your selections on the Summary page. Links to the tables you selected to import and SQL query you specified are provided.
11. Click **Done** to exit the Adapter Endpoint Configuration Wizard.
12. Complete the integration by performing mapping and tracking tasks.
13. Activate the integration.
14. Copy the link to invoke the integration from under the **How to Run** link.
15. Invoke the integration from a tool such as the SOAP UI.
16. Review the values returned by the Microsoft SQL Server Adapter.

# 5

## Troubleshoot the Microsoft SQL Server Adapter

Review the following topic to learn about troubleshooting issues with the Microsoft SQL Server Adapter.

### Topics:

- [Connection Reset Exception During an Invoke](#)

Additional integration troubleshooting information is provided. See Troubleshoot Oracle Integration in *Using Integrations in Oracle Integration 3* and the [Oracle Integration Troubleshooting page](#) on the Oracle Help Center.

## Connection Reset Exception During an Invoke

A `Connection reset` exception occurs when invoking an integration using Microsoft SQL Server Adapter if the Microsoft SQL Server Database endpoint abruptly ended the session created by the Microsoft SQL Server Adapter.

A re-invoke of the same instance re-establishes the connections. Ensure that an external script or a firewall does not interfere and end the connection created by the Microsoft SQL Server Adapter in the Microsoft SQL Server Database.