

Oracle® Database

Using Oracle Client for Microsoft Tools



Release 19c

F84376-01

October 2023

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Oracle Database Using Oracle Client for Microsoft Tools, Release 19c

F84376-01

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1

Installing and Configuring Oracle Client for Microsoft Tools

Learn about Oracle Client for Microsoft Tools, including determining the correct install type and installation instructions.

- [About Oracle Client for Microsoft Tools](#)
Learn about Oracle Client for Microsoft Tools, supported Microsoft tools, and how to select the appropriate Oracle Client for Microsoft Tools install type.
- [Installing Oracle Client for Microsoft Tools](#)
General steps for installing Oracle Client for Microsoft Tools.

1.1 About Oracle Client for Microsoft Tools

Learn about Oracle Client for Microsoft Tools, supported Microsoft tools, and how to select the appropriate Oracle Client for Microsoft Tools install type.

Introduction

Oracle Client for Microsoft Tools (OCMT) is a graphical installer that automates the installation and configuration of Oracle Data Provider for .NET (ODP.NET) to support Microsoft tool connections with Oracle on-premises and cloud databases, including Oracle Autonomous Database (ADB) Serverless. OCMT supports multiple Microsoft tools, including:

- Power BI Desktop
- Power BI service
- Excel
- SQL Server Analysis Services
- SQL Server Data Tools
- SQL Server Integration Services
- SQL Server Reporting Services
- BizTalk Server

These instructions work for on-premises database and both dedicated and serverless ADB. The instructions for on-premises database setup also apply to Oracle Database Cloud Services and Oracle Exadata Cloud Service.

Compatibility

Power BI Desktop, Power BI service, Excel, SQL Server Analysis Services, and BizTalk Server use **unmanaged ODP.NET** to connect to Oracle database. If you use a 64-bit product, you must use 64-bit OCMT to install 64-bit unmanaged ODP.NET. If you use a 32-bit Microsoft product, you must use 32-bit OCMT to install 32-bit unmanaged ODP.NET.

SQL Server Data Tools, SQL Server Integration Services, and SQL Server Reporting Services use **managed ODP.NET**. Managed ODP.NET works with both 32-bit and 64-bit

apps, which allows you to use either 32-bit or 64-bit OCMT with any of these Microsoft products.

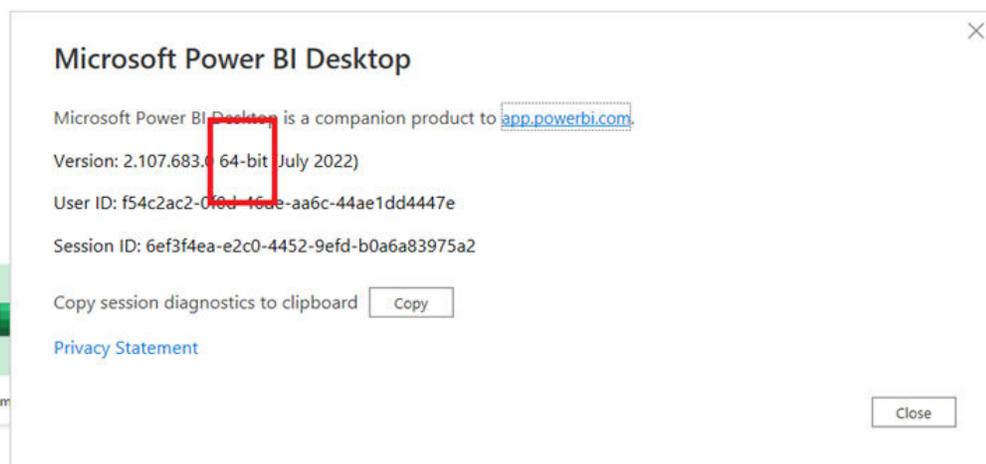
- [Example: Determining the Bitness of a Microsoft Product](#)
Determine the bitness of a Microsoft product.

1.1.1 Example: Determining the Bitness of a Microsoft Product

Determine the bitness of a Microsoft product.

If you are using unmanaged ODP.NET, determine whether you are using the 32-bit Microsoft product or the 64-bit Microsoft product so you can install the matching bitness of ODP.NET.

Let's use Power BI Desktop as an example. In Windows, start Power BI Desktop. On the menu, select **Help**, then **About** to see a window like the following:



The above screenshot notes that this is 64-bit Power BI Desktop. That means 64-bit unmanaged ODP.NET must be installed and configured for Power BI to connect to an Oracle Database.

If you are using 32-bit Power BI Desktop instead, you must install 32-bit unmanaged ODP.NET.

1.2 Installing Oracle Client for Microsoft Tools

General steps for installing Oracle Client for Microsoft Tools.

Determine which bitness of Oracle Client for Microsoft Tools (OCMT) you need to install. In general, if you use a 32-bit product, you should use 32-bit OCMT. If you use a 64-bit product, you should use 64-bit OCMT.

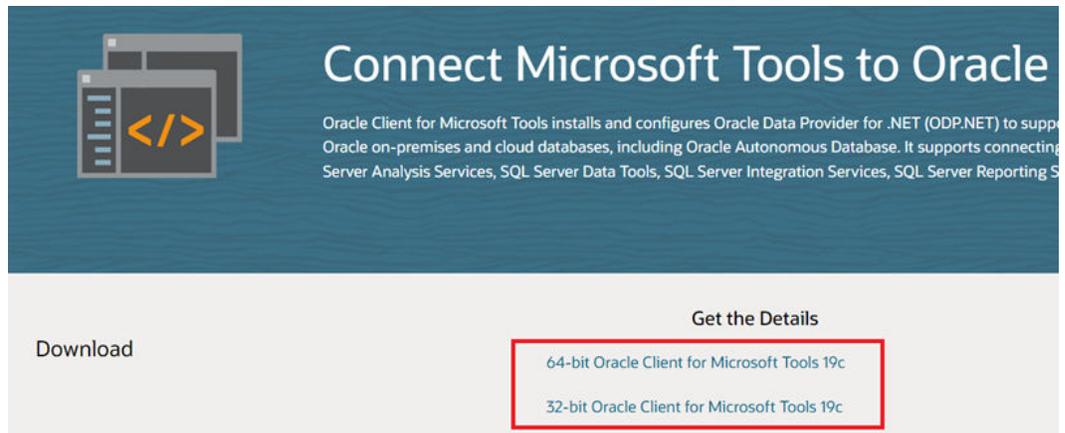


Note:

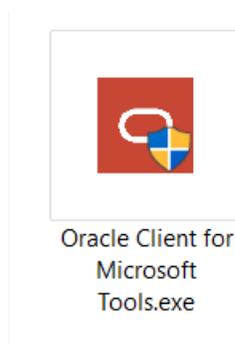
Screenshots may differ slightly between 32-bit OCMT and 64-bit OCMT.

For more information on selecting the bitness of a product, see [About Oracle Client for Microsoft Tools](#) for general information, or [Connecting with Microsoft Tools](#) for information on the specific tool you are using.

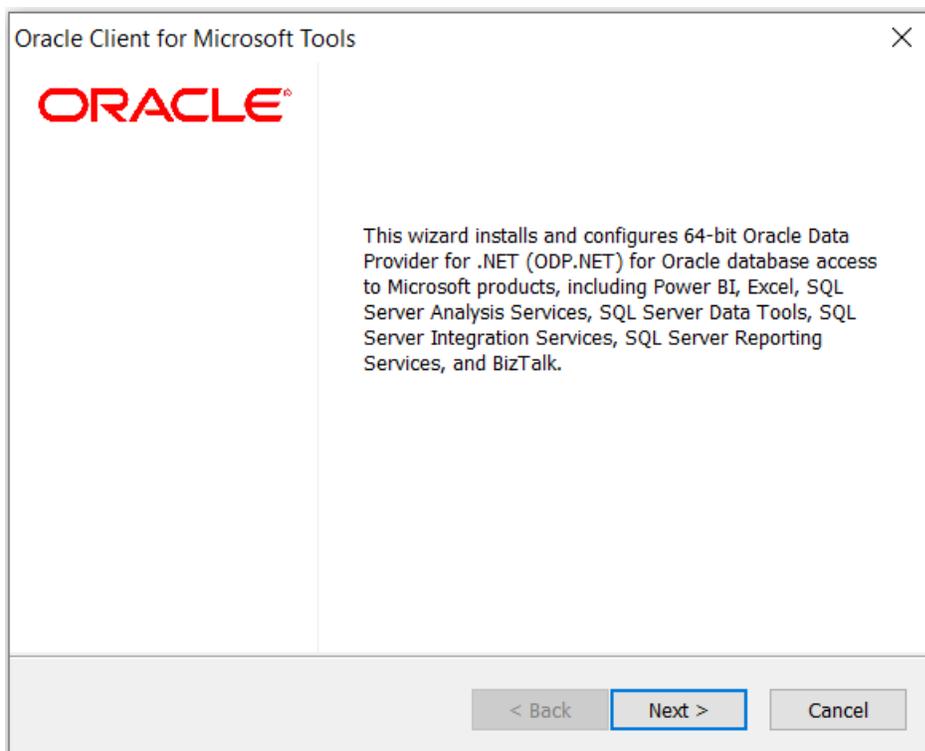
1. From the [Oracle Client for Microsoft Tools](#) page, click on the download link:
 - For 64-bit unmanaged ODP.NET, choose **64-bit Oracle Client for Microsoft Tools**.
 - For 32-bit unmanaged ODP.NET, choose **32-bit Oracle Client for Microsoft Tools**.
 - For managed ODP.NET, you can choose either download.OCMT downloads to your machine.



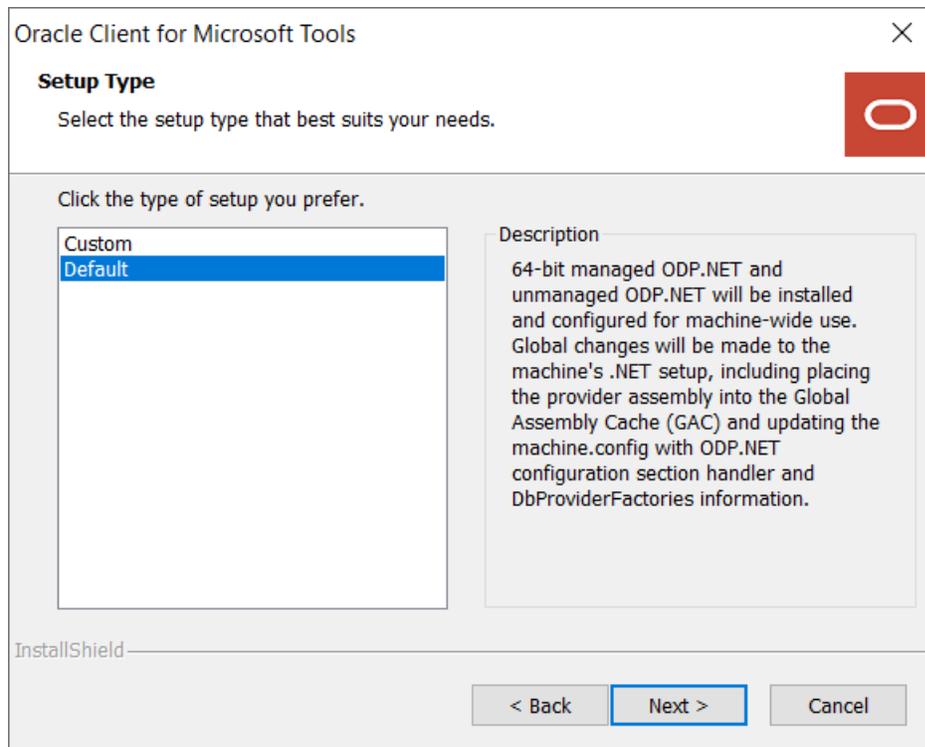
2. Find the OCMT executable on your machine and doubleclick it to begin the install process.



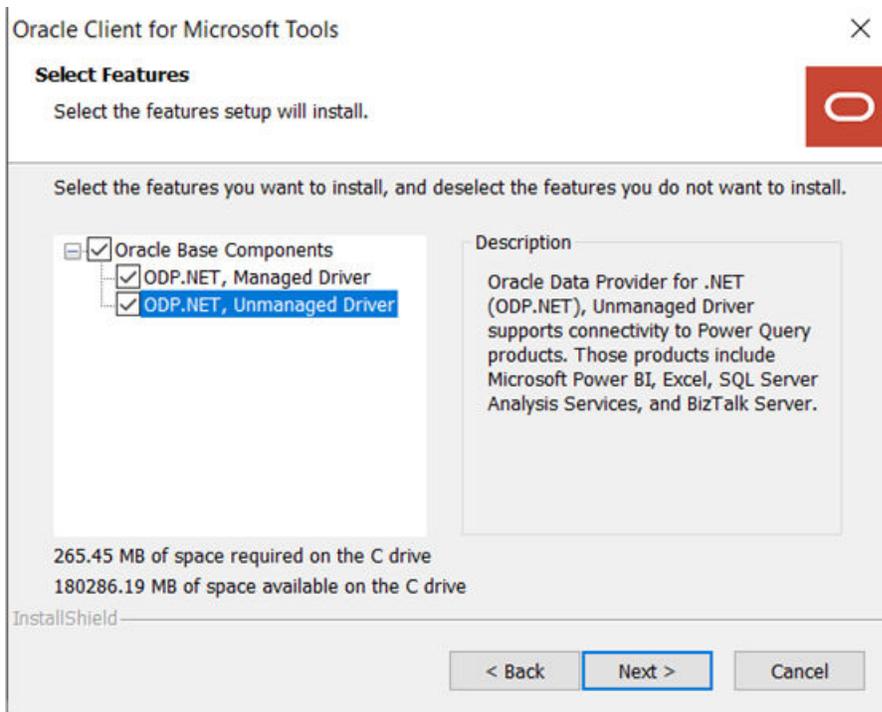
3. Click **Yes** in the User Account Control screen.
The introductory install screen displays.



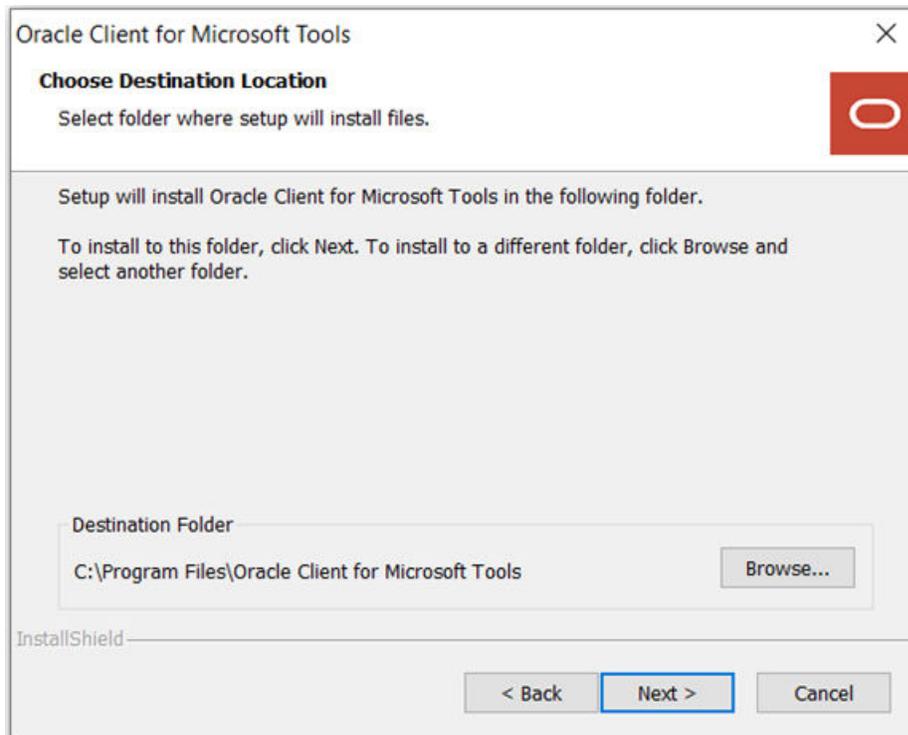
4. Click **Next**.
5. The OCMT Setup Type screen appears. You have two choices:
 - **Custom** - Decide whether to install and configure only managed ODP.NET, only unmanaged ODP.NET, or both.
 - **Default** - Both managed and unmanaged ODP.NET are installed and configured.



6. Click **Next**.
7. (Custom only) On the **Select Features** screen, select an installation option and click **Next**:
 - **Managed ODP.NET** - Installs only managed ODP.NET.
 - **Unmanaged ODP.NET** - Installs only unmanaged ODP.NET.
 - **Both** - Installs both managed and unmanaged ODP.NET.



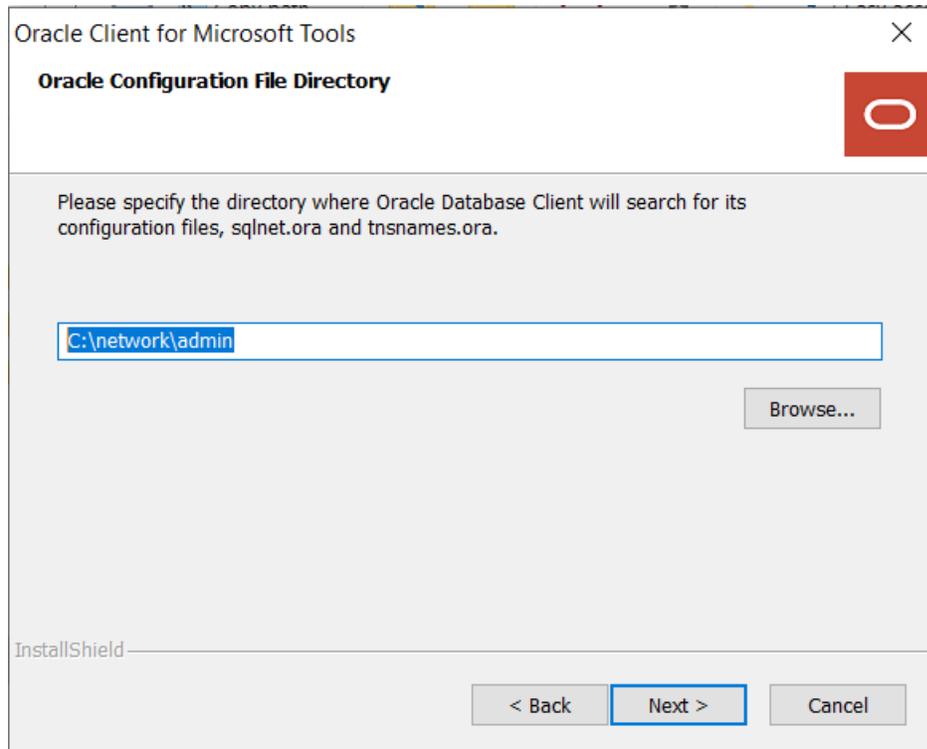
8. On the **Destination Location** screen, click **Browse** and select the installation directory for ODP.NET.



9. Click **Next**.

10. On the **Oracle Configuration File Directory** screen, click **Browse** to select the location of the Oracle Client configuration files, `sqlnet.ora` and `tnsnames.ora`, and click **Next**.

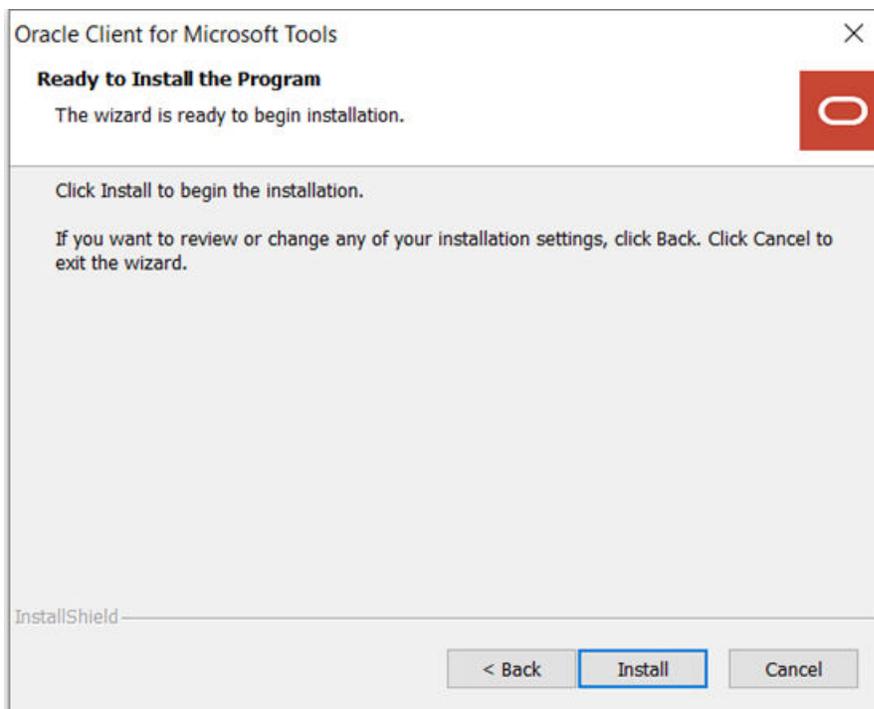
For example, `C:\network\admin`.



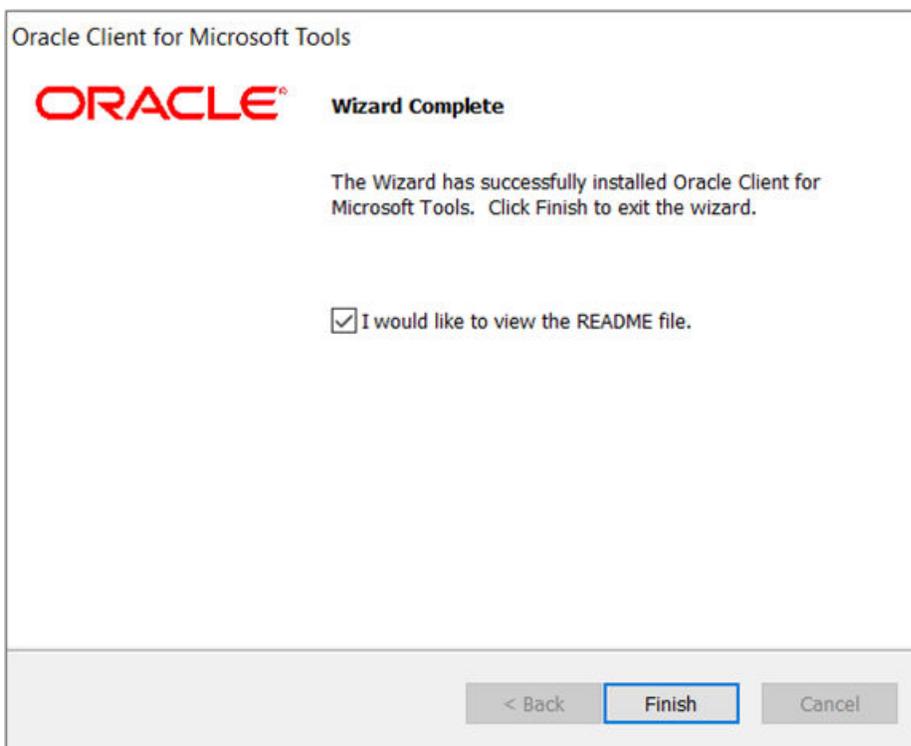
11. If you are connecting to Oracle Autonomous Database Serverless:
 - a. Download the database connection credentials zip file from the Oracle Cloud Console.
 - b. Unzip the contents into the configuration file directory you specified in the previous step.
 - c. Open `sqlnet.ora`.
 - d. Update the wallet location's `DIRECTORY` setting value to the same configuration file directory.

For more information on configuring Oracle database connections with specific Microsoft tools, see [Connecting with Microsoft Tools](#).

12. Click **Install**.



13. (Optional) Select the checkbox to view the README file.
14. Click **Finish**.



The installation is complete and configured for use on your machine. Your Microsoft tools can now connect to Oracle databases.



Note:

For more information on connecting specific Microsoft tools, see [Connecting with Microsoft Tools](#).

2

Database Client Configuration Files

Learn about database client configuration files for on-premises database and Oracle Autonomous Database (ADB).

In order to use Oracle Client for Microsoft Tools, an on-premises Oracle Database or ADB must already be provisioned. Connecting to Oracle databases on-premises and through ADB are similar, but there are some variations in the steps needed.

- [Setting Up On-Premises Databases](#)
Locate the client configuration files and place them into a specified location on your machine.
- [Setting Up Oracle Autonomous Database](#)
Download your database credentials and unzip the content onto your client machine.

2.1 Setting Up On-Premises Databases

Locate the client configuration files and place them into a specified location on your machine.

To connect to an on-premises database:

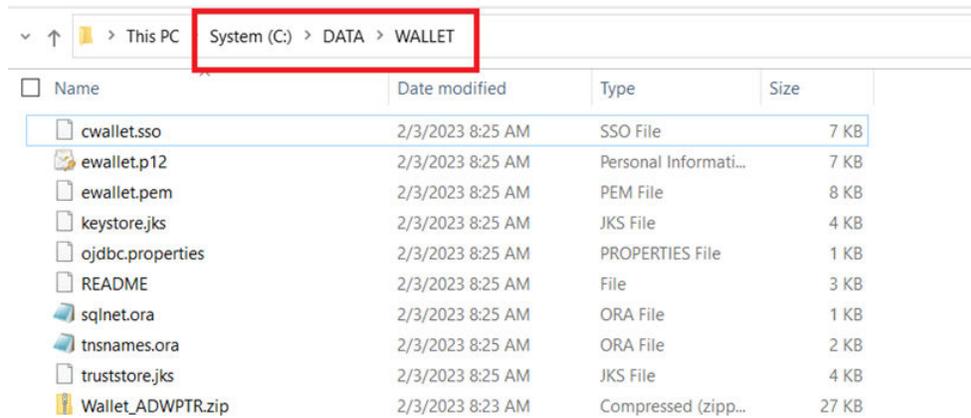
1. Locate the configuration files required for your database server setup.
 - Typically, ODP.NET requires `tnsnames.ora` and `sqlnet.ora` to be accessible to connect to the database server. These files can be copied from another Oracle database client that connects to the target database server.
 - Alternatively, an Easy Connect or Easy Connect Plus string can be used in lieu of credential files for on-premises databases. If you use Easy Connect (Plus), you can skip the credential file downloading and setup steps.

For example, the Power BI Desktop **Server** configuration setting accepts an Easy Connect string with the following format:

```
<DB hostname>:<Port>/<Service Name>
```

2. Place the client configuration files on your Windows machine into a directory, and note the directory location.

For example, `C:\data\wallet`.



Name	Date modified	Type	Size
cwallet.sso	2/3/2023 8:25 AM	SSO File	7 KB
ewallet.p12	2/3/2023 8:25 AM	Personal Informati...	7 KB
ewallet.pem	2/3/2023 8:25 AM	PEM File	8 KB
keystore.jks	2/3/2023 8:25 AM	JKS File	4 KB
ojdbc.properties	2/3/2023 8:25 AM	PROPERTIES File	1 KB
README	2/3/2023 8:25 AM	File	3 KB
sqlnet.ora	2/3/2023 8:25 AM	ORA File	1 KB
tnsnames.ora	2/3/2023 8:25 AM	ORA File	2 KB
truststore.jks	2/3/2023 8:25 AM	JKS File	4 KB
Wallet_ADWPTR.zip	2/3/2023 8:23 AM	Compressed (zipp...	27 KB

If your on-premises database requires a wallet or additional configuration, be sure to update your `tnsnames.ora`, `sqlnet.ora`, or other configuration files accordingly.

The credentials are now available, and you can continue with the configuration of your specific Microsoft tool.

2.2 Setting Up Oracle Autonomous Database

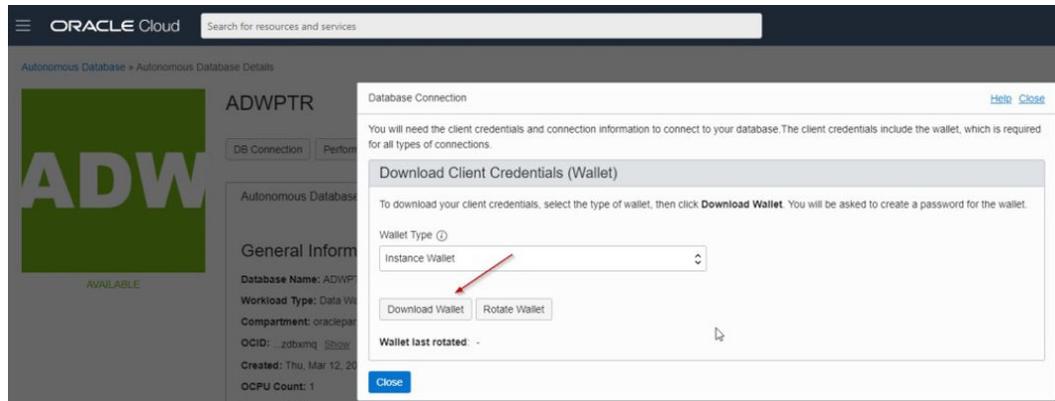
Download your database credentials and unzip the content onto your client machine.

In order to use Oracle Client for Microsoft Tools (OCMT), Autonomous Database (ADB) must already be provisioned.

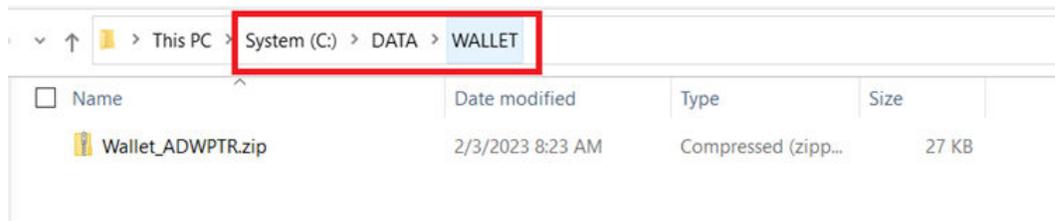
You need access to the Oracle Cloud Console that has access to your ADB instance.

1. Go to the cloud console screen for the ADB instance you connect to.
2. Start your ADB instance.
3. Click **Database Connection**.
4. Click **Download Wallet**.
5. Supply the wallet password. Confirm the password, and click **Download**.
6. Download the ADB credentials zip file to the machine that has your Microsoft tool installed.

OCMT uses these credential files (`cwallet.sso`, `tnsnames.ora`, and `sqlnet.ora`) to connect your Microsoft tool to ADB.



7. Unzip the credentials, and place them on your Windows machine into a directory. Note the directory location.
For example, C:\data\wallet.



8. If you are connecting to one ADB instance:
 - a. From the credentials directory, open `sqlnet.ora` in a text editor.
 - b. Locate the following line: `WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY=?/network/admin)))`
 - c. Set the `DIRECTORY` value to the ADB wallet directory.

For example,

```
WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY=C:\DATA\WALLET)))
```

9. If you are connecting to multiple ADB instances:
 - a. Ensure that each ADB instance is set up with a different wallet.
 - b. In each wallet location, add the parameter `WALLET_LOCATION` to each connect descriptor in `tnsnames.ora`.
 - c. After making your changes, save the file.

For example:

```
adwptr_high =
(description=(retry_count=20) (retry_delay=3) (address=(protocol=tcps)
(port=1522) (host=host name))
(connect_data=(service_name=service name))
```

```
(security=(ssl_server_dn_match=yes)  
(WALLET_LOCATION=C:\DATA\WALLET\ADWPTR))
```

```
adwbi_high =  
(description=(retry_count=20) (retry_delay=3) (address=(protocol=tcps)  
(port=1522) (host=host name))  
(connect_data=(service_name=service name))  
(security=(ssl_server_dn_match=yes)  
(WALLET_LOCATION=C:\DATA\WALLET\ADWBI)))
```

10. Continue with the configuration of your specific Microsoft tool.



Note:

See [Connecting with Microsoft Tools](#) for more detailed information.

3

Connecting with Microsoft Tools

Learn about connecting Oracle databases to Microsoft tools, including configuration steps.

- [Microsoft Power BI Desktop](#)
Configure Microsoft Power BI Desktop to connect to Oracle Database.
- [Microsoft Power BI Service](#)
Configure Microsoft Power BI Service to connect to Oracle Database.
- [Performance Tuning for Large Data Retrievals](#)
Recommendations for improving Oracle database retrieval performance with Microsoft tools.

3.1 Microsoft Power BI Desktop

Configure Microsoft Power BI Desktop to connect to Oracle Database.

Microsoft Power BI Desktop uses **unmanaged Oracle Data Provider for .NET (ODP.NET)** for data access. You can configure Microsoft Power BI Desktop to access on-premises database and both dedicated and serverless ADB. The instructions for on-premises databases setup also apply to Oracle Database Cloud Services and Oracle Exadata Cloud Service.

Overview

The general steps to set up Oracle database connectivity with Microsoft Power BI Desktop are:

1. Provision Oracle database or ADB.
2. Download database credentials to Windows client. (See [Database Client Configuration Files](#).)
3. Install Power BI on Windows client.
4. Install and configure ODP.NET on Windows client with OCMT. (See [Installing and Configuring Oracle Client for Microsoft Tools](#).)
5. Validate Power BI connects to Oracle database or ADB.

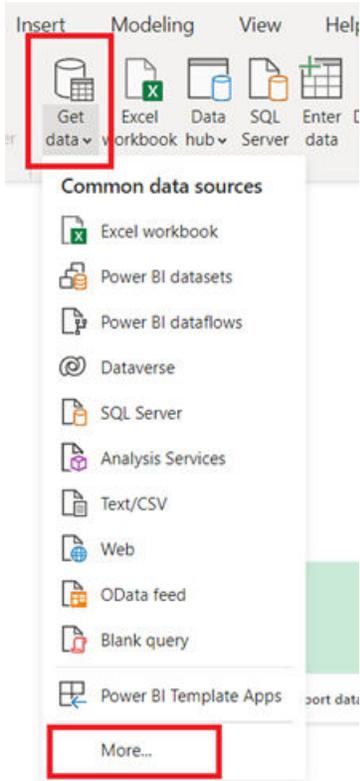
This section covers how to complete step 5, and assumes you have already completed steps 1-4. [Database Client Configuration Files](#) covers step 2. [Installing and Configuring Oracle Client for Microsoft Tools](#) covers step 4.

- [Validating Power BI Connects to Oracle DB](#)
Validate the Power BI Desktop connection to Oracle Database by setting up the connection from Power BI Desktop.

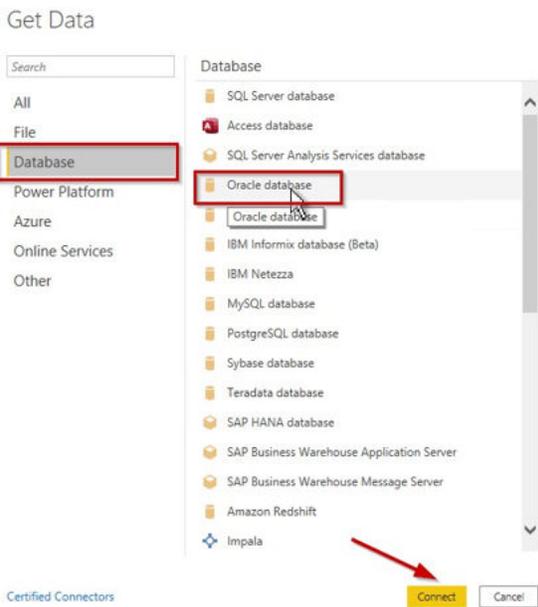
3.1.1 Validating Power BI Connects to Oracle DB

Validate the Power BI Desktop connection to Oracle Database by setting up the connection from Power BI Desktop.

1. Open **Power BI Desktop**.
2. On the menu bar, click **Get data, More....**



3. Select **Database, Oracle database, Connect.**



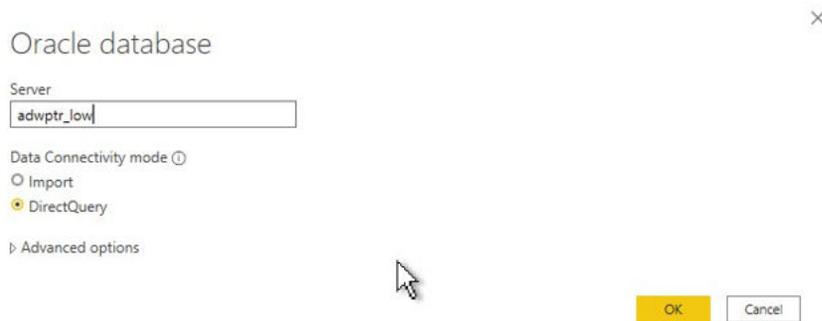
4. In the **Server** text box, enter your database net service name or an Easy Connect (Plus) string.

If you are using a `tnsnames.ora` file with your Oracle database, open the file to see which ADB or database net service names you can connect to. The screenshot shows three different ones: `adwptr_high`, `adwptr_low`, and `adwptr_medium`. Use one of these values for the server name.

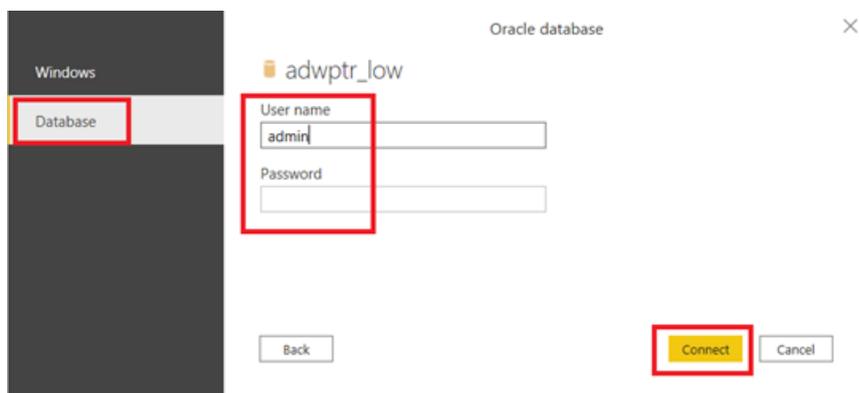
```

tnsnames
File Edit Format View Help
adwptr_high = (description= (retry_count=20)(retry_delay=3)(address=(protocol=tcps)(port=1522)(host=a
adwptr_low = (description= (retry_count=20)(retry_delay=3)(address=(protocol=tcps)(port=1522)(host=ad
adwptr_medium = (description= (retry_count=20)(retry_delay=3)(address=(protocol=tcps)(port=1522)(host

```



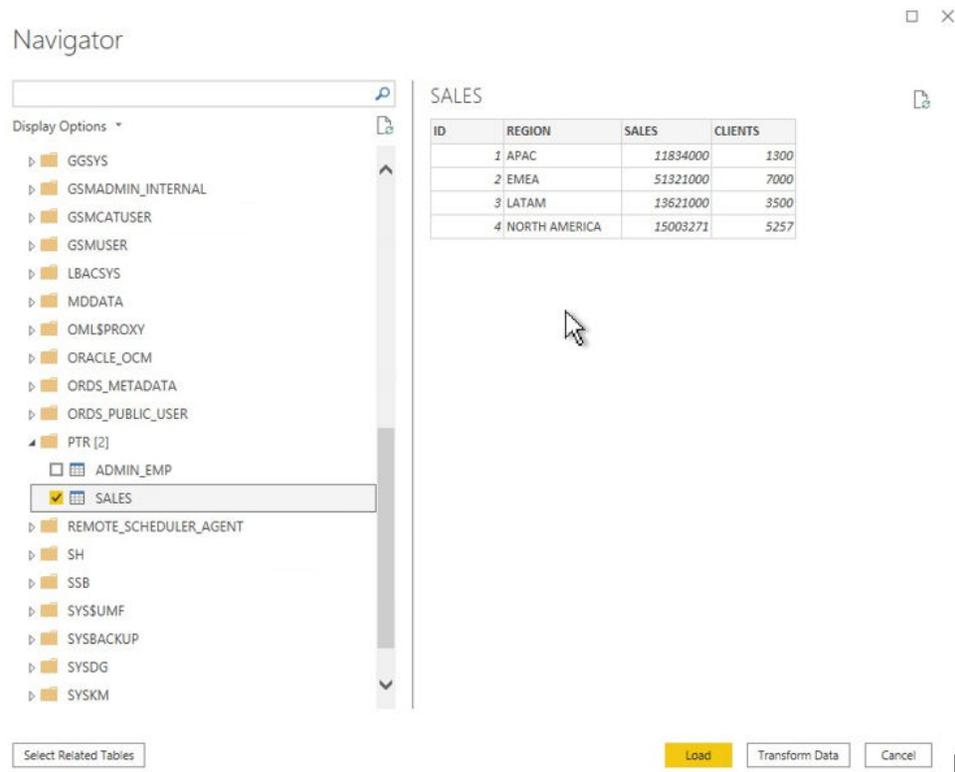
5. Set any other Power BI settings needed on this screen.
6. Click **OK**.
7. Select **Database** and enter your database credentials.



Note: Oracle Autonomous Database Serverless, new Oracle Database 19c release updates, and Oracle Database 23c support Microsoft Entra ID/Azure Active Directory connections.

8. Click **Connect**.

- To continue, select the schema objects needed for your Microsoft Power BI Desktop file (.pbix) and load the data.



Congratulations! Power BI Desktop is connected to ADB or an on-premises Oracle database. For information on performance tuning for large data retrievals, see [Performance Tuning for Unmanaged ODP.NET](#).

3.2 Microsoft Power BI Service

Configure Microsoft Power BI Service to connect to Oracle Database.

Microsoft Power BI Service runs in the Microsoft 365 cloud. Power BI service uses an on-premises data gateway, also known as **Power BI gateway**, to connect the Power BI service to Oracle databases. The gateway is hosted on Windows, either on-premises or in a cloud virtual machine, such as in Oracle Cloud Infrastructure or Azure.

These instructions use **64-bit unmanaged Oracle Data Provider for .NET (ODP.NET)** for data access. They work for on-premises database and both dedicated and serverless ADB. The instructions for on-premises databases setup also apply to Oracle Database Cloud Services and Oracle Exadata Cloud Service.

Overview

These are the general steps to setup Oracle database connectivity with Microsoft Power BI Desktop:

- Provision Oracle database or ADB.

2. Download database credentials to Windows client. (See [Database Client Configuration Files](#).)
3. Create Power BI service in Microsoft 365 Cloud.
4. Install and configure Power BI gateway.
5. Install and configure ODP.NET on Windows client with OCMT. (See [Installing and Configuring Oracle Client for Microsoft Tools](#).)
6. Validate Power BI service connects to Oracle database or ADB.

This section covers how to complete steps 4 and 6, and assumes you have already completed all other steps. [Database Client Configuration Files](#) covers step 2. [Installing and Configuring Oracle Client for Microsoft Tools](#) covers step 5.

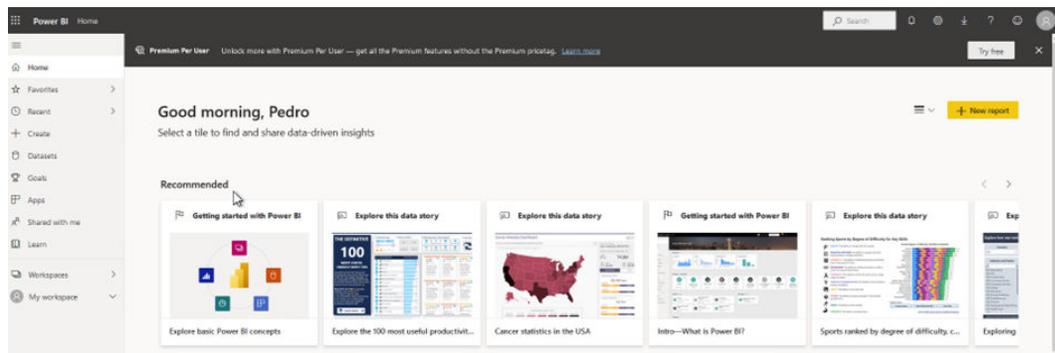
- [Installing and Configuring Power BI Gateway](#)
Download Power BI Gateway from the Power BI website.
- [Validating Power BI Connects to Oracle DB](#)
Configure and validate the Power BI Service connection to Oracle Database.

3.2.1 Installing and Configuring Power BI Gateway

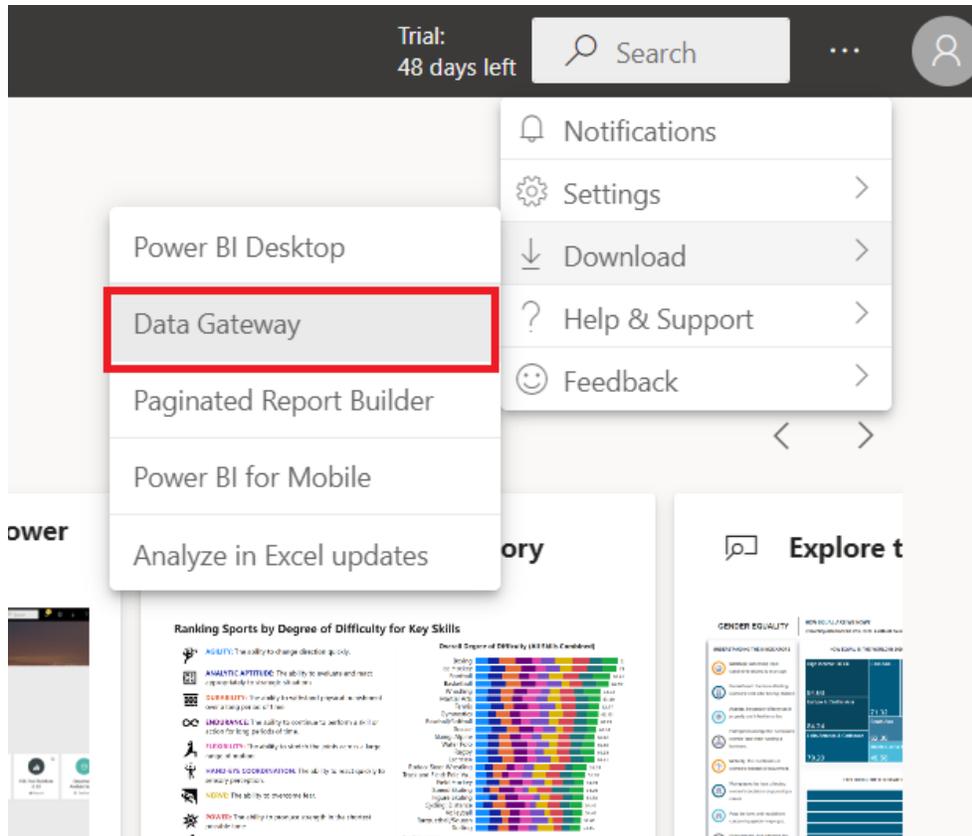
Download Power BI Gateway from the Power BI website.

To install and configure Power BI Gateway:

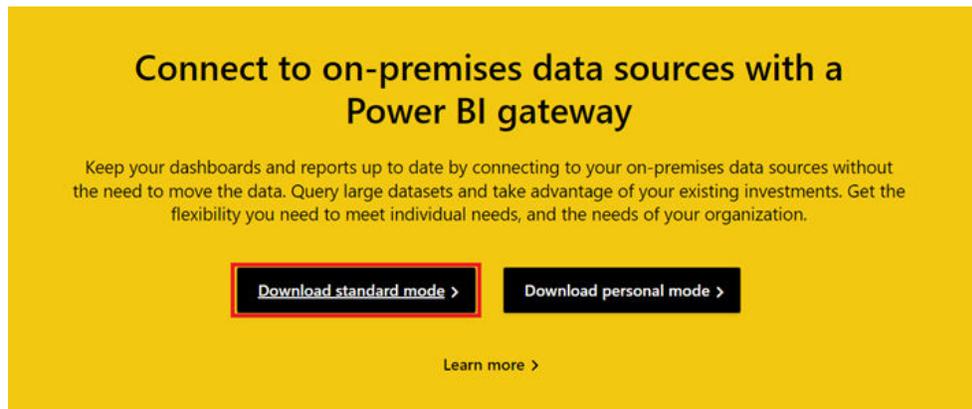
1. Sign on to the [Power BI website](#) with your Microsoft 365 account.



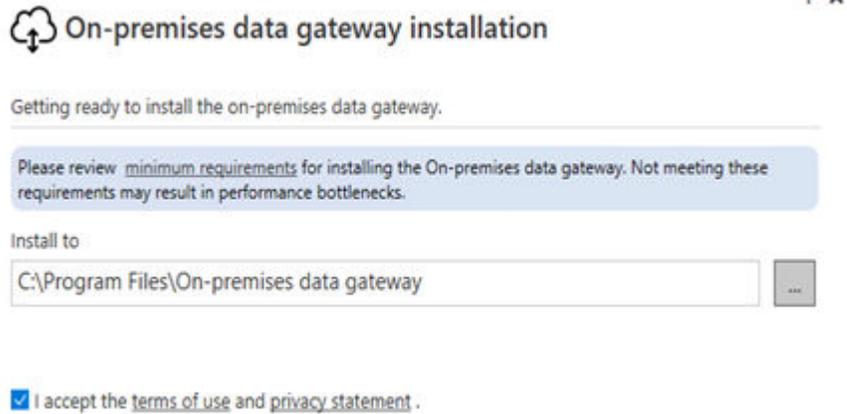
2. From the Power BI web console, click **Menu**, **Download**, **Data Gateway**.



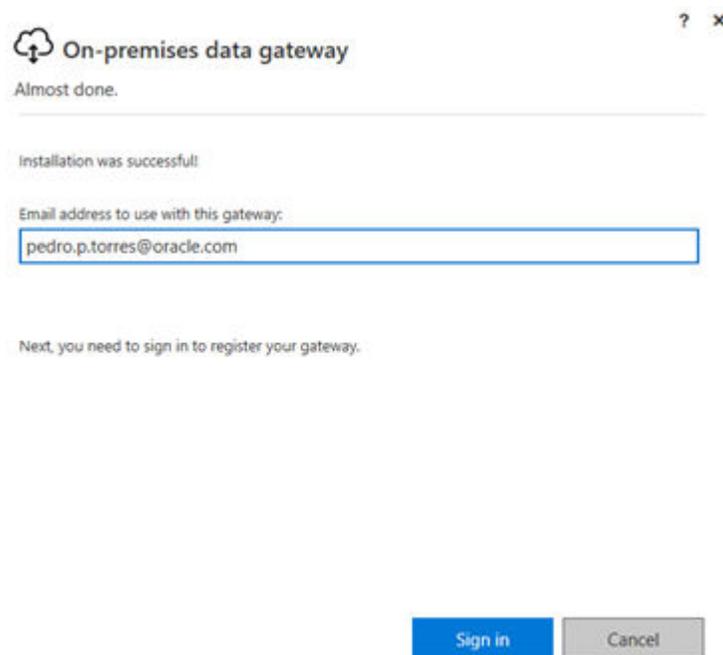
3. Click **Download standard mode**.



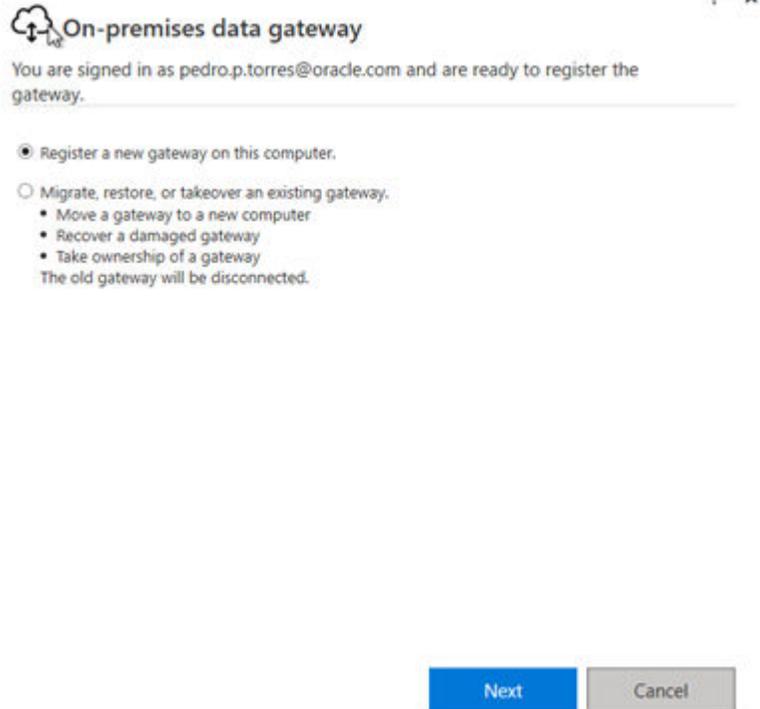
4. After the gateway installation file downloads, run **GatewayInstall.exe**.
5. Select the installation directory location, and accept the terms.



6. Complete your registration of the Power BI gateway:
 - a. Enter the email address of your Power BI service account.



- b. Sign in.
 - c. Select **Register a new gateway on this computer**.



- d. Click **Next**.
- e. Name the gateway, provide the recovery key, and confirm the key.
You use the gateway name when creating a Power BI Data Source.

? x

On-premises data gateway

You are signed in as pedro.p.torres@oracle.com and are ready to register the gateway.

New on-premises data gateway name

Add to an existing gateway cluster [Learn more](#)

Recovery key (8 character minimum)

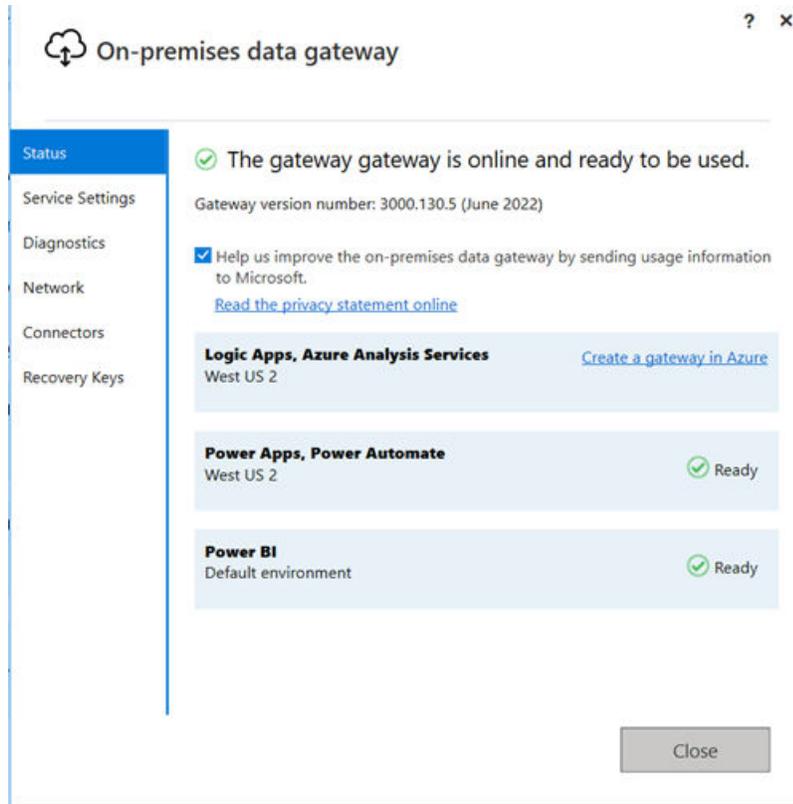
 This key is needed to restore the gateway and can't be changed. Record it in a safe place.

Confirm recovery key

We'll use this region to connect the gateway to cloud services: West US [Change Region](#)
[Provide relay details](#) By default, Azure Relays are automatically provisioned

- f. Click **Configure**.

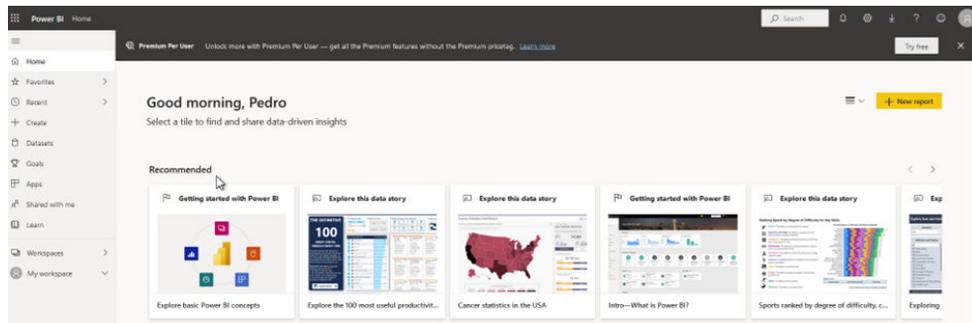
The gateway is now online and ready to use.



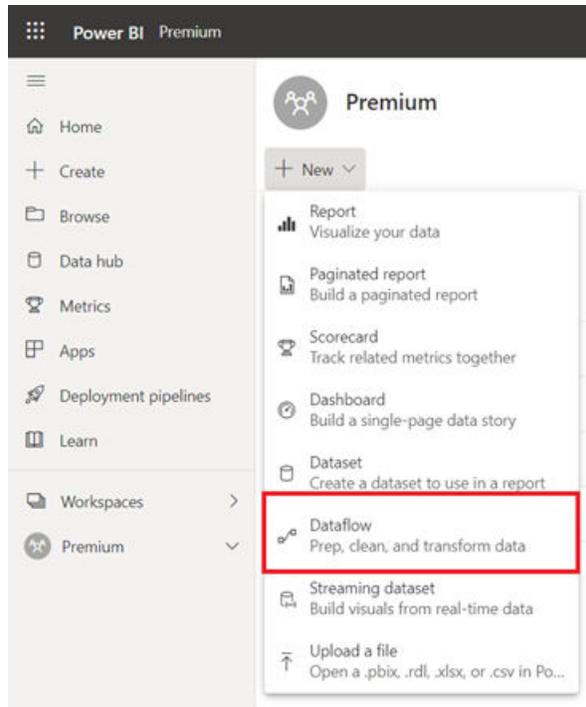
3.2.2 Validating Power BI Connects to Oracle DB

Configure and validate the Power BI Service connection to Oracle Database.

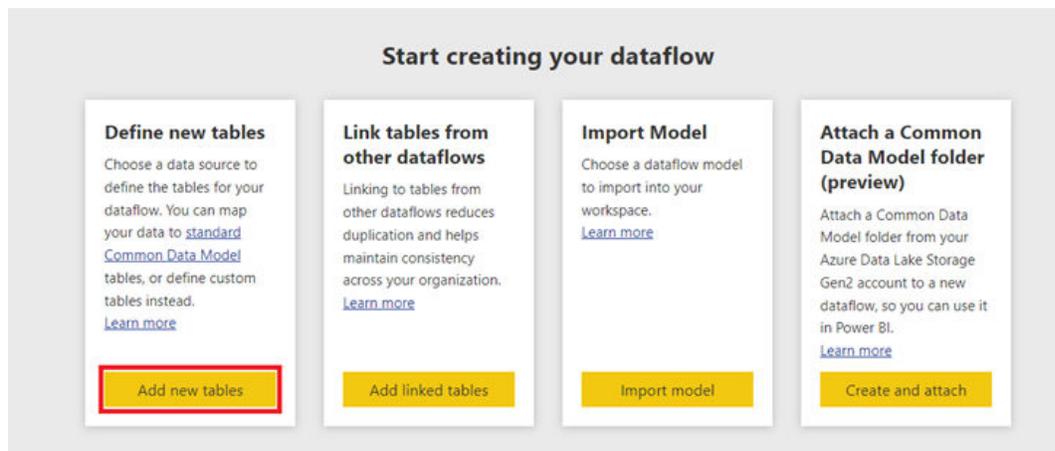
1. Log into the Power BI website with your Microsoft 365 account.



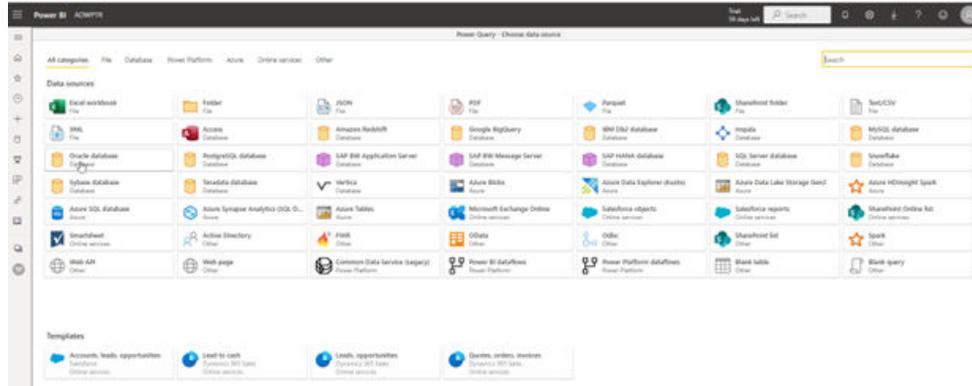
2. Navigate to a **Power BI Premium** or **Power BI Pro** workspace.
3. Click **New, Dataflow**.



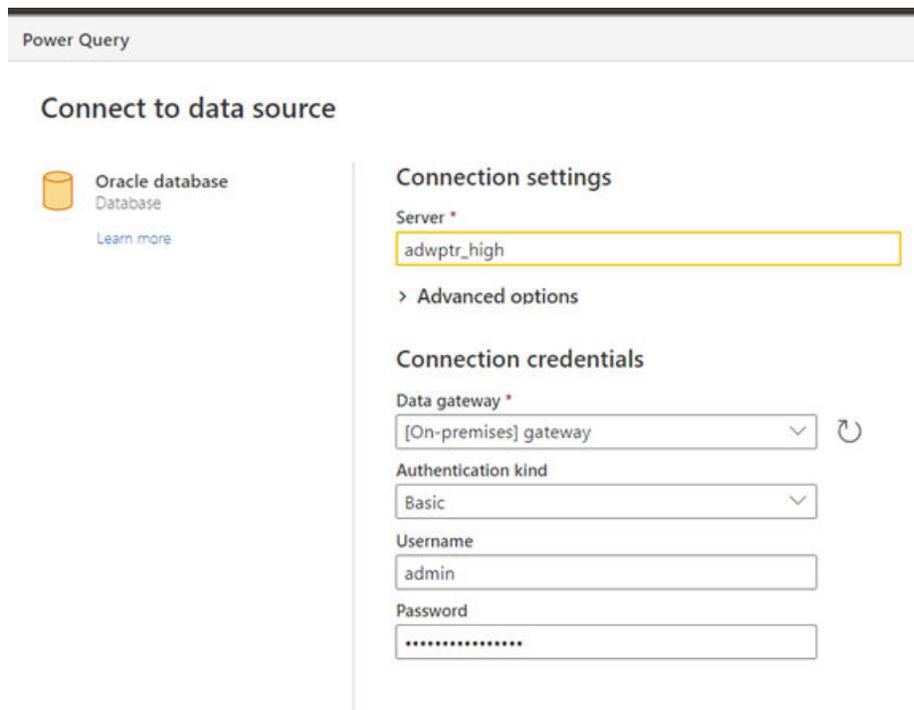
4. On the **Start creating your dataflow** screen, select **Add new tables**.



5. Select **Oracle database**.



6. Provide the entries to connect to your data source:
 - a. Server - Enter the database net service name.
For example, adwptr_high, adwptr_low, or the Easy Connect (Plus) configuration.
For more information, see [Setting Up On-Premises Databases](#).
 - b. Data gateway - the Power BI gateway name.
For more information, see [Installing and Configuring Power BI Gateway](#).
 - c. Authentication kind - Basic
 - d. Username and Password - Your ADB or on-premises database user credentials



7. Click **Next** to complete the connection.

8. To continue, select the schema objects needed for your Microsoft Power BI application and load the data.



Congratulations! Power BI Service now connects to Oracle Database. You can now view the schema objects by selecting the objects from the tree control. For information on performance tuning for large data retrievals, see [Performance Tuning for Unmanaged ODP.NET](#).

3.3 Performance Tuning for Large Data Retrievals

Recommendations for improving Oracle database retrieval performance with Microsoft tools.

Typically, BI and ETL applications retrieve large amounts of data from a source database for further processing. The ODP.NET **FetchSize** setting determines the amount of data ODP.NET fetches into its internal cache upon each database round trip. You can improve performance by an order of magnitude by significantly increasing FetchSize when retrieving large result sets.

- [Performance Tuning for Unmanaged ODP.NET](#)
Improve performance for unmanaged ODP.NET by increasing FetchSize in the Windows Registry.
- [Performance Tuning for Managed ODP.NET](#)
Improve performance for managed ODP.NET by increasing the FetchSize in the .NET machine.config file.

3.3.1 Performance Tuning for Unmanaged ODP.NET

Improve performance for unmanaged ODP.NET by increasing FetchSize in the Windows Registry.

This method works for tools that use unmanaged ODP.NET, including Microsoft Power BI Desktop, Microsoft Power BI Service, and Microsoft SQL Service Analysis Services.

To increase `FetchSize` in the Windows Registry:

1. Launch the Windows Registry editor (`regedit.exe`).

2. Go to the following Registry key:
HKEY_LOCAL_MACHINE\SOFTWARE\Oracle\ODP.NET\4.122.19.1
3. Add the String Value `FetchSize` and set it to a value larger than the default (131072), such as 4194304 (4 MB).
`FetchSize` can be set as large as `int.MaxValue`.
4. Restart the Microsoft tool and run your queries with the new setting.

3.3.2 Performance Tuning for Managed ODP.NET

Improve performance for managed ODP.NET by increasing the `FetchSize` in the `.NET machine.config` file.

This method works for tools that use managed ODP.NET, including Microsoft SQL Server Data Tools, Microsoft SQL Service Integration Services, and Microsoft SQL Server Reporting Services.

To increase `FetchSize` in the `.NET machine.config` file:

1. Locate the `.NET machine.config` file. This file is generally located in one of two directories. The file you need to modify depends on whether you are running 32-bit or 64-bit processes.
 - For 32-bit, the location is
C:\Windows\Microsoft.NET\Framework\v4.0.30319\Config
 - For 64-bit, the location is
C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Config

Modifying the `machine.config` file requires Windows Administrator privileges.

2. Add an `<oracle.manageddataaccess.client>` section in the `machine.config` file for managed ODP.NET. This section should be placed within the `<configuration>` section and after `<configSections></configSections>`.

This example sets `FetchSize` to 4 MB. New configuration additions are in bold.

```
<configuration>
  <configSections>
    ...
  </configSections>
  <oracle.manageddataaccess.client>
    <version number="4.122.19.1">
      <settings>
        <setting name="FetchSize" value="4194304" />
      </settings>
    </version>
  </oracle.manageddataaccess.client>
</configuration>
```

3. Restart the Microsoft tool and run your queries with the new setting.

Glossary

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