

Oracle® Analytics

User's Guide for Oracle Analytics Desktop



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Preface

Learn how to explore data using Oracle Analytics Desktop.

Topics

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

Audience

User's Guide for Oracle Analytics Desktop is intended for business users who upload and query data sources, create visualizations to analyze data, build and work with workbooks, and import and export workbooks.

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>.

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

These related Oracle resources provide more information.

- [Oracle Analytics Product Information](#)
- [Oracle Community Forum](#)
- [Oracle Analytics Desktop Installation Download](#)
- [Oracle Analytics Library](#)

Conventions

Conventions used in this document are described in this topic.

Text Conventions

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.
<code>monospace</code>	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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Your company can use skins and styles to customize the look of the application, dashboards, reports, and other objects. It is possible that the videos and images included in the product documentation look different than the skins and styles your company uses.

Even if your skins and styles are different than those shown in the videos and images, the product behavior and techniques shown and demonstrated are the same.

1

Get Started with Oracle Analytics Desktop

This topic describes the benefits of using Oracle Analytics Desktop, how to install it, and how to get started using the sample workbook.



Topics:

- [About Oracle Analytics Desktop](#)
- [Install Oracle Analytics Desktop](#)
- [Install Machine Learning and Advanced Analytics on Windows](#)
- [Install Machine Learning and Advanced Analytics on Mac](#)
- [Open Oracle Analytics Desktop](#)
- [Get Started with Sample Workbook](#)

About Oracle Analytics Desktop

Use Oracle Analytics Desktop to experience standalone data exploration and visualization as a desktop download.

Oracle Analytics Desktop enables you to visualize and explore your data from multiple sources or for analysis and investigation of your local datasets. Just upload data files or connect to Oracle Applications or a database, select the elements you're interested in, and let Oracle Analytics Desktop find the best way to visualize it. Choose from various visualizations to look at data in a specific way.

Oracle Analytics Desktop previews the self-service visualization capabilities of Oracle Analytics Cloud and Oracle Analytics Server. Oracle Analytics Desktop is a free download provided under the Oracle Technology Network license. Oracle Analytics Desktop isn't intended for production use, and isn't covered by Oracle's support policy.

Install Oracle Analytics Desktop

Anyone can install Oracle Analytics Desktop on Windows or a Mac.

You can install and use Oracle Analytics Desktop to learn more about Oracle Analytics functionality, or to use it as a stand-alone development environment. You can create workbooks and export them to share with other Oracle Analytics Desktop users or to import into Oracle Analytics Cloud.

Go to this page to find the installer and read about system requirements: [Oracle Analytics Desktop Installation Download](#).

For more about the installation, see [Oracle Analytics Desktop Installation FAQs](#) and [Installation and Configuration Issues and Workarounds](#).

1. Use the above link to go to the Oracle Analytics Desktop Download page to locate the current version of the installer.

2. Click **Download** and in the Oracle Software Delivery Cloud page review and accept the license agreement, and click the **Platforms** drop-down button and select one or more platforms to install Oracle Analytics Desktop onto. Click off the field to enter your selection.
3. Confirm your selection, click **Download**, and specify where on your computer to save the installer .zip file. If needed, enable your browser's popups for edelivery.oracle.com.

This step adds the **Oracle Download Manager** file to your computer, which you use to complete the installer download.
4. Go to the download location that you chose, locate and open the **Oracle Download Manager** file, confirm the installer's download destination, and click **Next** to start the installer .zip download.
5. After the download completes, click **Open Destination** to locate the .zip that contains the installer.
6. Extract the .zip file and launch the installer (.exe file for Windows or .pkg file for Mac). Follow the instructions provided on the screens to complete the installation.

Install Machine Learning and Advanced Analytics on Windows

Machine learning and advanced analytics are optional components that aren't included in the Oracle Analytics Desktop Windows installation. Install machine learning if you want to use Diagnostics Analytics (Explain), Machine Learning Studio, or advanced analytics.

1. Go to the Windows Start menu, browse to Oracle, and click **Install DVML**.
Terminal is launched and `BiPython_Framework.exe` downloads.
2. The installer starts on completion of the download. Follow the displayed instructions to install machine learning to the selected install path.
3. Click **Finish** to close the installer.
4. When prompted, press any key to close the terminal window.
5. If Oracle Analytics Desktop was running during the installation, then restart it.

Install Machine Learning and Advanced Analytics on Mac

Machine learning and advanced analytics are optional components that aren't included in the Oracle Analytics Desktop Mac installation. Install machine learning if you want to use Diagnostics Analytics (Explain), Machine Learning Studio, or advanced analytics.

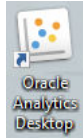
1. Double-click the application **Oracle Analytics Desktop Configure Python** in Finder under the Applications folder that contains Oracle Analytics Desktop.
Terminal is launched and `BiPython_Framework.pkg` downloads.
2. The installer starts on completion of the download. Follow the displayed instructions to install machine learning to the selected install path. Enter an administrator user name and password to run the installation.
3. Click **Close** after the installation is completed.

The Machine Learning Framework was installed in `/Library/Frameworks/DVMLruntime.framework`
4. If Oracle Analytics Desktop was running during the installation, then restart it.

Open Oracle Analytics Desktop

You can open the Oracle Analytics Desktop application from a desktop shortcut or by locating it from the start menu in Windows, or in the Applications folder on a Mac.

This is the desktop shortcut icon:



The shortcut icon is available on your desktop if you selected the **Create desktop shortcut** option when you installed Oracle Analytics Desktop, or if you manually created a shortcut on your computer after installation.

1. To open Oracle Analytics Desktop from a shortcut icon, locate the shortcut on your desktop and double-click (for Windows) or click it (for Mac).
2. To open Oracle Analytics Desktop from your computer:
 - If you're using Windows, click **Start**, browse to and open the Oracle folder, and click **Oracle Analytics Desktop**.
 - If you're using a Mac, click Finder, click Go, and then select Applications. In Applications, double-click **Oracle Analytics Desktop**.

Get Started with Sample Workbook

Use the sample workbook provided to explore and discover Oracle Analytics Desktop's capabilities. The sample workbook is designed to teach you best practices that you can use when creating workbooks.

Sample Workbook uses the Sample Order Lines and Sample States spreadsheets as its datasets. The visualizations included in Sample Workbook illustrate creating different views of the data and arranging them on multiple canvases to provide a comprehensive look at the data.

You can choose to download Sample Workbook during installation. If you didn't download Sample Workbook during installation, then you can still get it by uninstalling and then reinstalling Oracle Analytics Desktop. Your personal data isn't deleted when you uninstall and reinstall.

Oracle also provided examples designed to help you enhance your data visualizations. The examples are .dva files that you can re-use with your own data. See Oracle Analytics Examples Library.

2

Connect to Data Sources

Create data source connections to access the data that you want to analyze and explore. Examples of data sources are: a database, Oracle applications, or a snowflake data warehouse.

Topics:

- [About Data Sources](#)
- [Manage Connections to Data Sources](#)
- [Connect to an Oracle Database](#)
- [Connect to Oracle Analytic Views](#)
- [Connect to Oracle Autonomous Data Warehouse](#)
- [Connect to Oracle Autonomous Transaction Processing](#)
- [Connect to an Application in Oracle Fusion Cloud Applications Suite](#)
- [Create a Connection to Oracle Essbase](#)
- [Connect to NetSuite](#)
- [Connect to Oracle Talent Acquisition Cloud](#)
- [Connect to a Database Using Delta Sharing](#)
- [Connect to Dropbox](#)
- [Connect to Google Drive or Google Analytics](#)
- [Connect to Data Using JDBC](#)
- [Create Generic ODBC Connections](#)
- [Connect to Snowflake Data Warehouse](#)
- [Databases that Support Incremental Reload for Datasets](#)

About Data Sources

You can connect to many types of data source, such as Cloud databases, on-premises databases, and many commonly used applications, such as Dropbox, Google Drive, and Amazon Hive.

You create a connection for each data source that you want to access in Oracle Analytics. Once connected, you can visualize your data to create insights.

A data source is any tabular structure. You see data source values after you load a file or send a query to a service that returns results.

A data source can contain any of the following:

- **Match columns** - These contain values that are found in the match column of another source, which relates this source to the other, for example, Customer ID or Product ID.

- **Attribute columns** - These contain text, dates, or numbers that are required individually and aren't aggregated, for example, Year, Category Country, Type, or Name.
- **Measure columns** - These contain values that should be aggregated, for example, Revenue or Miles driven.

You can analyze a data source on its own, or you can analyze two or more data sources together, depending on what the data source contains. If you use multiple sources together, then at least one match column must exist in each source. The requirements for matching are:

- The sources contain common values, for example, Customer ID or Product ID.
- The match must be of the same data type, for example, number with number, date with date, or text with text.

Manage Connections to Data Sources

You can create, update, remove, and share connections to data sources.

Topics:

- [Create a Connection to a Data Source](#)
- [Edit a Data Source Connection](#)
- [Delete a Data Source Connection](#)
- [Database Connection Options](#)
- [Connect to Data With Upper, Lower, or Mixed-case Characters](#)

Create a Connection to a Data Source

You can create a connection to enable you to analyze data in that data source.

1. On the Home page, click **Create**, and then click **Connection**.
2. In the Select Connection Type dialog box, click the icon for the connection type that you want. For example, **Oracle Database**.
3. Enter the required connection information such as host, port, username, password, and service name.
4. Optional: Select an **Authentication** option for your connection..
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
 - (Displayed if Oracle Analytics supports impersonation for this database type) **Use the active user's credentials** - Oracle Analytics doesn't prompt users to sign in to access the data. The same credentials they used to sign in to Oracle Analytics are also used to access this data source.
5. Click **Save**.

You can now begin creating workbooks or datasets using this connection. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Edit a Data Source Connection

You can update a data source's connection details.

If you're editing an SSL connection to an Oracle Database and you need to use a new `cwallet.sso` file, in the **Client Wallet** field, click **Select** to browse for the `cwallet.sso` file. Ask your administrator for the location of the `cwallet.sso` file.

1. On the Home page click the Navigator, select **Data**, and then click **Connections**.
2. Hover over the connection that you want to edit. To the right of the highlighted connection, click **Actions**, then select **Inspect**.
3. In the Inspect dialog, edit the connection details.

You can't see the current password or Logical SQL for connections. If you need to change these, create a new connection.

4. Click **Save**.

Delete a Data Source Connection

You can remove a data source connection from Oracle Analytics Cloud. For example, you must delete a database connection and create a new connection when the database's password has changed.

If the connection contains any datasets, then you must delete the datasets before you can delete the connection.

1. Go to the Data page and select **Connections**.
2. Hover over the connection that you want to delete. To the right of the highlighted connection, click **Actions**, then select **Delete**.
3. Click **Yes**.

Database Connection Options

When you specify connection details using the Create Connection dialog or Inspect dialog, some database types have extra configuration options.

General Options

- When you create connections to Oracle Databases, you can connect in two ways using the **Connection Type** option:
 - **Basic** - Specify the **Host**, **Port**, and **Service Name** of the database.
 - **Advanced** - In the **Connection String** field specify the Single Client Access Name (SCAN) ID of databases running in a RAC cluster. For example:

```
sales.example.com =(DESCRIPTION= (ADDRESS_LIST= (LOAD_BALANCE=on)
(FAILOVER=ON) (ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.111) (PORT=1521))
(ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.222) (PORT=1521))
(ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.333) (PORT=1521)))
(CONNECT_DATA=(SERVICE_NAME= saleservice.example.com)))
```
- **Enable Bulk Replication** - If you're loading a dataset for a workbook, then this option should be turned off and you can ignore it. This option is reserved for data analysts and advanced users for replicating data from one database to another database.

Authentication Options

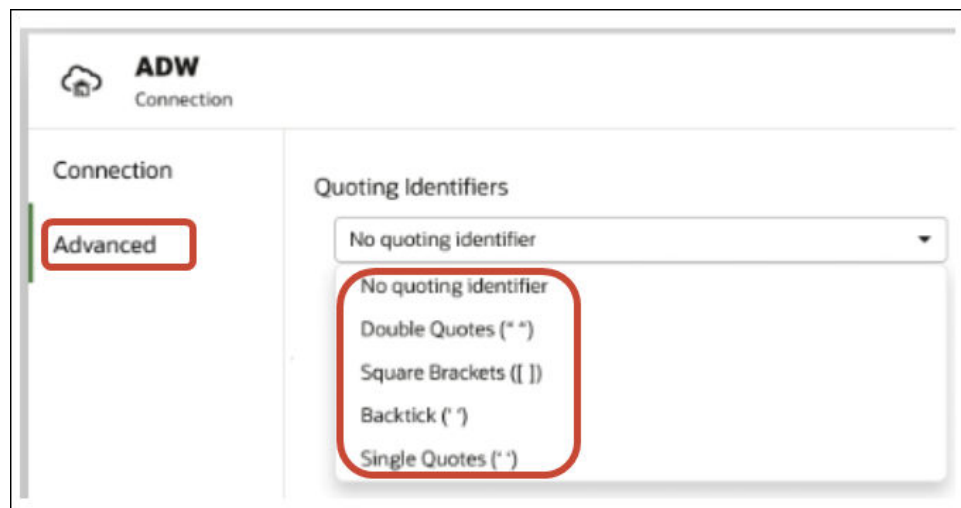
- **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
- **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
- (Displayed if Oracle Analytics supports impersonation for this database type) **Use the active user's credentials** - Oracle Analytics doesn't prompt users to sign in to access the data. The same credentials they used to sign in to Oracle Analytics are also used to access this data source.

Connect to Data With Upper, Lower, or Mixed-case Characters

If you're connecting to an Oracle database, Oracle Autonomous Data Warehouse, Oracle Transaction Processing, Snowflake, SQL Server, or My SQL, you can change the default quoting identifier so that you can read data with upper, lower, or mixed-case characters in table or column names.

For example, you might choose double quotes as the quoting identifier. Oracle Analytics then adds double quotes to the underlying SQL statement `select "EfG_Field" from "AbCd";` instead of issuing `select EfG_Field from AbCd;`, (which would fail).

1. On the Home page, click **Create** and then click **Connection**.
2. Click one of the database types that support advanced properties.
Supported databases are Oracle, Oracle Autonomous Data Warehouse, Snowflake, and My SQL.
3. Specify the connection details then save the connection.
4. On the home page, click the **Navigator**, then click **Data**, and then **Connections**.
5. Hover over the connection that you saved in Step 2 and click **Actions** then click **Inspect**.
6. Click **Advanced**, then use the Quoting Identifiers option to select the quoting identifiers used in the database.



For example, you might select **Double Quotes (\" \"')**. Oracle Analytics adds double quotes to the underlying SQL statement `select "EfG_Field" from "AbCd";` instead of issuing `select EfG_Field from AbCd;`.

 Note:

You won't see the **Advanced** option if the connection was created with the **System connection** option selected. Advanced options aren't supported for system connections.

7. Click **Save**.

Connect to an Oracle Database

You can create a connection to a database and use the connection to access data, build a dataset, and visualize data.



You can't use remote connections to save a dataset from a Data Flow.

1. On the Home page, click **Create**, then click **Connection**.
2. In Create Connection dialog, click the connection type, for example, **Oracle Database**.
3. Enter a unique name for the new connection, and database connection details.
 - If you're not creating an SSL connection, specify the connection information for the database, such as the hostname, port, credentials, service name and so on.
 - If you're creating an SSL connection, in the **Client Wallet** field, click **Select** to browse for the `cwallet.sso` file. Ask your administrator for the location of the `cwallet.sso` file.
4. Use the **Connection Type** option to specify how you'd like to connect.
 - When you create connections to Oracle Databases, you can connect in two ways using the **Connection Type** option:
 - **Basic** - Specify the **Host**, **Port**, and **Service Name** of the database.
 - **Advanced** - In the **Connection String** field specify the Single Client Access Name (SCAN) ID of databases running in a RAC cluster. For example:

```
sales.example.com =(DESCRIPTION= (ADDRESS_LIST= (LOAD_BALANCE=on)
(FAILOVER=ON) (ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.111) (PORT=1521))
(ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.222) (PORT=1521))
(ADDRESS=(PROTOCOL=tcp) (HOST=123.45.67.333) (PORT=1521)))
(CONNECT_DATA=(SERVICE_NAME= salesservice.example.com)))
```
 - **Enable Bulk Replication** - If you're loading a dataset for a workbook, then this option should be turned off and you can ignore it. This option is reserved for data analysts and advanced users for replicating data from one database to another database.
5. Under **Authentication**, specify how you'd like to authenticate the connection:
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
6. Click **Save**.
7. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Connect to Oracle Analytic Views

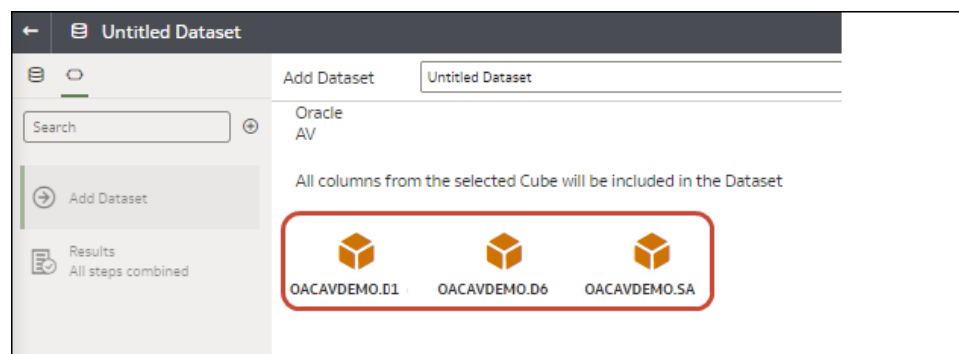
You can create a connection to Analytic Views in an Oracle Database to access data, build a dataset, and visualize data.

Dataset authors can use this connection type to consume Oracle Analytic Views data, including multi-dimensional objects, without having to understand the complexities of Java database connectivity (JDBC).

1. On the Home page, click **Create**, then click **Connection**.
2. Click **Oracle Analytic Views** and enter the connection details.
 - For **Connection Type**, select **Basic** to connect by specifying **Host** as an Internet Protocol (IP) address, **Port**, and Service Name for the Oracle database. For example, **Host** = <IP address>, **Port** = 9018, and **Service Name** = PDBORCL.
 - Alternatively, select **Advanced** to connect by specifying a **Connection String**. For example, (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP) (HOST = <IP address>) (PORT = 9018))) (CONNECT_DATA = (SERVICE_NAME = PDBORCL)))
3. Under **Authentication**, specify how you'd like to authenticate the connection:
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
4. Click **Save**.

You can now create datasets using the connection and build workbooks.

When you create a dataset using the connection, select one of the cubes listed in the database. Then build a workbook using that dataset and start visualizing your data.



Connect to Oracle Autonomous Data Warehouse

You can create a connection to Oracle Autonomous Data Warehouse and use the connection to access data.

You can connect to Oracle Autonomous Data Warehouse using security certificates downloaded from Oracle Autonomous Data Warehouse to a wallet (known as mTLS, or Mutual Transport Layer Security), or without a wallet (known as TLS, or Transport Layer Security). See [About TLS Authentication](#). The credentials wallet file secures communication between Oracle

Analytics and Oracle Autonomous Data Warehouse. The wallet file (for example, `wallet_ADWC1.zip`) that you upload must contain SSL trusted certificates, to enable SSL on your Oracle Database Cloud connections.

Tutorial

1. Before you create connections to Oracle Autonomous Data Warehouse, you must obtain the client credentials zip file containing the trusted certificates that enable Oracle Analytics to connect to Oracle Autonomous Data Warehouse.

See Download Client Credentials (Wallets) in *Using Oracle Autonomous Database Serverless*.

The credentials wallet file secures communication between Oracle Analytics and Oracle Autonomous Data Warehouse. The wallet file (for example, `wallet_ADWC1.zip`) that you upload must contain SSL certificates, to enable SSL on your Oracle Database Cloud connections.

2. On the Home page, click **Create** then click **Connection**.
3. Click **Oracle Autonomous Data Warehouse**.
4. Enter a user-friendly **Connection Name** and **Description**.
5. For **Encryption Type**:
 - To connect without a credentials wallet file, select **TLS** as the **Encryption Type**, enter a **Connection String**, then enter a **Username** and **Password** of a user in Oracle Autonomous Data Warehouse.
 - To connect using a credentials wallet file, select **Mutual TLS** as the **Encryption Type**, then click **Select** and browse for and select the Client Credentials wallet file that you downloaded from Oracle Autonomous Data Warehouse (for example, `wallet_ADWC1.zip`), then enter a **Service Name**. The **Client Credentials** field displays the `cwallet.sso` file. See [Selecting an Oracle Autonomous Data Warehouse Database Service Name](#).

Tip: If you define the Oracle Autonomous Data Warehouse connection using an instance wallet, the high service name is selected by default. Change the name to low or medium to avoid limiting the number of concurrent connections.
6. Under **Authentication**, specify how you'd like to authenticate the connection:
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.

7. Click **Save**.

You can now create datasets from the connection.

Selecting an Oracle Autonomous Data Warehouse Database Service Name

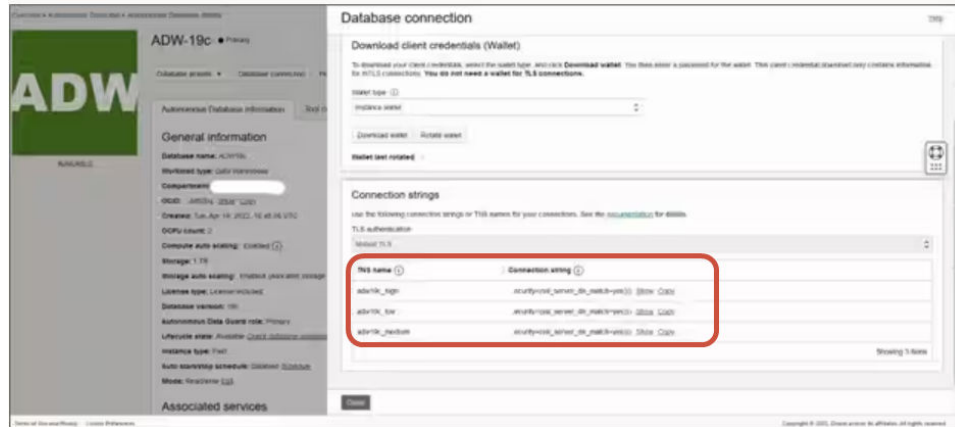
Selecting the correct prebuilt database service name is key to connecting to Oracle Autonomous Data Warehouse. Learn about the different prebuilt database service names and which one you should choose.

What are the prebuilt database service names?

Oracle Autonomous Data Warehouse provides three database service names for connections in the following format:

- `databasename_high` - Highest resources, lowest concurrency. Queries run in parallel.
- `databasename_medium` - Fewer resources, higher concurrency. Queries run in parallel.
- `databasename_low` - Least resources, highest concurrency. Queries run serially.

These names are contained in the `tnsnames.ora` file in the Oracle wallet. Click **Database Connections** in the Oracle Cloud Infrastructure Console to see the strings.



About Consumer Groups in Oracle Resource Manager

The database service names are mapped to consumer groups in the Resource Manager that limit the number of simultaneous connections and queries that can run in Oracle Autonomous Data Warehouse at the same time (concurrency) and the maximum number of parallel processes that are allowed per query (`parallel_degree_limit`). These limits are based on the number of ECPUs or OCPUs licensed and whether auto-scaling is enabled.

The following table shows sample concurrent connection values for a database with 32 ECPUs with ECPU auto-scaling disabled and enabled.

Database Service Name	Number of Concurrent Queries with ECPU Auto Scaling Disabled	Number of Concurrent Queries with ECPU Auto Scaling Enabled
high	3	9
medium	20 ($.63 \times \text{number of ECPUs}$)	60 ($1.89 \times \text{number of ECPUs}$)
low	Up to 4800 ($150 \times \text{number of ECPUs}$)	Up to 4800 ($150 \times \text{number of ECPUs}$)

Choosing the Optimal Database Service Name for Oracle Analytics

The largest number of simultaneous queries that can run for the high database service is three without auto-scaling and nine with auto-scaling enabled. This limit can be reached by three users connected to the high database service name running one query each or three reports in one Oracle Analytics dashboard for a single user.

The low service name works well for most Oracle Autonomous Data Warehouse workloads with Oracle Analytics, but to utilize parallel queries, select the medium service name. The parallel degree limit for the low service name is one, meaning no parallelism. If you're connected to the low service name, even if the parallel degree is specified at the table or index level, the degree of parallelism is reduced to one and the query doesn't run in parallel. The parallel degree limit (per query) for medium and high equals two times the number of licensed CPUs.

Note: Connecting to a database that's part of Oracle Fusion Analytics Warehouse (Fusion Analytics) requires using the low service name to allow for the maximum number of concurrent queries.

Monitoring queued statements

If the maximum number of concurrent queries limit is reached, the excess queries are queued. Oracle Autonomous Data Warehouse provides a metric to check for queued statements.

Select **Database Actions** and **Database Dashboard** in the Oracle Autonomous Data Warehouse page of Oracle Cloud Infrastructure Console.

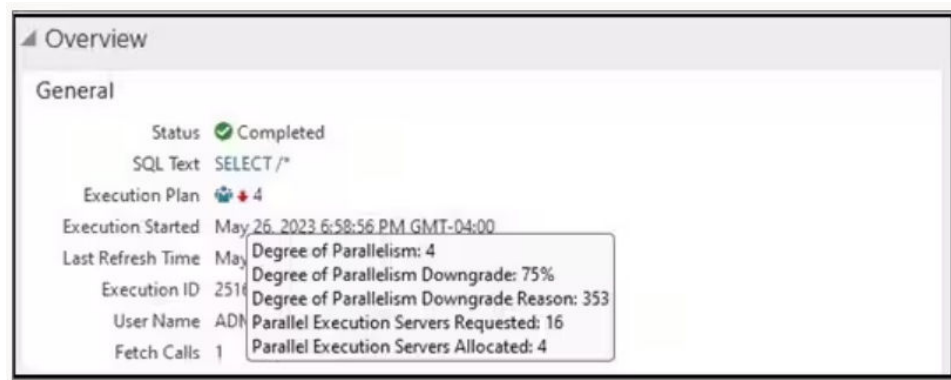


Select **Performance Hub**, and select **SQL Monitor Tab** to see the queued statement status, which is displayed as a grey clock. In this example, three queries are running with the high service name, one is queued, and one query is running with the medium service name. The queued statement executes when one of the three queries running with the high service name completes.

Status	Duration	SQL ID	SQL Plan Hash	User Name	Parallel
	8.00 sec	harrs5r2ddnk	396151021	ADMIN	
	5.00 sec	harrs5r2ddnk	396151021	ADMIN	4
	12.00 sec	harrs5r2ddnk	396151021	ADMIN	4
	29.00 sec	harrs5r2ddnk	396151021	ADMIN	4
	32.00 sec	harrs5r2ddnk	396151021	ADMIN	4
	31.00 sec	harrs5r2ddnk	396151021	ADMIN	4

Monitoring parallelism

If the parallel degree limit is exceeded, you see the degree of parallelism (DOP) downgrade in the SQL monitor report. The degree of parallelism downgrade reason of 353 means that the Resource Manager downgraded the statement due to the maximum degree of parallelism limit.



For Oracle Database version 18 and higher, the downgrade reason codes are described in the following table:

ID	Reason Codes
352	DOP downgrade due to adaptive DOP.
353	DOP downgrade due to resource manager max DOP.
354	DOP downgrade due to insufficient number of processes.
355	DOP downgrade because slaves failed to join.

Resource Manager CPU Wait Event

A session waiting to be allocated CPU by the Resource Manager increments the `resmgr:cpu quantum` wait event. To reduce the occurrence of this wait event, verify that the low or medium service name is being used for the OAC connection or increase the number of CPUs allocated to ADW.

To see the number of waits and the average wait time, review Foreground Wait Events in the Automatic Workload Repository (AWR) report for the `resmgr:cpu quantum` wait event.

In this example, there were a total of 272 waits, waiting on average 588.91 milliseconds each for a total wait time of 160 seconds. It was determined that the reason was that the high database service name was being used for the OAC connection. These wait periods disappeared once the customer switched to the medium service, and the periodic slowness of their dashboard was resolved.

Foreground Wait Events						
- s - second, ms - millisecond, us - microsecond, ns - nanosecond - Only events with Total Wait Time (s) >= .001 are shown - ordered by wait time desc, waits desc (idle events last) %Timeouts: value of 0 indicates value was < .5%. Value of null is truly 0						
Event	Waits	%Time -outs	Total Wait Time (s)	Avg wait	Waits /txn	% DB time
resmgr:cpu quantum	272		160	588.91ms	0.01	0.26

Tip When Creating a Connection to Oracle Autonomous Data Warehouse in Oracle Analytics

In Oracle Analytics, when you define the Oracle Autonomous Data Warehouse connection using the instance wallet, the high service name is selected by default. Change the name to low or medium to avoid limiting the number of concurrent connections.



Create Connection

Oracle Autonomous Data Warehouse

* Connection Name: adw19c

Description:

Encryption Type: Mutual TLS

* Client Credentials: cwallet.sso [Select...]

* Username: reporting

* Password:

* Service Name: adw19c_high

adw19c_high

adw19c_low

adw19c_medium

Connect to Oracle Autonomous Transaction Processing

You can create a connection to Oracle Autonomous Transaction Processing and use the connection to access data.

1. Before you create connections to Oracle Autonomous Transaction Processing, you must obtain the client credentials zip file containing the trusted certificates that enable Oracle Analytics to connect to Oracle Autonomous Transaction Processing.

See Download Client Credentials (Wallets) in *Using Oracle Autonomous Database Serverless*.

The credentials wallet file secures communication between Oracle Analytics and Oracle Autonomous Transaction Processing. The wallet file (for example, wallet_ATP1.zip) that you upload must contain SSL certificates, to enable SSL on your Oracle Database Cloud connections.

2. On the Home page, click **Create** then click **Connection**.
3. Click **Oracle Autonomous Transaction Processing**.

4. Enter a user-friendly **Connection Name** and **Description**.
5. For **Encryption Type**:
 To connect without a credentials wallet file, select **TLS**, then skip to the next step.
 To connect using a credentials wallet file, select **Mutual TLS**, then click **Select** and browse for and select the Client Credentials wallet file that you downloaded from Oracle Autonomous Transaction Processing (for example, wallet_ATP1.zip). The **Client Credentials** field displays the `cwallet.sso` file.
6. For the **TLS** connection type (without a wallet), enter a **Connection String**, the **Username** and **Password** of a user in Oracle Autonomous Transaction Processing.
7. Under **Authentication**, specify how you'd like to authenticate the connection:
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
8. Click **Save**.
9. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Connect to an Application in Oracle Fusion Cloud Applications Suite

Create a connection to an application in Oracle Fusion Cloud Applications Suite to visualize data from that application. For example, you can connect to Oracle Fusion Cloud Financials with Oracle Transactional Business Intelligence. You can also connect to Oracle BI Enterprise Edition.

1. On the Data page or Home page, click **Create**, then click **Connection**.
2. Click **Oracle Applications**. 
3. Enter the connection details.
 - For **Connection Name**, specify a user-friendly name to identify the connection details in Oracle Analytics.
 - For **Host**, enter the URL for Fusion Applications Suite with Oracle Transactional Business Intelligence or Oracle BI EE.
 - For **Username** and **Password**, specify the Oracle Applications user credentials.
4. Under **Authentication**, specify how you'd like to authenticate the connection:
 - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
 - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
 - **Use the active user's credentials** - Oracle Analytics doesn't prompt users to sign in to access the data. The same credentials they used to sign in to Oracle Analytics are

also used to access this data source. Make sure that the Oracle Analytics user exists in Oracle Transactional Business Intelligence .

5. Click **Save**.

You can now create datasets from the connection.

The connection is visible only to you (the creator), but you can create and share datasets for it.

Create a Connection to Oracle Essbase

You can create a connection to Oracle Essbase 11g and use the connection to access source data.

1. On the Home page, click **Create**, and then click **Connection**.

2. Click **Oracle Essbase**.

3. Enter the connection details.

4. For **DSN** (data source name), enter the agent URL for your data source.

If you want to connect to an Oracle Essbase 11g database, enter the hostname and agent port number on which Oracle Essbase is running. Use the format: `hostname:port`

For example: `essbase.example.com:1423`

The default port is 1423.

Your Essbase administrator must open agent port 1423 and server ports in the range 30000-34000 to allow the connection.

5. For **Username** and **Password**, enter user credentials with access to the Essbase data source.

6. Under **Authentication**, specify how you'd like to authenticate the connection:

- **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
- **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data source. Users can only access the data for which they have the permissions, privileges, and role assignments.
- (Displayed if Oracle Analytics supports impersonation for this database type) **Use the active user's credentials** - Oracle Analytics doesn't prompt users to sign in to access the data. The same credentials they used to sign in to Oracle Analytics are also used to access this data source.

7. Click **Save**.

You can now create datasets from the connection.

Connect to NetSuite

Connect to a NetSuite (NetSuite2.com) data source to visualize ERP and CRM data.

1. On the Home page, click **Create** and then click **Connection**.

2. Click **Oracle Netsuite**.

3. Enter the connection details.

To obtain the connection details for your NetSuite application, go to the NetSuite Portal home page, and navigate to **Settings** then **Set up SuiteAnalytics Connect**.

In **Role ID**, make sure that you specify the ID for a role name that doesn't contain spaces or special characters. Role names containing spaces or special characters can cause data flows to fail with an internal or syntax error.

4. Click **Save**.
5. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Connect to Oracle Talent Acquisition Cloud

You can create a connection to Oracle Talent Acquisition Cloud and use the connection to access data.

1. On the Home page, click **Create** and then click **Connection**.
2. Click **Oracle Talent Acquisition** and enter the connection details.
3. For **Host**, enter the URL for the Oracle Talent Acquisition data source.

For example, if the Oracle Talent Acquisition URL is `https://example.taleo.net`, then the connection URL that you must enter is `https://example.taleo.net/smartorg/Bics.jss`.

4. Select an **Authentication** option.
 - Select **Always use these credentials**, so that the login name and password you provide for the connection are always used and users aren't prompted to log in.
 - Select **Require users to enter their own credentials** when you want to prompt users to enter their user name and password to use the data from the Oracle Talent Acquisition Cloud data source. Users are required to log in see only the data that they have the permissions, privileges, and role assignments to see.
5. Click **Save**.
6. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

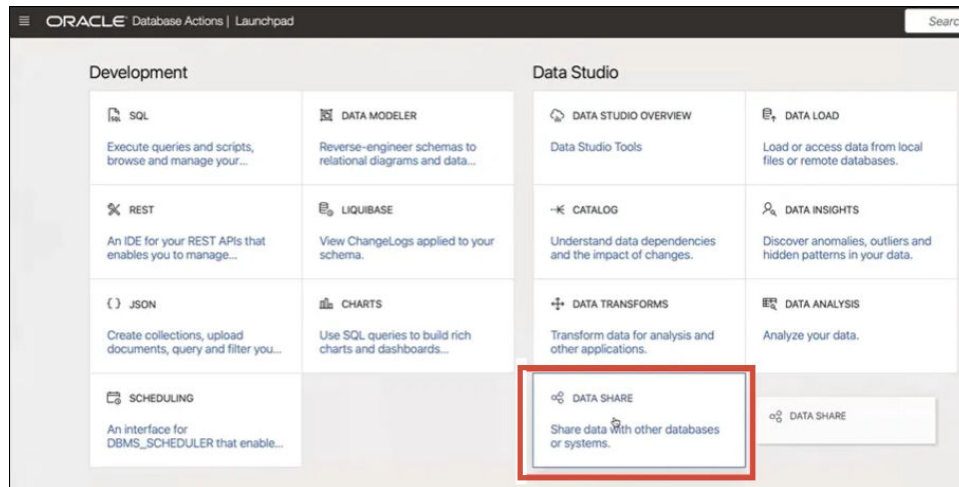
Connect to a Database Using Delta Sharing

You can connect to some databases using the Delta Sharing protocol, for example, Oracle Autonomous Database, and visualize the data.

The Delta Sharing protocol provides secure data access without direct access to the source.

Use the connection to create a dataset and build workbooks. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created. Save the dataset and use it to build workbooks.

Before you start, ask the target database administrator to set up a delta sharing area and share it with you. For example, in Oracle Autonomous Database, an administrator creates a Data Share area, and shares it with you so that you receive a email containing an activation link. The link enables you to download a JSON file containing profile details required to create a connection in Oracle Analytics.



1. Contact the database administrator to request a data share.
2. In the activation email that you receive from the database administrator, click the activation link.
3. In the activation dialog, click **Get Profile Information**.
A credentials file for the target database is downloaded to your local area in JSON format.
4. On the Oracle Analytics Home page, click **Create**, and then click **Connection**.
5. In Create Connection, click **Delta Share**.
6. Enter a **Connection Name** and optional **Description**.
7. In **Connection Type**, select a type suitable for your data source. For example:
 - For Oracle Autonomous Database, select **Client Credentials**.
 - For DataBricks, select **Bearer Token**.
8. Click **Import File** then select the JSON file containing connection details.
Oracle Analytics populates the rest of the input fields with values from the import file.
9. Click **Save**.
You're now ready to create a workbook and start visualizing your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created and create a workbook.

Connect to Dropbox

You can create a connection to Dropbox and use the connection to access data.



Before you start, set up a Dropbox application. See the Dropbox documentation.

1. In Console, register the following domains as safe in the Safe Domains page:
 - api.dropboxapi.com
 - *.dropbox.com
2. On the Oracle Analytics Home page, click **Create**, and then click **Connection**.
3. Click **Dropbox**.

4. Enter a **Connection Name** and optional **Description**.
5. Copy the URL displayed in the **Redirect URL** field.
6. In the Dropbox application, sign-in, and paste the **Redirect URL** URL into the Dropbox **OAuth 2 Redirect URIs** field, then click **Add**.
7. In Dropbox, copy the key in the **App Key** field.
8. In Oracle Analytics, paste the **App Key** key into the **Client ID** field.
9. In Dropbox, locate the **App Secret** field, then click **Show** and copy the value.
10. In Oracle Analytics, paste the **App Secret** value into the **Client Secret** field, then click **Authorize**.
11. In the Dropbox prompt to authorize the connection, click **Allow**.
The Create Connection dialog refreshes and displays the name of the Dropbox account and associated email account.
12. Click **Save**.
13. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Connect to Google Drive or Google Analytics

You can create a connection to Google Drive or Google Analytics and use the connection to access data.

Before you start, set up a Google Drive or Google Analytics application. See the Google documentation.

Use the latest Google Analytics connector, which supports column-listing.

1. In Console, register the following domains as safe in the Safe Domains page:
`api.google.com`
`*.google.com`
2. On the Oracle Analytics Home page, click **Create**, then click **Connection**.
3. Click **Google Drive** or **Google Analytics** to display the Create Connection dialog.
4. Enter a **Connection Name** and optional **Description**.
5. Copy the URL displayed in the **Redirect URL** field.
6. In the Google application, on the Credentials page, paste the **Redirect URL** value into the Google "Authorized redirect URIs" field, then click **Add**.
7. In Google, on the Credentials page copy the "Client secret" value and the "Client ID" value.
8. In Oracle Analytics, paste the Google "Client secret" value into the **Client Secret** field.
9. In Oracle Analytics, paste the Google "Client ID" into the **Client ID** field.
10. In the Google application, copy the "Account ID" from the Account details and copy the "Property ID" from the Property details.
In the Google administration settings, navigate to Account, then Account details to obtain the "Account ID", and navigate to Property details to obtain the "Property ID".
11. In Oracle Analytics, use the "Account ID" and "Property ID" that you copied in the previous step to specify the **Account ID** value and the **Property ID** value, then click **Authorize**.
12. In the Google prompt to authorize the connection, click **Allow**.

The Create Connection dialog refreshes and displays the name of the Google account, and its associated email account.

13. Click **Save**.
14. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Connect to Data Using JDBC

You can use JDBC to connect to databases that aren't listed as connection types on the Create Connection dialog.

You use drivers in a JDBC JAR file to connect to databases.

Check with your administrator that the JDBC driver version must match the database version, even when using an Oracle database. A version mismatch can result in data issues.

For the connection criteria:

- Avoid using instance-specific connection names such as host names, because the same connection can be configured against different databases in different environments, for example, development and production.
 - Check the driver documentation and the JAR file for specifying the URL of your JDBC data sources.
 - Find the driver class name in the JAR file or from wherever you downloaded the JAR file.
 - When you install a JDBC driver locally, make sure that it doesn't have the same driver class as an existing driver. If you do install two drivers with the same driver class, you'll get a connection error when you use this connection (for example, `Failed to save connection Invalid hostname.`).
 - For the **URL** value, specify the JDBC URL, for example, `jdbc:oracle:thin:@host:port/database`.
 - For the **Driver Class Name** value, use the name specified in the JDBC driver download pack that you're using, for example, `oracle.jdbc.driver.OracleDriver`.
1. On the Data or Home page, click **Create**, then click **Connection**.
 2. In the Create Connection dialog, locate and click the **JDBC** icon.
 3. Enter the connection criteria.
 4. Click **Save**.

You can now create datasets from the connection.

If you import a workbook containing a JDBC connection into an Oracle Analytics installation where the JDBC driver isn't installed, the import still works. However, the connection doesn't work when you try to run the workbook or Data Flow. You must recreate the JDBC connection and JDBC driver to a suitable data source.

Connect to a Remote Databricks Data Source

In , you can connect to a remote Databricks data source.

1. On the Oracle Analytics Home page, click **Create**, and then click **Connection**.
2. Click **Databricks**.
3. In **Connection Name**, enter a user-friendly display name.

4. In **Connection Type**, select **Basic** or **Advanced**, depending on your requirements.

- **Basic** - Provide target data source details as **Host**, **Port**, and **Http Path**.
- **Advanced** - Provide target data source details as a string in **Connection String**.

To obtain the connection details, refer to the JDBC/ODBC tab for a Databricks cluster, or the Connection Details tab for a Databricks SQL warehouse.

- For **Host**, copy in the hostname for your Databricks data source. For example, `adb-1234567890.1.azuredatabricks.net`.
- For **Port**, copy in the port number for your Databricks data source. For example, 443.
- For **Http Path**, copy in the Http Path value for your Databricks data source. For example, `/sql/1.0/warehouses/a1234567890b1234567890a`.
- For **Connection String**, specify a JDBC connection URL in the format:
`jdbc:databricks://<server-hostname>:443;httpPath=<http-path>[;<setting1>=<value1>;<setting2>=<value2>;<settingN>=<valueN>]`

For example:

```
jdbc:databricks://
adb-1234567890.1.azuredatabricks.net:443;HttpPath=/sql/1.0/warehouses/
a1234567890b1234567890a
```

5. For **Username** and **Password**, enter user credentials with access to the Databricks data source.
6. In **Driver Class Name** (read-only), you can view the full path of the driver being used.

Note:

The **Use Remote Data Connectivity** option is selected by default and greyed out because you can't use this connection type with local data sources.

7. Click **Save**.

Configure Remote Data Connectivity for a Databricks Data Source

In , you can connect to a remote Databricks data source using Data Gateway. Before workbook creators connect to the Databricks data source, you must configure your Data Gateway installation to support Databricks.

You supply your own Databricks JDBC driver. Oracle doesn't manage the license or usage compliance for Databricks drivers. Make sure that you fully test data sources and database features before deployment to production.

1. Download the latest Databricks JDBC driver JAR file from the Databricks website.
2. In each Data Gateway installation that you have, navigate to the `\<Data Gateway installation>\` folder and copy in the JAR file.
 - In a server deployment, copy the JAR file into: `<Data Gateway install_location>/domain/jettybase/thirdpartyDrivers`
 - In a personal deployment on Windows, copy the JAR file into: `<Data Gateway_extract_path>\thirdpartyDrivers`

- In a personal deployment on MacOS, copy the JAR file into: <Application->Show Package Contents>Resources->app.nw-> thirdpartyDrivers

3. Restart the Data Gateway agent.

You can now use the Databricks connection type to connect to your data source. See [Connect to a Remote Databricks Data Source](#).

Create Generic ODBC Connections

You can create generic ODBC connections to databases and use the connections to access data sources. For example, to connect to databases and database versions that aren't listed with the default connection types.

You can only use generic ODBC connections to connect on Windows systems.

1. Confirm that the appropriate database driver is installed on your computer.

You must have the required database driver installed on your computer to create an ODBC Data Source Name (DSN). If you need to install a database driver, use installation instructions provided by the organization that supplies the database driver.

2. Create the new ODBC data source in Windows.

- a. In Windows, locate and open the ODBC Data Source Administrator dialog.
- b. Click the **System DSN** tab, and then click **Add** to display the Create New Data Source dialog.
- c. Select the driver appropriate for your data source, and then click **Finish**.
- d. The remaining configuration steps are specific to the data source you want to configure.

Refer to the documentation for your data source.

3. Create the generic ODBC data source.

- a. On the Data or Home page, click **Create**, then click **Connection**.
- b. In the Create Connection dialog, locate and click the **ODBC** icon.
- c. Enter the connection criteria. Note the following:
 - **Name** - Any name that uniquely identifies the connection.
 - **DSN** - The name of the system DSN that you set up on your computer.
- d. Click **Save**.

You can now create datasets from the connection.

If you import a workbook containing an ODBC connection into an Oracle Analytics Desktop installation where the ODBC DSN doesn't exist, and the ODBC driver isn't installed, the import still works. However, the connection doesn't work when you try to run the workbook or Data Flow. You must recreate the ODBC connection, and recreate the ODBC DSN, and ODBC driver to a suitable data source.

Connect to Snowflake Data Warehouse

You can create a connection to Snowflake Data Warehouse and use the connection to access data.

See format guidelines, <https://docs.snowflake.net/manuals/user-guide/connecting.html>.

1. On the Home page, click **Create**, and then click **Connection**.
2. Click **Snowflake Data Warehouse**.
3. Enter a Connection Name.
4. In **Hostname**, enter the host account name using one of the following formats:
 - For Amazon Web Services US West, use `<account>.snowflakecomputing.com`
 - For all other regions on Amazon Web Services, use `<account>.<region>.snowflakecomputing.com`
 - For all regions on Microsoft Azure, use `<account>.<region>.azure.snowflakecomputing.com`

Where `account` is the Snowflake account name that you want to use to access the data, for example: `exampleaccountname.snowflakecomputing.com`.
5. For **Username** and **Password**, enter user credentials with access to the Snowflake data source.
6. For **Database Name**, enter the name of the database containing the schema tables and columns that you want to connect to.
7. For **Warehouse**, enter the name of the warehouse containing the database, schema tables and columns that you want to connect to. For example, `Example-WH`.
8. Click **Save**.
9. Use the connection to connect to your data. For example, from the Home page, click **Create**, then click **Dataset**, then select the connection that you just created.

Databases that Support Incremental Reload for Datasets

You can reload a dataset's data incrementally if it use one of these database types.

- Oracle Database
- Oracle Applications
- Oracle Autonomous Data Warehouse (ADW)
- Oracle Autonomous Transaction Processing (ATP)
- Oracle Talent Management Cloud/Oracle Talent Acquisition Cloud (Taleo)
- DB2
- Informix
- MySQL
- SQL Server
- Sybase ASE and Sybase IQ

See [Configure a Dataset to Load Incrementally](#).

3

Connect to Your Data Using Datasets

This topic describes how to use a data source connection to create a dataset.

Topics

- [What Are Datasets?](#)
- [About Opening Datasets](#)
- [View Available Connections](#)
- [Data Sources Available for Use in Datasets](#)
- [About the Dataset Editor](#)
- [Create a Dataset From a Connection](#)
- [Add Multiple Connections to a Dataset](#)
- [Add a File to a Dataset Created From a Connection](#)
- [Add a Table to a Dataset Using a SQL Statement](#)
- [Understand Dataset Table Joins](#)
- [Add Joins Between Dataset Tables](#)
- [Disable Auto Joins in Datasets](#)
- [Modify or Fix Joins in a Dataset](#)
- [Add Joins When Table Columns Don't Match](#)
- [Delete Joins from a Dataset](#)
- [Include a Dataset Table in Data Source Queries](#)
- [What is Preserve Grain?](#)
- [Specify Which Table Determines Grain](#)
- [Rearrange the Order of a Dataset's Tables](#)
- [What are Quality Insights?](#)
- [Enhance Your Data Using Quality Tiles](#)
- [About Removing or Restoring Dataset Columns](#)
- [Remove or Restore a Dataset Table's Columns](#)
- [Filter a Dataset Table](#)
- [Specify Whether a Dataset Table Is Cached or Live](#)
- [View a Dataset Table's Original Formatting](#)
- [Create Datasets from Files](#)
- [Create a Dataset from a Subject Area in Oracle Fusion Cloud Applications Suite](#)
- [Create a Dataset from an Analysis in Oracle Fusion Cloud Applications Suite](#)
- [Create a Dataset from an Essbase Connection](#)

What Are Datasets?

Datasets are self-service data models that you build specifically for your data visualization and analysis requirements.

A dataset can be based on one table, spreadsheet, or file. Or a dataset can be a self-service data model that contains multiple tables with relationships defined between the tables.

You can create datasets from data from files that you upload, or SaaS applications, Oracle Analytics reports, and many relational and big data sources that you build connections to. See [Data Sources Available for Use in Datasets](#).

Datasets are subsets of the file or data source's data that you curate and shape to meet your specific analytics and visualization needs. A dataset contains data source connection information, tables, the columns you specify, and the data enrichments and transformations that you apply.

You can use a dataset in multiple workbooks and in data flows. If you change a dataset, changes affect all workbooks and data flows that use the dataset.

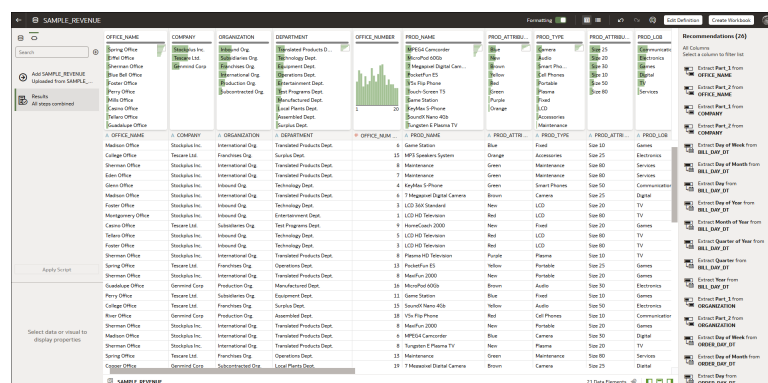
When you create and build a dataset, you can:

- Choose between many types of connections or spreadsheets.
- Create datasets based on data from multiple tables in a database connection, Oracle data source, or a local subject area. And create datasets based on data from tables in different connections and subject areas. For example, you can build a dataset that includes tables from an Autonomous Data Warehouse connection, tables from a Spark connection, and tables from a local subject area.
- Specify joins between tables.
- Transform and enrich the columns in the dataset.

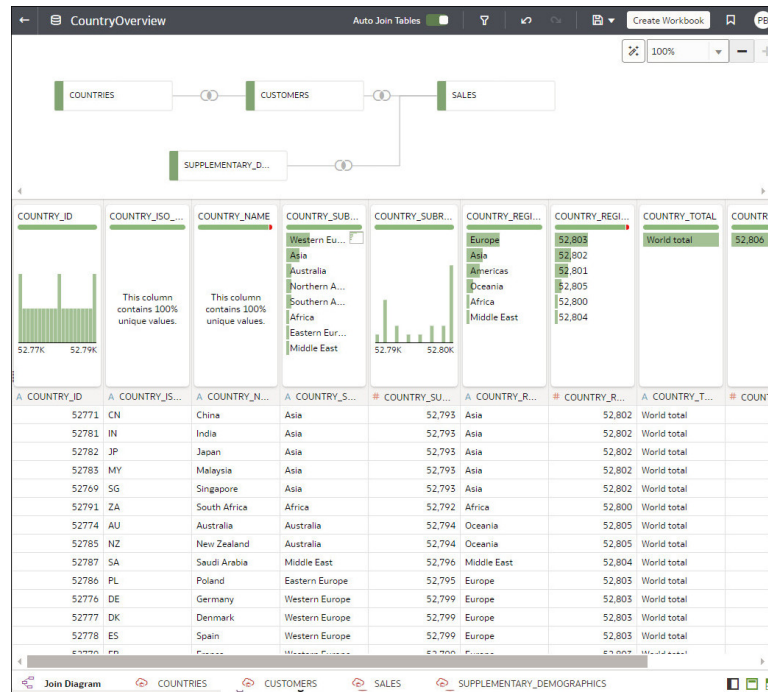
About Opening Datasets

The type of data source a dataset uses determines how you navigate the user interface when you create a new dataset, and when you open an existing dataset by itself or from a workbook.

When you create or open a dataset that uses Oracle EPM Cloud, Oracle Essbase, or Google Analytics, the dataset is displayed in the Transform editor.



When you create or open a dataset with multiple tables, the dataset is displayed in the Dataset editor.



When working in a workbook, use the **Data** tab to view and open the workbook's datasets. The dataset determines which editor Oracle Analytics opens.

- If the dataset is based on Oracle EPM Cloud, Oracle Essbase, or Google Analytics, then the Transform editor is opened in a new window.
- If the dataset contains multiple tables, then the Dataset editor is opened in a new window.

View Available Connections

A dataset uses one or more connections to data sources to access and supply data for analysis and visualization.

Your list of connections contains the connections that you built. View the connections list to determine if the connections that you need to create datasets already exist. You can also use the connections list to access more information about a specific connection and decide if it can supply the data that you need to build a specific dataset, for example, the type of database it connects to and information about its data elements.



Note:

You can create datasets with multiple tables from most data sources. Exceptions include Oracle EPM Cloud, Oracle Essbase, or Google Analytics.

If you need to create a connection, see [Create a Connection to a Data Source](#).

1. In the Home Page, click **Navigator** and then click **Data**.

2. Click the **Connections** tab to view your connections list.

Data Sources Available for Use in Datasets

Learn which data sources you can use in datasets. You can use most data sources to create datasets that contain multiple tables.

Oracle Data Sources

You can use one or more of these Oracle data source connections to create a dataset containing multiple tables.

- Oracle Fusion Cloud Applications Suite (Use the **Oracle Applications** connection type)
- Oracle Autonomous Data Warehouse
- Oracle Autonomous Transaction Processing
- Oracle Database
- Oracle NetSuite
- Oracle Service Cloud

Other Data Sources

You can use one or more of these data source connections to create a dataset containing multiple tables.

- Amazon EMR
- Amazon Redshift
- Apache Hive
- DB2
- Dropbox
- Files (XLSX, XLS, CSV, and TXT)
- Google Drive
- GreenPlum
- HortonWorks Hive
- IBM BigInsights Hive
- Impala (Cloudera)
- Informix
- MapR Hive
- Microsoft Azure SQL Database
- MongoDB
- Pivotal HD Hive
- PostgreSQL
- Salesforce
- Snowflake
- Spark
- SQL Server

- Sybase ASE
- Sybase IQ
- MySQL

Data Sources Not Available for Multiple Table Datasets

These data source connections aren't available to create or include in a dataset containing multiple tables.

- Oracle Fusion Cloud Enterprise Performance Management (EPM)
- Oracle Essbase
- Google Analytics

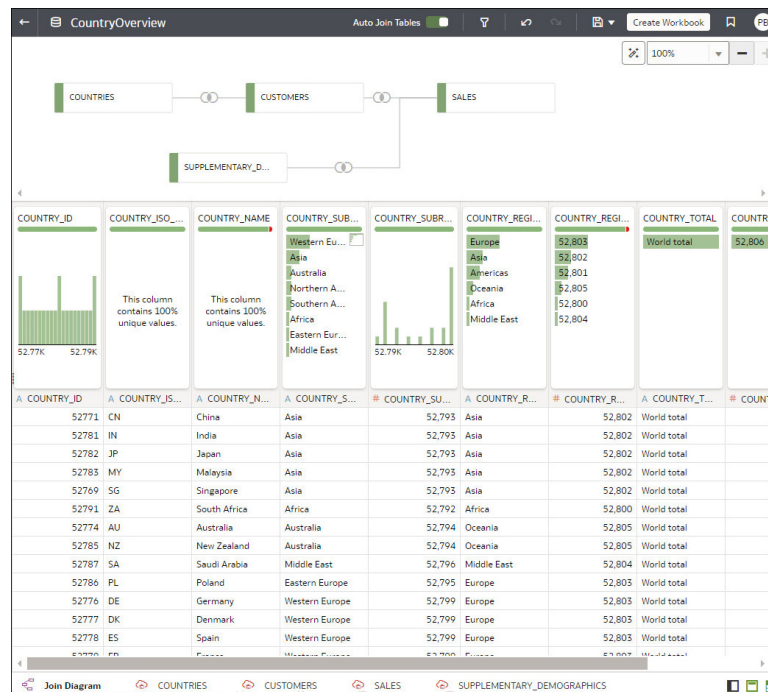
About the Dataset Editor

Use the Dataset editor to create or edit a dataset that includes tables, joins, and enriched data.

When you create a dataset from a connection that supports datasets with multiple tables, Oracle Analytics displays the Dataset editor. See [Data Sources Available for Use in Datasets](#).

You can't create datasets with multiple tables from Oracle EPM Cloud, Oracle Essbase, or Google Analytics connections. Use the Transform editor for connections that don't support datasets with multiple tables.

Each Dataset editor feature and what you can do with it is explained here:



• Connections Pane

This pane displays the data source connection's schemas and tables, and uploaded files. To add a table or file from the Connections Pane to the Join Diagram, drag and drop it from the list to the diagram or double-click it. You can add more than one table or file.

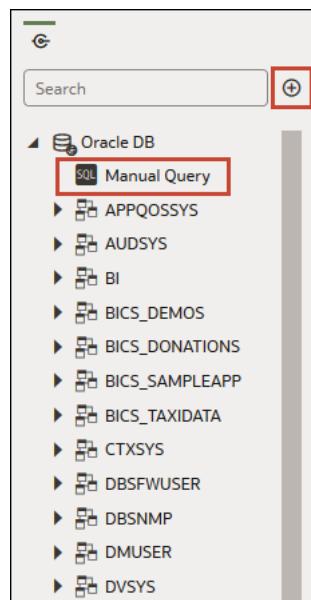
Click **Add** to open the Add Connection or Open File dialog where you can select or create another connection or select a file to add to the dataset.

Use **Search** to find a schema, table, or file displayed in the Connections pane.

To write a SQL statement to create a table, drag and drop the Manual Query item to the diagram. Then go to the diagram and double-click the Manual Query table to access the SQL editor.

 Note:

Use Manual Query when a JDBC connection doesn't provide a schema and tables listing.

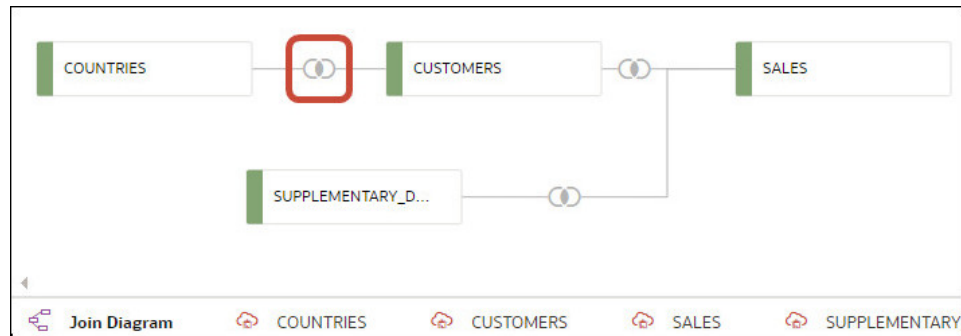


- **Join Diagram**

The Join Diagram displays the tables and joins in the dataset. Drag and drop tables to reposition them in the diagram.

When you select a table, the Preview Data area displays a sample of the table's data. If you double-click a table, then the Transform editor is displayed where you transform or enrich the table's data.

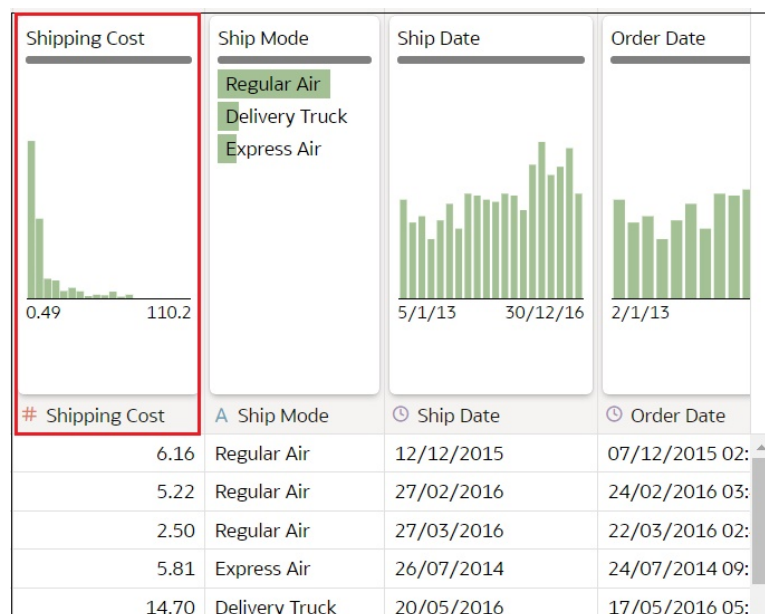
The diagram's join links and icons indicate the relationships between tables. Click on a join to display the Join editor, which enables you to configure it.



- Data Preview**

The data preview area displays a data sample for the table selected in the **Join Diagram**. From the data preview area you can click a column's type attribute to change its type. For example, change the CALENDAR_YEAR column from a measure to an attribute.

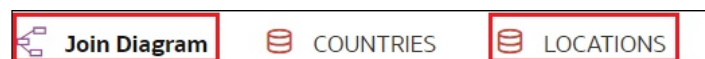
By default, a quality insight tile is displayed for each column. Quality Insights uses a representative sample of the column's data to determine information about the column's data quality. See [What are Quality Insights?](#)



- Dataset Table Page Tabs**

The Dataset editor displays a tab for each table in the dataset. Click a table tab to go to the Transform editor to transform or enrich the table's data. The tabs also display at the bottom of the Transform editor. Use them to navigate to other tables or back to the Join Diagram.

You can also drag and drop tabs to reorder tables to make it easy to locate the tables and columns that you use most often in visualizations.



- Dataset Editor Toggle Buttons**

These buttons control which parts of the Dataset editor are displayed.



This button hides or displays the connections panel:



This button hides or displays the quality tiles:



This button hides or displays the preview data area:



Create a Dataset From a Connection

When you create a dataset, you can add tables from one or more data source connections, add joins, and enrich data.



[Video](#)



[Tutorial](#)

Before you create the dataset, you can check to see if the data source connections you need already exist. See [View Available Connections](#).



Note:

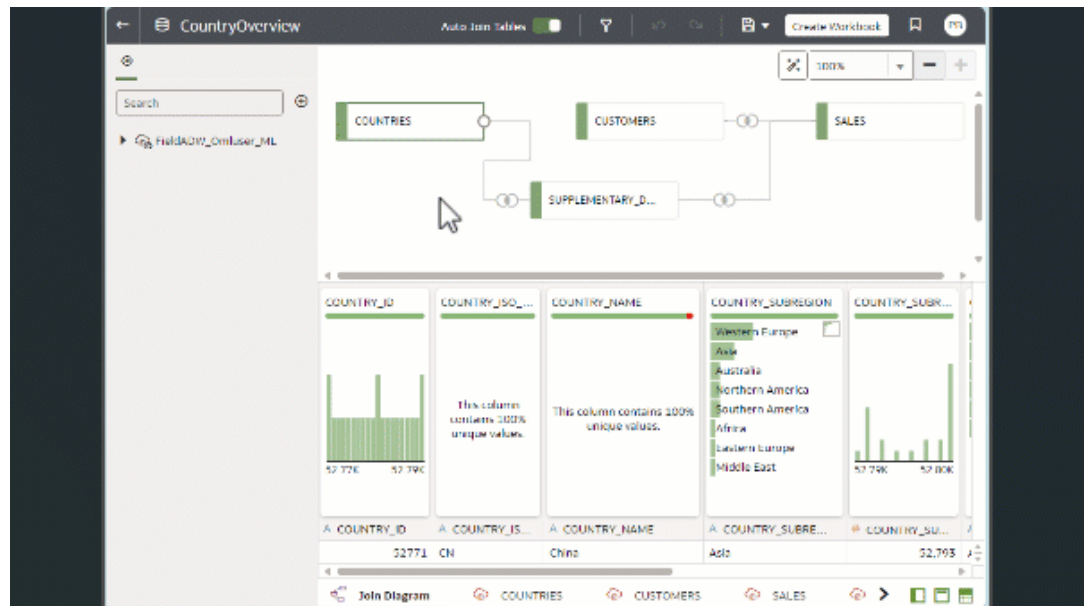
You can create datasets with multiple tables from most data sources. Exceptions include Oracle EPM Cloud, Oracle Essbase, or Google Analytics.

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, select a connection.
3. In the Dataset editor, go to the **Connections** pane and browse or search for a schema.
4. Optional: If you want to build the dataset's table joins manually rather than have Oracle Analytics automatically create them, then deselect the **Auto Join Tables** toggle to turn off automatic join creation.
5. Click the schema to view a list of its tables. Drag and drop tables to the **Join Diagram**. If you know the fact table, then add it first before you add dimension tables. The fact table must be the left-most table in the **Join Diagram**.

By default, the dataset you're building includes any table joins defined in the data source. If no joins exist in the data source then Oracle Analytics identifies and adds joins.

6. Optional: To add data from additional data sources, go to the **Connections** pane, click **Add**, and then click **Add Connection** or **Add File** to select and add another connection or file to the dataset.
7. Optional: If you added another connection or a file, then from the **Connections** pane, click the new connection's schema to open it, and drag and drop tables to the **Join Diagram**.

8. Optional: When you drag and drop a table to the **Join Diagram** from some data sources such as Fusion Applications Suite subject areas, then no columns are displayed. Go to the **Table Page Tabs**, click the subject area table, and use the **Transform Editor** to specify which columns to include in the table. Click **OK**.
9. In the **Join Diagram**, inspect, modify, add, or delete joins.
 - To inspect or modify a join, click the join to open the Join editor and inspect or modify the join type and join conditions.
 - To add a join, locate the table that you want to join, hover over it to select it, and then click and drag and drop it on to the table that you want to join it to. Open the Join editor to inspect or update the join type and conditions.
 - To delete a join, hover over the join icon and click **Delete Join**.
10. Click **Save**.
11. Enter a name and click **OK**.
12. To prepare a table's data, go to the tab row at the bottom of the Dataset editor and click the table's tab. Alternatively, from the Join Diagram, double-click the table, or right-click the table and select **Open**.



13. Use the Transform editor to perform any data transformations or enrichments. Click **Save Dataset**.
14. To edit a table's definition such as columns to include or exclude and data access, in the Transform editor, click **Edit Definition** and make any changes. Click **OK** and then click **Save Dataset**.

Add Multiple Connections to a Dataset

A dataset can include more than one connection. Adding more connections allows you to access and join all of the tables and data that you need to build your dataset.

A dataset can contain a combination of connections and files. See [Add a File to a Dataset Created From a Connection](#).

Most connections are available for you to add. Exceptions include Oracle EPM Cloud, Oracle Essbase, or Google Analytics.

Before you create the dataset, you can check to see if the data source connections you need already exist. See [View Available Connections](#).

If you drag a subject area or analysis to the **Join Diagram**, then no columns are displayed. You must use the **Transform Editor** to specify which columns to include in the subject area's dataset table.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the Connections pane, click **Add**, and click **Add Connection**.
5. In the Add Connection dialog, locate and click a connection to add it to the Connections pane.
6. In the Connections pane, confirm that the connection you selected was added.
7. Click **Save**.

Add a File to a Dataset Created From a Connection

A dataset can contain tables created from files and connections.

Most connections are available for you to add to a dataset. Exceptions include Oracle EPM Cloud, Oracle Essbase, or Google Analytics.

Before you add a connection, you can check to see if the data source connections you need already exist. See [View Available Connections](#).

If you drag a subject area or analysis to the **Join Diagram**, then no columns are displayed. You must use the **Transform Editor** to specify which columns to include in the subject area's dataset table.

Before you upload a file, confirm that the file meets these requirements:

- The file is either an Excel spreadsheet in .XLSX or .XLS format, a CSV file, or a TXT file.
 - The spreadsheet contains no pivoted data.
 - The spreadsheet is structured properly for import and use as a dataset. See [About Files for Datasets](#).
1. On the Home page, click **Navigator** and then click **Data**.
 2. Click the **Datasets** tab.
 3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
 4. Locate the file:
 - If the file you want to add is located on your computer, then in the Connections pane, click **Add**, and click **Add File**.
 - If the file you want to add is located in Dropbox or Google Drive, then in the Connections pane, click **Add**, and then click **Add Connection**.
 5. Browse for and select the file that you want to upload.
 6. Optional: If you're uploading a CSV or TXT file, then in the **Separated By, Thousand Separator**, and **Decimal Separator** fields, confirm or change the default delimiters.

To specify a custom delimiter, choose **Custom** in the **Separated By** field and enter the character you want to use as the delimiter. In the CSV or TXT file, a custom delimiter must be one character. The following example uses a pipe (|) as a delimiter: Year|Product|Revenue|Quantity|Target Revenue| Target Quantity.

7. Click **OK** to add the file to the dataset.
8. In the **Connections** pane, confirm that the file was added.
9. Click **Save**.

Add a Table to a Dataset Using a SQL Statement

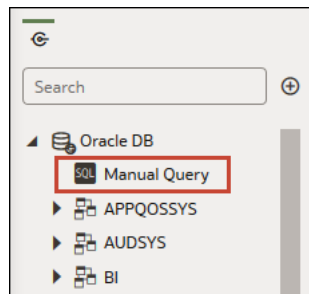
You can write a source-specific SQL SELECT statement to query a connection's data and create a table in a dataset. This manual query option is available for most connection types.

Use the manual query option to create tables when you don't want to use a connection's tables in the dataset but instead want to target specific information. Or use the manual query option when the data source connection doesn't provide a schema listing. The SQL statement you use is determined by the data source connection type.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.

Make sure that you open a dataset that's based on database tables. These are displayed with the database icon .

4. In the Data panel, **Connections** pane, locate and expand the connection that you want to query, and locate the **Manual Query** option.



5. Drag and drop **Manual Query** to the Join Diagram to create a table shell.
6. Double-click the Manual Query table.
7. Confirm that **Enter SQL** is selected.
8. In the **Statement** field, enter the SQL statement.
9. Optional: Click **Get Preview Data** to verify that you're querying the correct data.
10. Click **OK**.
11. Optional: To modify the SQL statement, go to the **Table Page Tabs**, and select the tab for the table you created. Click **Edit Definition** and use the **Statement** field to edit the SQL statement.

Understand Dataset Table Joins

A dataset can have multiple tables. The table joins you add indicate the relationships between the dataset's tables.

Tutorial

By default, when you drag and drop tables to the Join diagram to create a multiple table dataset, any joins that are defined in the data source are automatically created between tables in the dataset. Oracle Analytics also automatically creates joins base on the column name matches it finds between the tables. When defining your dataset, be sure to add the most detailed table first. This is usually the primary table for your analysis. For example, the Sales table. Then add the remaining tables like Products, Customers, Channels, and so on that provide context for your analysis. If you're adding tables from a dataset that is dimensionally modeled or a transactional table, then the most detailed table is possibly a fact table with measures.

In some cases you might want to build a dataset's joins manually. For example, if your dataset contains too many matching columns and it's time consuming for you to delete the unnecessary matches. In such cases you can turn off automatic joins for your dataset. See [Disable Auto Joins in Datasets](#).

If you're creating a dataset based on facts and dimensions and if joins already exist in the source tables, then joins are automatically created in the dataset. If you're creating a dataset from multiple connections and schemas, then you manually define the joins between tables. To do this, drag and drop a dimension table onto a fact table and specify the type of join to use and the join columns. You can create a join on more than one column. The columns that you're joining must be attribute columns and have the same data format.

Oracle EPM Cloud, Oracle Essbase, or Google Analytics aren't available for you to add and join to in a dataset that contains multiple tables. When you're working in a workbook and include data from different datasets, for example a dataset containing multiple tables from Oracle Autonomous Data Warehouse and a dataset containing data from Oracle EPM Cloud, then you use blending to match the columns. See [Blend Datasets](#).



Note:

To analyze data based on two star schemas, create a dataset for each star schema, add the datasets to a workbook, and then blend the datasets.

The Join Diagram displays join icons representing the type of joins used between tables and if any joins are incomplete. Join icons are Venn diagram thumbnails that represent the join type.

Icon	Description
	Indicates an inner join. When this icon is selected, it's displayed in blue. An inner join returns rows from the left table that match with the rows from the right table.
	Indicates a left join. When this icon is selected, it's displayed in blue. The left join returns all rows from the left table with the matching rows if available from the right table. If there is no matching row found from the right table, then the left join contains null values for the columns of the right table.

Icon	Description
	Indicates a right join. When this icon is selected, it's displayed in blue. The right join returns all rows from the right table with the matching rows if available from the left table. If there is no matching row found from the left table, then the right join contains null values for the columns of the left table.
	Indicates a full outer join. When this icon is selected, it's displayed in blue. The full outer join returns a result set that contains all rows from both left and right tables, with the matching rows from both sides where available. If there is no match, then the missing side has nulls.
	The dashed line indicates an incomplete join. When this icon is selected, it's displayed in blue. When this icon isn't selected, it's displayed in yellow. Click the icon to open the Join editor and assign or fix the join.

Add Joins Between Dataset Tables

Add joins to indicate relationships between fact tables and dimension tables. For example, to identify a doctor for each patient you might join a table containing doctors' details to a table containing patient details using a common field DOCTOR_ID.

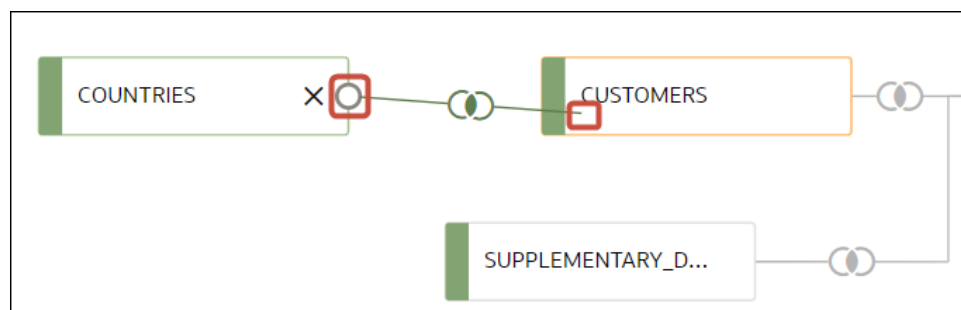
Tutorial

By default, when you drag and drop tables to a dataset, any joins defined in the data source are automatically created between the dataset's tables. Oracle Analytics also automatically creates joins based on the column name matches it finds between the tables. However if Oracle Analytics can't detect data relationships or you've turned off the **Auto Join Tables** option, you can manually create joins.

If your dataset table contains deleted columns, then those columns aren't available to use in joins. If your dataset table contains hidden columns, then those columns are available to use in joins. See [Hide or Delete a Column](#).

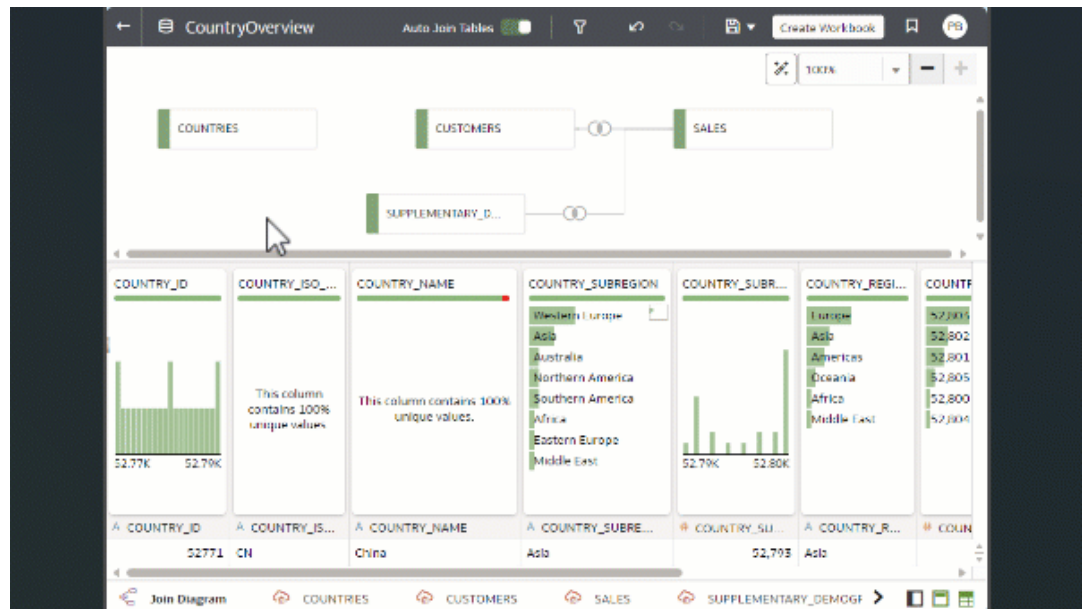
For information about using joins, see [Understand Dataset Table Joins](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram**, hover over the first table, click the O node that's displayed at the right-hand edge, and drag and drop over the target table that you want to join to.



Tip: Don't drag the whole table over another table - this simply rearranges the tables.

5. In the pop-up Join panel, select a join column from each table and a connector type (for example, =, >, <), then click outside the Join panel to close it.



Disable Auto Joins in Datasets

You can use the **Auto Join Tables** toggle button to prevent Oracle Analytics from creating joins when you add tables to your dataset.

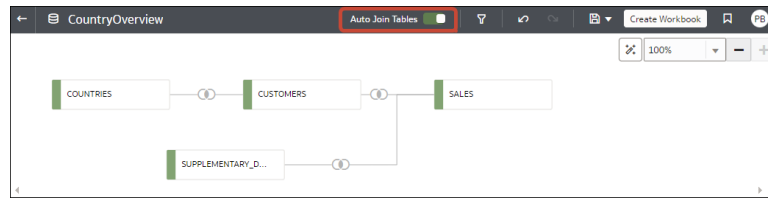
By default, when you drag and drop tables to a dataset, any joins defined in the data source are automatically created between the dataset's tables. Oracle Analytics also automatically creates joins based on the column name matches it finds between the tables.

In some cases you might want to build the dataset's joins rather than have Oracle Analytics build joins for you. For example, if your datasets contains too many matching columns and it's time consuming for you to delete the unnecessary matches. In such cases you deselect the **Auto Join Tables** toggle button to turn off automatic joins.

Deselecting **Auto Join Tables** doesn't remove the dataset's existing joins, so you must remove those joins manually.

After you turn off automatic joins and add tables to the dataset, you must manually add joins before you can save the dataset. For information about creating dataset table joins, see [Add Joins Between Dataset Tables](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. Click the **Join Diagram** tab.
5. Click **Auto Join Tables** to prevent Oracle Analytics from automatically creating joins for tables you add to the dataset.



Modify or Fix Joins in a Dataset

You can modify any joins that were automatically added to the dataset and fix any incomplete or broken joins.



Note:

Each table in the dataset must be joined to one or more tables.

This icon indicates an incomplete join:



For information about using joins, see [Understand Dataset Table Joins](#).

If the columns that you need to create joins aren't listed in the Join dialog, then you can update the columns to make them available for joins. See [Add Joins When Table Columns Don't Match](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** locate the join, hover over it, and click it to open the Join dialog.
5. Optional: Click the join type and select a new type. The join type that you select determines the join icon in the Join Diagram.
6. Optional: To modify a join condition, click a table's join column name and pick a different column to join on.
7. Optional: To add another join condition, click **Add Join Condition** and select a join column for each table.

Join COSTS - PROMOTIONS

Inner

COSTS		PROMOTIONS
PROMO_ID	=	PROMO_ID
Select a column	=	Select a column

Add Join Condition

8. Click **Save**.

Add Joins When Table Columns Don't Match

If your dataset's column data doesn't match between tables, then you can transform the column's data into the format required to create joins.



Examples of transformations include changing the data type, splitting or concatenating data in the column, or enriching the column data. The list of available transformation menu options for a column depends on the type of data in that column. See [Transform Reference](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** locate the table with the column that you want to transform.
5. Right-click the table and select **Open**.
6. In the Transform editor, locate the column that you want to transform and click **Options**.
7. From the menu, select a transformation and complete any required fields.
8. Click **Save Dataset** and then click the **Join Diagram** tab.
9. In the Join Diagram, click and hold the table to select it and then drag and drop the selected table onto the target table that you want to join it to.
10. In the **Join Diagram** locate the join that you just added, hover over it, and click it to open the Join dialog.
11. Optional: Click the join type and select a new type. The join type that you select determines the join icon in the Join Diagram.
12. Optional: To add a join condition, click **Add Join Condition** and select a join column for each table.

Join COSTS - PROMOTIONS

Inner

COSTS		PROMOTIONS
PROMO_ID	=	PROMO_ID
Select a column	=	Select a column

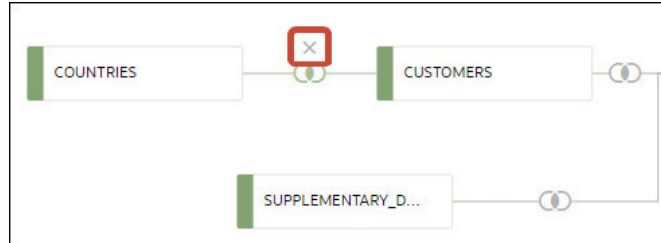
+ Add Join Condition

13. Click **Save**.

Delete Joins from a Dataset

You can delete any table join from a dataset.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** locate the join, hover over it, and click **X**.



5. Click **Save**.

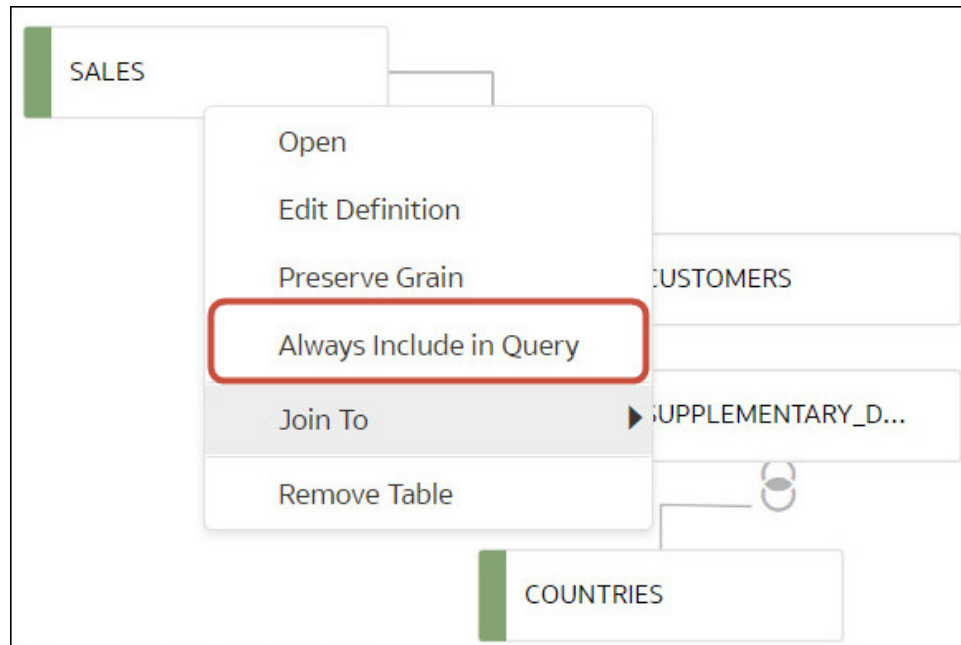
Include a Dataset Table in Data Source Queries

Oracle Analytics generates source-specific optimized queries for each visualization. During this process, a dataset is treated as a data model in that only the tables needed to satisfy a visualization are used in the query.

However, there are scenarios where you may want to use a table in the query even if the table isn't queried in the visualization. In these scenarios, you can set the table to **Always Include in Query**. For example, you may want to see only Sales where a product is associated but the visualization is based on only Customer and Sales. Or you may want to apply a date filter to all visualizations in a workbook.

Oracle Analytics prunes any of the dataset's tables not used in the visualization or not specified to be included in the query.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** locate the table, right-click, and select **Always Include in Query**.



In the join diagram, the table displays an **Always Include in Query** icon .

5. Click **Save Dataset**.

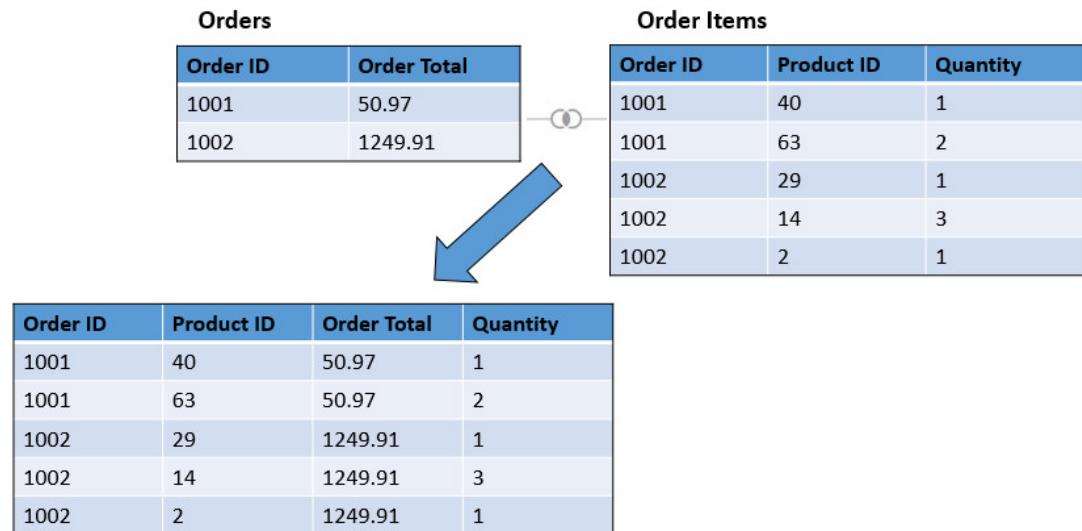
What is Preserve Grain?

By default a dataset's grain is determined by the table with the lowest grain, but you can use the preserve grain setting to specify which table determines the dataset's grain.

See [Specify Which Table Determines Grain](#).

You can create a measure in any table in a dataset. However, this can cause the measure on one side of a one-to-many or many-to-many relationship to be duplicated. In cases like this you can set the table on one side of the cardinality to **Preserve Grain** to keep its level of detail.

For example, if you have an Orders table and an Order Items table, join them on the Order ID column, and query them, then the Order Total is duplicated for each order item. This is because the Order Items table has the lower grain.

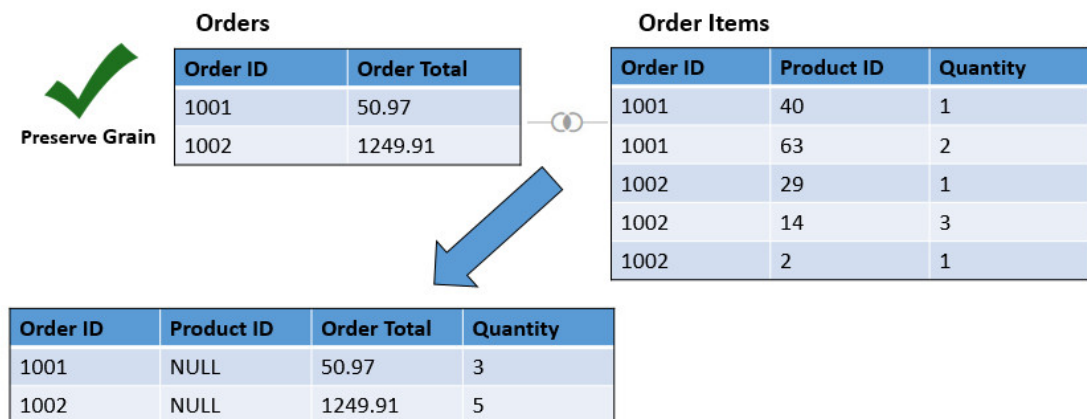


However, if you want the query results to show data at the Orders table's level, then in the Dataset Editor's Data Diagram, you set the Orders table to **Preserve Grain**.



Note:

In the following example, the Product ID column is NULL because there are multiple values for PRODUCT for each Order. The Values are set to NULL to preserve the grain at the Order level.



Specify Which Table Determines Grain

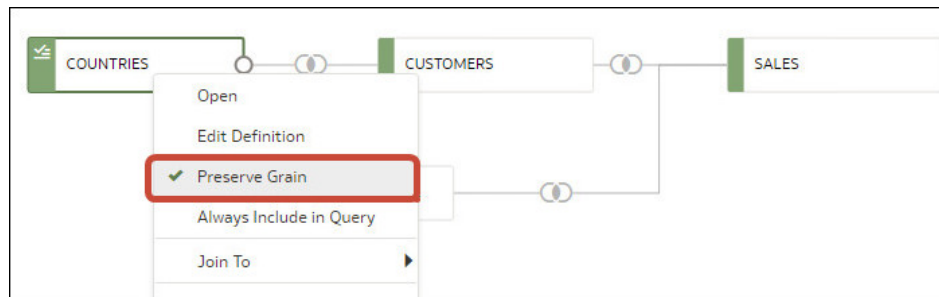
By default the table with the lowest grain determines a dataset's grain, but you can change which dataset table determines grain.

Any table in the dataset can contain a measure. However, this can cause the measure on one side of a one-to-many or many-to-many relationship to be duplicated and produce unexpected query result. In cases like this you can set the table on one side of the cardinality to **Preserve Grain** to keep its level of detail.

For an example of why you'd change a table's grain, see [What is Preserve Grain?](#)

When you set a table to **Preserve Grain**, a green bar is displayed at the top of table in the Join Diagram. This green bar indicates which table's grain the dataset uses.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** locate the table, right-click, and select **Preserve Grain**.



In the join diagram, the table displays a **Preserve Grain** icon .

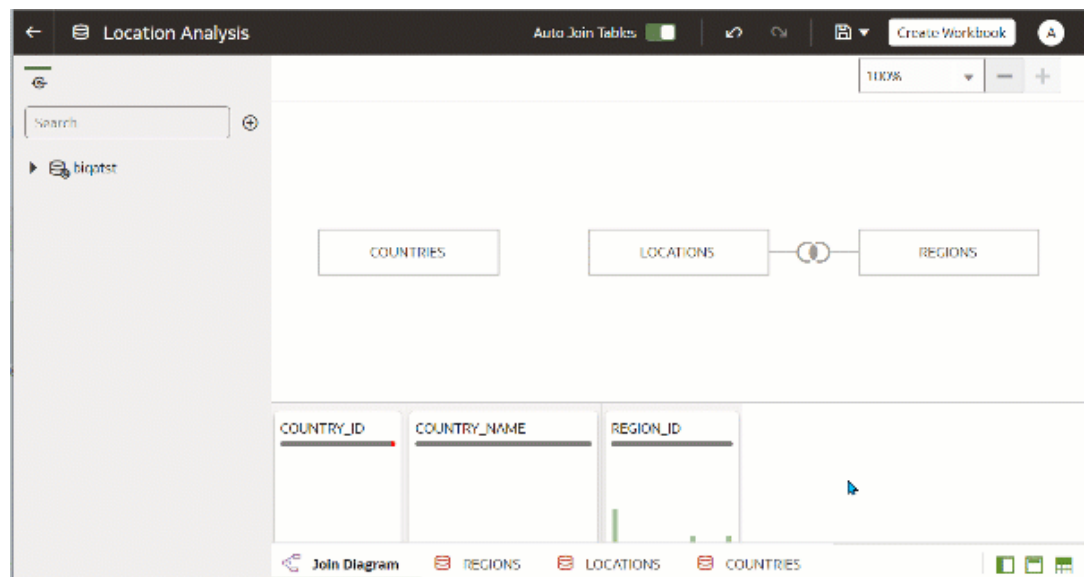
5. Click **Save Dataset**.

Rearrange the Order of a Dataset's Tables

When you include a dataset in a workbook, the Workbook Editor's **Data Panel** displays the dataset's tables as folders and in the same order that you added them to the dataset.

In the Dataset editor's **Table Page Tabs** you can drag and drop tables into an order that makes it easy for you to locate the folders and columns that you use most often in visualizations.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Table Page Tabs** locate the table that you want to reposition.
5. Click and hold, and then drag and drop the table to a different position on the tabs bar.



6. Click **Save Dataset**.

What are Quality Insights?

Oracle Analytics automatically analyzes data quality to help you cleanse and enrich your data.

When you edit a table in the join diagram or transform editor, Oracle Analytics analyzes the quality of the data and provides a visual summary known as a quality insight in a tile above each column. Quality insights enable you to explore your data, and use a visual overview of the content to assess and improve data quality. The quality summary is based on a sample of the data, but changes that you make are applied to all of your data. Quality insights display a frequency tile for text or a histogram for dates and numbers.

City	State	Postal_Code	Country	Latitude	Longitude
Abra Pampa	Jujuy	AR101514	Argentina	-22.71	-65.69
Adelaide	South Australia	AU101679	Australia	-34.93	138.60
Ahmedabad	Dadra and Nagar Haveli	IN101449	India	23.030	72.580
Ahmednagar	Maharashtra	IN11439	India	19.110	74.750
Albany	New York	US10878	United States	44.620	-123.0
Aomori	Aomori	JP101537	Japan	40.825	140.71

Quality tiles enable you to:

- **Explore** - Explore your data in real time using instant filtering, which enables you to temporarily filter data across all column in the table. You can filter on multiple values at the same time.

City	State	Postal_Code
Belfast	EN	E1 1
Birmingham	Alabama	GB101409
Bristol	California	GB101410
Cardiff	Nordrhein-Westfalen	GB101432
Edinburgh	Ciudad de Buenos Ai...	GB101483
Glasgow	Colorado	GB101484
Leeds	Jujuy	GB101490
Liverpool	Karnataka	GB101491
London	Western Cape	GB101493
Manchester	Arkansas	GB101495

A City	A State	A Postal_Code
Belfast	EN	GB101409
Birmingham	EN	GB101495
Bristol	EN	GB101490
Cardiff	EN	GB101410
Edinburgh	EN	GB101432
Glasgow	EN	GB101496

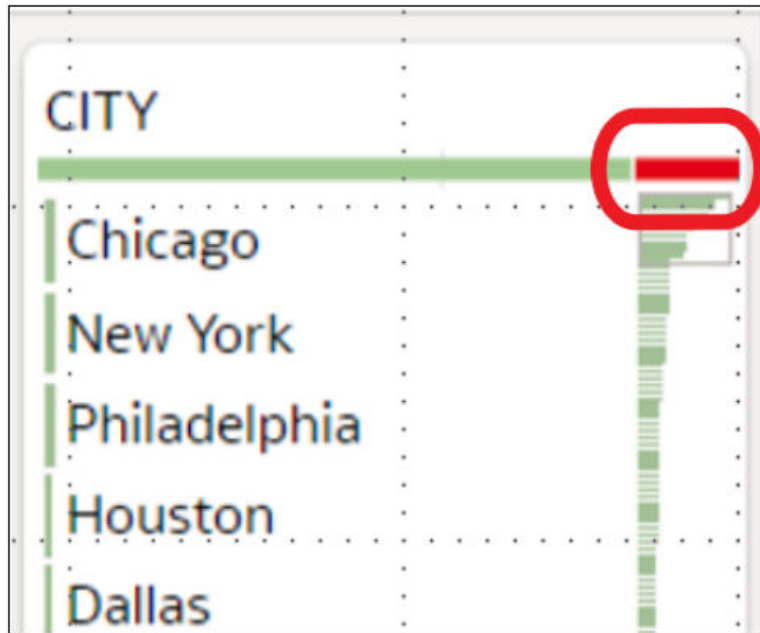
The value being filtered is marked with a green box. Filters aren't added to the data preparation script.

- **Review** - Use the interactive visualizations such as bar charts and histograms to evaluate your data and identify anomalies and outliers.

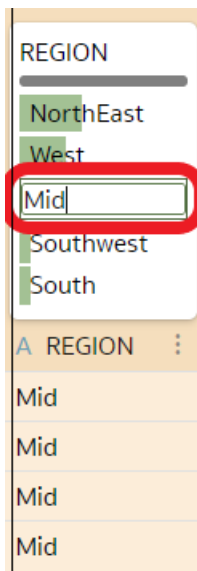
CREDIT_CARD_L...	REGION	HOUSE_OWNER...	N_TRANS_WEB...	BUY_INSURANCE
	NorthEast West Midwest Southwest South			No Yes
A CREDIT_CAR...	A REGION	A HOUSE_OWN...	A N_TRANS_WE...	A BUY_INSURA...
1100	West	1	1600	Yes
900	South	1	5000	Yes
600	NorthEast	1	414	No
2500	NorthEast	1	1400	Yes
1100	NorthEast	0	900	No

The quality tiles at the top of each column provide an instant assessment of the quality of content in that column based on a deep semantic understanding of the data.

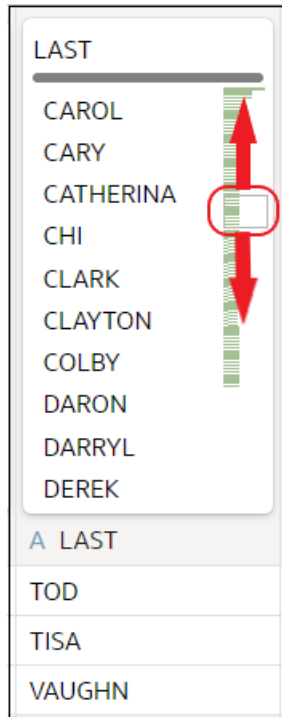
- **Assess** - Hover over the quality bar to see a popup summary showing the percentage of valid and invalid values. Click on areas marked in red to filter on invalid values.



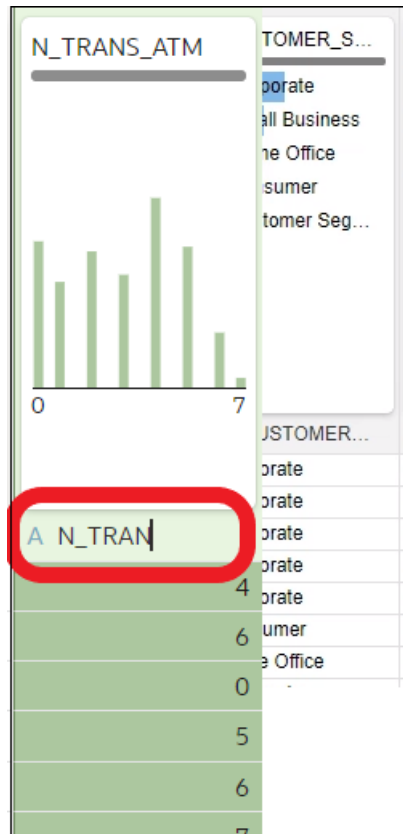
- **Replace or correct** - When you've identified anomalies and outliers, use inline replace to correct values. You get immediate feedback on the improvements to the data quality on the quality bar.



- **Scroll** - Navigate large datasets using the scrollable mini-map.



- **Rename columns** - Create more readable column names easily.



Make sure that you toggle the **Quality Tiles** option bottom right to display quality tiles.

A LAST	A N_MORTGAGES	A CAR_OWNER...
TOD	1	
TISA	1	
VAUGHN	1	
CHARLES	1	
LAVERN	0	
STEPHAN	1	
ANGEL O	1	

V_APPLY 31 Data Elements

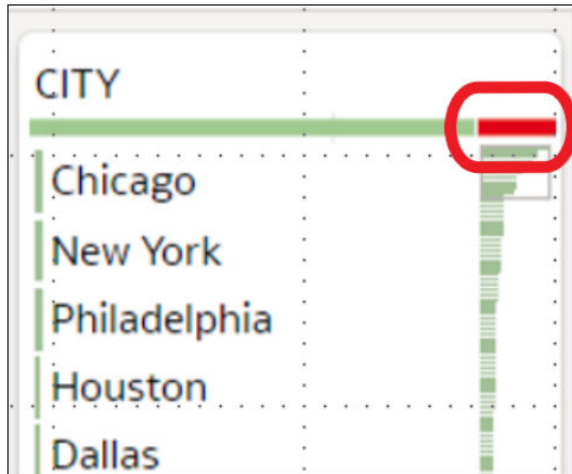
Enhance Your Data Using Quality Tiles

When you edit a dataset in the transform editor, Oracle Analytics displays a quality tile for each data column, which displays a visual summary of data quality and enables you to analyze data quality and enhance your data.

- On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
- Use the quality insights to get an instant assessment of the quality of content in that column based on a deep semantic understanding of the data.

CREDIT_CARD_L...	REGION	HOUSE_OWNER...	N_TRANS_WEB...	BUY_INSURANCE
A CREDIT_CAR...	A REGION	A HOUSE_OW...	A N_TRANS_WE...	A BUY_INSURA...
1100	West	1	1600	Yes
900	South	1	5000	Yes
600	NorthEast	1	414	No
2500	NorthEast	1	1400	Yes
1100	NorthEast	0	900	No

For example, hover over a quality bar to see how many valid and invalid values are in the column. Click on areas marked in red to filter on invalid values.



3. To explore your data by applying a temporary filter, click one or more values to use as a filter.

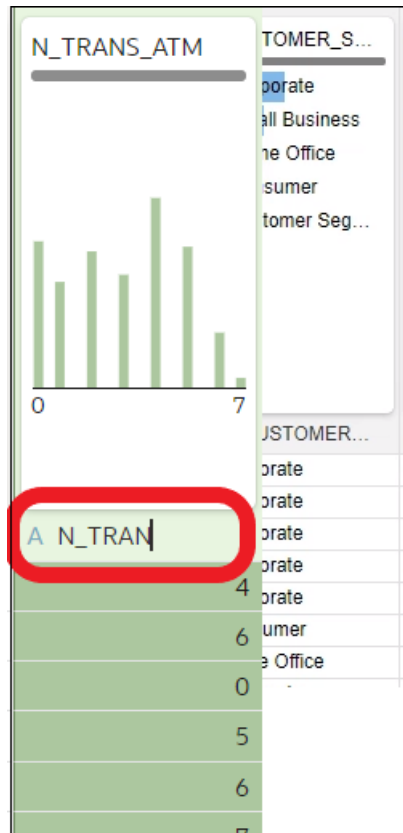
Oracle Analytics highlights filter values with a green box. To unfilter a value, click the value again.

City	State	Postal_Code
Belfast	EN	E1 1
Birmingham	Alabama	GB101409
Bristol	California	GB101410
Cardiff	Nordrhein-Westfalen	GB101432
Edinburgh	Ciudad de Buenos Ai...	GB101483
Glasgow	Colorado	GB101484
Leeds	Jujuy	GB101490
Liverpool	Karnataka	GB101491
London	Western Cape	GB101493
Manchester	Arkansas	GB101495
A City	A State	A Postal_Code
Belfast	EN	GB101409
Birmingham	EN	GB101495
Bristol	EN	GB101490
Cardiff	EN	GB101410
Edinburgh	EN	GB101432
Glasgow	EN	GB101496

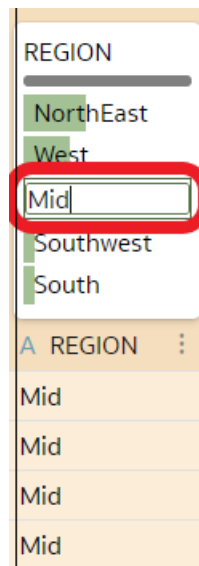
When you filter on values, Oracle Analytics updates all data columns to instantly display only the rows relating to the filter values you selected. If you filter a value nearer the bottom of a long list, you might have to scroll down the list to locate it so that you can deselect the value.

Note: Temporary filters that you apply in quality tiles aren't saved with your data (that is, aren't added to the data preparation script).

4. To rename a column, click the column name to edit the value.

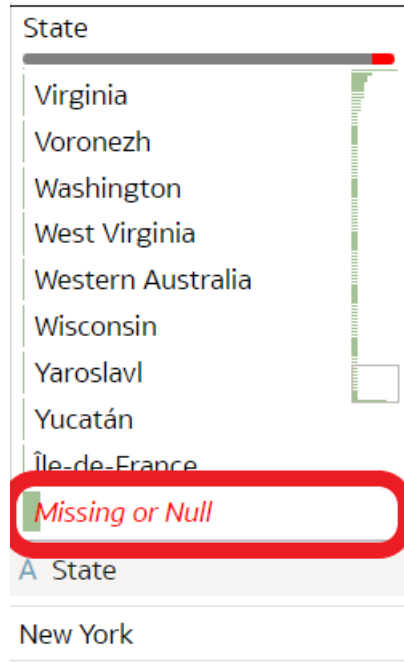


5. To edit values.
 - a. In the quality tile, double-click the value you want to change.

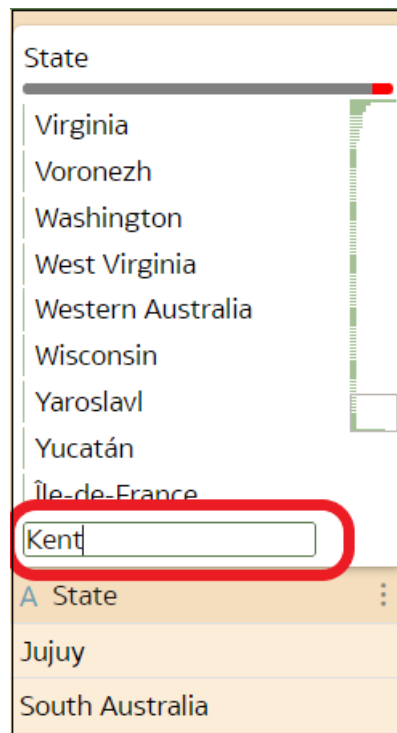


- b. Oracle Analytics inserts the value that you specify into every row that contained the original value.
6. To fix null or missing values:
 - a. In the quality tile, scroll to the last value in the list.

If your data has missing values, you see **Missing or Null** highlighted in red.



- b. Double-click **Missing or Null**, then enter the value you want to use.
Oracle Analytics inserts the value that you specify into every Missing or Null row.



Changes that you apply in the quality insight tiles are added to the data preparation script (except for filters).

About Removing or Restoring Dataset Columns

Removing columns doesn't permanently delete them from the table, and you can re-add the removed columns as needed for enrichments and transformations, or for inclusion in the visualizations that you create from the dataset.

It's important to understand that removing a column is different than deleting a column from a dataset:

- Use Edit Definition to *remove* a column.
- The Transform editor doesn't indicate which columns were removed, and removing a column doesn't add a step to the Preparation Script Panel. To confirm which columns were deleted or to re-add them, go to Edit Definition.
- Use the Transform editor to *delete* a column.
- Deleting a column creates a step in the Preparation Script Panel. Remove the step to restore the column.

You can create dataset filters on removed columns.

In some cases profiling and generating quality insights for a table that contains many columns can be time and resource-intensive. If you're working with a table with many columns and want to increase system performance, Oracle recommends that you remove any columns that you don't need before you perform any enrichments or transformations.

See [Hide or Delete a Column](#) and [Remove or Restore a Dataset Table's Columns](#).

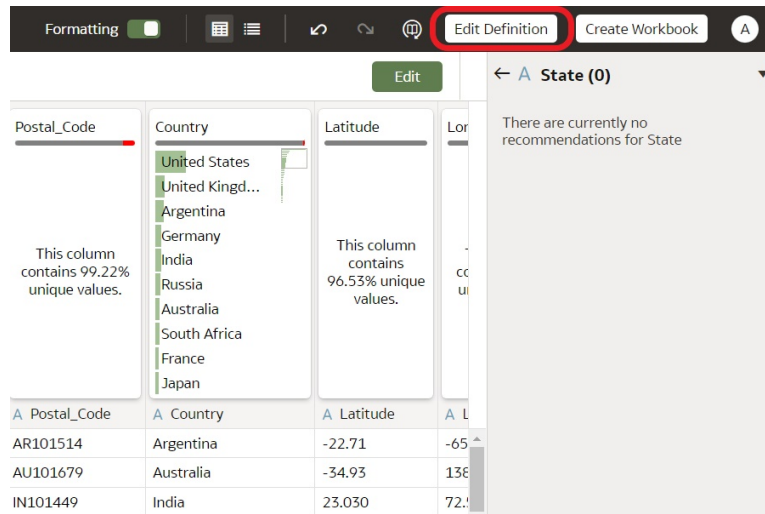
Remove or Restore a Dataset Table's Columns

You can remove columns from a dataset table when the dataset doesn't need the columns, and you can restore any removed columns.

See [About Removing or Restoring Dataset Columns](#).

When you remove or restore a column, those changes are displayed in the table's view in the Transform editor. Oracle Analytics warns you if the column you've chosen to remove is used in the Transform editor's Preparation Script pane. But Oracle Analytics won't warn you if the column you've chosen to remove is used in a workbook or visualization.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** go to the **Table Page Tabs** and click the table that you want to work with.
5. In the Transform editor, click **Edit Definition**.



6. (Optional) To remove columns, either click **Remove All** to remove all columns, or select the columns that you want to remove and click **Remove Selected**.
7. (Optional) To re-add columns, either click **Add All** to add all columns not included in the table, or select the columns that you want to add and click **Add Selected**.
8. Click **OK**.

Filter a Dataset Table

In most cases when you add a table to the dataset, all of the table's column values are included. You can add filters so that the table contains only the values needed in the dataset.

Applying a filter to a column limits everything in the table. For example, if a table contains data for every world region, you can create a filter on the COUNTRY_REGION column and set its value to Americas so that your table's columns contain data for North, Central, and South America.

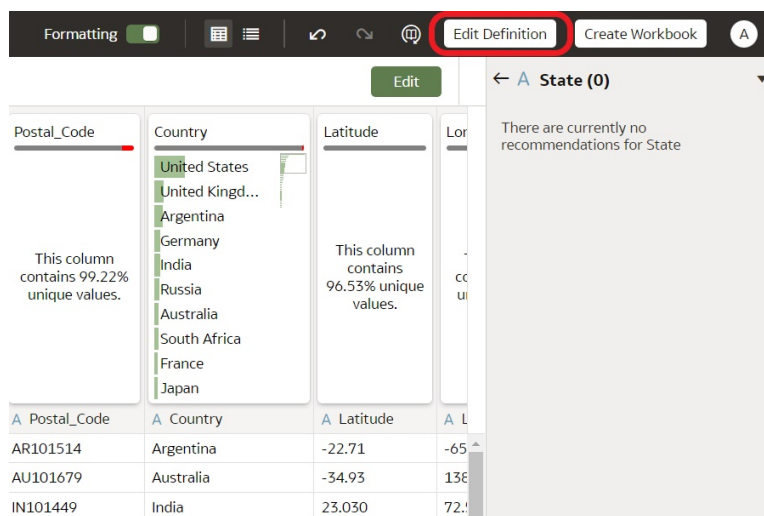
If you add more than one filter to the dataset, by default the filters limit each other. For example, if you add a filter on the COUNTRY_REGION column and set its value to Americas and then add a filter on the COUNTRY column, the COUNTRY column's filter selection values are limited to the names of countries in the Americas, for example, Canada, Brazil, and Panama.

Any filters that you apply limit what is displayed in the table's quality tiles, the Transform editor, and the table's data preview.

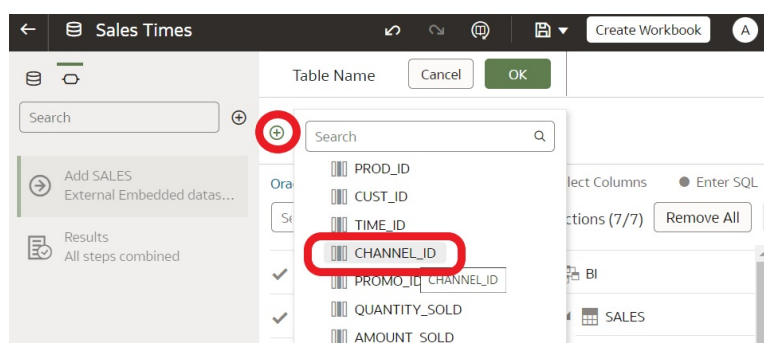
You can create filters on columns that have been removed from the table. See [Remove or Restore a Dataset Table's Columns](#).

In some cases you might want to use the table's filter to query other visualizations in a workbook. See [Include a Dataset Table in Data Source Queries](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** go to the **Table Page Tabs** and click the table that you want to work with.
5. In the Transform editor, click the **Edit Definition** button.



6. Click **Add Filter**.
7. Select the column that you want to filter by.



8. Select the filter's values.
9. Click off the filter.

Specify Whether a Dataset Table Is Cached or Live

A dataset table's data access setting determines if the table's data is loaded into cache, or if the table gets its data directly from the data source.

You can set a table to **Automatic Caching** or **Live**.

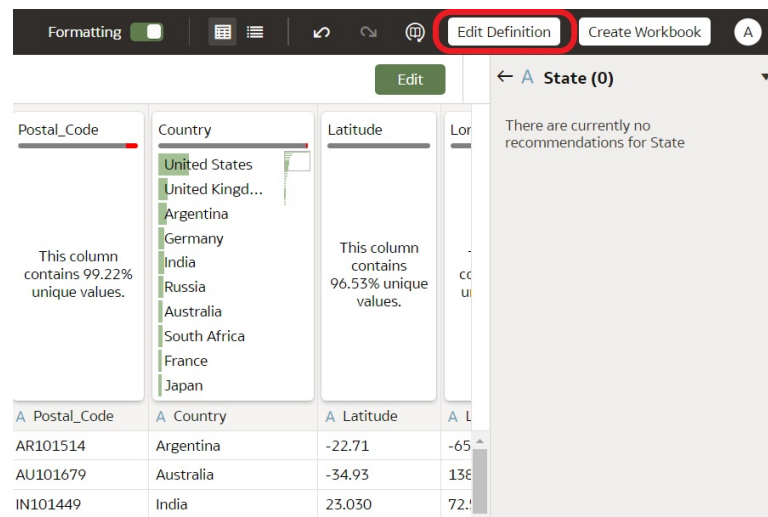
- **Automatic Caching** - If you select this option, then the table loads or reloads its data into cache. This option can provide faster performance when you refresh a table's data from the **Transform** editor or from a workbook. Selecting this option causes the **Reload** menu option to display at the table and dataset level. This option is limited to 2GB of data after compression. If the data is larger than 2GB or if the data takes too long to load, the data access mode uses a live query if the connection type supports it. If you want to use automatic caching and the data is larger than 2GB, then add column filters to the table, for example limit a date range to reduce the size of the data.
- **Live** - If you select this option, then the table gets its data directly from the data source. When a table is set to **Live**, the source system manages the table's data source queries.

This option is useful when the data is stored in a high-performance system such as Oracle Autonomous Data Warehouse. It also ensures that the latest data is used.

In a dataset with multiple tables, some tables can use automatic caching and some can include live data. If you reload multiple tables using the same connection and the reloading of data on one table fails, then any tables set to use automatic caching are switched to use live data.

For best performance, set all tables in a dataset to access data in the same way. When the tables in one dataset are mixed between automatic caching and live data, the system must resolve joins and performance varies based on the amount of data needed from each table to complete the queries.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** go to the **Table Page Tabs** and click the table that you want to work with.
5. In the Transform editor, click **Edit Definition**.



6. Confirm that the data access panel is displayed.

If the data access panel isn't displayed, go to the right center edge of the window to locate and drag the handle to open the panel.

The screenshot shows a 'Create Workbook' dialog box with the following fields and values:

- Name: diab pred results
- Description: (empty text box)
- Connection: diabetes_adw
- Data Access: Live (dropdown menu)
- Created On: Jan 23, 2024
- Modified On: Jan 23, 2024
- Refreshed: Jan 23, 2024
- Advanced: (collapse icon)
- Flow New Data Indicator: Select Column (dropdown menu, highlighted with a red box)

7. In the **Data Access** field, specify how you want the table to access its data.

The screenshot shows the 'Data Access' dropdown menu for the 'PRODUCTS' dataset. The menu is open, showing two options:

- Live: Latest data is always returned from the live source.
- Automatic Caching: Data from the live source may be cached for faster performance. (This option is selected and highlighted with a green checkmark and a red box)

8. Click **OK**.

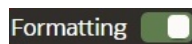
View a Dataset Table's Original Formatting

By default Oracle Analytics applies formatting to the numbers and dates in the dataset. You can toggle this default formatting off to view numbers and dates as they're formatted in the dataset's data source.

For example, when Oracle Analytics's default formatting is applied, dates are displayed as 06/20/2019. But when default formatting is turned off, then dates are displayed as 2019-06-20.

You can toggle the default formatting off and on, but you can't save the default formatting. To modify a column's formatting, see [Adjust the Display Format of a Date or Number Column](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. In the **Join Diagram** go to the **Table Page Tabs** and click the table that you want to work with.
5. In the Transform editor, click the **Formatting** toggle on the tool bar to turn formatting off or on.



Create Datasets from Files

You can create datasets from a range of files, including comma-separated value (*.CSV), text (*.TXT), and spreadsheets.

Topics:

- [About Files for Datasets](#)
- [Create a Dataset from a File Uploaded from Your Computer](#)
- [Create a Dataset from a File Uploaded from Dropbox or Google Drive](#)
- [Add Multiple Files to a Dataset](#)

About Files for Datasets

You can create datasets from Microsoft Excel spreadsheets (XLSX and XLS), Google Sheets, CSV files, and TXT files. The maximum file size you can upload is 250 MB and the data column limit for a single file is 250 columns.

You can upload and use files from your computer, or from Dropbox or Google Drive data source connections.

When you upload a file, you can use it only in the dataset that you uploaded it to. Because Oracle Analytics doesn't store an uploaded file, you must upload the file again to include it in another dataset.

Formatting Rules for Excel Spreadsheet and Google Sheets Files

- Tables start in Row 1 and Column 1.

- Tables have a regular layout with no gaps, repeated column names, or inline headings. An example of an inline heading is one that's repeated on every page of a printed report.
- Row 1 contains the unique names of the columns in the table.
- Row 2 and greater contain the data for the table.
- Data in a column is of the same type. For example, don't use a phone number column to hold email addresses.
- Data is at the same granularity.

Character Set Encoding Rules for CSV and TXT Files

- Encode source files using UTF-8.
- Before you edit your files, configure your text editor to use the appropriate font and script (or subset).

Create a Dataset from a File Uploaded from Your Computer

You can upload spreadsheets from Microsoft Excel or Google Sheets, CSV files, and TXT files from your computer to create a dataset.

Confirm that the file that you want to upload meets these requirements:

- The file is either a Microsoft Excel (.XLSX or .XLS format) or Google Sheets spreadsheet, a CSV file, or a TXT file.
- Spreadsheets shouldn't contain pivoted data.
- Spreadsheets are structured properly for import and use as a dataset. See [About Files for Datasets](#).

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, either drag and drop a file to the dialog, or click **Drop data file here or click to browse** to browse your computer for a file to upload.
3. In the Create Dataset page's **Name** field, change the default dataset name if required.
4. Optional: If you're uploading a CSV or TXT file, use the **Separated By, Thousand Separator**, and **Decimal Separator** fields to configure the default delimiters.

To specify a custom delimiter, choose Custom in the **Separated By** field and enter the character you want to use as the delimiter. In the CSV or TXT file, a custom delimiter must be one character. The following example uses a pipe (|) as a delimiter: Year|Product|Revenue|Quantity|Target Revenue| Target Quantity.

5. Click **OK** to upload the file and create the dataset.

Create a Dataset from a File Uploaded from Dropbox or Google Drive

You can upload spreadsheets from Microsoft Excel or Google Sheets, CSV files, and TXT files from Dropbox or Google Drive and use them to create a dataset.



Note:

Files uploaded from Google Analytics aren't available to create or include in a dataset with multiple tables.

Confirm that the file that you want to upload meets these requirements:

- The file is either a Microsoft Excel (.XLSX or .XLS format) or Google Sheets spreadsheet, a CSV file, or a TXT file.
- Spreadsheets shouldn't contain pivoted data.
- Spreadsheets are structured properly for import and use as a dataset. See [About Files for Datasets](#).

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, select a connection.
3. Browse for and select the file that you want to upload.
4. In the Create Dataset page's **Name** field, change the default dataset name if required.
5. Optional: If you're uploading a CSV or TXT file, use the **Separated By, Thousand Separator**, and **Decimal Separator** fields to configure the default delimiters.

To specify a custom delimiter, choose Custom in the **Separated By** field and enter the character you want to use as the delimiter. In the CSV or TXT file, a custom delimiter must be one character. The following example uses a pipe (|) as a delimiter: Year|Product|Revenue|Quantity|Target Revenue|Target Quantity.

6. Click **OK** to upload the file and create the dataset.

Add Multiple Files to a Dataset

A dataset can include more than one file uploaded from your computer or from Dropbox or Google Drive.



Note:

Files uploaded from Google Analytics aren't available to create or include in a dataset with multiple tables.

Before you add a file from a connection, confirm that the connection you need exists. See [View Available Connections](#).

A dataset can contain tables created from files and connections. See [Add a File to a Dataset Created From a Connection](#).

Confirm that the file that you want to upload meets these requirements:

- The file is either a Microsoft Excel (.XLSX or .XLS format) or Google Sheets spreadsheet, a CSV file, or a TXT file.
- The spreadsheet contains no pivoted data.
- The spreadsheet is structured properly for import and use as a dataset. See [About Files for Datasets](#).



Tutorial

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to open, click **Actions**, and then click **Open**.
4. Locate the file:

- If the file you want to add is located on your computer, then in the Dataset editor's Connections pane, click **Add**, and click **Add File**.
 - If the file you want to add is located on Dropbox or Google Drive, then in the Dataset editor's Connections pane, click **Add**, and then click **Add Connection**.
5. Browse for and select the file that you want to upload.
 6. In the Create Dataset page's **Name** field, provide a name for the dataset table created from the file.
 7. If you're uploading a CSV or TXT file, then in the **Separated By**, **Thousand Separator**, and **Decimal Separator** fields, confirm or change the default delimiters.

To specify a custom delimiter, choose Custom in the **Separated By** field and enter the character you want to use as the delimiter. In the CSV or TXT file, a custom delimiter must be one character. The following example uses a pipe (|) as a delimiter: Year|Product|Revenue|Quantity|Target Revenue| Target Quantity.
 8. Click **OK** to add the file to the dataset.
 9. In the Connections pane, confirm that the file was added.
 10. Click **Save**.

Create a Dataset from a Subject Area in Oracle Fusion Cloud Applications Suite

You can create a dataset from subject areas stored in an applications in Oracle Fusion Cloud Applications Suite. For example, Oracle Fusion Cloud Financials with Oracle Transactional Business Intelligence.

When you drag and drop a subject area to the **Join Diagram**, by default Oracle Analytics doesn't include any columns in the dataset table. You must specify which columns to include in the table.

Oracle Analytics doesn't automatically join tables created from subject areas. You need to manually join these tables. See [Understand Dataset Table Joins](#).

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, select a connection to the application you want to analyze.

Oracle Applications connections have this icon:



3. In the Dataset editor, go to the **Connections** pane and browse or search for a subject area.
4. Drag and drop one or more subject areas to the **Join Diagram**.
5. To add columns to a table, go to the **Table Page Tabs**, click a subject area table, and use the **Transform Editor** to specify which columns to include in the table. Click **OK**.
6. In the **Join Diagram**, locate the table that you want to join, hover over it to select it, and then click and drag and drop it on to the table that you want to join it to. Open the Join editor to inspect or update the join type and conditions.
7. Click **Save Dataset**.
8. Change the default name "New Dataset" displayed top left.

Create a Dataset from an Analysis in Oracle Fusion Cloud Applications Suite

You can create a dataset based on analyses from applications in Oracle Fusion Cloud Applications Suite. For example, Oracle Fusion Cloud Financials with Oracle Transactional Business Intelligence.

Oracle Analytics doesn't automatically join tables created from analyses. You need to manually join these tables. See [Understand Dataset Table Joins](#).

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Dataset editor, go to the **Connections** pane and browse or search for an analysis.
3. Drag and drop one or more analysis to the **Join Diagram**.
4. In the **Join Diagram**, locate the table that you want to join, hover over it to select it, and then click and drag and drop it on to the table that you want to join it to. Open the Join editor to inspect or update the join type and conditions.
5. Click **Save Dataset**.
6. Optional: Change the default name "New Dataset" displayed top left.

Create a Dataset from an Essbase Connection

You can use an Essbase connection to create a dataset.



Note:

Essbase connections aren't available to create or include in a dataset with multiple tables.

Datasets that use Oracle Essbase connections aren't available for blending.

Before you create the dataset, confirm that the data source connection you need exists. See [View Available Connections](#).

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, select the Essbase connection.
3. In the Transform editor's Add Dataset step, double-click the Essbase cube that you want to use in the dataset.
4. Optional: Select an **Alias** value.
If you select an alias value other than the default, then values from the selected alias table are displayed in visualizations that use this Essbase dataset.
5. Click **Add** to save the dataset and go to the Transform editor to transform and enrich the dataset's data.

4

Enrich and Transform Data

Data preparation involves cleansing, standardizing, and enriching your dataset before you visualize the data.

You enrich and transform data to improve its quality and get it ready to visualize. Better quality data gives you better quality insights.

See also [Transform Reference](#).

Topics:

- [About Data Enrichment and Transformation in Oracle Analytics](#)
- [Enrich and Transform Your Data](#)
- [Accept Enrichment Recommendations](#)
- [Transform Data](#)
- [Replace Missing or Null Values in a Dataset](#)
- [Transform Data Using Replace](#)
- [Convert Text Columns to Date or Time Columns](#)
- [Adjust the Display Format of a Date or Number Column](#)
- [Create a Bin Column When You Prepare Data](#)
- [Configure Columns Properties in a Dataset](#)
- [Hide or Delete a Column](#)
- [Restore a Hidden or Deleted Column](#)
- [Add Columns to a Dataset](#)
- [Edit the Data Preparation Script](#)

About Data Enrichment and Transformation in Oracle Analytics

Oracle Analytics makes it easy to enrich and transform your data before you make it available for analysis.



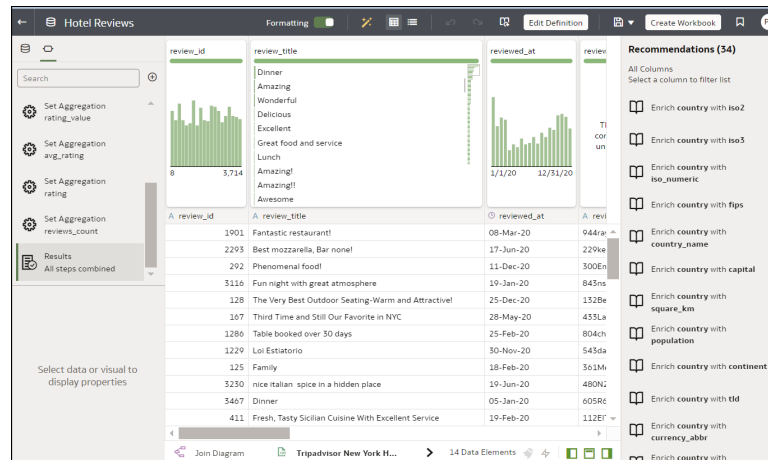
[Tutorial](#)

Navigate to the transform editor

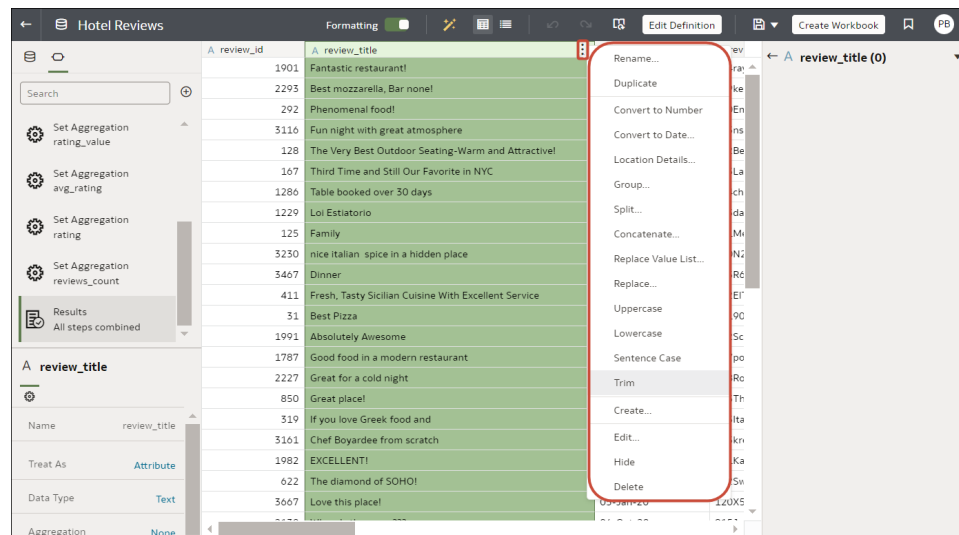
From the workbooks editor - If you open a workbook, click the Data page, and in the **Data Diagram**, select the dataset you want to prepare. If the dataset contains multiple tables, you see a **Join Diagram**, with a tab for each table. Select a table to open it in the transform editor.

From the datasets editor - If you open a dataset, you see the transform editor. If the dataset contains multiple tables, you see a **Join Diagram**, with a tab for each table. Select a table to open it in the transform editor.

The transform editor enables you to evaluate data quality, edit your metadata, and cleanse and transform your data.

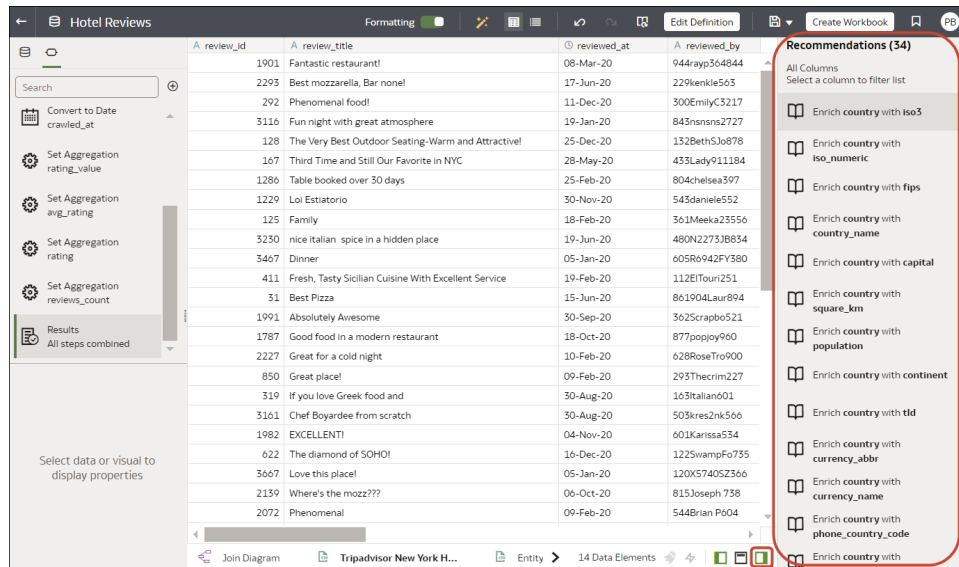


To transform your data, click **Options** (the ellipsis top-right of the data column ) , and select a transformation option (for example, **Bin**, **Rename** or **Convert to Text**).



Applying recommended transformations

When you create a workbook and add a dataset to it, the data undergoes column level profiling that runs on a representative sample of the data. After profiling the data, you can implement transformation and enrichment recommendations provided for the recognizable columns in the dataset. Click a recommendation in the right-hand Recommendations panel to implement it.



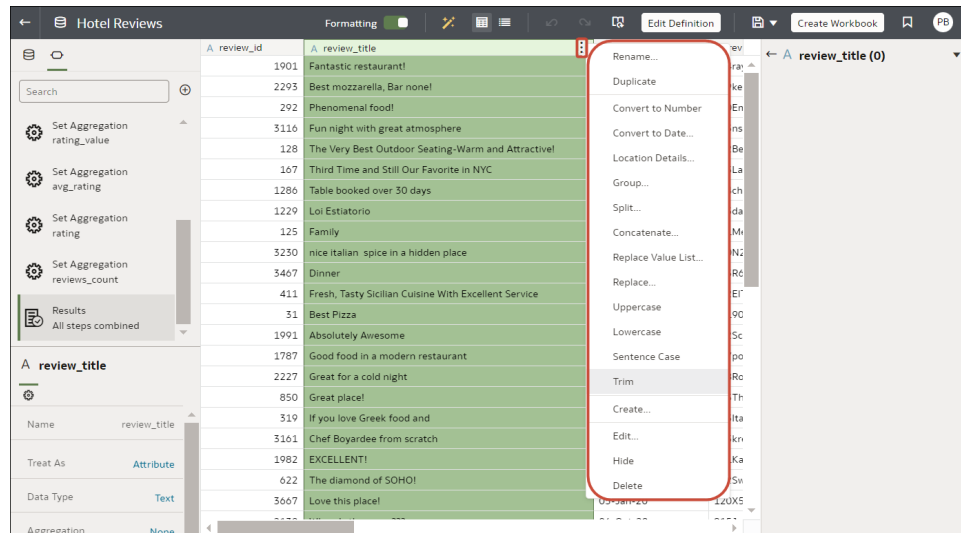
You can enhance or transform a dataset with:

- Column concatenations, for example, adding a column with the person's first and last name.
- Date part extractions, for example, extract the day of the week from a column that uses month, day, year as its format.
- Delete columns containing sensitive fields.
- Duration enrichments for date columns, with Extract Age in Years, Months, or Days. For example, you might use the generated numeric column to assign data into bins, such as 0-3 months, 3-6 months, 6+ months, and so on.
- Global positioning system enrichments such as latitude and longitude for cities or zip codes.
- Obfuscation or masking of sensitive fields (full and partial).
- Part extractions, for example, extract the house number from the street name in an address.
- Semantic extractions, for example, separating out information from a recognized semantic type such as domain from an email address.

Applying your own transformations

In addition to the recommended transformations that you see in the Column Action Panel, you can create your own transformations in different ways:

- Use the **Options** menu at the top of each column to apply common transformations such as Rename, Uppercase, and Trim. See [Transform Data](#).



- Click **Add Preparation Step** in the Data Panel to add a column based on a custom transformation. You can build your column using a wide range of functions, for example, operators, math, aggregates, and conversion. See [Add Columns to a Dataset](#).
- Use the **Element** options pane in the bottom left-hand corner of the Data Panel to change the column type (set the **Treat As** option to attribute or measure), or change the default **Aggregation** type.
Tip: For recommendations on setting column types, on the toolbar click **Review auto**

Treat-as recommendations (). For example, if the semantic profiler initially identifies a column with numeric IDs such as 1078220 as a measure, you can change the column to an attribute.

How dataset transformations affect workbooks and data flows

The data transformation and enrichment changes that you apply to a dataset affect all workbooks and data flows that use the same dataset. When you open a workbook that shares the dataset, you see a message indicating that the workbook uses updated data. When you refresh data in a dataset, the preparation script changes are automatically applied to the refreshed data.

Refreshing Profile Results

If the System Knowledge or Custom Knowledge has been updated and you have author privileges on the dataset, you can reprofile and refresh the results for the currently open

dataset by clicking **Refresh Profile Results** on the toolbar (). Oracle Analytics usually manages this refresh for you, so in most cases you won't need to use this option. Use **Refresh Profile Results** to reprofile the data if the System Knowledge has been updated, or the Custom Knowledge has been updated and you want to incorporate this in the currently open dataset. When new knowledge is available, the **Refresh Profile Results** icon displays an alert showing the number of updates available.

Enrich and Transform Your Data

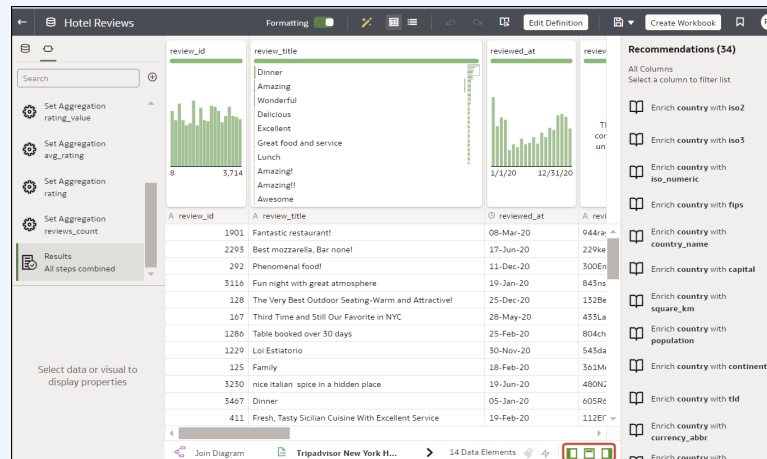
Before you deploy your visualization workbooks, you typically enrich and transform your data. For example, you might rename data columns, fix cell phone data, or add calculations.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Select columns and use the enrich and transform tools to enhance your data.
 - Use the **Recommendations** panel to apply suggested enrichments and transformations.
 - Use the **Options** menu at the top of each column to apply common transformations such as Rename, Uppercase, and Trim.
 - From the **Options** menu at the top of a column, click **Edit** to enhance columns with functions and expressions from the Oracle Analytics functions library. For example, aggregates, strings, expressions, and math functions.
 - Click **Add Preparation Step** in the Data Panel to add a column based on a custom transformation. You can build your column using a wide range of functions and expressions from the Oracle Analytics functions library. For example, aggregates, strings, expressions, and math functions.
 - Use the properties pane at the bottom of the Data Panel to review and change a column's type and aggregation. For example, you might select **Treat As** and change from attribute to measure, or change the default **Aggregation** type from Sum to Average.
 - Use the Quality Insights tile above each column to explore and enrich your data.
 - Use the **Review auto Treat-as recommendations** option () to change the default column type identified by the semantic profiler. For example, if the semantic profiler identifies a column with numeric IDs such as 1078220 as a measure, you can change the column to an attribute.

When you edit data, a step is automatically added to the Preparation Script pane. A blue dot indicates that a step hasn't been applied.
3. To save your data preparation changes and apply them to your data, click **Save Dataset**.
4. If you're working in a workbook, click **Save** and click **Visualize** to review the enriched columns.

 Note:

Configure your transform editor by displaying the Data Panel, Recommendations Panel, and Quality Insights. Use these toggle options displayed bottom right **Toggle Data Panel** , **Toggle Column Action Panel** , and **Toggle Quality Insights**.



Accept Enrichment Recommendations

When you edit a dataset in the transform editor, Oracle Analytics suggests recommendations for enriching your data.

You can upload or open an existing dataset to modify the data using enrichment recommendations. After making the changes to the dataset, you can create a workbook.

If an enrichment recommendation adds information to data such as enhancing a zip code attribute column with the state name, a new column is added to the dataset containing the name of the states associated with the zip codes. When you select a recommendation, the change is added to the Preparation Script and is applied when you save the dataset or apply the preparation script. If you delete or undo the change, the recommendation is displayed once again as an available option in the Recommendations panel.

Enrichment recommendations enable you to enhance your data without requiring data scientist expertise.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Select a column, then click a recommendation to apply to the dataset.

review_id	review_title	reviewed_at	reviewed_by
1901	Fantastic restaurant!	08-Mar-20	944ray364844
2293	Best mozzarella, Bar none!	17-Jun-20	229kenkie563
292	Phenomenal food!	11-Dec-20	300EmilyC5217
3116	Fun night with great atmosphere	19-Jan-20	843nnsns2727
128	The Very Best Outdoor Seating-Warm and Attractive!	25-Dec-20	132Beth536878
167	Third Time and Still Our Favorite in NYC	28-May-20	433Lady911184
1286	Table booked over 30 days	25-Feb-20	804chelsea397
1229	Loi Estiatorio	30-Nov-20	543daniele552
125	Family	18-Feb-20	361Meeka23556
3250	nice italian, spice in a hidden place	19-Jun-20	480N22737B854
3407	Dinner	05-Jan-20	605R6942FY380
411	Fresh, Tasty Sicilian Cuisine With Excellent Service	19-Feb-20	112ETouri251
31	Best Pizza	15-Jun-20	861904Laur894
1991	Absolutely Awesome	30-Sep-20	362Scrapbo521
1787	Good food in a modern restaurant	18-Oct-20	877popjoy960
2227	Great for a cold night	10-Feb-20	628RoseTro900
850	Great place!	09-Feb-20	293Thecrim227
319	If you love Greek food and	30-Aug-20	163Italian001
3161	Chef Boyardee from scratch	30-Aug-20	503kres2nk566
1982	EXCELLENT!	04-Nov-20	601Karissa534
622	The diamond of SOHO!	16-Dec-20	122SwampFo735
3667	Love this place!	05-Jan-20	120X57405Z366
2139	Where's the mozz???	06-Oct-20	815Joseph 738
2072	Phenomenal	09-Feb-20	544Brian P604

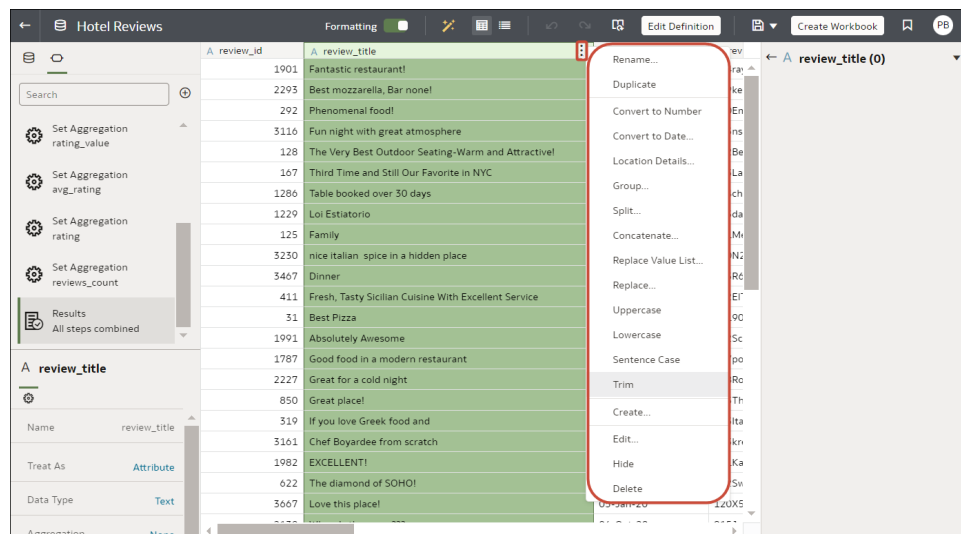
3. Use the Preparation Script panel to review your data enrichments and make changes if required.
For example, hover over a step and click X to remove an enrichment.
4. To save your data preparation changes and apply them to your data, click **Save Dataset**.

Transform Data

You can use the transform editor to enhance your data. For example, you might convert text to uppercase or trim leading and trailing spaces from data. Transform your data to make it more useful and powerful for content consumers.

If you don't apply the transformation script and close the workbook or the dataset, you lose all the data transform changes you've performed.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Mouse-over the column you want to transform.
3. Click **Options** (the ellipsis top-right of the data column ) and select a transformation option (for example, **Bin**, **Rename** or **Convert to Text**).



Oracle Analytics adds a step for the transform option you selected to the **Preparation Script** panel.

4. To save your data preparation changes and apply them to your data, click **Save Dataset**.

Replace Missing or Null Values in a Dataset

Replace missing or null values in a dataset column to cleanse your data. For example, if values are missing from a Month column, you might change them to January.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Hover over or select the column that you want to transform.
3. In the quality tile at the top of a column, double-click **Missing or Null**.

No data 5
108.05
1195.8800000000001
1303.93
Sum of REVENUE
Missing or Null
A No data 5
Sum of REVENUE
1195.8800000000001
1195.8800000000001
108.05
108.05
1303.93

4. Enter a value to replace missing or null values, then press Enter. For example, if values are missing from a Month column, you might enter "January".

Oracle Analytics adds a step to the left-hand Preparation Script panel.

5. To save your data preparation changes and apply them to your data, click **Save**.

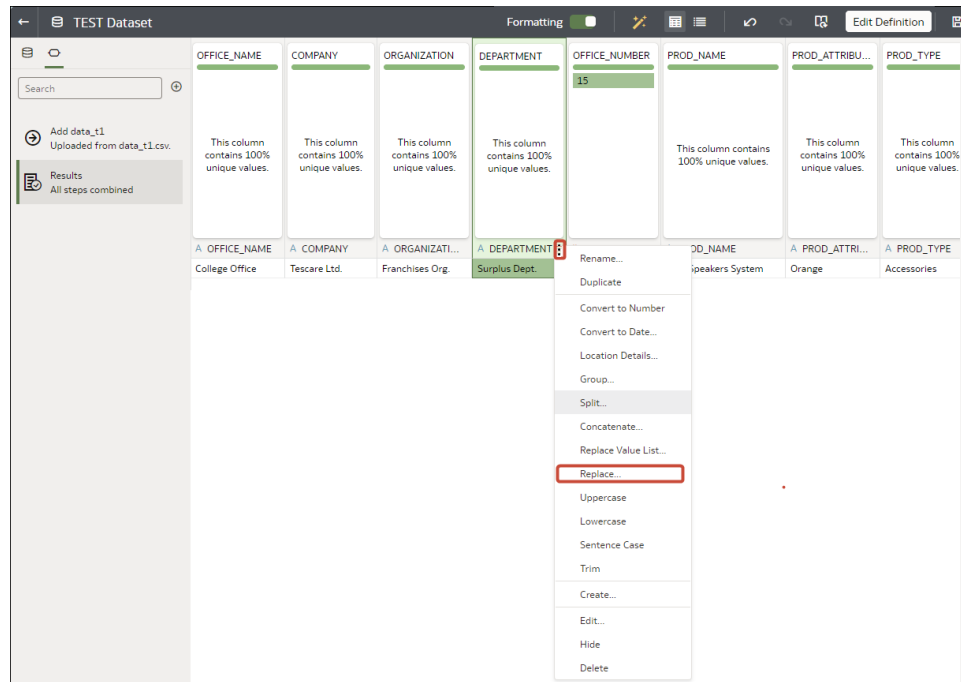
Transform Data Using Replace

Transform data in a column using a simple pattern match or a regular (regex) expression. For example, in a State column, you might change CA to California.

Tutorial

You can use any Perl Compatible Regular Expression (PCRE), which are also referred to as regex expressions. Transforms are applied to every applicable row in a dataset.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Hover over or select the text column that you want to transform.
3. Click **Options** at the base of the quality tile, then click **Replace**.



Tip: To replace more than one value at the same time, use the **Replace Value List** option.

4. In the Replace step editor, specify how you'd like to match values. For example:
 - Click **Use regular expression** to match using a complex regular expression (regex).
 - Click **Match entire values only** to change "male" to "M" but not "female" to "feM".
5. In the **String to replace** field and **New string** field, specify the literal text or regular expressions to search and replace (case-sensitive).

Examples:

- To change "2553 Bolman Court" to "2553 #Bolman# #Court#", select **Use regular expression**, enter `([A-Za-z]+)` in the **String to replace** field, and enter `#$1#` in the **New String** field.
- To change "male" with "M", select **Match entire values only**, enter `male` in the **String to replace** field, and enter `M` in the **New String** field. This changes "male" to "M" but won't change "female" to "feM".

When you complete both fields, you see a preview of the transformed data in the preview pane. Adjust the replace options until you get the transformation you want in the preview pane.

6. Click **Add Step**.
Oracle Analytics adds a step to the Preparation Script panel.
7. To save your data preparation changes and apply them to your data, click **Save**.

Example Replace Transforms Using Regular Expressions

Here are just a few examples of using regular (regex) expressions to transform data.

In these examples, the Search Expression shows what to enter in the **String to replace** field, and the Replace Value shows what to enter in the **New string** field.

Table 4-1 Example replace transforms

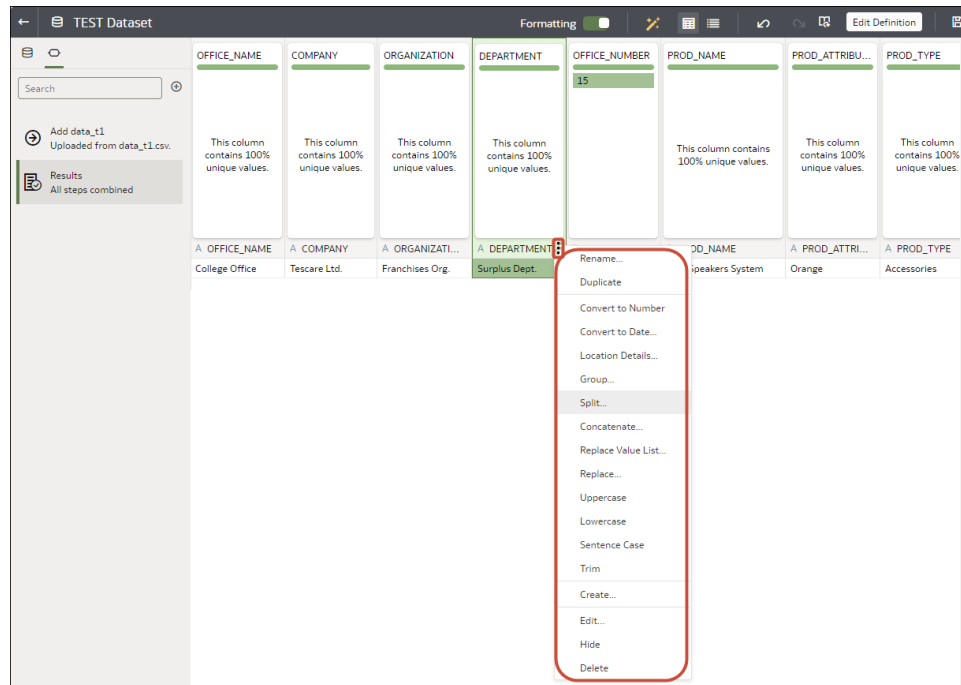
Search Expression	Replace Value	Original Text	Replaced Text	Notes
@([a-z]+)(?=\.[a-z]{3})	@example.com	MichelePFalk@yahoo.com	MichelePFalk@example.com	This example replaces domain details in email addresses.
^Gray Grey\$	Silver	Grey Gray Graystone	Silver Silver Graystone	The ^\$ characters mean only look for entire string matches. The vertical bar is the regular expression for OR, so in this case the regular expression looks for either "Gray" or "Grey" and replace with "Silver". The string Graystone isn't transformed because the regular expression is looking for entire value matches only.
\d+	9999	8398 Park Street 123 Oracle Parkway	9999 Park Street 9999 Oracle Parkway	This regular expression looks for one "d" or more "+" digits and replaces them with "9999". The replace also works when the original text has only three digits.
([A-z]+)(\d+)	\$2	UA101654 US829383	101654 829383	This regular expression is looking for one "[A-z]" or more "+" consecutive letters followed by one "d" or more "+" digits - each of the two expressions is bounded by parentheses, which captures two groups - the first one ([A-z]) and the second one (\d+) - these groups are numbered automatically and can then be used in the replacement by using the dollar sign for the second group, for example, "\$2".
([A-z]+)(\d+)	Postal Code: \$2	UA101654 US829383	Postal Code: 101654 Postal Code: 829383	This example uses the same match expression as the previous example, except that it shows how to insert your own replacement text in addition to a group. Text can be inserted before and after a recalled match group.

Convert Text Columns to Date or Time Columns

You can convert any text column to a date, time, or timestamp column.

For example, you can convert an attribute text column to a true date column.

- On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
- Hover over the column that you want to convert.
- Click .



4. Select one of the conversion options, for example, **Convert to Number**, or **Convert to Date**.

Oracle Analytics adds a step to the Preparation Script panel.

5. To save your data preparation changes and apply them to your data, click **Save Dataset**.
The changes you make apply to all workbooks using that data source.

Adjust the Display Format of a Date or Number Column

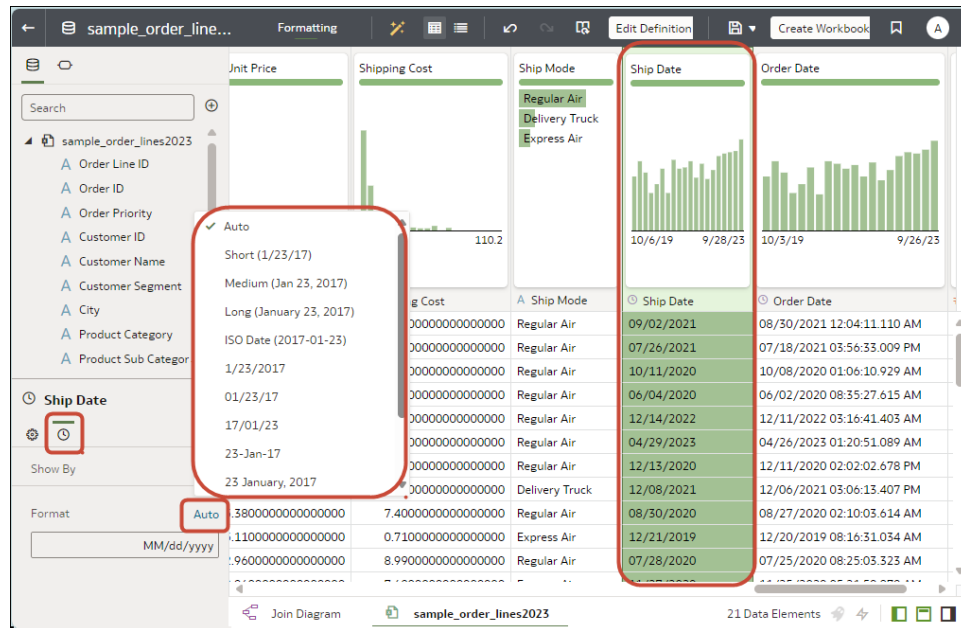
You can adjust the display format and granularity level of a date column or number column.

[LiveLabs Sprint](#)

For example, you might want to change the format of a transaction date column from November 1, 2017 to 2017-11-01.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Click the number or date that you'd like to edit, then in the Data Panel, click **Number Format** (for number columns) or **Date/Time Format** (for date columns).

The Data panel displays a configuration pane for the selected column.



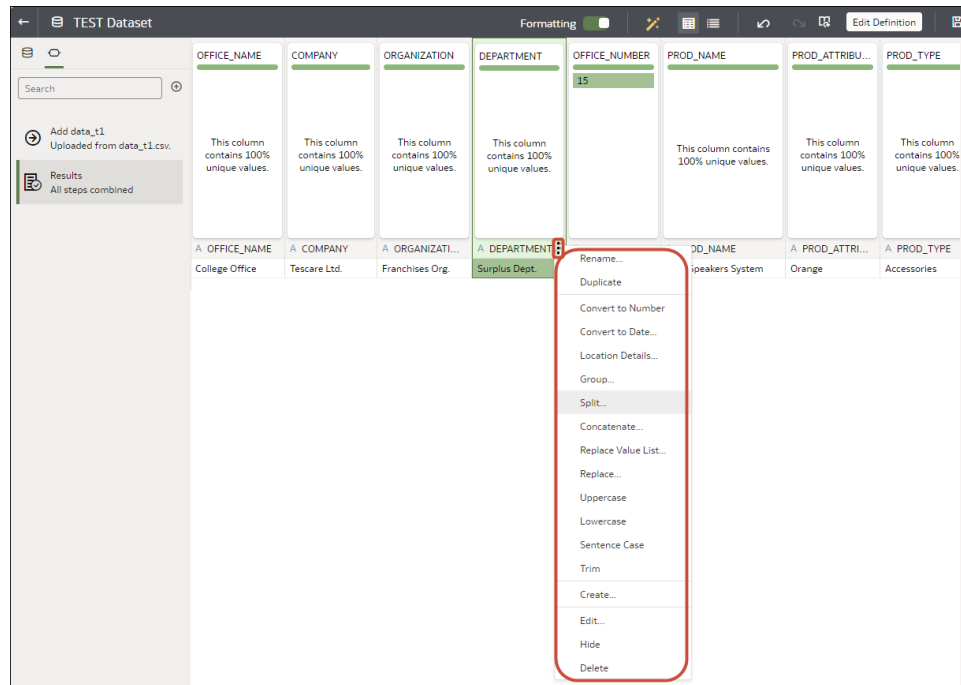
3. In the Data Panel, click **Auto** next to **Format** and select an alternative format.
4. Click **Save Dataset**.

Create a Bin Column When You Prepare Data

Binning a measure creates a new column based on the value of the measure. For example, you might want to assign temperature values into two bin categories for less than or equal to 70 degrees and more than 70 degrees.

You can assign a value to the bin dynamically by creating the number of equal-sized bins or by explicitly specifying the range of values for each bin. You can create a bin column based on a data element.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Select the column that you want to modify.
3. Click **Options** in the column header .



4. Select **Bin**.

5. In the Bin step editor, specify the options for the bin column.

- Enter a number or use the arrows to increment or decrement the number of bins.
- Based on your selection in the **Method** field, the range and count of the bins are updated.
 - In the **Manual** method, you select the boundary (that is, minimum and maximum) of each bin. You can also change the default name of each bin.
 - In the **Equal Width** method, the boundary of each bin is the same, but the count differs. Based on your selection in the **Bin Labels** field, the bin column labels are updated.
 - In the **Equal Height** method, the height of each bin is the same or very slightly different but the range is equal.
- If you select the **Equal Width** method, click to select a dimension (that is, an attribute data element) on which to apply the bin.

6. Click **Add Step**.

Oracle Analytics adds a step to the Preparation Script panel, ready to be applied when you click **Apply Script** or **Save Dataset**.

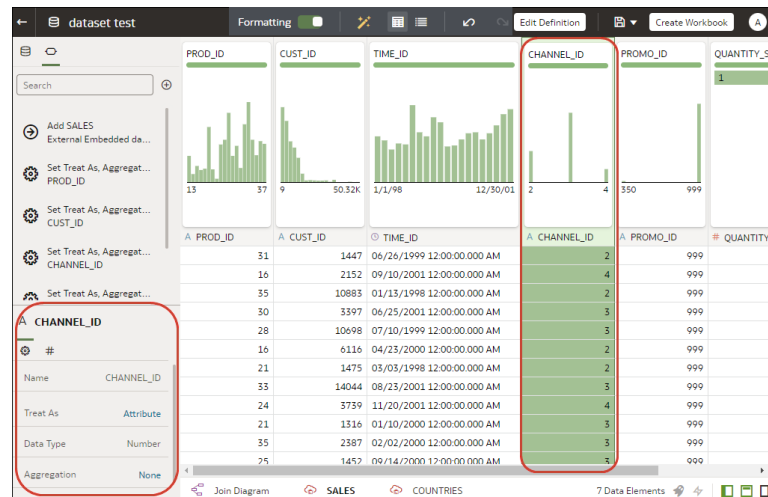
7. To save your data preparation changes and apply them to your data, click **Save Dataset**.

Configure Columns Properties in a Dataset

In the transform editor you can edit the Data Type, Treat As, Aggregation, Hidden, or number format properties of a dataset column. For example, you might configure a number column as currency so that you can create financial reports.

In Data view () , you configure the properties of one column at a time. In Metadata view () , you can update the properties of multiple columns at the same time. Oracle Analytics adds each property change to the Preparation Script panel. You can select to rollback changes using the Undo command.

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. To configure the properties of one column:
 - a. From the toolbar, click **Data** () .
 - b. Select a column and use the properties pane at the bottom of the Data Panel to change the properties. For example, use **Number Format** to configure a number column as currency.



3. To update the **Data Type**, **Treat As**, **Aggregation** or **Hidden** properties of multiple columns at the same time:
 - a. From the toolbar, click **Metadata** () .
Dataset columns are listed as **Data Elements**.
 - b. Select multiple data elements to configure.
Oracle Analytics highlights selected data elements and displays an arrow in the first data element that you selected.

Data Element	Data Type	Treat As	Aggregation	Sample Values
Order Line ID	Text	Attribute	None	1076; 1210; 134; 1630; 17
# of Order Lines	Text	Measure	Count	1076; 1210; 134; 1630; 17
Order ID	Text	Attribute	None	23140; 26439; 28482; 328
# of Orders	Text	Measure	Count Distinct	23140; 26439; 28482; 328
Order Priority	Text	Attribute	None	Critical; Medium; High; Not
Customer ID	Text	Attribute	None	308; 3151; 2007; 1104; 11
# of Customers	Text	Measure	Count Distinct	308; 3151; 2007; 1104; 11
Customer Name	Text	Attribute	None	Glen Caldwell; Glenda Hunt
Customer Segment	Text	Attribute	None	Corporate; Home Office; S
City	Text	Attribute	None	Recife; Rivadh; Shanghai; S
Product Category	Text	Attribute	None	Office Supplies; Technology
Product Sub Category	Text	Attribute	None	Paper; Telephones and Cor
Grouped Sub Category	Text	Attribute	None	Stationery; Furniture; Com
Product Container	Text	Attribute	None	Small Box; Wrap Bag; Smal
Product Name	Text	Attribute	None	Fiskars Softener Scissors; B
Profit	Double	Measure	Sum	-10.87; -16.40; -204.71; -2
Quantity Ordered	Integer	Measure	Sum	7; 9; 12; 5; 10; 4; 2; 3; 8; 11
Sales	Double	Measure	Sum	168.63; 107.53; 151.03; 2.3
Discount	Double	Measure	Sum	0.89; 1.01; 1.34; 1.71; 2.22
Gross Unit Price	Double	Measure	Average	6.84; 69.64; 132.96; 32.69

- c. Use the properties pane at the bottom of the Data Panel to change the properties. For example, you might set the **Aggregation** property of selected columns to Count.

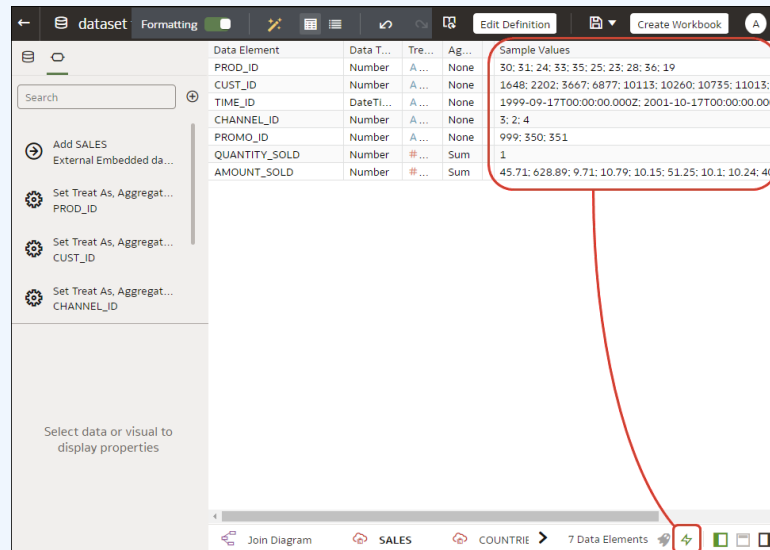
You can also change properties by clicking the arrow in the first data element selected and selecting a configuration value from the drop-down list.

Data Element	Data T...	Tre...	Ag...	Sample Values
PROD_ID	Nu...	A...	N...	30; 31; 24; 33; 35; 25; 23; 28; 36; 19
CUST_ID	Number	A...	None	1648; 2202; 3667; 6877; 10113; 10260; 10735; 11013; 11575; 11779
TIME_ID	Text	A...	None	1999-09-17T00:00:00.000Z; 2001-10-17T00:00:00.000Z; 2001-07-13T00:00
CHANNEL_ID	Number	A...	None	999; 350; 351
PROMO_ID	Number	A...	None	1
QUANTITY_SOLD	Number	#...	Sum	45.71; 628.89; 9.71; 10.79; 10.15; 51.25; 10.1; 10.24; 40.62; 61.22
AMOUNT_SOLD	Number	#...	Sum	

 Note:

You can improve performance in your data preparation by turning off **Use**

sample data (⚡) to stop generating the sample values displayed in the "Sample Values" column. The **Use sample data** option is displayed at the bottom right of the Metadata View.



Hide or Delete a Column

In the Transform editor, you can hide or delete a column from the dataset. Hiding or deleting columns doesn't permanently remove them, and you can restore columns when needed.

It's important to understand that deleting a column is different than removing a column from a dataset:

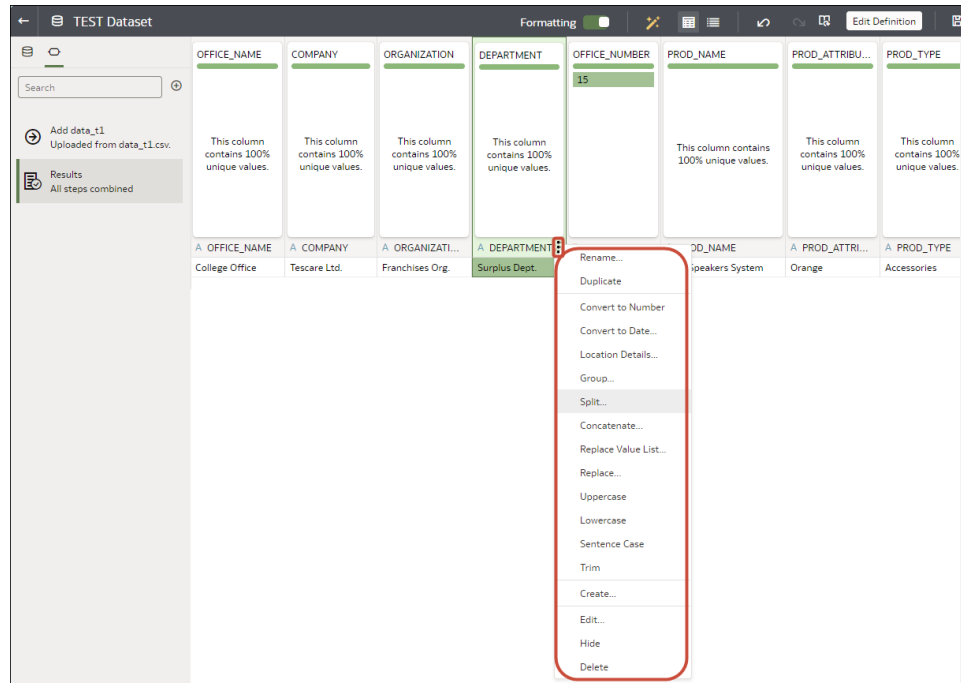
- Use the Transform editor to *delete* a column.
- Deleting a column creates a step in the Preparation Script Panel. Remove the step to restore the deleted column.
- Use Edit Definition to *remove* a column.
- The Transform editor doesn't indicate which columns were removed, and removing a column doesn't add a step to the Preparation Script Panel. To confirm which columns were removed or to re-add them, go to Edit Definition.

Hidden columns are available for table joins. Deleted columns aren't available for table joins.

You can also hide columns in the dataset. Hiding a column is useful when you want to use a column to create a formula but don't need the column to display in the dataset. See [Remove or Restore a Dataset Table's Columns](#).

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.

- Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. Hover over the column that you want to hide or delete.
 3. Click .



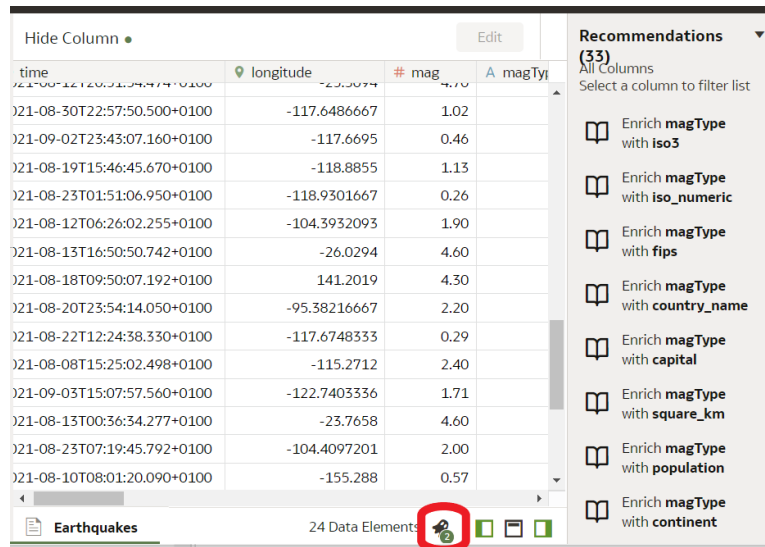
4. Select **Hide** or **Delete**.

Restore a Hidden or Deleted Column

In the Transform editor, you can restore any dataset columns that you hid or deleted.

If you don't see a column's **Delete Step** in the Preparation Script Panel, then the column might have been removed from the dataset. Use Edit Definition to confirm if the column has been removed instead of deleted. See [Remove or Restore a Dataset Table's Columns](#).

1. On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. To restore a hidden or deleted columns, go to the Preparation Script Panel and locate the Hide Column or Delete Column step.
3. Click **Delete Step**.
4. Optional: To unhide one or more hidden columns, in the Transform editor, click **Hidden columns** and click **Unhide All**.



time	longitude	# mag	magType
2021-08-30T22:57:50.500+0100	-117.6486667	1.02	
2021-09-02T23:43:07.160+0100	-117.6695	0.46	
2021-08-19T15:46:45.670+0100	-118.8855	1.13	
2021-08-23T01:51:06.950+0100	-118.9301667	0.26	
2021-08-12T06:26:02.255+0100	-104.3932093	1.90	
2021-08-13T16:50:50.742+0100	-26.0294	4.60	
2021-08-18T09:50:07.192+0100	141.2019	4.30	
2021-08-20T23:54:14.050+0100	-95.38216667	2.20	
2021-08-22T12:24:38.330+0100	-117.6748333	0.29	
2021-08-08T15:25:02.498+0100	-115.2712	2.40	
2021-09-03T15:07:57.560+0100	-122.7403336	1.71	
2021-08-13T00:36:34.277+0100	-23.7658	4.60	
2021-08-23T07:19:45.792+0100	-104.4097201	2.00	
2021-08-10T08:01:20.090+0100	-155.288	0.57	

Recommendations (33)
All Columns
Select a column to filter list

- Enrich magType with iso3
- Enrich magType with iso_numeric
- Enrich magType with fips
- Enrich magType with country_name
- Enrich magType with capital
- Enrich magType with square_km
- Enrich magType with population
- Enrich magType with continent

Earthquakes 24 Data Elements

Edit the Data Preparation Script

You can edit the data transformation changes added to the Preparation Script. For example, you can edit, preview, or delete transformation steps before you apply them.

Both before and after you've applied recommended changes displayed in the Column Action Panel, you can edit the data transformation steps. The edit option isn't available for all types of transform steps.

The updates to the columns are applied only to the dataset and not to the visualization. To ensure that you see the most up-to-date data, on the Visualize canvas, click **Refresh Data**.

- On the Home page, open a dataset or workbook.
 - Hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
 - Hover over the workbook that contains the dataset, click **Actions**, then select **Open**, then click **Data**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
- Select a step in the Preparation Script pane and click **Edit Step**.
- Select a transform step in the Preparation Script pane and click the pencil icon or **Edit Transform**.

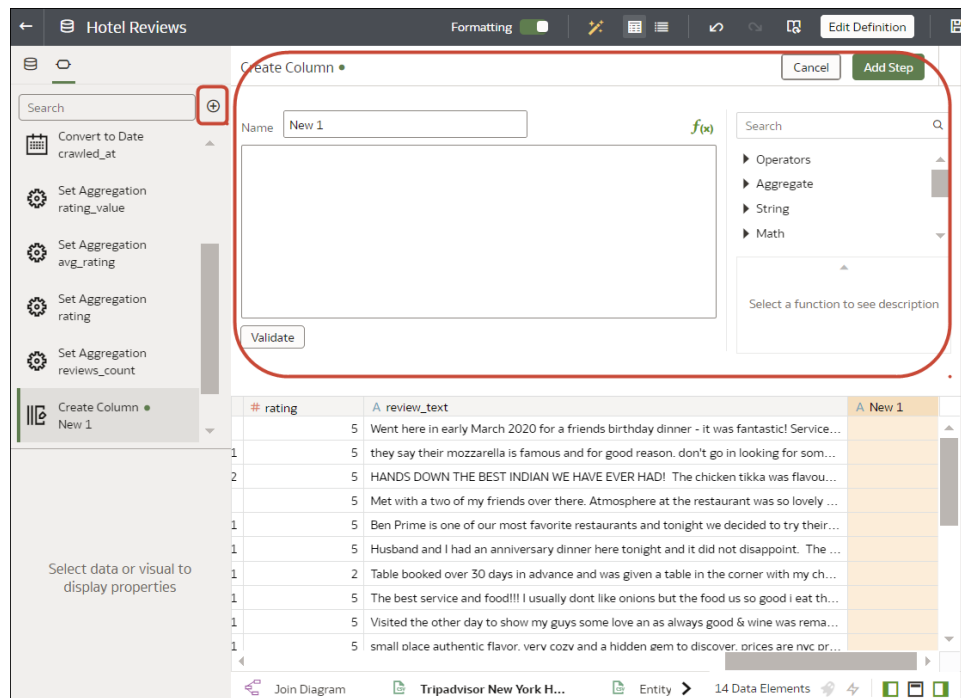
If a step isn't editable, a message is displayed when you hover over the pencil icon that editing for the transform step has been disabled.

- In the step editor, update the fields to edit the data transform changes that are applied to the columns.
- Click **OK** to update the column and close the step editor.
- To save your data preparation changes and apply them to your data, click **Save**.

Add Columns to a Dataset

You can develop your datasets by adding columns. For example, you might create a new column that concatenates columns ADDRESS_LINE_1, ADDRESS_LINE_2, and ADDRESS_LINE_3.

1. On the Home page, hover over the dataset, click **Actions**, and then select **Open**. In the Data Diagram or Join Diagram, right-click a data source and click **Open** to display the transform editor.
2. In the transform editor, click **Add Preparation Step**.



3. In **Create Column**, enter a **Name** for the column, and in the expression box define an expression to add values to the column. For example, to concatenate values in columns **Category** and **Sub-category**, you might specify: `CONCAT(Category, Sub-Category)`.

Use the **f(x)** function picker to build an expression using operators, mathematical, string, and conversion functions.

4. Click **Validate** and review the new column in the data preview.
5. Click **Add Step**.

Oracle Analytics adds a step to the Preparation Script panel.

6. To save your data preparation changes and apply them to your data, click **Save**.

Enrich and Transform Reference

Use this reference information to help you enrich and transform your data.

Topics:

- [Data Profiles and Semantic Recommendations](#)
- [General Custom Format Strings](#)
- [Column Menu Options for Quick Data Transformations](#)

Data Profiles and Semantic Recommendations

When you create a dataset, Oracle Analytics performs column-level profiling to produce a set of semantic recommendations to repair or enrich your data. When you create workbooks, you can also include knowledge enrichments in your visualizations by adding them from the Data Panel.

These recommendations are based on the system automatically detecting a specific semantic type during the profile step. For example, datasets based on local subject areas are profiled using a simple Top N sample.

There are categories of semantic types such as geographic locations identified by city names, recognizable patterns as in credit cards, email addresses and social security numbers, dates, and recurring patterns. You can also create your own custom semantic types.

Topics:

- [Semantic Type Categories](#)
- [Semantic Type Recommendations](#)
- [Recognized Pattern-Based Semantic Types](#)
- [Reference-Based Semantic Types](#)
- [Recommended Enrichments](#)
- [Required Thresholds](#)
- [Custom Knowledge Recommendations](#)

Semantic Type Categories

Profiling is applied to various semantic types.

Semantic type categories are profiled to identify:

- Geographic locations such as city names.
- Patterns such as those found with credit cards numbers or email addresses.
- Recurring patterns such as hyphenated phrase data.

Semantic Type Recommendations

Recommendations to repair, enhance, or enrich the dataset, are determined by the type of data.

Examples of semantic type recommendations:

- **Enrichments** - Adding a new column to your data that corresponds to a specific detected type, such as a geographic location. For example, adding population data for a city.
- **Column Concatenations** - When two columns are detected in the dataset, one containing first names and the other containing last names, the system recommends concatenating the names into a single column. For example, a *first_name_last_name* column.
- **Semantic Extractions** - When a semantic type is composed of subtypes, for example a *us_phone* number that includes an area code, the system recommends extracting the subtype into its own column.
- **Part Extraction** - When a generic pattern separator is detected in the data, the system recommends extracting parts of that pattern. For example if the system detects a repeating hyphenation in the data, it recommends extracting the parts into separate columns to potentially make the data more useful for analysis.
- **Date Extractions** - When dates are detected, the system recommends extracting parts of the date that might augment the analysis of the data. For example, you might extract the day of week from an invoice or purchase date.
- **Full and Partial Obfuscation/Masking/Delete** - When sensitive fields are detected such as a credit card number, the system recommends a full or partial masking of the column, or even removal.

Recognized Pattern-Based Semantic Types

Semantic types are identified based on patterns found in your data.

Recommendations are provided for these semantic types:

- Dates (in more than 30 formats)
- US Social Security Numbers (SSN)
- Credit Card Numbers
- Credit Card Attributes (CVV and Expiration Date)
- Email Addresses
- North American Plan Phone Numbers
- US Addresses

Reference-Based Semantic Types

Recognition of semantic types is determined by loaded reference knowledge provided with the service.

Reference-based recommendations are provided for these semantic types:

- Country names
- Country codes
- State names (Provinces)
- State codes
- County names (Jurisdictions)
- City names (Localized Names)
- Zip codes

Recommended Enrichments

Recommended enrichments are based on the semantic types.

Enrichments are determined based on the geographic location hierarchy:

- Country
- Province (State)
- Jurisdiction (County)
- Longitude
- Latitude
- Population
- Elevation (in Meters)
- Time zone
- ISO country codes
- Federal Information Processing Series (FIPS)
- Country name
- Capital
- Continent
- GeoNames ID
- Languages spoken
- Phone country code
- Postal code format
- Postal code pattern
- Phone country code
- Currency name
- Currency abbreviation
- Geographic top-level domain (GeoLTD)
- Square KM

Required Thresholds

The profiling process uses specific thresholds to decide about specific semantic types.

As a general rule, 85% of the data values in the column must meet the criteria for a single semantic type in order for the system to make the classification determination. As a result, a column that might contain 70% first names and 30% “other”, doesn't meet the threshold requirements and therefore no recommendations are made.

Custom Knowledge Recommendations

Use custom knowledge recommendations to augment the Oracle Analytics system knowledge. Custom knowledge enables the Oracle Analytics semantic profiler to identify more business-specific semantic types and make more relevant and governed enrichment recommendations.

For example, you might add a custom knowledge reference that classifies prescription medication into USP drug categories Analgesics or Opioid.



Tutorial

General Custom Format Strings

You can use general custom format strings to create custom time or date formats.

The table shows the general custom format strings and the results that they display. These allow the display of date and time fields in the user's locale.

General Format String	Result
[FMT:dateShort]	Formats the date in the locale's short date format. You can also type [FMT:date].
[FMT:dateLong]	Formats the date in the locale's long date format.
[FMT:dateInput]	Formats the date in a format acceptable for input back into the system.
[FMT:time]	Formats the time in the locale's time format.
[FMT:timeHourMin]	Formats the time in the locale's time format but omits the seconds.
[FMT:timeInput]	Formats the time in a format acceptable for input back into the system.
[FMT:timeInputHourMin]	Formats the time in a format acceptable for input back into the system, but omits the seconds.
[FMT:timeStampShort]	Equivalent to typing [FMT:dateShort] [FMT:time]. Formats the date in the locale's short date format and the time in the locale's time format. You can also type [FMT:timeStamp].
[FMT:timeStampLong]	Equivalent to typing [FMT:dateLong] [FMT:time]. Formats the date in the locale's long date format and the time in the locale's time format.
[FMT:timeStampInput]	Equivalent to [FMT:dateInput] [FMT:timeInput]. Formats the date and the time in a format acceptable for input back into the system.
[FMT:timeHour]	Formats the hour field only in the locale's format, such as 8 PM.
YY or yy	Displays the last two digits of the year, for example 11 for 2011.
YYY or yyy	Displays the last three digits of the year, for example, 011 for 2011.
YYYY or yyyy	Displays the four-digit year, for example, 2011.
M	Displays the numeric month, for example, 2 for February.
MM	Displays the numeric month, padded to the left with zero for single-digit months, for example, 02 for February.
MMM	Displays the abbreviated name of the month in the user's locale, for example, Feb.
MMMM	Displays the full name of the month in the user's locale, for example, February.
D or d	Displays the day of the month, for example, 1.
DD or dd	Displays the day of the month, padded to the left with zero for single-digit days, for example, 01.
DDD or ddd	Displays the abbreviated name of the day of the week in the user's locale, for example, Thu for Thursday.
DDDD or dddd	Displays the full name of the day of the week in the user's locale, for example, Thursday.

General Format String	Result
DDDDD or ddddd	Displays the first letter of the name of the day of the week in the user's locale, for example, <code>T</code> for Thursday.
r	Displays the day of year, for example, 1.
rr	Displays the day of year, padded to the left with zero for single-digit day of year, for example, 01.
rrr	Displays the day of year, padded to the left with zero for single-digit day of year, for example, 001.
w	Displays the week of year, for example, 1.
ww	Displays the week of year, padded to the left with zero for single-digit weeks, for example, 01.
q	Displays the quarter of year, for example, 4.
h	Displays the hour in 12-hour time, for example 2.
H	Displays the hour in 24-hour time, for example, 23.
hh	Displays the hour in 12-hour time, padded to the left with zero for single-digit hours, for example, 01.
HH	Displays the hour in 24-hour time, padded to the left with zero for single digit hours, for example, 23.
m	Displays the minute, for example, 7.
mm	Displays the minute, padded to the left with zero for single-digit minutes, for example, 07.
s	Displays the second, for example, 2. You can also include decimals in the string, such as <code>s.#</code> or <code>s.00</code> (where # means an optional digit, and 0 means a required digit).
ss	Displays the second, padded to the left with zero for single-digit seconds, for example, 02. You can also include decimals in the string, such as <code>ss.#</code> or <code>ss.00</code> (where # means an optional digit, and 0 means a required digit).
S	Displays the millisecond, for example, 2.
SS	Displays the millisecond, padded to the left with zero for single-digit milliseconds, for example, 02.
SSS	Displays the millisecond, padded to the left with zero for single-digit milliseconds, for example, 002.
tt	Displays the abbreviation for ante meridiem or post meridiem in the user's locale, for example, <code>pm</code> .
gg	Displays the era in the user's locale.

5

Create Datasets Using Data Flows

Use data flows to combine, organize, and integrate data into datasets.



Use data flows to manipulate your data visually without requiring manual coding skills.

Topics:

- [About Data Flows](#)
- [What Steps Can I Use to Organize and Integrate My Data?](#)
- [Create a Dataset Using a Data Flow](#)
- [Generate or Update a Dataset Using a Data Flow](#)
- [Reuse a Data Flow](#)
- [Configure Incremental Processing in a Data Flow](#)
- [Process Data Using a Sequence of Data Flows](#)
- [Manage Your Data Flows](#)

About Data Flows

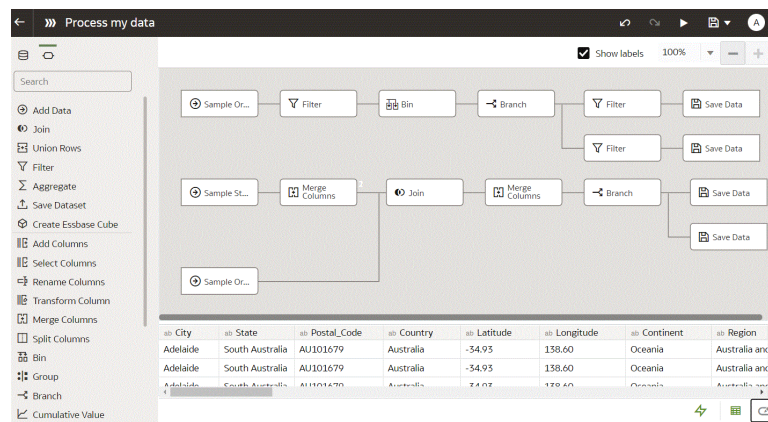
Data flows enable you to organize and integrate your data to produce curated datasets that your users can visualize.

Use data flows to manipulate your data visually without requiring manual coding skills.

For example, you might use a data flow to:

- Create a dataset.
- Combine data from different sources.
- Aggregate data.
- Train machine learning models or apply a predictive machine learning model to your data.
- Perform object detection, image classification, or text detection using artificial intelligence via the OCI Vision service.

You create data flows in the data flow editor.



To build a data flow, you add steps. Each step performs a specific function, for example, add data, join tables, merge columns, transform data, save your data. Use the data flow editor to add and configure your steps. Each step is validated when you add or change it. When you've configured your data flow, you execute it to produce or update a dataset.

When you add your own columns or transform data, you can use a wide range of SQL operators (for example, BETWEEN, LIKE, IN), conditional expressions (for example, CASE), and functions (for example, Avg, Median, Percentile).

Database Support for Data Flows

With data flows you can curate data from datasets, subject areas, or database connections.

Use the **Add Data** step to add data to a data flow, and use the **Save Data** step to save output data from a data flow.

You can save the output data from a data flow in either a dataset or in one of the supported database types. If you save data to a database, you can transform the data source by overwriting it with data from the data flow. The data source and data flow tables must be in the same database and have the same name. Before you start, create a connection to one of the supported database types.

Data Output

You can save output data from data flows to these database types:

- Oracle Autonomous Data Warehouse
- Oracle Autonomous Transaction Processing
- Oracle Database
- Apache Hive
- Hortonworks Hive
- MapR Hive
- Spark

Data Input

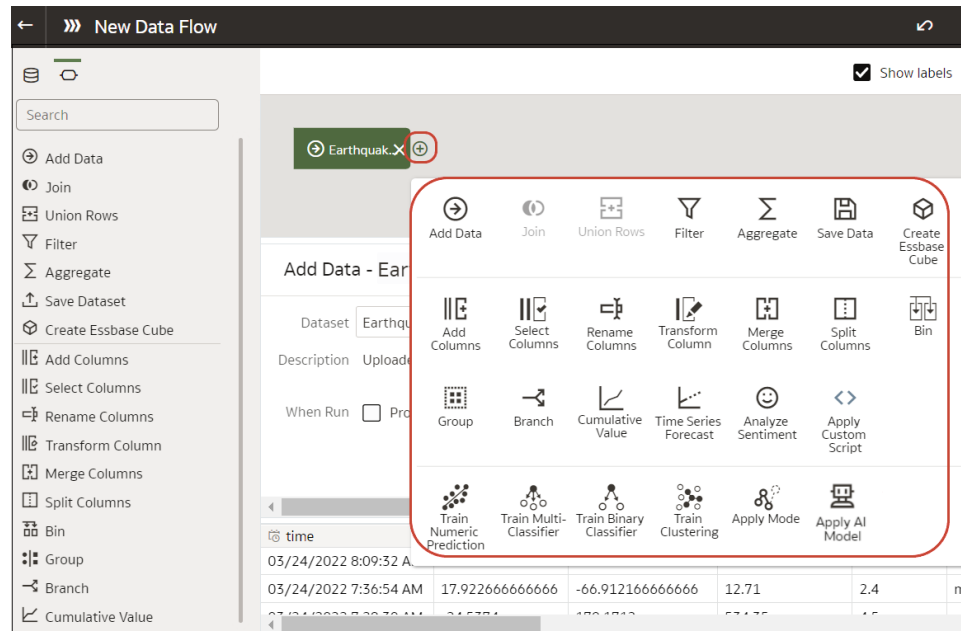
You can input data to data flows from most database types (except Oracle Essbase and EPM Cloud).

What Steps Can I Use to Organize and Integrate My Data?

Use these steps in data flows to organize, integrate, and transform your data. For example, you might merge data sources, aggregate data, or perform geo-spatial analysis.

Steps enable you to transform your data visually without requiring coding skills.

Use the data flow editor to add steps to your data flows.



Add Columns

Add custom columns to your target dataset. For example, you might calculate the value of your stock by multiplying the number of units in a `UNITS` column by the sale price in a `RETAIL_PRICE` column (that is, `UNITS * RETAIL_PRICE`).

Add Data

Add data sources to your data flow. For example, if you're merging two datasets, you add both datasets to your data flow. See [Database Support for Data Flows](#).

Aggregate

Create group totals by applying aggregate functions. For example, count, sum, or average.

Analyze Sentiment

Detect sentiment for a given text column (English only). For example, you might analyze customer feedback to determine whether it's positive or negative. Sentiment analysis evaluates text based on words and phrases that indicate a positive, neutral, or negative emotion. Based on the outcome of the analysis, a new column contains Positive, Neutral, or Negative.

Apply Model

Analyze data by applying a machine learning model from Oracle Machine Learning or OCI Data Science. For example, you might have created a classification model to predict whether

emails are spam or not spam. See [Apply a Predictive or Registered Oracle Machine Learning Model to a Dataset](#).

AutoML

Use Oracle Autonomous Data Warehouse's AutoML capability to recommend and train a predictive model for you. The AutoML step analyzes your data, calculates the best algorithm to use, and registers a prediction model in Oracle Analytics. The analytics are computed in the database, not in Oracle Analytics. This step is available in the step selector when you're connected to a dataset based on Oracle Autonomous Data Warehouse.

Bin

Assign data values into categories, such as high, low, or medium. For example, you might categorize values for `RISK` into three bins for low, medium, and high.

Branch

Creates multiple outputs from a data flow. For example, if you have sales transactions data based on country, you might save data for United States in the first branch and data for Canada in the second branch.

Create Essbase Cube

Create an Essbase cube from a spreadsheet or database.

Cumulative Value

Calculate cumulative totals such as moving aggregate or running aggregate.

Database Analytics

Perform advanced analysis and data mining analysis. For example, you can detect anomalies, cluster data, sample data, and perform affinity analysis. This step is available in the step selector when you're connected to a dataset based on Oracle database or Oracle Autonomous Data Warehouse. The analytics are computed in the database, not in Oracle Analytics. See [Database Analytics Functions](#).

Filter

Select only the data that you're interested in. For example, you might create a filter to limit sales revenue data to the years 2020 through 2022.

Graph Analytics

Perform geo-spatial analysis, such as calculating the distance or the number of hops between two vertices. This step is available in the step selector when you're connected to a dataset based on Oracle database or Oracle Autonomous Data Warehouse. The analytics are computed in the database, not in Oracle Analytics. See [Graph Analytics Functions](#).

Group

Categorize non-numeric data into groups that you define. For example, you might put orders for lines of business `Communication` and `Digital` into a group named `Technology`, and orders for `Games` and `Stream` into a group named `Entertainment`.

Join

Combine data from multiple data sources using a database join based on a common column. For example, you might join an `Orders` dataset to a `Customer_orders` dataset using a customer ID field.

Merge

Combine multiple columns into a single column. For example, you might merge the street address, street name, state, and ZIP code columns into one column.

Rename Columns

Change the name of a column to more meaningful. For example, you might change `CELL` to `Contact Cell Number`.

Reorder Columns

Change the ordering of columns in the output dataset. For example, you might want to order columns alphabetically based on column name, or order columns based on data type (character, integer, and so on).

Save Data

Specify where to save the data generated by the data flow. You can save the data in a dataset in Oracle Analytics or in a database. You can also specify runtime parameters, or change the default dataset name. See [Database Support for Data Flows](#).

Select Columns

Specify which columns to include or exclude in your data flow (the default is to include all data columns).

Split Columns

Extract data from within columns. For example, if a column contains `001011Black`, you might split this data into two separate columns, `001011` and `Black`.

Time Series Forecast

Calculate forecasted values based on historical data. A forecast takes a time column and a target column from a given dataset and calculates forecasted values for the target column.

Train <model type>

Train machine learning models using algorithms for numeric prediction, multi-classification, binary-classification and clustering. See [Data Flow Steps for Training Machine Learning Models](#).

When you've trained a machine learning model, apply it to your data using the **Apply Model** step.

Transform Column

Change the format, structure, or values of data. For example, you might convert text to uppercase, trim leading and trailing spaces from data, or calculate a percentage increase in value.

Union Rows

Merge the rows of two data sources (known as a UNION command in SQL terminology). You can match columns by order or name.

Database Analytics Functions

Database analytics functions enable you to perform advanced analysis and data mining analysis, for example, detecting anomalies, clustering data, sampling data, and affinity analysis. Analytics Functions are available when you connect to an Oracle database or Oracle Autonomous Data Warehouse.



To display the **Database Analytics** step in the data flow editor, you must connect to an Oracle database or Oracle Autonomous Data Warehouse.

Function Types	Description
Dynamic Anomaly Detection	Detect anomalies in your input data without a pre-defined model. For example, you might want to highlight unusual financial transactions. When you deploy this function with large datasets, configure the partition columns to maximize performance.
Dynamic Clustering	Cluster your input data without a pre-defined model. For example, you might want to characterize and discover customer segments for marketing purposes. When you deploy this function with large datasets, configure the partition columns to maximize performance.
Frequent Item Set	Discover relationships in your data by identifying sets of items that often appear together. This data mining technique is also known as association rule learning, affinity analysis, or in the retail industry as market basket analysis. If you use frequent item set as a market basket analysis tool, you might find that customers who buy shampoo also buy hair conditioner. This operation is resource intensive and its performance depends on several factors, such as input dataset volume, cardinality of transaction id, and cardinality of Item value column. To avoid potential performance degradation on the database, try with a higher value of minimum support percent (default is 0.25) and gradually reduce it to accommodate more itemsets in your output.
Sampling Data	Selects a random sample percentage of data from a table. You simply specify the percentage of data you want to sample. For example, you might want to randomly sample ten percent of your data.

Function Types	Description
Text Tokenization	Analyze textual data by breaking it down into distinct words and counting the occurrences of each word. When you run your data flow, Oracle Analytics creates a table in the database named <code>DR\$IndexName\$I</code>, which contains the token text and the token count related details. Use the <code>DR\$IndexName\$I</code> table to create a dataset. - Under Outputs, use the Create option next to each field to select the columns to index. - Under Parameters, then Text Column, click Select a column to select the field you'd like to break down into separate words. Use the Reference Column<number> options to include one or more columns in the output dataset. Use the Use Special Language Lexer option to select specific languages such as Chinese, Danish, Dutch, English, Finnish, German, Norwegian, Japanese, Korean and Swedish for special lexers. See Oracle database documentation for more details on supported languages. The database connection that you use for your data flow requires special database privileges. Check with your administrator that: - Your database account has <code>grant EXECUTE on CTXSYS.CTX_DDL</code> to schema name. - You use an Oracle Analytics connection with the same username as the schema where the source table exists. This is best practice to avoid access privilege issues when the data flow runs. - The database table column you're analyzing has no existing CONTEXT index. If there's an existing CONTEXT index on the database table that you're analyzing, remove that index before you run the text tokenization data flow.
Time Series	Time Series is a data mining technique that forecasts target value based on a known history of target values. The input to time series analysis is a sequence of target values. It provides estimates of the target value for each period of a time window that can include up to 30 periods beyond the historical data. The model also computes various statistics that measure the goodness of fit to historical data. These statistics are available as an additional output dataset via a parameter setting. Note: The Time Series algorithm is only available from Oracle database version 18c onwards.
Un-pivoting Data	Transpose data that's stored in columns into row format. For example, you might want to transpose multiple columns showing a revenue metric value for each year to a single revenue column with multiple value rows for the year dimension. You simply select the metric columns to transpose and specify a name for the new column. You get a new dataset with fewer columns and more rows.

Graph Analytics Functions

Graph analytics enable you to perform geo-spatial analysis. For example, you might calculate the distance or the number of hops between two vertices. To use graph analytics, connect to an Oracle database or Oracle Autonomous Data Warehouse (the analytics are computed in the database, not in Oracle Analytics).



[LiveLabs Sprint](#)

To display the **Graph Analytics** step in the data flow editor, you must connect to an Oracle database or Oracle Autonomous Data Warehouse.

Function Type	Description
Clustering	Finds connected components or clusters in a graph.

Function Type	Description
Node Ranking	Measure the importance of the nodes in a graph.
Shortest Path	Find the shortest path between two vertices in a graph.
Sub Graph	Find all nodes within a specified number (n) of hops of a given node.

Data Flow Steps for Training Machine Learning Models

Oracle Analytics enables you to train machine learning models using steps in data flows. When you've trained a machine learning model, apply it to your data using the **Apply Model** step.

Step Name	Description
AutoML (requires Oracle Autonomous Data Warehouse)	Use Oracle Autonomous Data Warehouse's AutoML capability to recommend and train a predictive model for you. The AutoML step analyzes your data, calculates the best algorithm to use, and registers a prediction model in Oracle Analytics.
Train Binary-Classifier	Train a machine learning model to classify your data into one of two predefined categories.
Train Clustering	Train a machine learning model to segregate groups with similar traits and assign them into clusters.
Train Multi-Classifier	Train a machine learning model to classify your data into three or more predefined categories.
Train Numeric Prediction	Train a machine learning model to predict a numeric value based on known data values.

Create a Dataset Using a Data Flow

Use a data flow to curate data and create a dataset. For example, you might merge two datasets, cleanse the data, and output the results to a new dataset.

1. On the Home or Data page, click **Create** and select **Data Flow**.
2. In the Add Dataset dialog, select a dataset then click **Add**.
You can add more data sources at any time by clicking **Add Step (+)**, then clicking **Add Data**.
3. Optional: In the Add Data pane, configure your data. For example, include or exclude columns, or rename columns.
4. Build your data flow:
For each function that you want to perform, click **Add a step (+)**, click the step type you want, then specify the properties in the Step editor pane.

Tip: Hover over the last step to display the **Add a step (+)** option. You can also edit your flow and add steps using **Options** in the Column header. For example, you can rename, reformat, merge, or transform columns.

5. Add a **Save Data** step to the end of your data flow.
6. Save your data flow.

You can start processing your data now by clicking **Run Data Flow**, or later using the **Data Flows** panel on the Data page (from the Home page, click **Navigator**, then click **Data**). You can access the generated dataset on the **Datasets** panel on the Data page.

Generate or Update a Dataset Using a Data Flow

Run (that is, execute) a data flow to generate or update a dataset.

1. On the Home page, click **Navigator**, then **Data**, then **Data Flows**.
2. Start a data flow.
 - To start a data flow immediately, right-click a data flow and click **Run**.
 - To schedule a data flow to execute at a particular date and time, right-click a data flow, click **New Schedule**, then click **New**, and use the Data Flow dialog to specify a date and time and repeat cycle.

You can also run a data flow from the data flow editor by clicking **Run Data Flow**.

To view the dataset, from the Home page, click **Navigator**, then **Data** and navigate to the **Datasets** page.

Reuse a Data Flow

In a data flow, you can add parameters so that users can specify the data source and output dataset to use at runtime.

1. On the Home page, click **Navigator**, then **Data**, then **Data Flows**.
2. Open your data flow.
3. In the Step editor pane, select the parameter prompt options to your steps. You can add parameters to the steps **Add Data**, **Save Data**, and **Create Essbase Cube**.
4. To specify the datasource at runtime, in an **Add Data** step, select the **When Run Prompt to select Dataset** option then provide the **Name** and **Prompt** values for the parameter.
5. To specify the output dataset at runtime, in a **Save Data** step, select the **When Run Prompt to specify Dataset** option, then provide the **Name** and **Prompt** values for the parameter.
6. To specify the output Essbase cube at runtime, in a **Save Data** step, select the **When Run Prompt to specify Dataset** option, then provide the **Cube**, **Application**, and **Prompt** values for the parameter.

When you run (or execute) the data flow, you see a Dataflow Prompt dialog, which enables you to either use the default values or specify alternative values. For example:

- If you added a parameter to specify the data source, you can either click **OK** to accept the default, or click the default dataset name displayed in the Sources section to display the Add Dataset dialog where you can select an alternative.

- If you added a parameter to specify the data target, you can either click **OK** to accept the default, or edit the default dataset name displayed in the Targets section to specify an alternative.

Configure Incremental Processing in a Data Flow

Configure incremental processing to load only new or updated records from a database. You can deploy incremental processing if your data is sourced from a database (using a database connection).

Incremental processing keeps your data up-to-date, providing better quality insights.

Before you start, create a connection to one of the supported databases, for example Oracle, Oracle Autonomous Data Warehouse, Apache Hive, Hortonworks Hive, or Map R Hive.

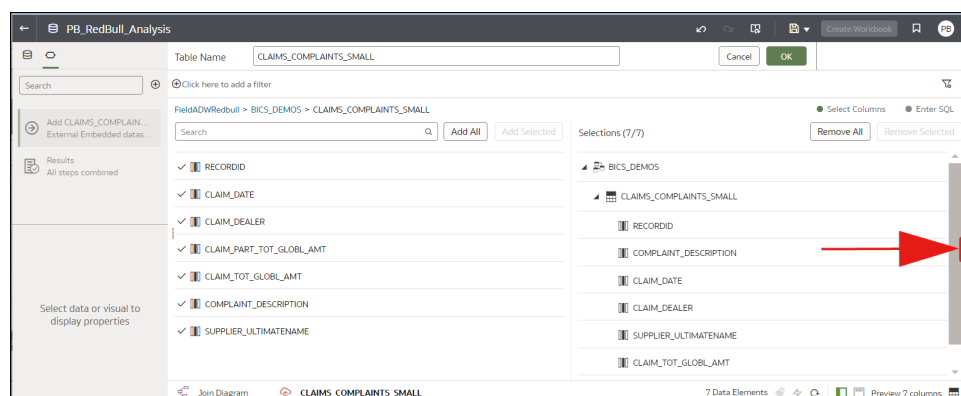
1. Specify a new data indicator in the data source. See [Specify a New Data Indicator for a Data Source](#).
2. Apply incremental processing in your data flow. See [Apply Incremental Processing in a Data Flow](#).

Specify a New Data Indicator for a Data Source

To configure incremental processing in a data flow, you select the data column to use as the flow new data indicator in the data source. This indicator determines when new data is detected since the last time the data flow was executed. For example, you might select a timestamp column.

Before you start, create a connection to one of the supported databases, for example Oracle, Oracle Autonomous Data Warehouse, Apache Hive, Hortonworks Hive, or Map R Hive.

1. On the home page, click **Navigators**, then click **Data**.
2. Hover over a dataset, click **Actions**, then select **Open**.
3. In the **Join Diagram**, double-click the table that includes the incremental identifier you'd like to use.
4. Click **Edit Definition**.
5. If the data access panel isn't displayed, go to the center of the right edge of the window to locate the **Expand** option, then click **Expand**.



You can now view the caching options and the **Flow New Data Indicator** field under **Advanced**.

The screenshot shows a configuration window for a data flow step. At the top, there are navigation icons and buttons for 'Cancel' and 'OK'. Below these, the step name is 'diab pred results'. The 'Description' field is empty. The 'Connection' is set to 'diabetes_adw'. The 'Data Access' is set to 'Live'. The 'Created On', 'Modified On', and 'Refreshed' dates are all 'Jan 23, 2024'. The 'Advanced' section is expanded, revealing the 'Flow New Data Indicator' field, which is currently set to 'Select Column' and is highlighted with a red rectangular box.

6. In the **Flow New Data Indicator** field, select a column to detect when new data is added.
7. Click **OK**.

Apply Incremental Processing in a Data Flow

Apply incremental processing in a data flow to load only new or updated records from a database.

Before you start, create a connection to one of the supported databases, for example Oracle, Oracle Autonomous Data Warehouse, Apache Hive, Hortonworks Hive, or Map R Hive.

1. Create or open the data flow in which you want to apply incremental processing.
2. In the Data Flow editor select the **Save Data** step to display the Step editor pane.
3. In the **Dataset** field, specify the name of the input dataset (the dataset specified in the **Add Data** step).
4. At the **Save data to** option select **Database Connection**.
5. Click **Select Connection** and select a connection to one of the supported target databases.
6. In the **Data** field, specify the name of the target table that you're writing to.

7. In the **When run** option, select **Add new data to existing data**.
8. Click **Save**.

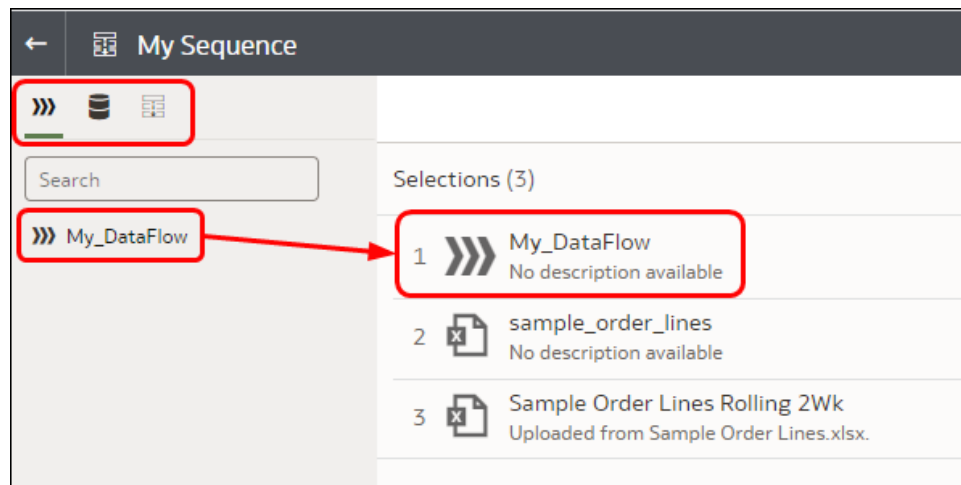
You're now ready to schedule your data flow to load new data regularly.

Process Data Using a Sequence of Data Flows

A sequence is collection of data flows, datasets, or other sequences that you process together. They're useful when you want to run multiple data flows, datasets, or sequences, as a single transaction.



1. On the Home page click **Create** and select **Sequence**.
2. Click the default sequence name "New Sequence" top left, and change to a meaningful name, for example "My Sequence".
3. Add the items you want to process using the **Data Flows**, **Datasets**, and **Sequences** tabs to show items for selection.



- To add data flows, click **Data Flows**, then drag and drop one or more data flows to the **Selections** pane.
 - To add datasets, click **Datasets**, then drag and drop one or more datasets to the **Selections** pane.
 - To add other sequences, click **Sequences**, then drag and drop one or more sequences to the **Selections** pane.
4. Arrange the items in the sequence.
 - If you want to override the default order in which Oracle Analytics processes items, select the **Ordered** option and drag and drop items to change the order (numbered 1,2,3 and so on).
If the **Ordered** option is deselected (the default setting), this triggers auto-dependency detection. Oracle Analytics takes into consideration inputs and outputs for each sequence item to determine the execution order, and executes items in parallel where necessary.
 - To remove items, hover over an item and click the ellipsis at the right-hand side, then click **Remove**.

5. Click **Save**.
6. Start the sequence.
 - To start the sequence immediately, click **Execute Sequence** in the sequence editor.
 - To start the sequence later, from the Home page, click the **Navigator**, then click **Data**, then **Sequence**. Right-click a sequence, then click **Run**.
 - To schedule a sequence to execute at a particular date and time, from the Home page, click the **Navigator**, then click **Data**, then **Sequence**. Right-click a sequence, then click **New Schedule**, then click **New**, and use the Schedule dialog to specify a date and time and repeat cycle.
7. Manage the sequence process.
 - To manage a sequence being processed, from the Home page, click the **Navigator**, then **Jobs**.
 - To manage scheduled sequences, from the Home page, click the **Navigator**, then **Jobs**, then **Schedules**.

**Note:**

Sequences don't process copies of a data flow. When a sequence processes a data flow, copies of that data flow are ignored. If this happens, you see updates in the sequence logs accessed via the **History** tab on the Inspect panel.

Manage Your Data Flows

Manage your data flows on the Data Flows page. For example, you might schedule when you process your data, or export a data flow so that you can migrate it to a different Oracle Analytics instance.

Manage your data flows so keep your data up-to-date, giving you better quality insights.

1. On the Home page, click **Navigator**, then **Data**, then **Data Flows**.
2. Hover over a data flow, click **Actions**, and use these options:
 - Use **Run** to create or update your data using the data flow.
 - Use **Open/Open in a New Tab** to edit the data flow.
 - Use **New schedule** to create or update your data regularly.
 - Use **Inspect** to view general information about the data flow, such as the source and target data, when the flow was last executed, scheduled executions, and execution history. You can also use the **Access** tab to share data flows that you own.
 - Use **Export** to export a data flow with its dependent data and credentials as a .DVA file to the download folder of your machine. Use the export and import options to migrate data flows from one system to another or back up your data flows. When you export data flows, you can select what to include in the export file. For example, enable **Include Permissions** to include access permissions so that shared connections continue to work when you import the data flow. To import a data flow that you've downloaded, on the Data Flows page, click **Page Menu**, then click **Import Workbook/Flow**. Follow the on-screen instructions to select a local .DVA file to import. When you import the data flow, select **Import Permissions (if available)** to include access permissions so that shared connections continue to work.

- Use **Delete** to remove the data flow from your system (there's no undo).

6

Manage Datasets

This topic describes the different ways you can manage your datasets.

Topics:

- [Dataset Type Icons](#)
- [View a List of Datasets and Information About Them](#)
- [Reload a Dataset's Data](#)
- [Inspect a Dataset's Properties](#)
- [Rename a Dataset and Change Its Description](#)
- [Copy a Dataset's Object ID](#)
- [View a Dataset's Data Elements](#)
- [Download a Dataset's Source File](#)
- [Duplicate a Dataset](#)
- [Delete a Dataset](#)

Dataset Type Icons

A dataset's icon helps you identify the connection type or file it uses to source its data.

Dataset type icons are displayed in your list of datasets. See [View a List of Datasets and Information About Them](#).

Dataset Icon	Description
	Dataset uses two or more database connections. For example, Oracle Database and Oracle Analytics Warehouse.
	Dataset uses one database connection.
	Dataset uses an XLSX or XLS file.
	Dataset uses a CSV or TXT file.
	Dataset uses an Oracle Applications connection type. The Oracle Applications connection type can connect to: • Oracle Fusion Cloud Applications Suite (for example, Oracle Fusion Cloud Financials) • On-premises Oracle BI Enterprise Edition deployments (if patched to an appropriate level) • Another Oracle Analytics service

View a List of Datasets and Information About Them

You can access, browse, sort, or search a list of datasets. From the dataset list, you can choose any available dataset to use in a workbook.

You can use the dataset list to find information about a specific dataset, for example which data source connection it uses, when it was created and last modified, and the name, data type, and aggregation of each dataset column.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Optional: Enter a term in the **Search** field to search the list for a specific dataset.
4. To check a dataset's details, click **Actions** and then click **Inspect**.
5. Optional: Click the General tab to find information about the dataset, such as the connection used to create it and the database type that the dataset gets its data from.
6. Optional: Click the Data Elements tab to find information that can help you decide if the dataset contains the data that you need for your workbook.

Reload a Dataset's Data

Keep your analytics content up-to-date by reloading dataset data when it's been updated.



[LiveLabs Sprint](#)

Topics:

- [About Reloading a Dataset's Data](#)
- [Reload Data from the Workbook Editor](#)
- [Reload an Individual Table in a Dataset](#)
- [Reload Tables in a Dataset](#)
- [Reload a Dataset's Files](#)
- [Reload a Dataset's Data Incrementally](#)
- [View a Dataset's Reload History](#)
- [View and Download Log Files for a Dataset Reload Job](#)

About Reloading a Dataset's Data

You can reload data in a dataset to keep it up-to-date.

Reloading data ensures that workbooks and visualizations contain current data. The most current data is displayed in workbooks and visualizations after the dataset reload is complete and you refresh the workbooks. See [Refresh a Workbook's Data](#).

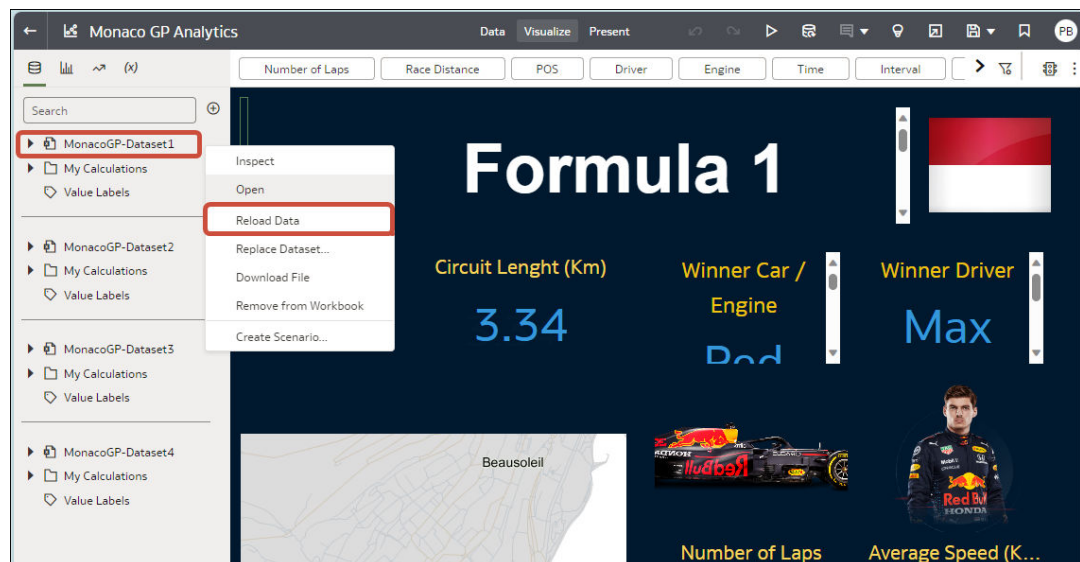
How you reload a dataset depends on how the data is sourced.

Dataset Source Type	How You Reload Data
Data from databases that support incremental loading	You can reload dataset data incrementally if the dataset uses a data source that supports this. Incremental loading only loads new or updated data. See Reload a Dataset's Data Incrementally .
Data from external connections	When you reload data for a dataset with an external connection, the dataset's SQL statement is rerun and the current data for the tables with the Data Access field set to Automatic Caching is loaded into cache. If your dataset contains one or more tables with the Data Access field set to Automatic Caching, then you can use the Data page to reload the tables in the dataset.
Data from Excel, CSV, or TXT File	When you reload a Microsoft Excel file (XLSX or XLS), the newer spreadsheet file must contain a sheet with the same name as the original file. And the sheet must contain the same columns that are in the dataset. The data reload fails if the file you load is missing columns. When you reload a CSV or TXT file, it must contain the same columns that are in the dataset. A reload will fail if the file you load is missing columns. To reload a dataset that uses one file as its source, use the Data .
Data from Oracle Fusion Cloud Applications Suite	You can reload data and metadata for Fusion Applications Suite data sources. If the Fusion Applications Suite data source uses logical SQL, reloading data reruns the dataset's SQL statement.

Reload Data from the Workbook Editor

When you're editing a workbook, you can reload data to update the workbook with the most up-to-date data.

1. On the Home page, locate the workbook and click **Open**.
2. Click the **Visualize** tab.
3. On the Data panel, right-click the connection name or dataset name and select **Reload Data**.



Reload an Individual Table in a Dataset

Use the Dataset editor to reload data for an individual dataset table that uses a connection. Reloading queries the table's data source and loads the current data into cache.

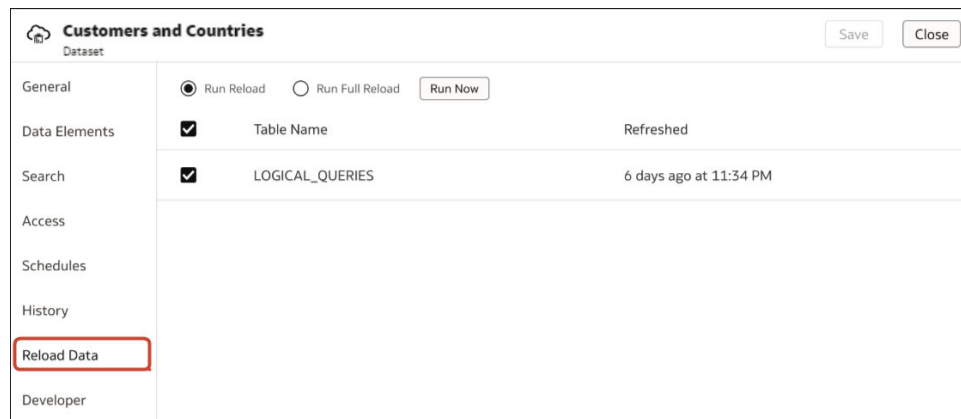
If you want to reload a table that uses a file as its source, then see [Reload a Dataset's Files](#).

The Reload option is available for any dataset table with the **Data Access** field set to **Automatic Caching**.

Typically you reload all of the dataset's tables at the same time so that the data is consistent across all tables. But sometimes it makes sense to reload only one of the dataset's tables. For example, where you know that the data has changed in a fact table but not in any of the dimension tables.

Reloading doesn't update the table's Profile data preview information. To see the most current data in the data preview, re-profile the table after you reload the table.

1. On the Home page, click **Data** and then click **Data**.
2. Click the **Datasets** tab.
3. Hover over the dataset that you want to reload, click **Actions**, and then click **Reload Data**.
4. Select the table, then click **Run Now**.



Reload Tables in a Dataset

Use the Datasets tab to reload data for the dataset's tables that use connections and have the **Data Access** field set to **Automatic Caching**. Reloading queries the tables' data sources and loads the current data into cache.



Note:

You can also programmatically reload data for an existing dataset that's based on a connection using the REST API. See [Reload data for a dataset](#) in the *REST API for Oracle Analytics Cloud*.

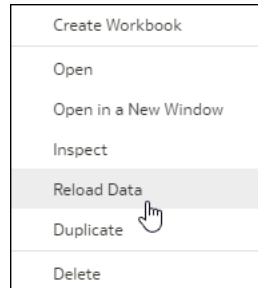
Reloading data ensures that workbooks and visualizations contain current data. The most current data is displayed in workbooks and visualizations after the dataset reload is complete and you refresh the workbooks.

If you want to reload a dataset that contains more than one table and uses files as its source, or if the dataset contains a combination of tables created from connections and files, then see [Reload a Dataset's Files](#).

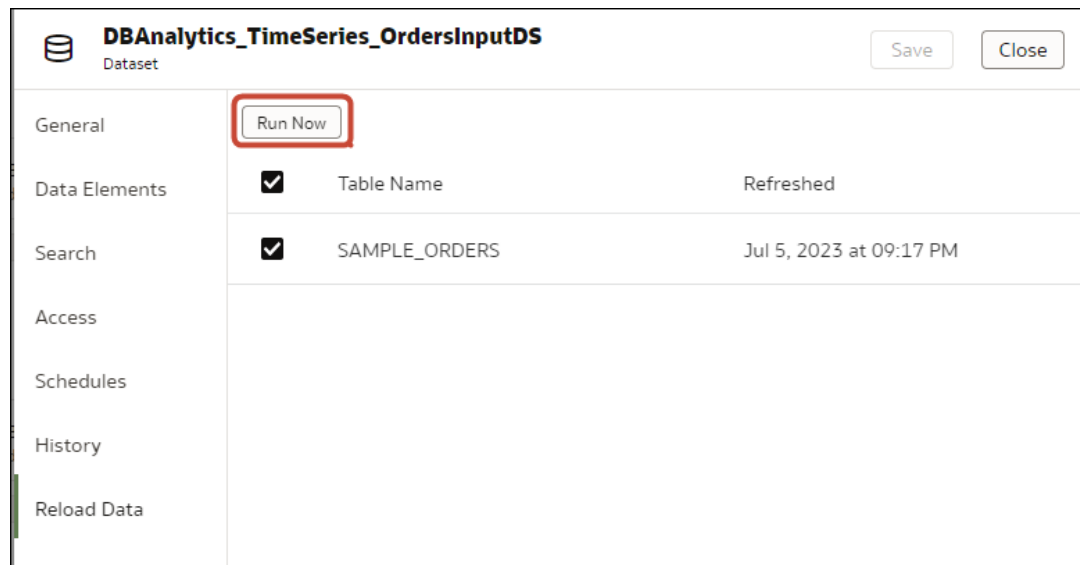
The **Reload Data** option is available for any dataset when the **Data Access** field is set to **Automatic Caching** for one or more table, and when the data source connection includes credentials for one or more table .

Dataset tables with the **Data Access** field set to **Live** aren't included in the reload. See [Specify Whether a Dataset Table Is Cached or Live](#)

1. On the Home page, click **Navigator** and then click **Data**.
2. Hover over the dataset that you want to reload, click **Actions**, and then click **Reload Data**



3. Select the tables that you'd like to reload then click **Run Now**.



Reload a Dataset's Files

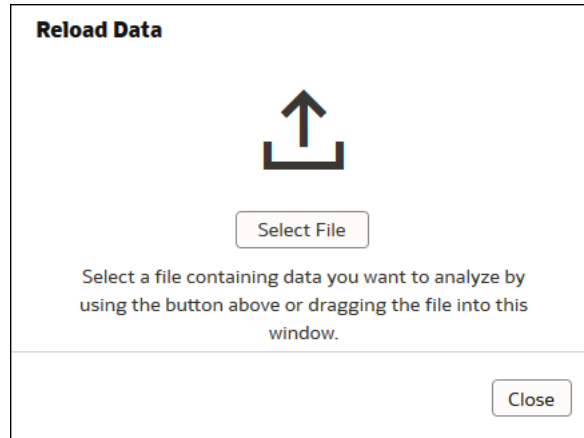
Reload data in a dataset based on a XLSX, XLS, CSV, or TXT file to make sure that you have the most up-to-date workbook content.

Before you start, make sure that the file you upload contains the same columns as the existing dataset.

Reloading a dataset's files ensures that workbooks and visualizations contain current data. The most current data is displayed in workbooks and visualizations after the file reload is complete and you refresh the workbooks.

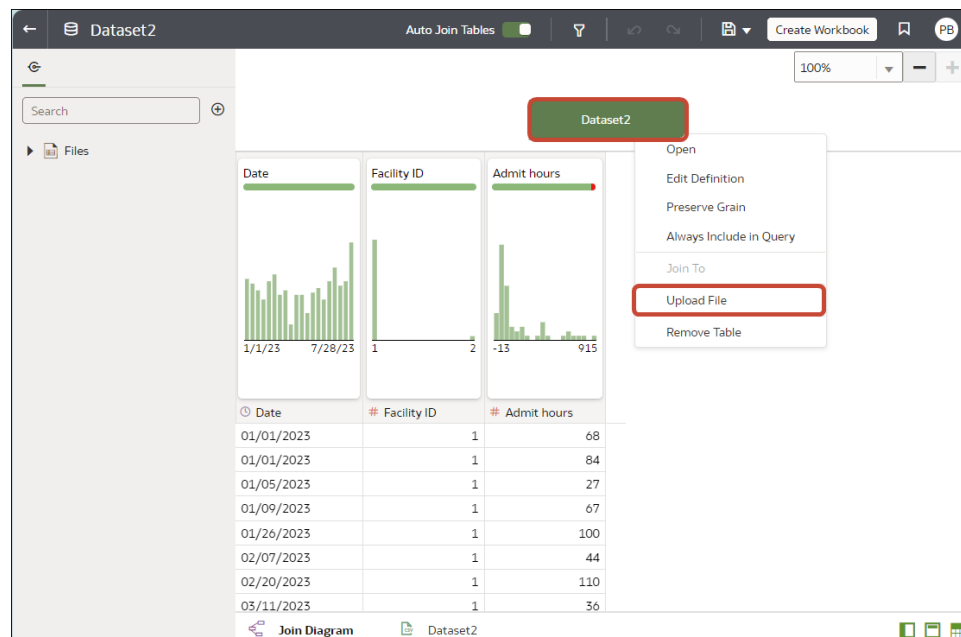
Reload a dataset's files from the Home page

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Hover over the dataset that you want to reload, click **Actions**, and then click **Reload Data**.
4. In the Upload File dialog, drag and drop the file onto the dialog or click **Select File** to browse for the file.



5. Click **OK**.

If you're working in the dataset editor, you can reload data by right-clicking the dataset in the Join Diagram and then selecting **Upload File**.



Reload a Dataset's Data Incrementally

Keep your analytics content up-to-date by reloading datasets efficiently when new data is available in the source database.

Topics:

- [Overview to Loading Datasets Incrementally](#)
- [Configure a Dataset to Load Incrementally](#)
- [Load Dataset Data Incrementally](#)

Overview to Loading Datasets Incrementally

Keep your workbooks up-to-date in the most efficient manner by loading dataset data incrementally. Review this overview before you start.

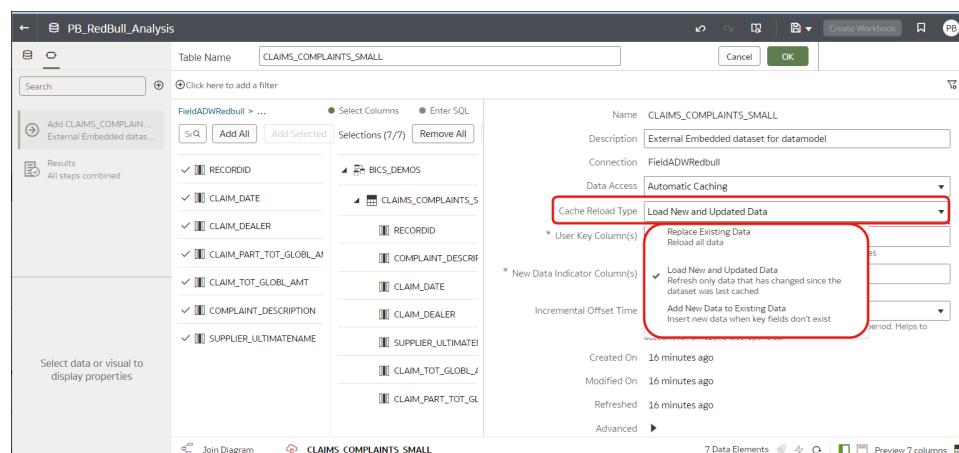
Reloading data incrementally refreshes data efficiently and minimizes processing time.

What Incremental Load Types Are Supported?

In Oracle Analytics you can:

- Load new records and updates to existing records (known as upsert).
- Load new records only (known as insert).

Alternatively, if incremental loading isn't suitable, you can perform a full data load. For example, if a significant proportion of your data changes regularly, a full data load might be more efficient.



Database Types that Support Incremental Loading for Datasets

- Oracle Database
- Oracle Applications
- Oracle Autonomous Data Warehouse (ADW)
- Oracle Autonomous Transaction Processing (ATP)
- Oracle Talent Management Cloud/Oracle Talent Acquisition Cloud (Taleo)

- DB2
- Informix
- MySQL
- SQL Server
- Sybase ASE and Sybase IQ

Working With Data in Different Time Zones

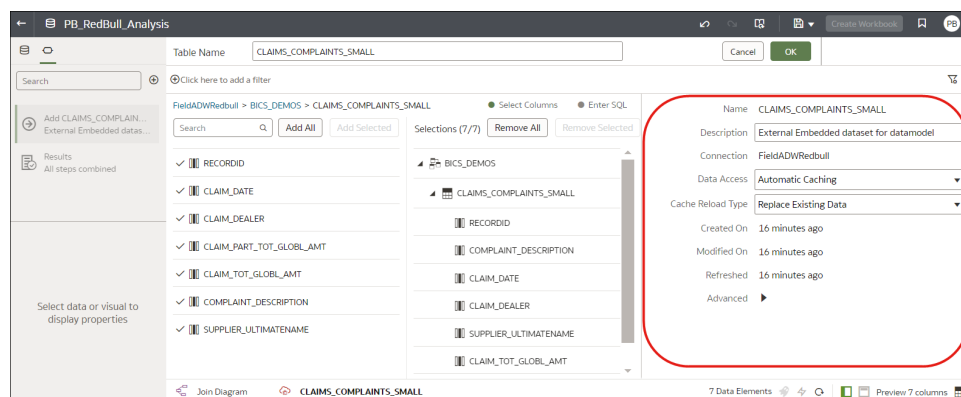
If there's a time difference between the timestamps in your data and the default Oracle Analytics timezone (Universal Time Coordinated or UTC), you can specify an offset that takes into account the time difference so that your data loads correctly. For example, if your source system records in Pacific Time Zone (PST), which is eight hours behind UTC, set the incremental offset time to 8 hours. See [Configure a Dataset to Load Incrementally](#).

Configure a Dataset to Load Incrementally

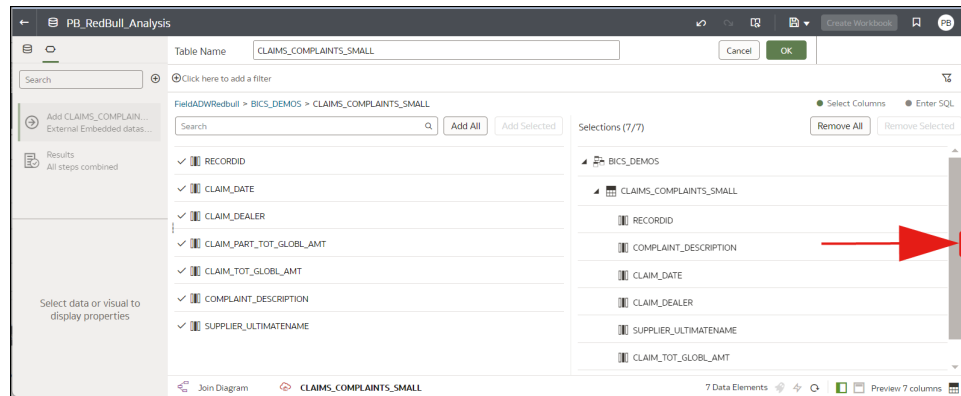
Keep your datasets up-to-date by configuring them to load incrementally. For example, if a source system has new records, load just the new records to your dataset to minimize system traffic and reduce processing time.

Before you start, make sure that you have a dataset based on a database type that supports incremental loading. See [Databases that Support Incremental Reload for Datasets](#).

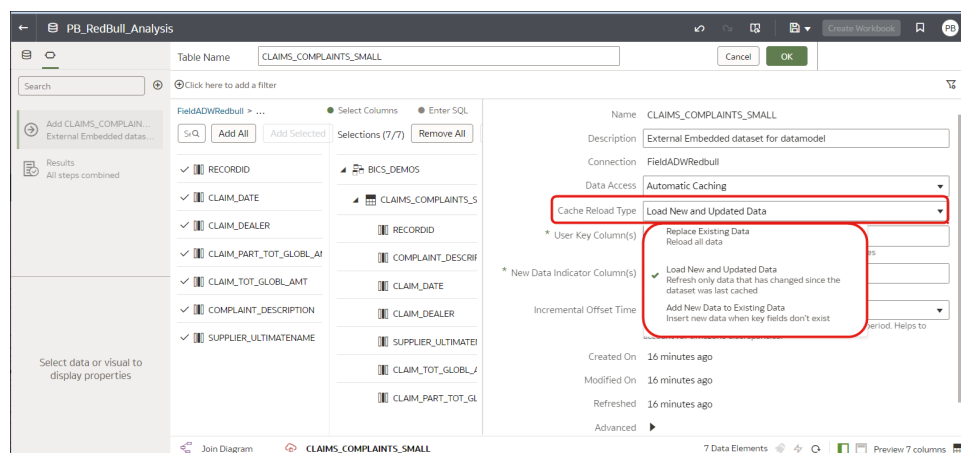
1. On the Home page, click **Data** from the Navigator, and hover over the dataset you'd like to refresh.
2. Click the **Actions** menu, then click **Open**.
3. In the **Join Diagram**, double-click the table you want to refresh.
4. Click **Edit Definition**.
5. Make sure that the data access options are displayed at the right-hand side.



If the data access options aren't displayed, hover over the center of the right edge of the window to locate the **Expand** option, then click **Expand**.



6. Use the fields on the data access panel to configure the refresh.



- In **Cache Reload Type**, specify the type of incremental refresh:
 - Select **Load New and Updated Data** (also known as upsert) to load new data when a new record is available or an existing record is updated. For example, you might want to load new transactions as well as changes to existing transactions.
 - Select **Add New Data to Existing Data** (also known as insert) to load new data when a new record is available. For example, you might want to load new transactions only.

Alternatively, if you think incremental reload isn't appropriate for your dataset, select **Replace Existing Data** to reload all records (also known as a full load). For example, if a significant percentage of your data has changed, it might be quicker to do a full reload rather than an incremental load.

- In **Key Fields**, specify the user key columns that identify unique records.
- In **New Data Indicator Column(s)**, specify the column or columns used to detect new or updated data. For example, you might select a unique transaction ID column to identify new transactions in the data source.
- In **Incremental Offset Time**, change the default (None) if there's a time difference between the timestamps in your data and the default Oracle Analytics timezone (Universal Time Coordinated or UTC). For example, if your source system records in Pacific Time Zone (PST), which is eight hours behind UTC, set the incremental offset time to 8 hours.

7. Repeat steps 3 to 6 for each table in the dataset that you want to reload.

8. Click **OK**.

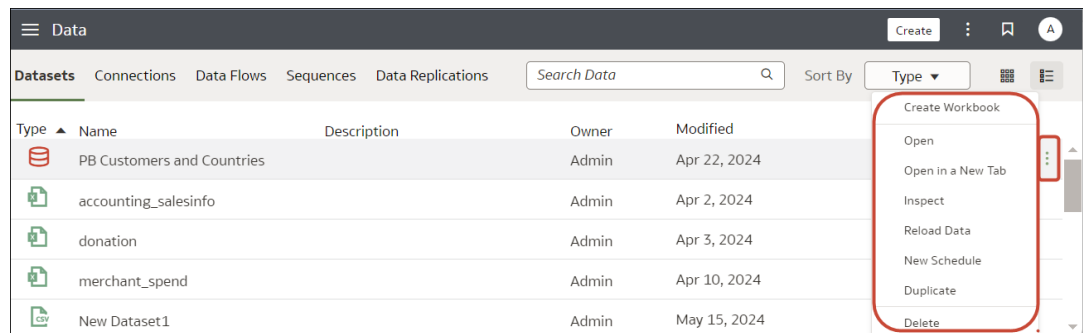
You can now reload the dataset, either once or regularly. See [Load Dataset Data Incrementally](#).

Load Dataset Data Incrementally

Reload dataset data incrementally to keep workbooks up-to-date. You can load data once or regularly.

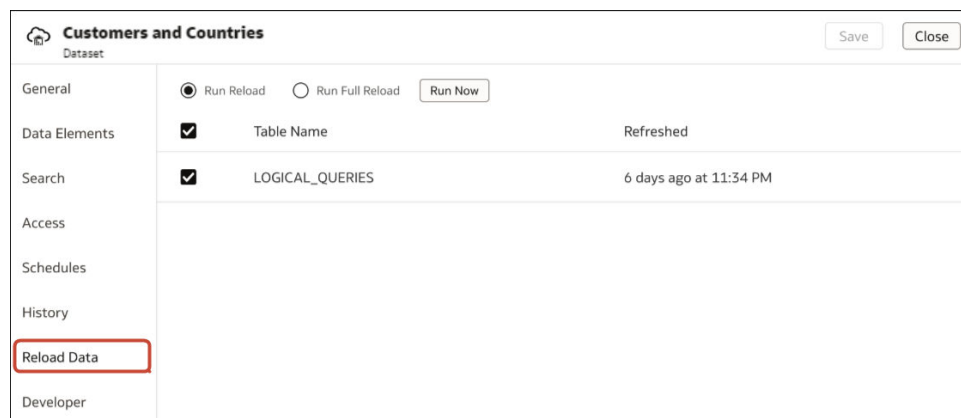
Before you start, configure your dataset to load incrementally. See [Configure a Dataset to Load Incrementally](#).

1. On the Home page, click **Data** from the Navigator, and hover over the dataset you'd like to refresh to display the **Actions** menu.



2. To load data once, click **Actions**, then click **Reload Data**.

Click **Run Reload**, then select the tables to reload, then click **Run Now**.



3. To load data regularly, click the **Actions** menu, then click **New Schedule**.

Use the Schedule dialog to specify when you'd like to start the refresh and how regularly to refresh the data, then click **OK**.

Schedule

Object: Customers and Countries

Activity: Run Dataset

Name: Customers and Countries

Start: 5/20/24 Time: 4:49 PM

Repeat: Weekly End: 5/21/24

☒ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday
☐ Friday ☐ Saturday ☐ Sunday

Cancel OK

Use the Schedules tab on the Inspect dialog to review updates. See [View a Dataset's Reload History](#) and [View and Download Log Files for a Dataset Reload Job](#).

If you drill into the task-level details for an incremental load, you'll see that the **Refresh Mode** is set to "Incremental".

UsageTracking - Inc Reload Demo

Save Close

General

Status

Task Details

Name	DSET : UsageTracking - Inc Reload Demo - LOGICAL_QUERIES
Source Name	'system'.UsageTracking'
Refresh Mode	Incremental
Status	Completed
Status Detail	Successfully ran with no errors
Start Time	6 days ago at 11:33 PM
End Time	6 days ago at 11:34 PM
Duration	7 sec
Number of Successful Rows	3
Number of Read Rows	3
Read Throughput	15 rows per second
Data Size	5MB

View a Dataset's Reload History

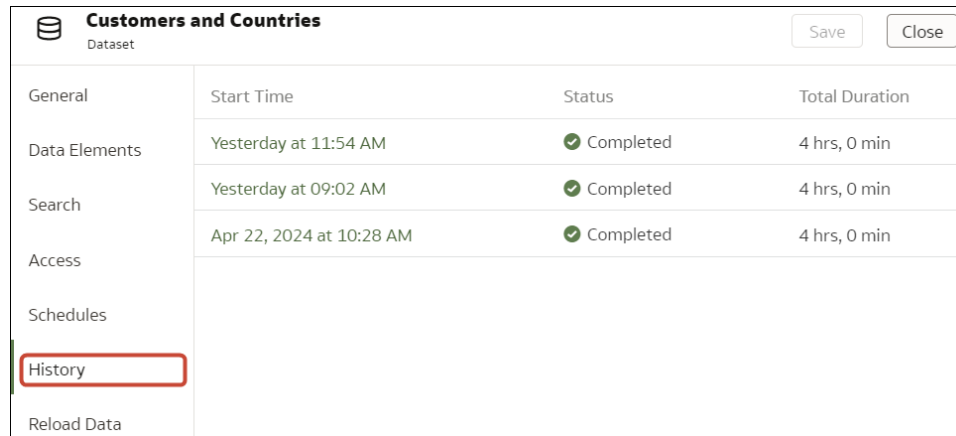
Historical information is generated for dataset reloads at the job level and at the table level.

Use a dataset's reload history to find out information such as how the reload was executed (manually or by schedule), job status, start time, end time, and the amount of data reloaded in bytes. You can also drill into information about the job's reloaded tables. For example, the table's source name, reload status, and number of rows.

Oracle Analytics generates historical information when you reload datasets that use connections.

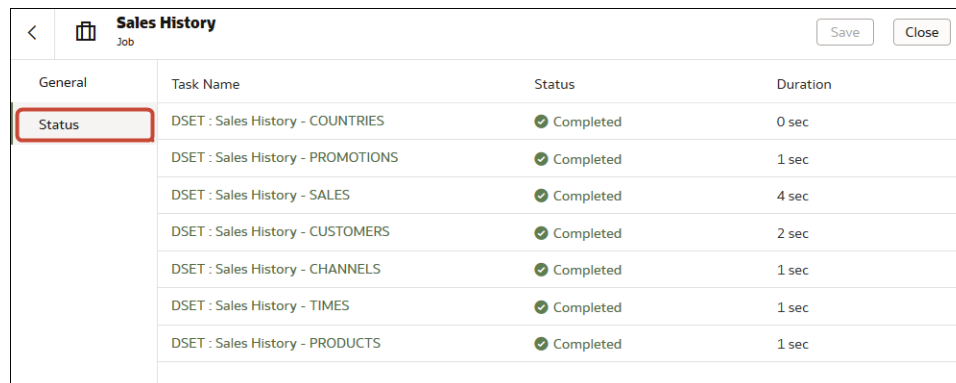
Oracle Analytics doesn't generate historical information and log files when you reload datasets that:

- Use only files.
 - Use a connection and a file. Oracle Analytics generates historical information only for a dataset's tables that use a connection.
 - Use an Oracle EPM Cloud or Oracle Essbase connection.
1. On the Home page, click **Navigator** and then click **Data**.
 2. On the **Datasets** tab, hover over a dataset, then click **Actions**, and then click **Inspect**.
 3. Click the **History** tab to see data load jobs that have completed on that dataset.



Customers and Countries Dataset				Save	Close
General	Start Time	Status	Total Duration		
Data Elements	Yesterday at 11:54 AM	✓ Completed	4 hrs, 0 min		
Search	Yesterday at 09:02 AM	✓ Completed	4 hrs, 0 min		
Access	Apr 22, 2024 at 10:28 AM	✓ Completed	4 hrs, 0 min		
Schedules					
History					
Reload Data					

4. Click a job in the list to display the **General** tab, which provides an overview of the job.
5. Optional: Click the **Status** tab display tasks that were executed as part of the job.



Sales History Job				Save	Close
General	Task Name	Status	Duration		
Status	DSET : Sales History - COUNTRIES	✓ Completed	0 sec		
	DSET : Sales History - PROMOTIONS	✓ Completed	1 sec		
	DSET : Sales History - SALES	✓ Completed	4 sec		
	DSET : Sales History - CUSTOMERS	✓ Completed	2 sec		
	DSET : Sales History - CHANNELS	✓ Completed	1 sec		
	DSET : Sales History - TIMES	✓ Completed	1 sec		
	DSET : Sales History - PRODUCTS	✓ Completed	1 sec		

Click a task in the list to display log information for the task. If the load was incremental, you'll see the **Refresh Mode** set to "Incremental".

UsageTracking - Inc Reload Demo	
General	Task Details
Status	Name: DSET : UsageTracking - Inc Reload Demo - LOGICAL_QUERIES Source Name: 'system'.UsageTracking' Refresh Mode: Incremental Status: Completed Status Detail: Successfully ran with no errors Start Time: 6 days ago at 11:33 PM End Time: 6 days ago at 11:34 PM Duration: 7 sec Number of Successful Rows: 3 Number of Read Rows: 3 Read Throughput: 15 rows per second Data Size: 5MB

View and Download Log Files for a Dataset Reload Job

You can review log files for dataset reloads to help you troubleshoot dataset reload issues.

For example, if you have an issue reloading data, the logs can help you determine if it's a problem with your configuration, such as an invalid or outdated password or an issue with too much data. In such cases, the log files contain time stamps for key operations and information on the number of records processed. You can review logs at the job level and at the table level.

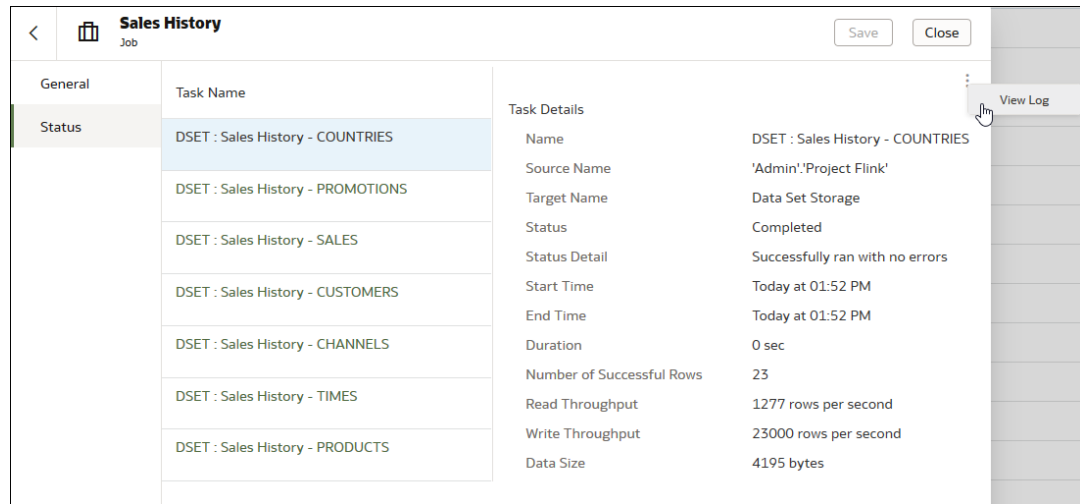
Oracle Analytics generates log files when you reload datasets that use connections. Log files aren't generated if a dataset uses one or more files, or uses an Oracle EPM Cloud or Oracle Essbase connection.

1. On the Home Page, click **Navigator** and then click **Data**.
2. On the **Datasets** tab, hover over a dataset, click **Actions**, and then click **Inspect**.
3. Click the **History** tab, then click the job that you want to look at.

Customers and Countries			
Dataset			
General	Start Time	Status	Total Duration
Data Elements	Yesterday at 11:54 AM	✓ Completed	4 hrs, 0 min
Search	Yesterday at 09:02 AM	✓ Completed	4 hrs, 0 min
Access	Apr 22, 2024 at 10:28 AM	✓ Completed	4 hrs, 0 min
Schedules			
History			
Reload Data			

4. In the **General** tab, click **Job details menu** in the top right-hand corner and select **View Log** to view the log, or select **Download Logs** to save the logs to a local file area.

5. If the job reloaded more than one table and you want to view log information for a specific table, then click **Status**, then the table's reload task name, then click **Job Task Menu** in the top right-hand corner, then click **View Log**.



Inspect a Dataset's Properties

Access and view information to learn about the dataset, such as when it was created, when it was last modified, and a list of its data elements.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to inspect properties for, click **Actions**, and then click **Inspect**.
4. Click the tabs to navigate and inspect the dataset's properties.
5. Click **Close**.

Rename a Dataset and Change Its Description

You can rename and change the description of any dataset.

Renaming a dataset doesn't affect a workbook's reference to the dataset, and any workbooks using the dataset display the new name and continue to work as designed. When you add a dataset to a workbook, the workbook connects to the dataset by the dataset's fixed object ID, which was assigned when the dataset was created and saved, and not by its name. See [Copy a Dataset's Object ID](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to rename, click **Actions**, and then click **Inspect**.
4. Click the **General** tab.
5. Go to the **Name** field and rename the dataset.
6. Go to the **Description** field and update the dataset's description.

7. Click **Save**.

Copy a Dataset's Object ID

Each dataset has an assigned, unique, fixed object ID. You can use this ID to help find and troubleshoot Oracle Analytics errors and issues, or search log files.

The dataset's object ID, and not the dataset's name, is used to reference, track, and manage the dataset. In most cases, the object ID is based on the name that you provide when you create the dataset. Updating a dataset's name doesn't update its object ID. See [Rename a Dataset and Change Its Description](#).

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that with the ID that you want to copy, click **Actions**, and then click **Inspect**.
4. Click the **General** tab.
5. Go to the **Object ID** field and click the **Copy** button.

View a Dataset's Data Elements

The data elements list contains information such as data element name, data type, and aggregation. You can use information about data elements to determine if the dataset contains data that you want to visualize and analyze.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to view data elements for, click **Actions**, and then click **Inspect**.
4. Click the **Data Elements** tab.

Sales History					
Dataset					
General	Name	Table Name	Data Type	Treat As	Aggregation
Data Elements	PROD_ID	SALES	Number	Match	None
Search	CUST_ID	SALES	Number	Attribute	None
Access	TIME_ID	SALES	Time	Match	None
Schedules	CHANNEL_ID	SALES	Number	Match	None
History	PROMO_ID	SALES	Number	Match	None
	QUANTITY_SOLD	SALES	Number	Measure	Sum
	AMOUNT_SOLD	SALES	Number	Measure	Sum
	CHANNEL_ID_1	CHANNELS	Number	Attribute	None
	CHANNEL_DESC	CHANNELS	Text	Match	None
	CHANNEL_CLASS	CHANNELS	Text	Match	None
	CHANNEL_CLASS_ID	CHANNELS	Number	Measure	Sum
	CHANNEL_TOTAL	CHANNELS	Text	Match	None
	CHANNEL_TOTAL_ID	CHANNELS	Number	Measure	Sum
	CUST_ID_1	CUSTOMERS	Number	Attribute	None

Download a Dataset's Source File

You can download a file from a dataset that contains one table and one source file.

Here are some reasons why you would download a dataset's source file:

- You uploaded the dataset file, but deleted, lost, or misplaced the original file.
- You imported the workbook and need to access the original dataset file.

When you download a dataset's source file, by default the resulting file is the same format as the file used to create the dataset. However, you can change the file type if you choose to save the file.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to download, click **Actions**, and then click **Download File**.
4. When prompted, open or save the file.

Duplicate a Dataset

You can duplicate any dataset. Duplicating a dataset and modifying the copy can be faster than creating and building a dataset from scratch.

You're the owner of the duplicate dataset. The default name of the duplicate dataset is the copied dataset's name appended with Copy. For example, SAMPLE_REVENUE-Copy.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to duplicate, click **Actions**, and then click **Duplicate**.

Delete a Dataset

Delete a dataset when it's no longer needed or you need to free up space on your system.



Note:

Deleting a dataset permanently removes it and breaks any workbooks that use it. When you choose to delete a dataset, Oracle Analytics won't list workbooks that use the dataset. Before you delete a dataset you must be sure that it isn't used in any workbooks.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to delete, click **Actions**, and then click **Delete**.

7

Visualize and Analyze Data

This topic describes the many ways that you can visualize and analyze your data.



Topics:

- [Begin to Build a Workbook and Create Visualizations](#)
- [Open a Workbook in Edit Mode](#)
- [Configure a Workbook to Open in Edit Mode](#)
- [Work with a Workbook's Datasets](#)
- [Build a Visualization by Adding Data](#)
- [About Visualization Types](#)
- [Enhance Visualizations with Statistical Analytics](#)
- [Create a Legend Visualization](#)
- [Use Spark Charts to Examine Trends](#)
- [Create a Reusable Calculation in a Workbook](#)
- [Undo and Redo Edits](#)
- [About Refreshing a Workbook's Data](#)
- [Refresh a Workbook's Data](#)
- [Pause Data Queries in a Workbook](#)
- [Work with Canvas Properties](#)
- [Design Canvas Layouts for Different Screen Sizes](#)
- [Copy and Paste a Visualization or Canvas](#)
- [Copy and Paste a Visualization's Data](#)
- [Work with Multiple Visualizations on a Canvas](#)
- [Change Visualization Types](#)
- [Adjust Visualization Properties](#)
- [Highlight Important Data Events with Conditional Formatting](#)
- [Apply Color to Visualizations](#)
- [Format Numeric Values of Columns](#)
- [Set Currency Symbols for Visualizations](#)
- [Add Notes to Visualizations](#)
- [Format Numeric Values of Visualizations](#)
- [Sort, Drill, and Select Data in Visualizations](#)
- [Replace a Dataset in a Workbook](#)

- [Remove a Dataset from a Workbook](#)
- [Use Calculations in Visualizations](#)
- [Create a Cluster or Outlier in a Visualization](#)
- [Analyze Data with Explain](#)
- [About the Warning for Data Issues in Visualizations](#)
- [Set Workbook Thumbnails](#)
- [Set Visualization Loading Overlay Opacity](#)
- [Open a Custom Workbook Extension](#)

Begin to Build a Workbook and Create Visualizations

Create a workbook with one or more data sources and design visualizations.

You create workbooks to store and organize your analytics content, such as graphs and charts.



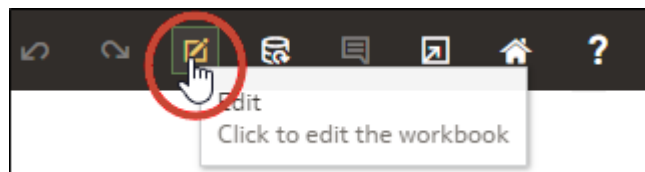
See [View a List of Datasets and Information About Them](#).

1. On the Home page, click **Create** and click **Workbook**.
2. In the Add Data dialog, search for and click a dataset, then click **Add to Workbook**.
3. In the Data Panel, locate and drag and drop data columns onto the Visualize canvas to start building visualizations.
4. Click **Save**.

Open a Workbook in Edit Mode

If you're a workbook author you can change a workbook that you open for viewing into a workbook that you can edit.

1. On the Home page, hover over a workbook, click Actions, and then select Open.
2. If the workbook opens for viewing, then click **Edit**.



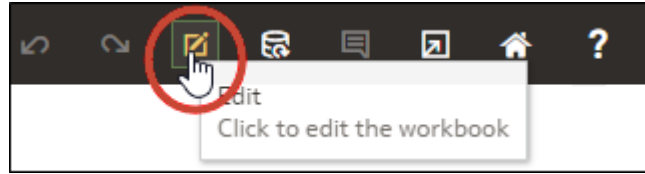
Configure a Workbook to Open in Edit Mode

As a workbook author, you can make workbooks that you create open in Edit mode as the default behavior.

A workbook always opens in Viewer mode unless you change its **Open as a Viewer** property.

1. On the Home page, click a workbook to open it.

2. Click **Edit** to open the workbook in edit mode and enable the display of workbook properties.



3. Click the workbook **Menu** and select **Workbook Properties**.
4. In the **Open as a Viewer** field, click **Off** for the workbook to open in edit mode by default.
5. Click **OK**.
6. Click **Go back**, then click **Save**.

Work with a Workbook's Datasets

This topic describes what you need to know to work with a workbook's datasets.

Topics:

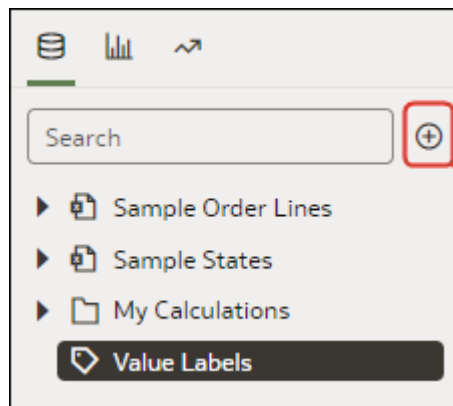
- [Add Datasets to a Workbook](#)
- [Replace a Dataset in a Workbook](#)
- [Remove a Dataset from a Workbook](#)
- [Modify a Workbook's Datasets](#)
- [Blend Datasets](#)

Add Datasets to a Workbook

Your workbook can use more than one dataset.

When you add more than one dataset, Oracle Analytics blends the data. You can check the default blending, or update or add data blending between datasets. See [Blend Datasets](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data panel, click **Add**, and select **Add Data**.



3. Optional: Enter search criteria and click **Enter** to display matching results. See [Search Options](#).
4. Select a dataset, then click **Add to Workbook**.

Replace a Dataset in a Workbook

When you replace a dataset, Oracle Analytics suggests how you can re-map the columns from the dataset that you replaced to the replacement dataset. You can accept or update these suggested mappings.

For example, you might replace a workbook's test dataset with a production dataset. Or you can copy a workbook and its visualizations, and then use the duplicate workbook as a template. After you rename the duplicated workbook, you can add a different dataset.

When you replace the dataset, any data mapping that you specify is applied to the workbook. For example, if you map a data element to **None**, the specific data is removed from the workbook's visualizations, calculations, and filters.

1. On the Home page, hover over the workbook to use as a template, click **Actions**, and then select **Open**.
2. From the Visualize page, click **Data**.
3. In the Data page, click the **Data Diagram**.
4. Locate the dataset to replace and click **Actions**.

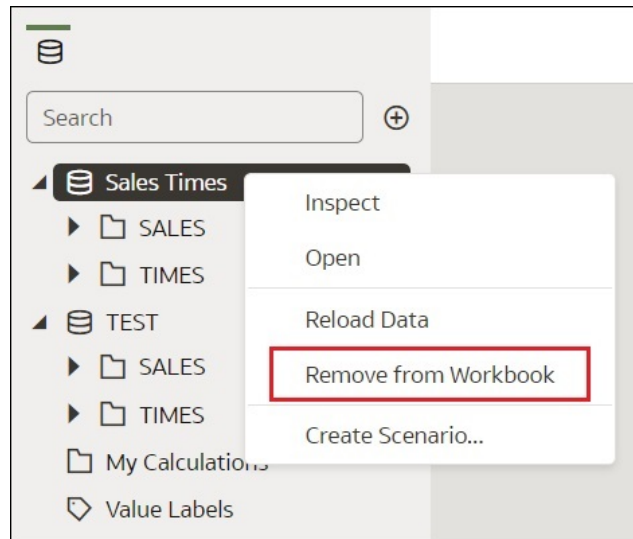


5. Select **Replace Dataset**.
6. In the Replace Dataset dialog, click the replacement dataset. Click **Select**.
7. Review, update, and specify the column mappings for the workbook's visualizations, calculations, and filters.
8. Click **Replace**.
9. Optional: If you want to add blending between datasets, then in the **Data Diagram**, click between the datasets that you want to blend, and in the Blend Data dialog add column matches.

Remove a Dataset from a Workbook

You can remove a dataset from a workbook. When you do this, you remove all of the dataset's columns from the workbook's visualizations, filters, and calculations.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the **Visualize** canvas, go to the Data Panel pane, right-click the dataset that you want to remove, and select **Remove from Workbook**.



3. Click **Save**.

Modify a Workbook's Datasets

You can use the Workbook Editor's **Data** page to navigate to the Dataset editor or Transform editor to view or modify a workbook's datasets.

When you locate a dataset's icon in the data diagram and click **Edit**, a new window opens that contains the editor that you use to view or modify the dataset. The Workbook Editor remains open in its own window and immediately reflects any saved dataset changes.

Note:

A dataset can be used in multiple workbooks and data flows. Modifying a dataset impacts all workbooks and data flows that use the dataset.

See [About the Dataset Editor](#) and [Enrich and Transform Your Data](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the workbook editor, click **Data** to go to the Data page.
3. In the data diagram, locate the dataset and click its **Open** button.

The window that's displayed depends upon the dataset you selected:

- If the dataset uses an Oracle EPM Cloud, Oracle Essbase, or Google Analytics connection, then the Transform Editor is opened in a window.
 - If the dataset uses a connection that supports multiple tables (for example, Oracle Database or Oracle Autonomous Data Warehouse), then the Dataset Editor is opened in a window.
4. Optional: If the Dataset editor is displayed, click the tab for the table that you want to view or modify and the Transform Editor is displayed.
 5. Modify and save the dataset.

Blend Datasets

This topic explains blending and how to blend a workbook's datasets.

Topics:

- [Understand Blending](#)
- [About Mismatched Values in Blended Data](#)
- [Blend Datasets](#)
- [Change Data Blending in a Visualization](#)

Understand Blending

When you add more than one dataset to a workbook, Oracle Analytics tries to match columns between the datasets that you added. This matching is called blending.



For example, Dataset A might contain new dimensions that extend the attributes of Dataset B. Or Dataset B might contain new facts that you can use alongside the measures that already exist in Dataset A.

Blending automatically matches external dimensions where they share a common name and have a compatible data type with attributes in the existing dataset.

Blend Data

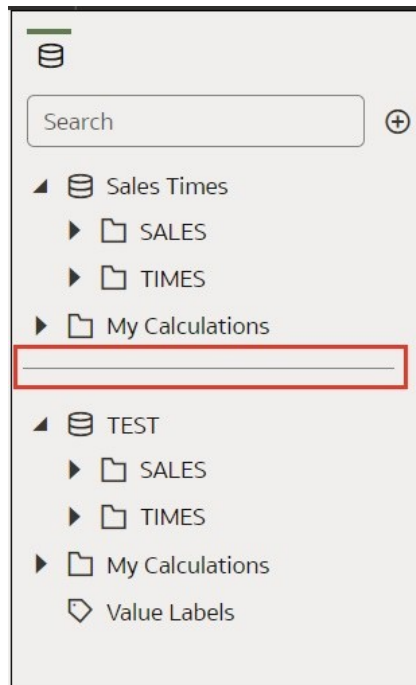
This connection will [Add Facts](#)

Match [Delete All Matches](#)

TEST	Sales Times	
TIME_ID	TIME_ID	×
DAY_NAME	DAY_NAME	×
WEEK_ENDING_DAY	WEEK_ENDING_DAY	×
CALENDAR_MONTH_DESC	CALENDAR_MONTH_DESC	×
FISCAL_MONTH_DESC	FISCAL_MONTH_DESC	×

[Add Another Match](#) [OK](#) [Cancel](#)

Datasets that aren't blended are divided by a line in the workbook's Data Panel.



There are restrictions between data elements and visualizations when a workbook contains datasets that aren't blended. For example, if your workbook contains two datasets that aren't blended, then you can't include the data elements of one dataset in the filters, visualizations, or calculations of the other dataset.

Blending relationships are stored in the tables and not in the workbook. So any blending matches that you add or remove impact the other datasets that use the same tables.

Datasets that use Oracle Essbase or Oracle EPM Cloud connections aren't available for blending.

Your workbook might contain a dataset that includes tables from different connections and schemas. When a dataset contains multiple tables, the tables will contain joins. See [Understand Dataset Table Joins](#). In your workbook, you can blend datasets that contain multiple tables and joins. For example, you can add and blend datasets with multiple tables when you want your workbook to contain cross fact analysis.

About Mismatched Values in Blended Data

In some cases when the rows of data that you expect to see in a dataset are missing, then you must specify which dataset to use for data blending.

Sometimes rows of data are missing when your workbook includes data from two datasets that contain a mixture of attributes and values, and there are match values in one source that don't exist in the other.

Suppose we have two datasets (Source A and Source B) with slightly different rows, as shown in the following image. Note that Source A doesn't include IN-8 and Source B doesn't include IN-7.

T1 - Source A

Inv#	Date	Rev
IN-1	1/1/2015	100.00
IN-2	1/1/2015	200.00
IN-3	1/1/2015	300.00
IN-4	1/2/2015	400.00
IN-5	1/2/2015	500.00
IN-6	1/2/2015	600.00
IN-7	1/3/2016	800.00

T2 - Source B

Inv#	Rep	Bonus
IN-1	Billie	1.00
IN-2	Joe	2.00
IN-3	Kim	3.00
IN-4	Billie	4.00
IN-5	Joe	5.00
IN-6	Kim	6.00
IN-8	Mika	8.00

The following results are displayed if you select the **All Rows** data blending option for Source A and select the **Matching Rows** data blending option for Source B. Because IN-7 doesn't exist in Source B, the results contain null Rep and null Bonus.

Source A

- Inv#
- Date
- Rev

Source B

- Inv#
- Rep
- Bonus

My Calculations

Value Labels

T4 - SA All SB Match -- no Mika

Date	Rep	Rev	Bonus
1/1/2015	Billie	100.00	1.00
	Joe	200.00	2.00
	Kim	300.00	3.00
1/2/2015	Billie	400.00	4.00
	Joe	500.00	5.00
	Kim	600.00	6.00
1/3/2016	(null)	800.00	(null)

T5 - SA All SB Match -- no Mika

Date	Rev	Bonus
1/1/2015	600.00	6.00
1/2/2015	1,500.00	15.00
1/3/2016	800.00	(null)

T6 - SA All SB Match -- no Mika

Rep	Rev	Bonus
Billie	500.00	5.00
Joe	700.00	7.00
Kim	900.00	9.00
(null)	800.00	(null)

The following results are displayed if you select the **Matching Rows** data blending option for Source A and select the **All Rows** data blending option for Source B. Because IN-8 doesn't exist in Source A, the results contain null Date and null Revenue.

Source A

- Inv#
- Date
- Rev

Source B

- Inv#
- Rep
- Bonus

My Calculations

Value Labels

T7 - SA Match SB All -- No 3Jan

Date	Rep	Rev	Bonus
1/1/2015	Billie	100.00	1.00
	Joe	200.00	2.00
	Kim	300.00	3.00
1/2/2015	Billie	400.00	4.00
	Joe	500.00	5.00
	Kim	600.00	6.00
(null)	Mika	(null)	8.00

T8 - SA Match SB All -- No 3Jan

Date	Rev	Bonus
1/1/2015	600.00	6.00
1/2/2015	1,500.00	15.00
(null)	(null)	8.00

T9 - SA Match SB All -- No 3Jan

Rep	Rev	Bonus
Billie	500.00	5.00
Joe	700.00	7.00
Kim	900.00	9.00
Mika	(null)	8.00

The visualization for Source A includes Date as an attribute, and Source B includes Rep as an attribute, and the match column is Inv#. Under dimensional rules, you can't use these attributes with a measure from the opposite table unless you also use the match column.

There are two settings for blending tables that contain both attributes and measures. These are set independently in each visualization based on what columns are used in the visualization. The settings are **All Rows** and **Matching Rows** and they describe which source rows the system uses when returning data to be visualized.

The system automatically assigns data blending according to the following rules:

- If the visualization contains a match column, then the system sets sources with the match column to **All Rows**.

- If the visualization contains an attribute, then the system sets its source to **All Rows** and sets the other sources to **Matching Rows**.
- If attributes in the visualization come from the same source, then the system sets the source to **All Rows**, and sets the other sources to **Matching Rows**.
- If attributes come from multiple sources, then the system sets the source listed first in the workbook's elements panel to **All Rows** and sets the other sources to **Matching Rows**.

Blend Datasets

If your workbook contains multiple datasets, then you can blend data in one dataset with data in another dataset.

When you add more than one dataset to a workbook, the system tries to find matches for the data that's added. It automatically matches external dimensions where they share a common name and have a compatible data type with attributes in the existing dataset. Blending relationships are stored in the tables and not in the workbook. So any blending matches that you add or remove affects the other datasets that use the same tables.

See [Understand Blending](#).

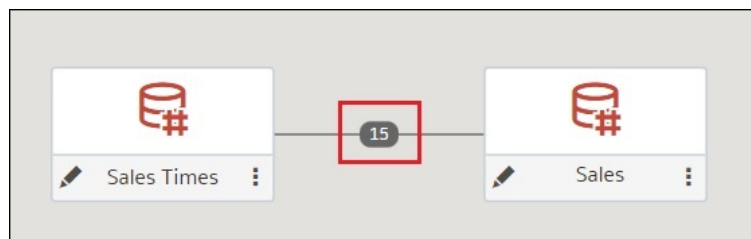
Datasets that use Oracle Essbase or Oracle EPM Cloud connections aren't available for blending.



Note:

Datasets can include tables from different connections and schemas. These datasets use joins, which are defined in the Dataset editor. To reduce or eliminate blending in workbooks, Oracle suggests that whenever possible you create datasets that contain multiple tables and use joins. See [Create a Dataset From a Connection](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. To add another dataset to the workbook, then click **Data**, and in the Data page, go to the Data Panel, click **Add (+)**, and then **Add Dataset**.
3. In the Add Dataset dialog, select a dataset and click Add to Workbook.
4. In the Data page, go to the **Data Diagram** and locate the datasets to blend.
5. Click the number between the dataset icons.



6. Optional: To change the match for a column, click the name of the column and select a different column.

If columns have the same name and same data type, then they're recognized as a possible match. You can customize this and specify that one column matches another by

explicitly selecting it even if its name isn't the same. You can select only those columns with a matching data type.

7. Optional: Click **Add Another Match**, and in the table, select the columns that you want to join.
8. Optional: For a measure that you're uploading for the first time, specify the aggregation type such as *Sum* or *Average*.
9. Click **OK**.

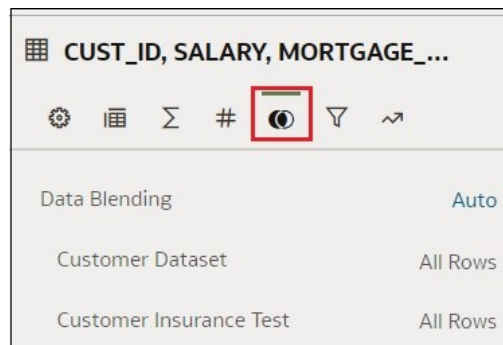
Change Data Blending in a Visualization

You can modify a visualization's properties to override the workbook's data blending settings.

Datasets that use Oracle Essbase or Oracle EPM Cloud connections aren't available for blending.

See [Understand Blending](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the workbook, select a visualization, and in the Properties Panel click **Datasets**.



3. To change the default blending, click **Data Blending**, and select either **Auto** or **Custom**. If you choose **Custom**, you can set the blending to either **All Rows** or **Matching Rows**.
 - You must assign at least one source to **All Rows**.
 - If both sources are **All Rows**, then the system assumes that the tables are purely dimensional.
 - You can't assign both sources to **Matching Rows**.

Build a Visualization by Adding Data

This topic describes how to add data to a visualization.

Topics:

- [Create the Best Visualization For Selected Data Elements](#)
- [Add Data to a Visualization](#)
- [Create a Visualization from Another Visualization](#)
- [Choose the Tooltips to Display in a Visualization](#)
- [Customize Visualization Tooltips](#)

Different Methods to Add Data

You can use different methods to add data from the Data Panel to create or update visualizations on a canvas.

Use one of the following methods to add data from the Data Panel:

- Drag data elements from the Data Panel and drop them onto the canvas.
- Select a data element or use Shift-click or Ctrl-click to select multiple data elements in the Data Panel, then right-click to select either a particular visualization type or the option to create a visualization automatically.
- Double-click a data element or use Shift-click or Ctrl-click to select multiple data elements in the Data Panel, then right-click to add them to the canvas.

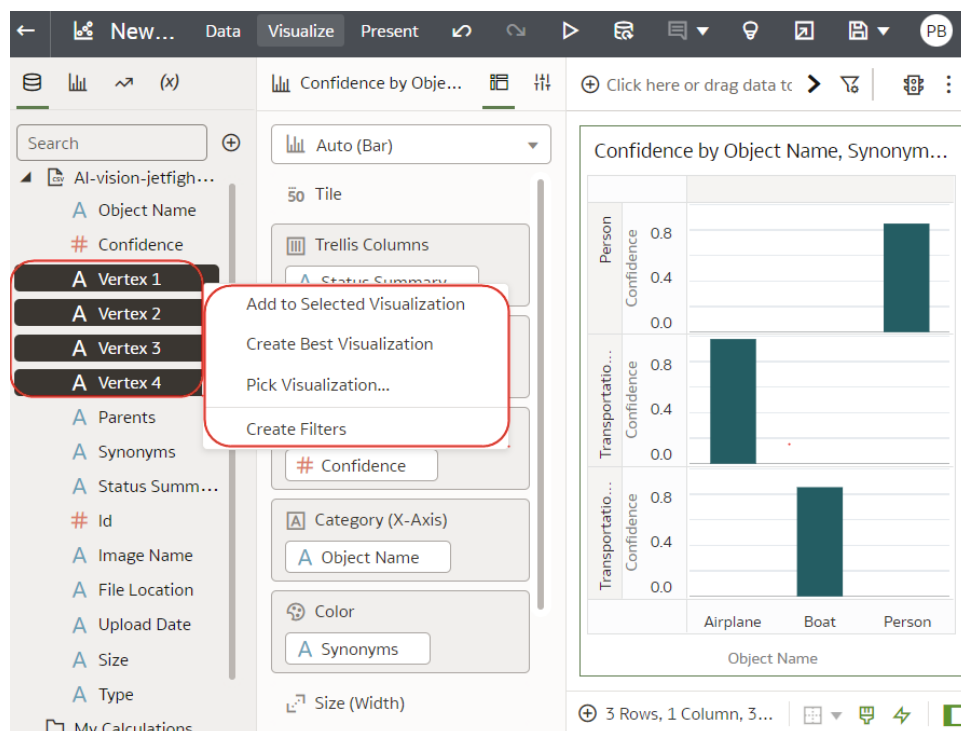
When you update an existing visualization, you can add data from the Data Panel onto the Grammar Panel or Assignments Pane on the canvas. You can move the data elements from one area to another in the Grammar Panel or Assignments Pane. The visualization is updated based on your selection.

You can create a visualization by selecting a visualization type from the Visualization tab of the Data Panel and adding data elements to the canvas.

Create the Best Visualization For Selected Data Elements

When you select data elements in the Data Panel, Oracle Analytics can create the best visualization for you.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Select the data you want to visualize by selecting one or more data elements on the Data Panel, right-click, and then click **Create Best Visualization**.



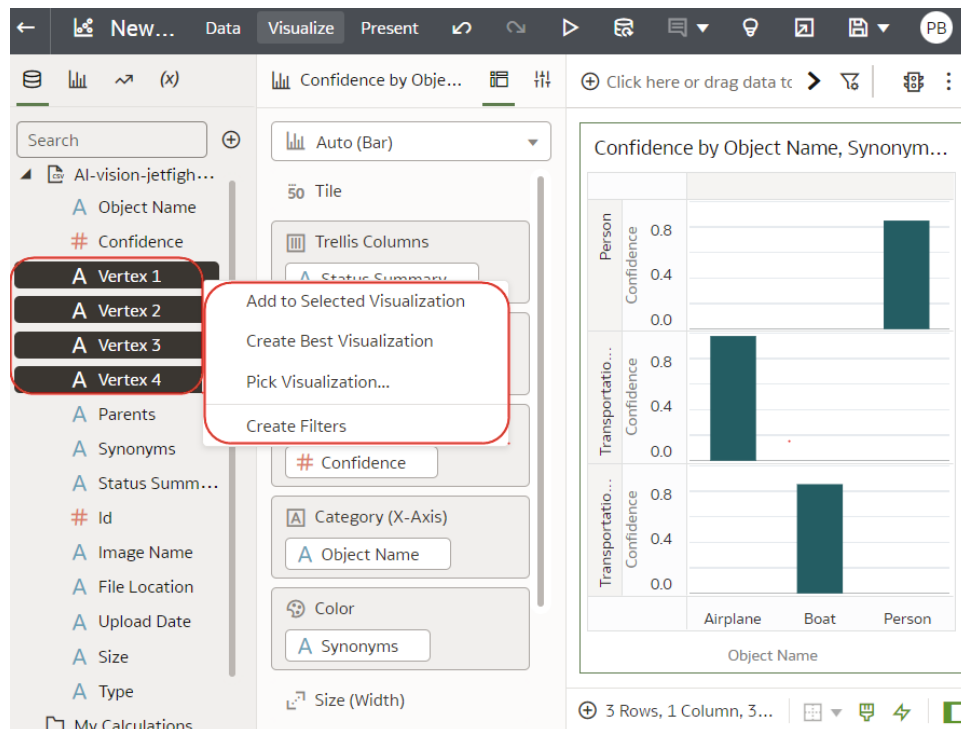
Add Data to a Visualization

After you've selected the datasets for your workbook, you can begin to add data elements such as measures and attributes to visualizations.

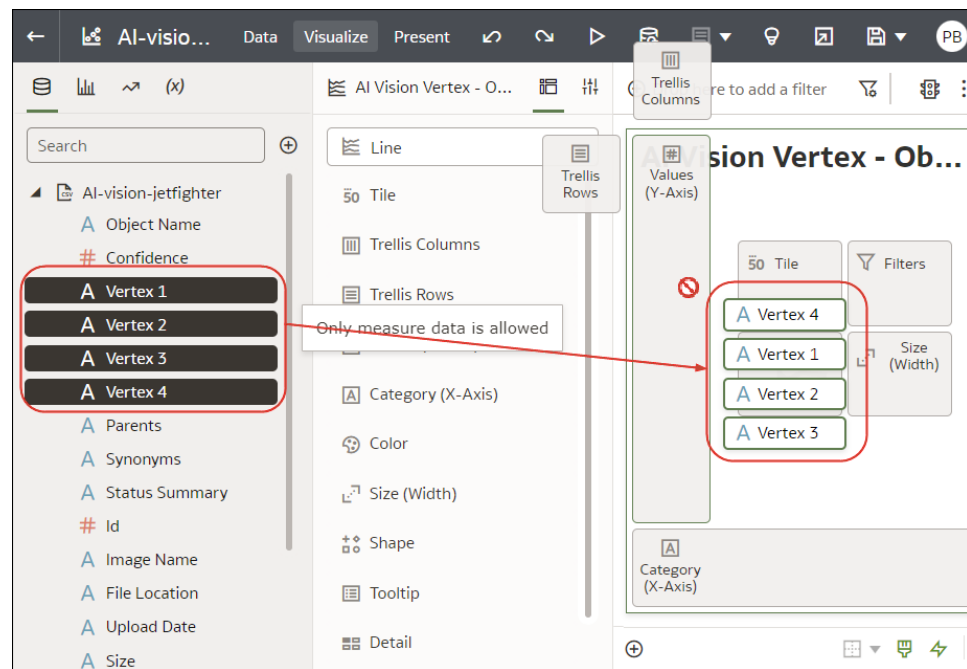
If you haven't already created a visualization, you need to create one. See [Begin to Build a Workbook and Create Visualizations](#).

You can select compatible data elements from the datasets and drop them onto the Grammar Panel in the Visualize canvas. Based on your selections, visualizations are created on the canvas. The Grammar Panel contains sections such as Columns, Rows, Values, and Category.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. If you created a workbook, then add a dataset to it.
3. Select the data you want to visualize by selecting one or more data elements on the Data Panel and then using one of the following methods:
 - Right-click, and click **Add to Selected Visualization**.

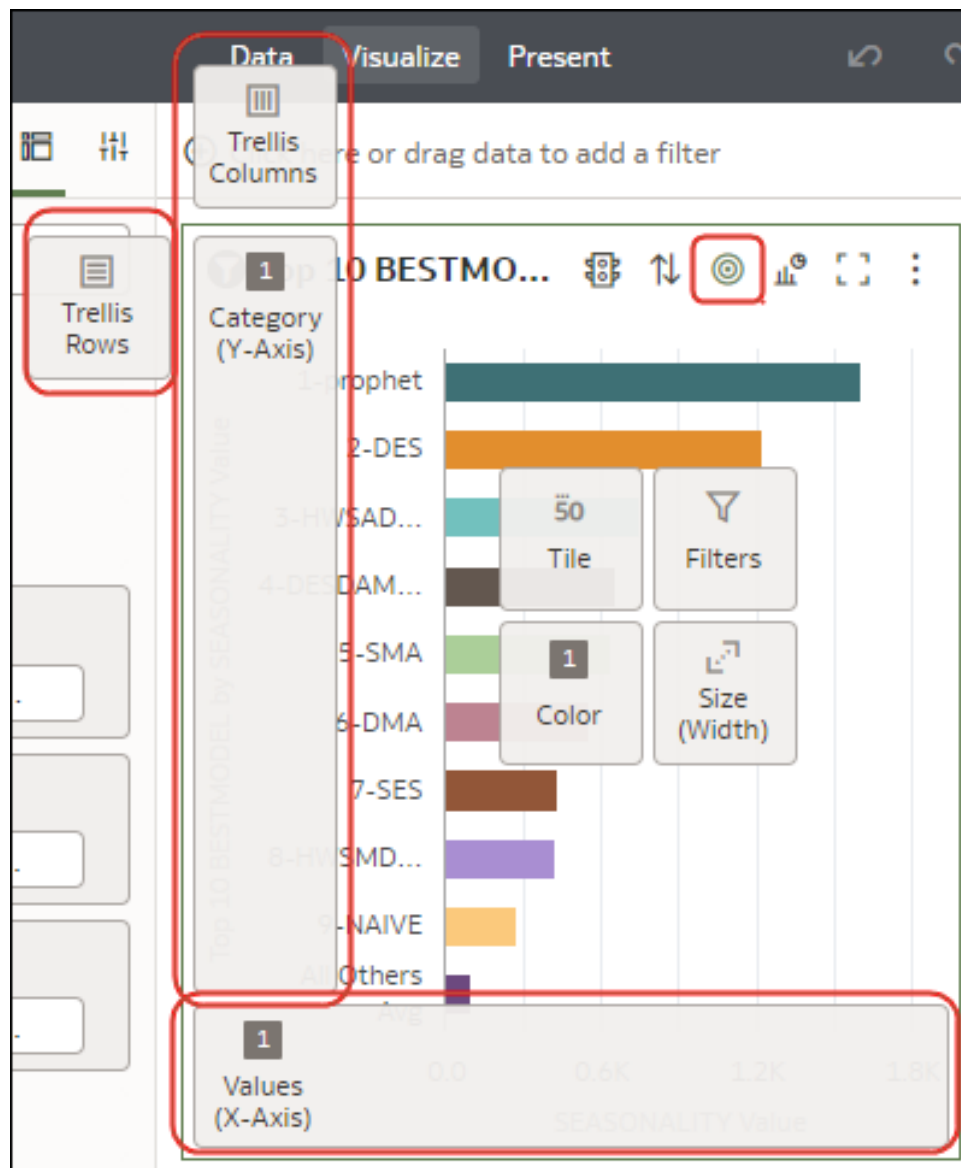


- Right-click, select **Pick Visualization**, and select a visualization type (for example, a table or heat map).
- Drag and drop them onto the visualization canvas or the Grammar Panel.



Tips on adding data

- To help you understand the components of a visualization, hover over it and click **Show Assignments** to annotate the visualization components, for example, the X-Axis and Y-Axis of a chart.



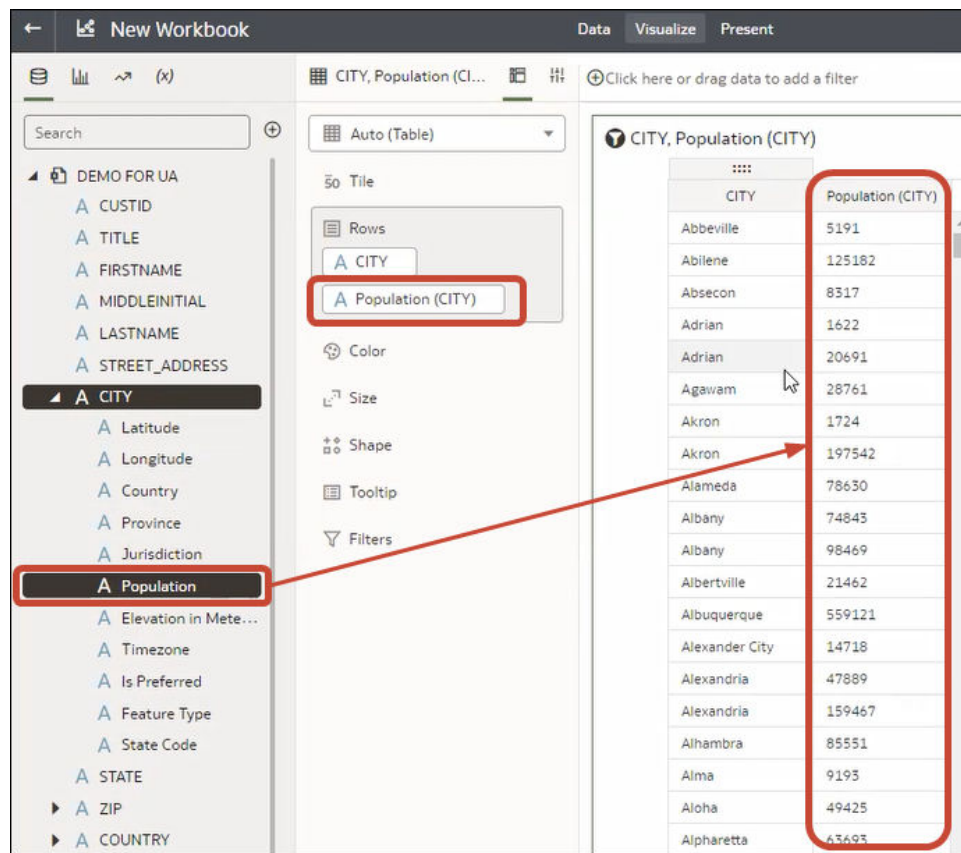
- Use the Grammar Panel to configure visualization components (for example, add, remove, re-order).

The screenshot displays the Oracle Analytics interface. On the left, the 'Customer Dataset' is expanded, showing fields: MARITAL_STATUS, STATE, CREDIT_BALANCE (selected), TIME_AS_CUSTOMER, MORTGAGE_AMO..., BANK_FUNDS, and N_OF_DEPENDENTS. Below the dataset list, a table shows the selected field's properties:

# CREDIT_BALANCE	
Name	CREDIT_BALA...
Treat As	Measure
Data Type	Number
Aggregation	Sum

On the right, the visualization configuration panel is shown, enclosed in a red box. It includes a search bar, a chart type dropdown set to 'Bar', and sections for 'Values (Y-Axis)' and 'Category (X-Axis)'. The Y-axis is assigned 'CREDIT_BALA...' and the X-axis is assigned 'MONTHLY_CH...'. Other available fields for the X-axis include 'CHECKING_A...', 'BANK_FUNDS', and 'N_OF_DEPEN...'. At the bottom of the panel are options for Color, Size (Width), Tooltip, Detail, and Filters.

- If a dataset is augmented with knowledge enrichments, you'll see knowledge enrichments in the element tree displayed just like regular data elements in the dataset. In this example, the Oracle Analytics administrator has added Population and other city-related data to Oracle Analytics. When you create a workbook based on the CITY dataset, you can add population and other data elements directly to your visualization.

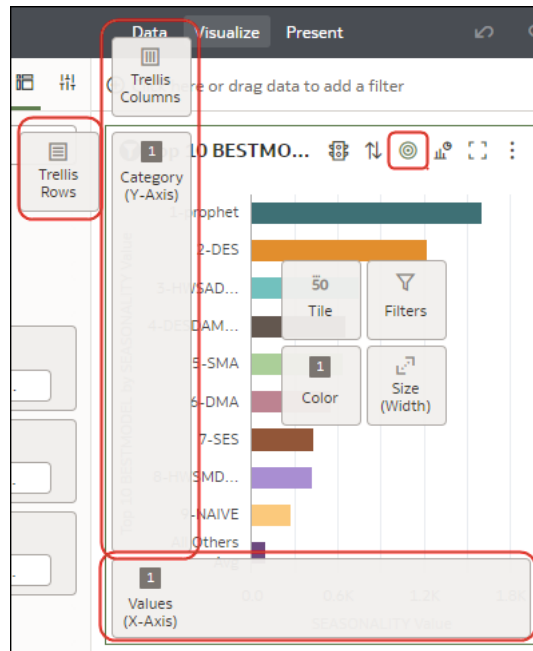


Use the Assignment Panel to Add Data to the Visualization

You can use the Assignment Panel to help you position data elements in the optimal locations for exploring content.

A workbook must contain one or more datasets before you can add data elements to the Assignment Panel. The sections in the Assignment Panel are the same as in the Grammar Panel.

1. On the Home page, select a workbook, click the **Actions menu**, and then select **Open**.
2. Hover over the visualization and click **Show Assignments** to show the visualization components, for example, the X-Axis and Y-Axis of a chart.



3. Drag a data element to the visualization and hover over assignments; you'll see a green cross when you're hovering over a valid assignment.
4. Drop the data element on the selected assignment.

Create a Visualization from Another Visualization

You can create a visualization by dragging and dropping columns from one visualization to a new visualization.

Using this method helps you to model a new visualization based on an existing one by selecting columns directly from the existing visualization.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit** to enter the workbook in author mode.
3. Select the visualization you want to use as the source for creating a visualization.
4. Click **Grammar** at the top of the Grammar Panel to display the Grammar pane.
5. Drag and drop a column in the Grammar pane to the edge between visualizations to create a visualization on the canvas.
6. Select the source visualization and drag and drop more columns to the new visualization.

Choose the Tooltips to Display in a Visualization

When you hover over a data point in a visualization, a tooltip displays and provides specific information about the data point. You can choose to see all tooltips or only the measures included in the Tooltip section of the Grammar Panel.

For example, if you create a simple bar chart visualization that shows revenue for countries in the Americas region, the tooltip displays the region's name, the country's name, and exact revenue amount. If you add Target Revenue to the Tooltip section of the Grammar Panel, then the target revenue amount is displayed in the tooltip and the user can easily compare the

actual revenues with the target revenues. Set the **Tooltip** field in the General Properties Pane to **Tooltip Grammar Only** if you want the tool tip to contain only the target revenue amount.

Note the following restrictions:

- You can drag and drop only measure columns to the Tooltip section in the Grammar Panel.
 - The Tooltip section in the Grammar Panel doesn't display for all visualization types.
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
 2. Select a visualization on the canvas.
 3. Drag and drop one or more measure columns from the Data Panel to the Tooltip section in the Grammar Panel.

Hover the mouse pointer over a data point on the visualization to display the tooltip. Because the **Tooltip** field is set to **All Data** by default, the tooltip contains the data point's values for all columns included in the visualization. The data values for the columns that you added to the Tooltip section are displayed at the bottom of the tooltip.

4. Optional: Use the **Tooltip** field to display only the data values that you want or to turn off the tooltip.
 - If you want the tooltip to display data values for only the columns you dragged to the Tooltip section, then set the **Tooltip** field to **Tooltip Grammar Only**.
 - If you don't want the tooltip to be displayed, then confirm that there are no columns in the Tooltip section and set the **Tooltip** field to **Tool Tip Grammar Only**.

Customize Visualization Tooltips

You can customize a visualization's tooltip to change the format of column names and column values, and you can add and format additional columns and text to display to users.

You use a text editor with formatting tools to change the appearance of the text and column values displayed in the tooltip. For example, you could add some descriptive text to a tooltip, and change the appearance of column labels, column values and any other text in the tooltip.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit** and select a visualization on the canvas.
3. Go to the General tab, Tooltip field.
 - Click **All Data** and select **Custom** to customize a tooltip.
 - Click **Custom** or the pencil icon  to update a customized tooltip.
4. Customize the tooltip text, formatting, or data.
5. Optional: Click **Preview** to see what your updates look like.
6. Click **OK**.

About Visualization Types

Oracle Analytics includes many visualization types ready for you to use in almost any data analysis scenario.

- [Bar Graphs](#)
- [Dashboard Filters and Other Visualization Types](#)
- [Geospatial Graphs](#)

- [Grid Graphs](#)
- [Line Graphs](#)
- [Network Graphs](#)
- [Pie and Treemap Graphs](#)
- [Scatter Graphs](#)

Bar Graphs

Bar graphs are one of the most commonly used visualization types. You can use them to compare data across categories, identify outliers, and uncover historical high and low data points.

Visualization Type	More Information
Bar	Compares groups of data over time using one categorical variable in a vertical format and is best used to show large changes.
Boxplot	Depicts groups of numerical data through quartiles and identifies outliers in a vertical format.
Butterfly	Plots data as two horizontal bars with the same X-axis in the center and visually resembles butterfly wings.
Combo	Displays different types of data in different ways, all within the same graph.
Horizontal 100%	Graphs data in the form of horizontal rectangular bars where the length of each bar equals 100%.
Horizontal Bar	Graphs data in the form of horizontal rectangular bars where the length of the bars is proportional to the values they represent.
Horizontal Boxplot	Depicts groups of numerical data through quartiles and identifies outliers in a horizontal format.
Horizontal Stacked	Renders numeric values across two categorical variables in a horizontal bar format.
Overlay Chart	Enables advanced combination charts with a multi-layer grammar experience and support for stacked bar charts.
100% Stacked Bar	Displays numeric values across one categorical variable where the length of each vertical bar equals 100%. Data containing negative values extends the vertical bar below the baseline of 0%.
Stacked Bar	Extends the standard bar graph by looking at numeric values across two categorical variables instead of one and is best used to show the total sizes of groups.
Waterfall	Shows how a starting value of something becomes a final value, uses the X, Y, Z axes to display intermediate values, and is useful in executive presentations.

Dashboard Filters and Other Visualization Types

Use these visualization types to bring your data to life.

Visualization Type	More Information
Dashboard Filters	Enables end users to use filter controls on a canvas to refine the data they're interested in. See Use Dashboard Filters .

Visualization Type	More Information
Language Narrative	Provides natural language descriptions of the attributes and measures in your dataset in the form of breakdown or trend.
Legend	Enables content authors to select data elements used in the canvas, and display them as a group of legends in a single visualization. See Create a Legend Visualization .
List	Filters data on the workbook canvas as a list format visualization.
Spacer	Provides a space between visualizations on the workbook canvas; the space can include a line that you format to mark the boundary between visualizations.
Tag Cloud	Displays word-frequency analysis of text data, such as tags and keywords.
Text Box	Provides a contained area to add text to the workbook canvas.
Tile	Provides a composite card style visualization to which you can add up to five measures, and specify the layout and positioning of labels and values for the primary and secondary measures. A tile grammar element is added automatically to the Grammar panel when you create a visualization.
Timeline	Depicts a sequential view of events or objects within a period of time.

Geospatial Graphs

Geospatial graphs enable you to overlay your data on to a map with support for many common map APIs such as Google Maps, Mapbox, and EZ Map.

Visualization Type	More Information
Image	Uses an uploaded image as a background for maps or other visualizations.
Map	Displays geographically related data in a map format and most used to analyze the distribution or proportion of data in each region.
Multi-layer Map	Based on the Map graph and uses the data layer feature to display multiple data series (different sets of dimensions and metrics) on a single map visualization.
REST Background	Based on the Map graph and uses custom REST APIs to transform data into map backgrounds.

Grid Graphs

Grid graphs use a row and column structure containing data or graphical representations of data and labels identifying the grid's contents.

Visualization Type	More Information
Correlation Matrix	Presents a table containing correlation coefficients between variables.
Grid Heat Map	Plots a main variable across two axis variables as a grid of colored squares.
Picto	Uses icons to visualize an absolute number, or the relative sizes of the different parts of a whole.

Visualization Type	More Information
Pivot	Similar to a table but summarizes and aggregates groups of data values in columns and rows.
Table	Displays data in rows and columns in a tabular format.

Line Graphs

Line graphs enable you to connect several distinct data points as a single continuous progression. You can use them to identify changes in one value relative to another.

Visualization Type	More Information
Area	Based on a line chart with the area between the axis and line filled in. These graphs show you the amount of change over time, and are useful for evaluating a total value across a trend.
100% Area	Based on the area graph but with the entire graph filled in to 100%.
Line	Depicts an entire series of values over time in a line format.
Radar Area	Based on the radar line graph but the areas between lines are filled in.
Radar Bar	Based on the radar line graph and presents multivariate data by plotting each variable on an axis and the data as a polygonal shape over all axes.
Radar Line	Displays multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on an axes starting from the same point.
Stacked Area	Based on the area graph and is useful for tracking not only the total value, but also seeing the breakdown of that total by groups.

Network Graphs

Network graphs illuminate relationships between entities using lines, nodes, or other graphics.

Visualization Type	More Information
Chord Diagram	Represents flows or relationships between entities (many-to-many connections) and identifies where there are commonalities.
Circular Network	Shows how connections happen within a circular flow (based on the network graph).
Network	Illustrates a schematic or network map and its connections.
Parallel Coordinates	Shows a set of points in an n-dimensional space with a backdrop consisting of n parallel lines, typically vertical, and equally spaced.
Sankey	Depicts a flow diagram in which the width of the arrows is proportional to the flow rate.
Tree Diagram	Represents a series of independent events or conditional probabilities in a node tree diagram, where each node represents an event and is associated with the probability of that event.

Pie and Treemap Graphs

Pie graphs show percentages of data as slices of data of a whole circle over a set timeframe and treemap graphs enable you to visualize different segments as smaller rectangles of data within a whole square.

Visualization Type	More Information
Donut	Based on the circular pie graph, but with a hollow center. It's divided into multiple segments in proportion with the related values.
Pie	Presents a circular statistical graphic divided into slices to illustrate numerical proportion.
Sunburst	Displays hierarchical data where each level of the hierarchy is represented by one circle with the innermost circle as the top of the hierarchy.
Treemap	Depicts data grouped and nested in a hierarchical (or tree-based) structure and is useful for quickly identifying patterns.

Scatter Graphs

Scatter graphs enable you to interpret the relationship between multiple variables, if any of the variables are a good predictor of another, or if the variables change on their own. You can make scatter graphs go even further by adding clusters or trend lines.

Visualization Type	More Information
Category	Shows you a set of vertices (or nodes) connected by links called edges (or arcs), which can also have associated directions.
Scatter	Uses dots to represent values for two numeric variables where the position of each dot on the horizontal and vertical axis indicates values for an individual data point. Scatter plots are good to use if you want to see the relationships between variables.
Stacked Category	Based on the category graph where values are stacked by category.

Use Calculations in Workbooks

Find out how to enhance your workbook content using calculations.

Topics:

- [Get Started with Calculations](#)
- [Create a Reusable Calculation in a Workbook](#)
- [Create a Group Calculation in a Workbook](#)
- [Create a Folder to Store Calculations in a Workbook](#)

Get Started with Calculations

Calculations enable you to create reusable artifacts to enhance your analytics content. For example, you might calculate the a moving average or concatenate two text fields.

With calculations, you can create aggregates, strings, math functions, dates, filters, analytics, and spatial functions. For a full list of supported functions, see [Functions](#).

To create a calculation from the workbook editor, in the Data pane or Visualize pane, right-click on My Calculations in the Data Panel or click Add (+) at the top of the panel. Then select either **Create Calculation** or **Create Group Calculation**. You can also create a group calculation based on an existing calculation by right-clicking the calculation and selecting **Create Group Calculation**.

- **Calculations** enable you to create data elements based on a wide range of expressions and functions. For example, concatenate text, create clusters or outliers, or calculate median values.

Edit Calculation

Name: Calculate average donation f(x)

Description:

Expression: TOTAL_DONATIONS / NUM_DONORS

Search:

- ▶ Operators
- ▶ Aggregate
- ▶ Running Aggregate
- ▶ String
- ▶ Math
- ▶ Calendar/Date
- ▶ Conversion
- ▶ System
- ▶ Functions

Select a function to see description

Buttons: Validate, Cancel, Save

- **Group Calculations** enable you to categorize your data for easier analysis. For example, you might create job categories Management, Sales, Technical, and Support so that you can assign job titles to these categories and report on them.

Group Calculation

Group: JOB TITLE Name: JOB TITLE Group ☐ Include Others

Search:

Selections (2/7)

Groups:

- Management (3/20)
- Technical (6/20)
- Sales (2/20)
- Support (4/20)

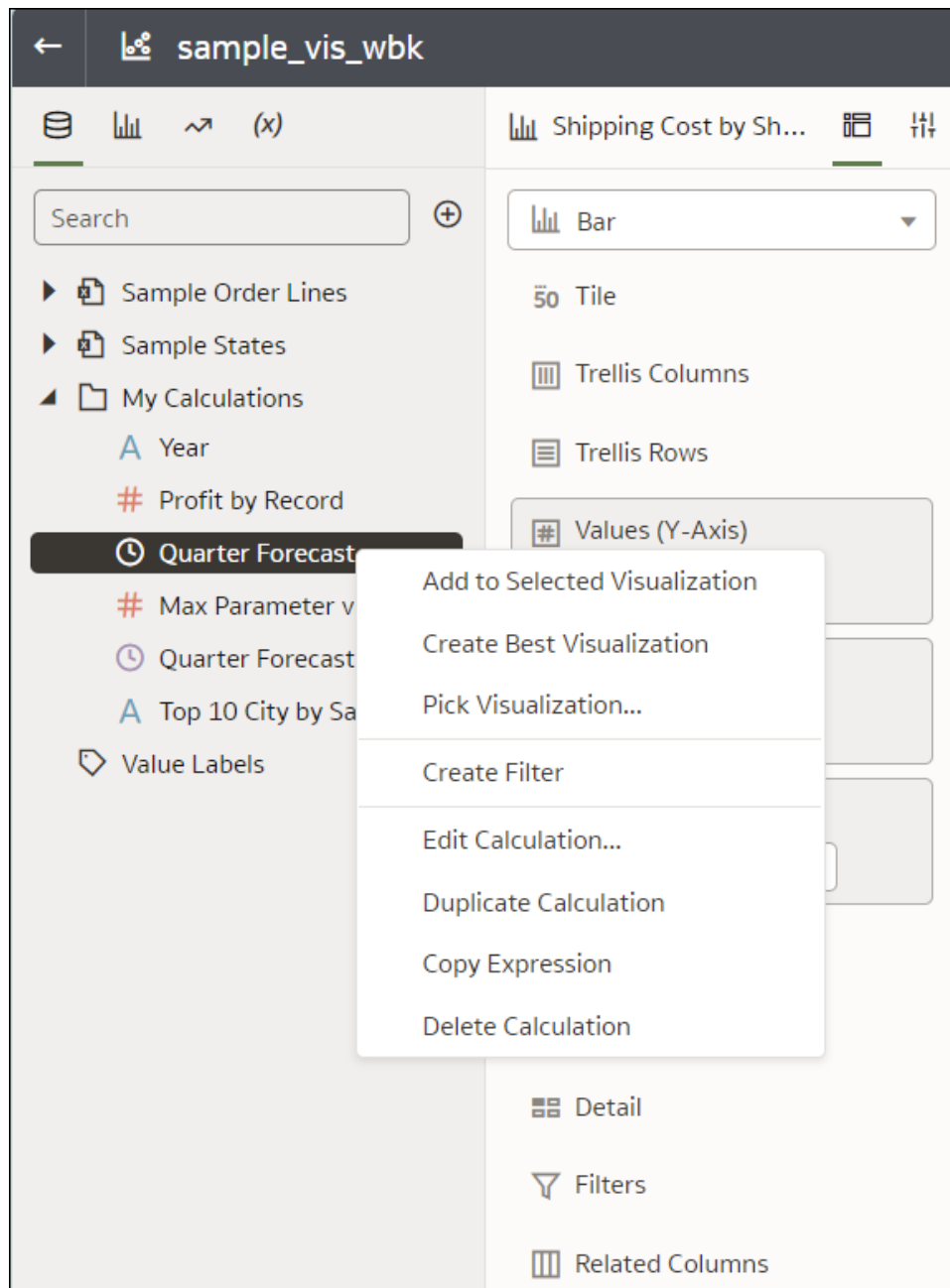
Job Titles:

- IT Technician
- Network Engineer
- Project Coordinator
- Software Engineer
- Technical Writer

Buttons: Add all, Remove all, Cancel, Save

Working With Calculations

When you create calculations in workbooks, by default they're stored in the My Calculations area of the workbook where you created them.



You can organize your calculations by creating multiple levels of sub-folders in the **My Calculations** area of the Data Panel. See [Create a Folder to Store Calculations in a Workbook](#).

Right-click calculations and folders to access these options:

Option	Use this option to
Add to Selected Visualization	Add the calculation to visualizations on the currently displayed canvas.
Copy Expanded Expression	(Displayed when a calculation references another calculation, known as a nested calculation) Copy the expression that is formed by replacing the referenced calculations with their source expressions recursively. In other words, the nested expressions are copied, replacing the name of the nested calculation.
Copy Expression	Review and copy the underlying SQL code used by the calculation. If the calculation references another calculation, the nested expressions aren't copied.
Create Best Visualization	Let Oracle Analytics create a visualization for you based on the best style for the data that you have.
Create Calculation	Add a calculation to the workbook.
Create Group Calculation	Add a group calculation to the workbook.
Create Filter	Filter the workbook or visualization using the calculation.
Create Folder	Create a sub-folders under the currently selected folder to organize your calculations. You can then drag and drop existing calculations into the sub-folders.
Delete Calculation	Remove the calculation from the workbook.
Delete Folder	Remove a folder from the workbook. You can only delete empty folders.
Duplicate Calculation	Create an editable copy of the calculation.
Edit Calculation	Update the calculation.
Pick Visualization	Add the calculation to the canvas using a visualization style that you select from a list of suitable styles.
Rename Folder	Change the name of a folder.

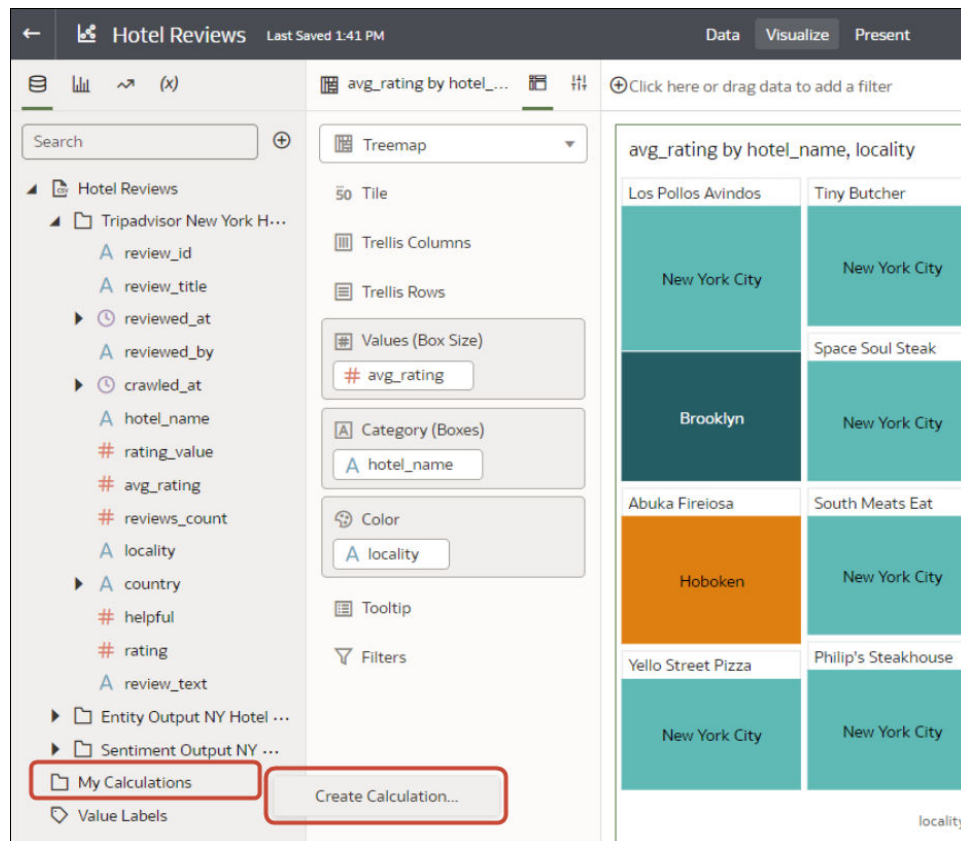
Create a Reusable Calculation in a Workbook

You can create a new data element based on a calculation, and then add the data element to your workbook's visualizations. For example, you create a new calculation called "SOME_NAME" and use the BIN function to classify AGE values into four buckets: 0 to 20, 21 to 40, 41 to 60, and 60 plus. You then add it to a visualization to group and display the number of product orders.

Calculated data elements are stored in the dataset's My Calculations folder and not in the workbook. Workbooks have a My Calculations folder for each dataset used (whether joined or not-joined). Calculations are available anytime you use the workbook.

When you're writing a new calculation, you can drag and drop columns from the Data Panel into the Expression Editor. You can only drag and drop columns that are joined to the dataset.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Data Panel, click **Add** , and select **Create Calculation** to open the New Calculation dialog.



3. Enter a name.
4. Optional: Enter a description that displays in the tooltip when you hover over a calculation.
5. In the expression builder pane, compose and edit an expression.
Tip: Start typing the name of a data element, function, or calculation to see a popup of the item that you can click to add to your expression.
6. Click **Validate**.
7. Click **Save**.

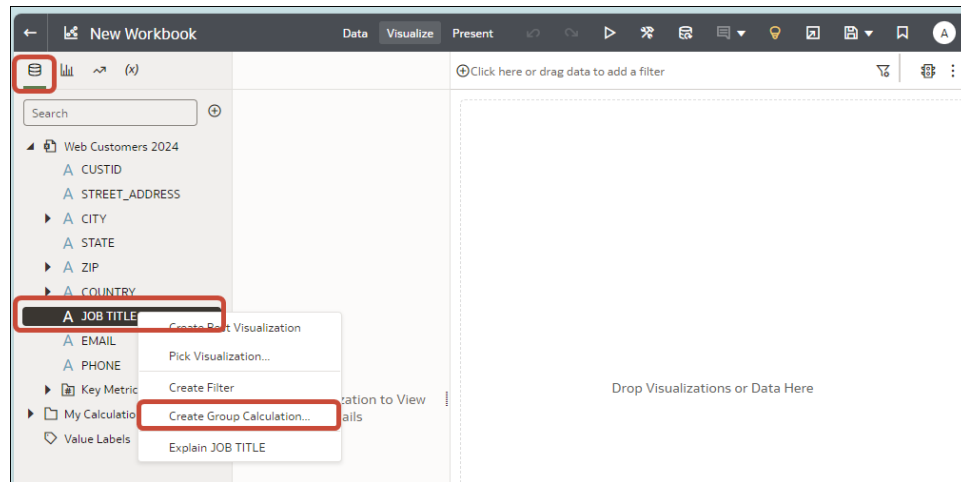
Create a Group Calculation in a Workbook

Create group calculations in your workbook to categorize your data for easier analysis.

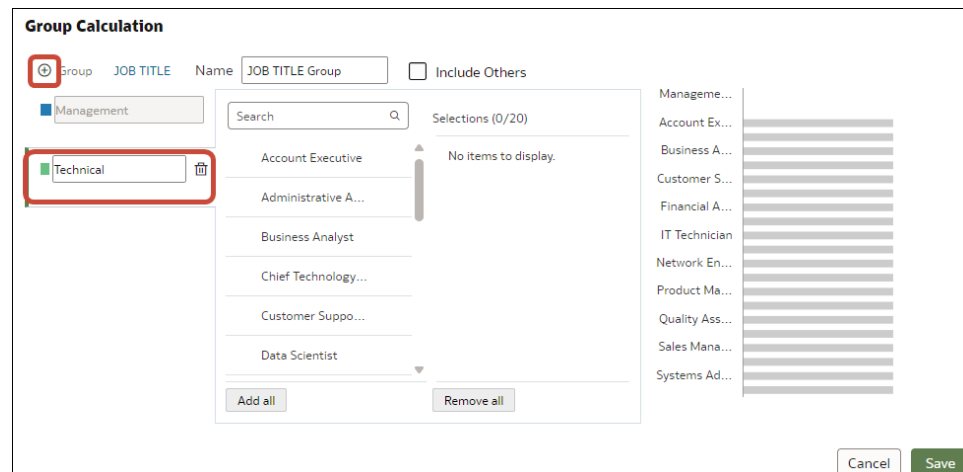
For example, to assign job titles to categories and report on them, you might create a group calculation for the job categories, Management, Sales, Technical, and Support.

Group calculations are stored in the My Calculations area of workbook. Workbooks have a My Calculations folder for each dataset used (whether joined or not-joined).

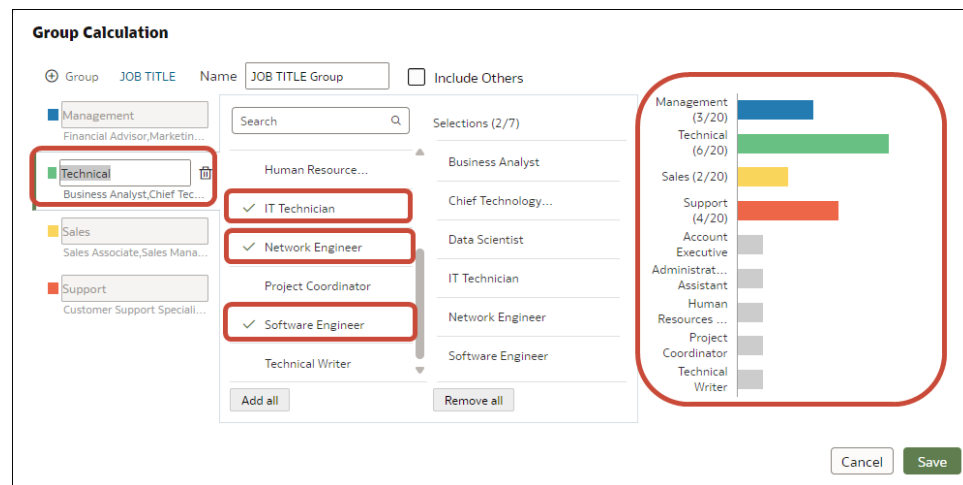
1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Data pane of the Data panel, right-click the attribute on which you want to group data and select **Create Group Calculation**.



3. In the **Name** field, change the default name to a meaningful name. For example, Job Categories.
4. At the left hand side, under **Group**, add the groups you want to create.
For example, you might create four groups for job categories Management, Sales, Technical, and Support.
 - Click **+** next to **Group** to add your groups.
 - Enter a meaningful name for each group.



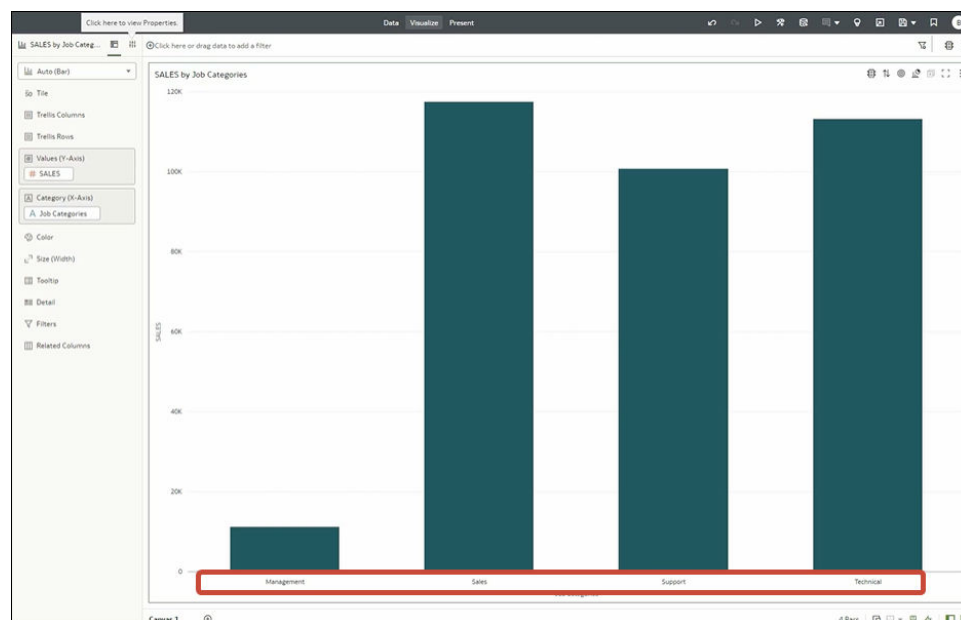
5. Add attributes from the central list to the groups.
For example, you might select the Technical group and then click job titles such as Software Engineer that apply to the Technical category.
 - First select a group at the left hand side.
 - Click attributes in the central list to add them to the selected group.
Tip: If there're large number of attributes and only a sub-set are listed, use the **Search** field above to locate attributes to add.
 -



As you populate the groups, you'll see the histogram at the right hand side update.

6. Click **Save**.

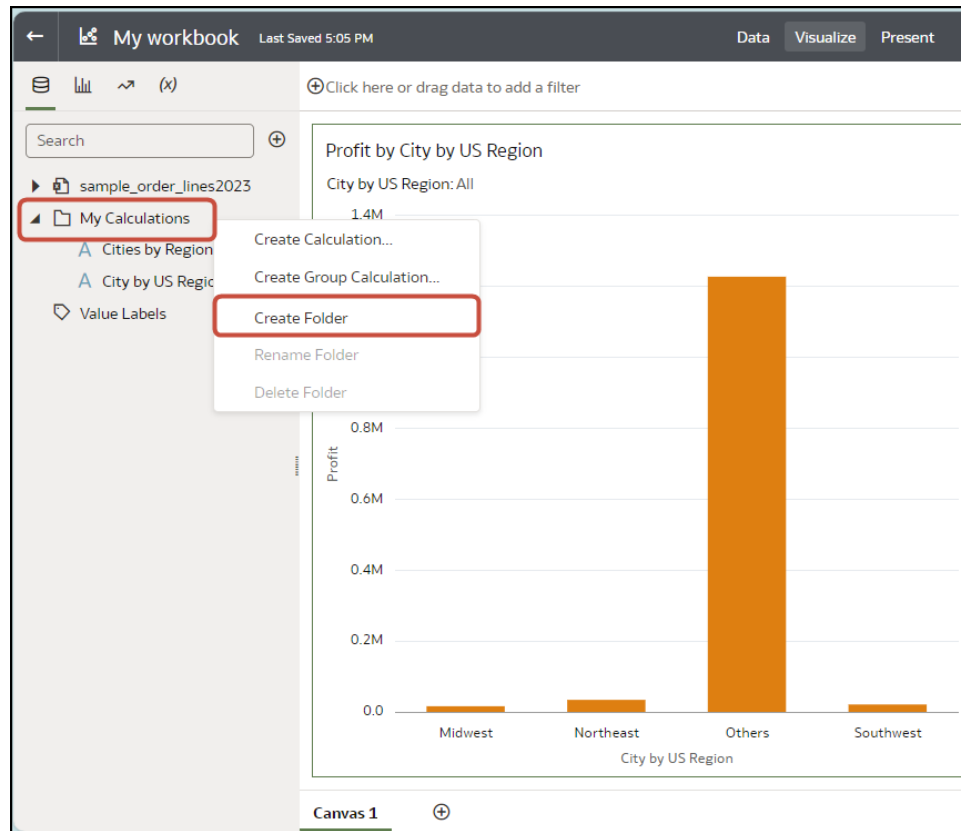
You can now visualize your data by your new groups. For example, you might add Sales and Job Category to a workbook to visualization sales by job category.



Create a Folder to Store Calculations in a Workbook

In workbooks you can organize your calculations by creating multiple levels of sub-folders in the **My Calculations** area of the Data Panel. For example, if you have a large number of calculations in a workbook, arranging them into folders makes them easier to manage.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Display the **Data** pane or **Visualize** pane.
3. In the **Data Panel**, right-click **My Calculations** or an existing folder and select **Create Folder**.



4. Optional: Change the default folder name to something more meaningful.

You can now organize your folders and calculations. For example, you can:

- Drag and drop existing calculations into folders.
- Drag and drop folders into other folders.
- Drag and drop folders to reorder them.

Enhance Visualizations with Statistical Analytics

Statistical analytics enable you to highlight clusters or outliers, add forecasts, and show trend and reference lines in your workbooks.

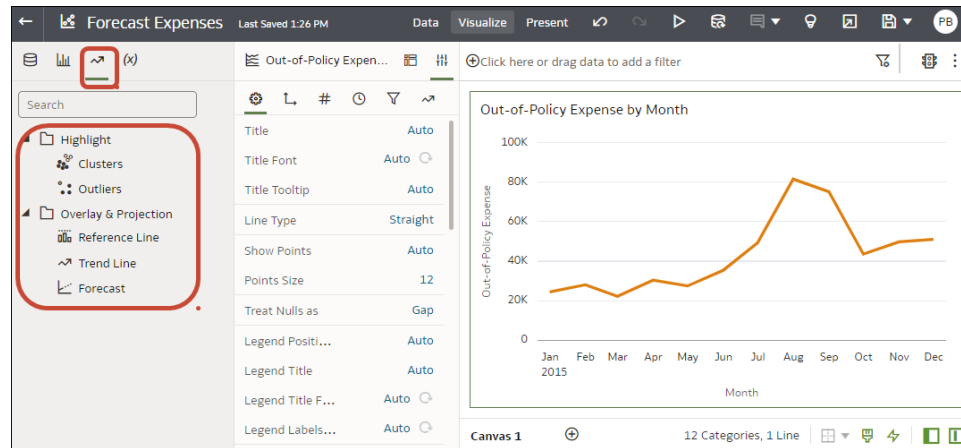
Topics:

- [Before You Start with Statistical Analytics](#)
- [What Statistical Analytics Can I Add to Visualizations?](#)
- [Add Statistical Analytics to Visualizations](#)
- [Add a Forecast to a Visualization](#)
- [Add a Reference Line to a Visualization](#)
- [Create a Cluster or Outlier in a Visualization](#)

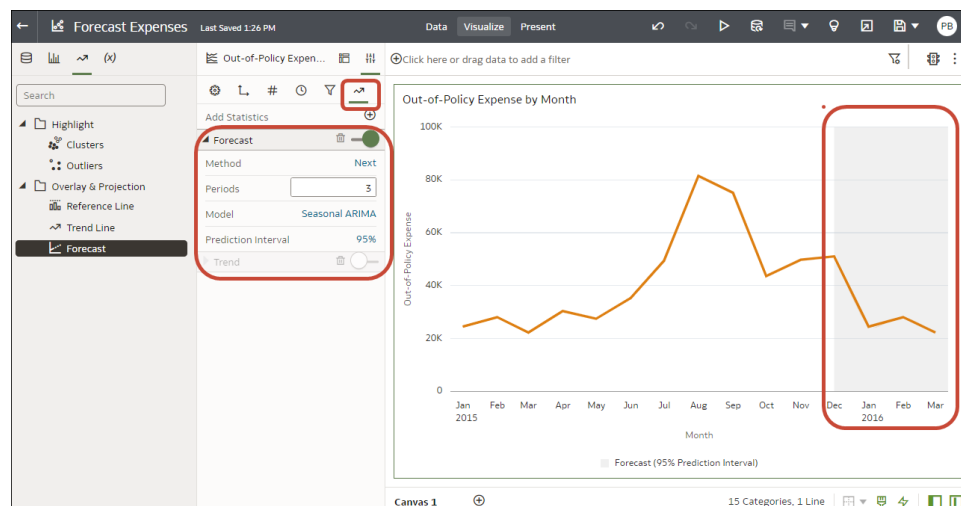
Before You Start with Statistical Analytics

To add statistical analytics to your workbooks such as forecasts, outliers, and trend lines, you can either use ready-to-use analytics on the Analytics pane of the Data Panel, or use functions in expression builder if you need more control over the configuration.

Oracle Analytics enables you to add a range of statistical analytics from the Analytics pane of the Data Panel, which come fully configured so that you don't need to be a statistical expert to achieve results.



You configure basic options for these analytics on the Grammar panel. For example, if your visualization analyzes Out-of-Policy Expenses by Month, you might use the **Periods** option to specify the number of months to forecast (in this example, '3' forecasts three months January, February, and March from the final data point for December).



If you need more control over statistical settings, or you want to use the analytic in other visualizations, consider adding a calculation and use the expression builder to define the equivalent function. (From the Data pane on the Data Panel, click **Add (+)**, then **Create Calculation** to display the expression builder.) For example, you might use the FORECAST() function.

New Calculation

Name: $f(x)$

Description:

Search:

- Conversion
- System
- Expressions
- Time Series Calculations
 - Period Rolling
 - Forecast**

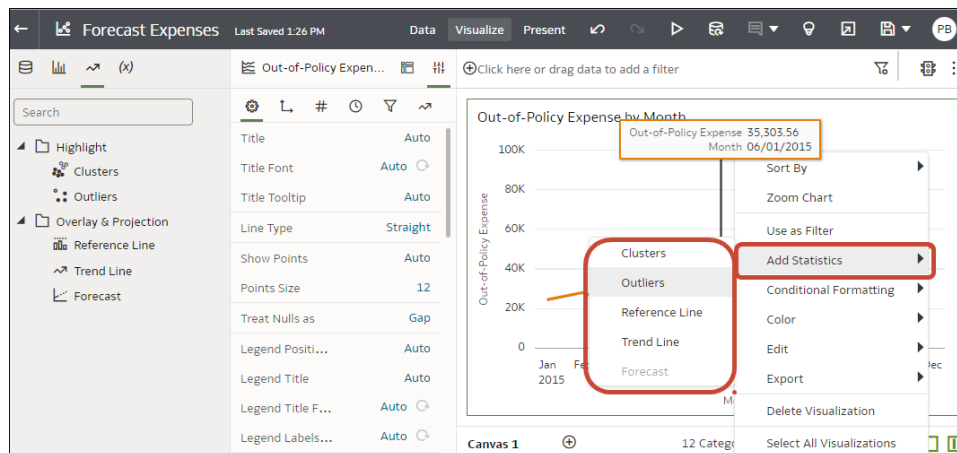
Forecast

This function creates a time-series model of the specified measure over the series using either using Exponential Smoothing or ARIMA and

Validate Cancel Save

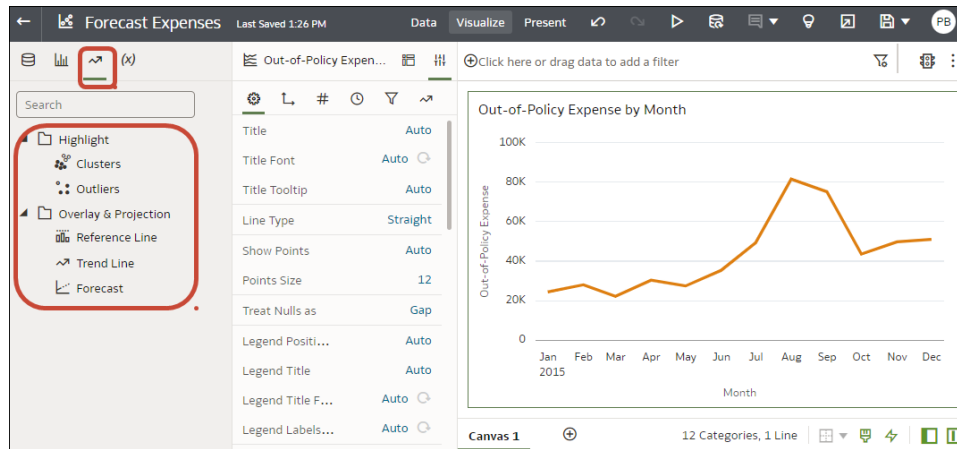
See Create a Calculated Data Element.

You can also access the statistical analytics options by right-clicking on a visualization, and selecting **Add Statistics**.



What Statistical Analytics Can I Add to Visualizations?

Add these statistical analytics to your visualizations to achieve better insights into your data.



Forecast

The forecast function uses linear regression to predict future values based on existing values along a linear trend.

You can set a number of time periods in the future for which you want to predict the value, based on your existing time series data. See [Add a Forecast to a Visualization](#).

Oracle supports these forecast model types:

- **Auto-Regressive Integrated Moving Average (ARIMA)** - Use if your past time series data is nonseasonal but provides enough observations (at least 50, but preferably more than 100 observations) to explain and project the future.
- **Seasonal ARIMA** - Use if your data has a regular pattern of changes that repeat over time periods. For example, seasonality in monthly data might be when high values occur during summer months and low values occur during winter months.
- **Exponential Triple Smoothing (ETS)** - Use to analyze repetitive time series data that doesn't have a clear pattern. This model type produces an exponential moving average that takes into account the tendency of data to repeat itself in intervals over time.

Alternatively, create a custom calculation using the `FORECAST` function to have more control over settings, or if you want to use the forecast in other visualizations. See [Analytics Functions](#).

Clusters

The cluster function groups a set of objects in such a way that objects in the same group show more coherence and proximity to each other than to objects in other groups. For example, you can use colors in a scatter chart to show clusters of different groups. See [Create a Cluster or Outlier in a Visualization](#).

- **K-means clustering** - Use to partition "n" observations into "k" clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster.
- **Hierarchical clustering** - Use to create a hierarchy of clusters built using either an agglomerative (bottom-up) approach, or a divisive (top-down) approach.

Alternatively, create a custom calculation using the `CLUSTER` function to have more control over settings, or if you want to use the cluster in other visualizations. See [Analytics Functions](#).

Outliers

The outliers function displays data records that are located the furthest away from the average expectation of individual values. For example, extreme values that deviate the most from other observations fall into this category. Outliers can indicate variability in measurement, experimental errors, or a novelty. If you add outliers to a chart that already has clusters, then the outliers are depicted as different shapes.

Outliers can use K-means clustering or hierarchical clustering. See [Create a Cluster or Outlier in a Visualization](#).

Alternatively, create a custom calculation using the `OUTLIER` function to have more control over settings, or if you want to use the outlier in other visualizations. See [Analytics Functions](#).

Reference Lines

The reference lines function defines horizontal or vertical lines in a chart that correspond to the X-axis or Y-axis values. See [Add a Reference Line to a Visualization](#).

- **Line** - You can choose to compute the line between average, minimum, or maximum. For example, in the airline industry, if passenger turnout is plotted against time, the reference line can show whether passenger turnout for a particular month is above or below average.
- **Band** - A band represents upper and lower range of data points. You can choose a custom option or a standard deviation function, and between average, maximum, and minimum. For example, if you're analyzing sales by month and you use a custom reference band from average to maximum, you can identify months where sales are above average, but below the maximum.

Trend Lines

The trend line function indicates the general course of the metric in question. A trend line is a straight line connecting a number of points on a graph. A trend line helps you analyze the specific direction of a group of value sets in a visualization. See [Add Statistical Analytics to Visualizations](#).

- **Linear** - Use with linear data. Your data is linear if the pattern in its data points resembles a line. A linear trend line shows that your metric is increasing or decreasing at a steady rate.
- **Polynomial** - Use this curved line when data fluctuates. It's useful, for example, for analyzing gains and losses over a large dataset.
- **Exponential** - Use this curved line when data values rise or fall at increasingly higher rates. You can't create an exponential trend line if your data contains zero or negative values.

Alternatively, create a custom calculation using the `TRENDLINE` function to have more control over settings, or if you want to use the trend line in other visualizations. See [Analytics Functions](#).

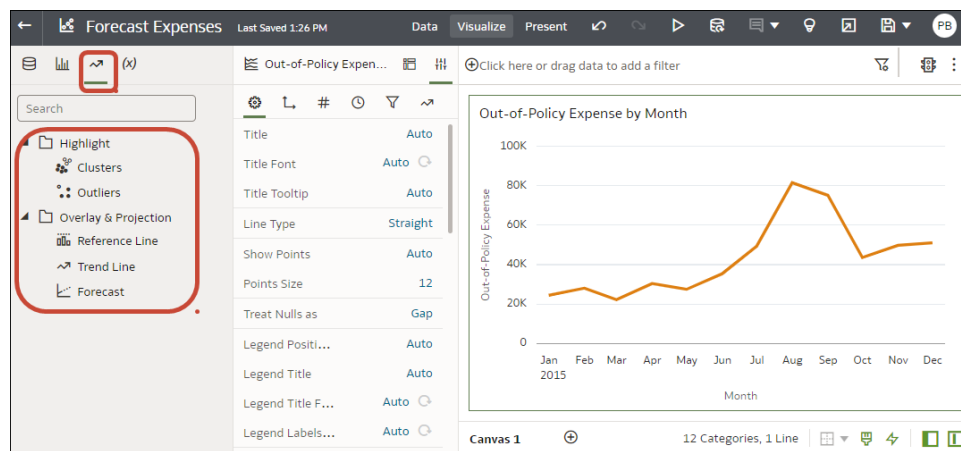
Add Statistical Analytics to Visualizations

Statistical analytics enable you to highlight clusters or outliers, add forecasts, and show trend and reference lines in your workbooks. Select them on the Analytics tab of the Data Panel in the workbook editor.

Alternatively, you can add forecasts, trendlines, and clusters to a workbook using text-only analytics functions. See [Analytics Functions](#).

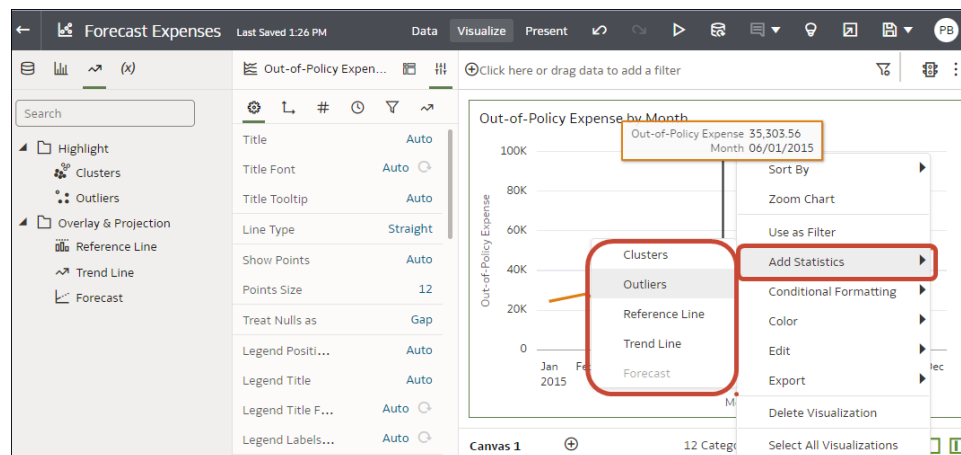
Before you can use analytic functions in visualizations, you must do the following:

- Install DVML.
On Windows go to **Start**, browse to and expand your system's Oracle folder, and click **Install DVML**.
On Mac, go to **Applications** and click **Oracle Analytics Desktop Configure Python**.
- Create a workbook or visualization that you can apply one or more analytic functions to.
 1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
 2. Make sure that you have the required data in your visualization for the type of analytics you want to add.
For example, for a forecast, you need at least one time dimension and a measure or metric.
 3. In the Data Panel or Grammar Panel, click the **Analytics** icon 



4. Drag and drop **Cluster** or **Outlier** from the **Analytics** pane to a visualization.
5. To configure the analytics function using the options on the Analytics pane on the Grammar panel.

Add Statistics



Add a Forecast to a Visualization

Add forecasts to your workbooks based on Auto-Regressive Integrated Moving Average (ARIMA), Seasonal ARIMA, or Exponential Triple Smoothing (ETS). For example, you might want to forecast summer temperatures based on data from previous summers.

Before you can use analytic functions in visualizations, you must do the following:

- Install DVML.

On Windows go to **Start**, browse to and expand your system's Oracle folder, and click **Install DVML**.

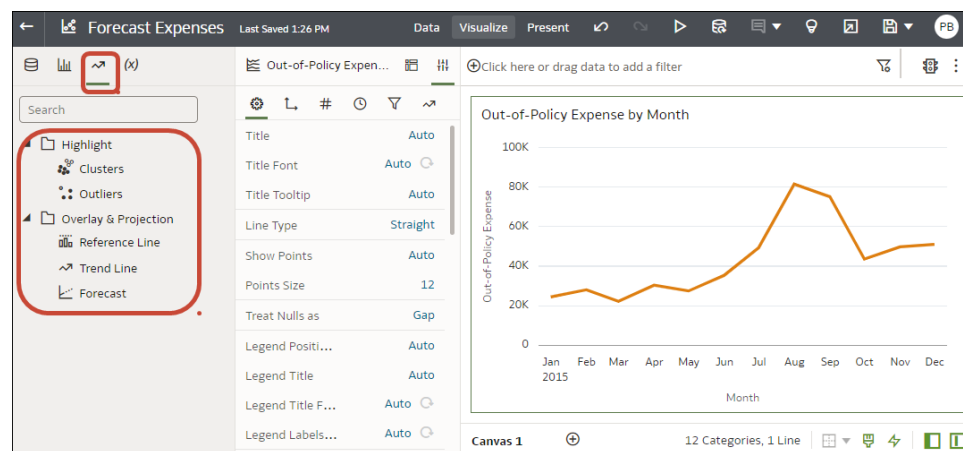
On Mac, go to **Applications** and click **Oracle Analytics Desktop Configure Python**.

- Create a workbook or visualization that you can apply one or more analytic functions to.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Make sure that you have the required data in your visualization for the type of analytics you want to add.

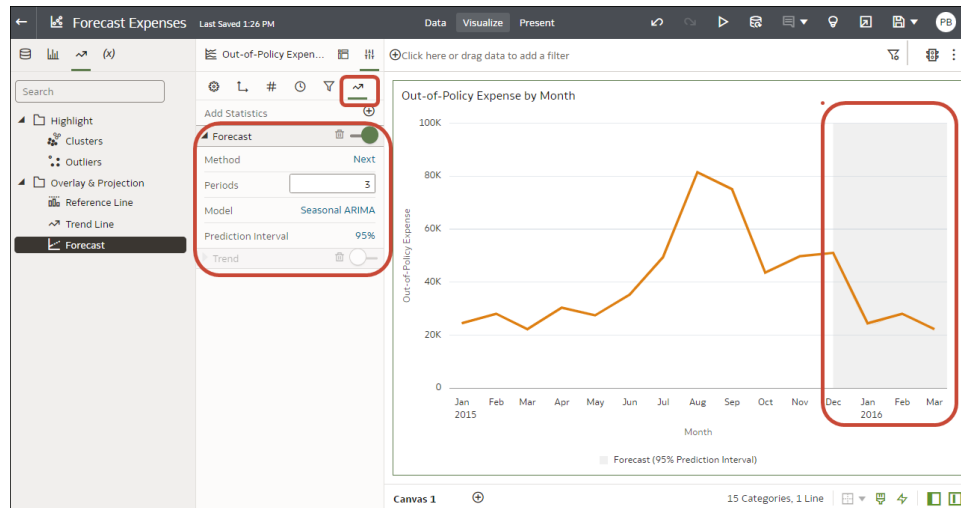
For example, for a forecast, you need at least one time dimension and a measure or metric.

3. In the Data Panel or Grammar Panel, click the **Analytics** icon 



4. Drag and drop **Forecast** from the **Analytics** pane to a visualization.
5. To configure the forecast, use the Analytics pane on the Grammar panel.

For example, if you add a Forecast, you can change the model type or the number of periods to forecast.



Add a Reference Line to a Visualization

Reference lines enable you to identify averages, medians, percentiles, and similar information in a visualization.

You can bind parameters to a visualization's reference line or band's date value or date range when you want to use a parameter value to place the reference line or band on the visualization. See [Bind a Parameter to a Reference Line or Band](#).

When you configure the reference line in the Analytics pane on the Grammar panel, you might for example, select the **Type** option to display a line or a band, use the **Function** option to change the default line to Average, Percentile, Top N, or use the **Z Order** option for date and date order columns to position the reference line in front or behind a visualization. If you select a non-date attribute column, for example City, you can choose a **Value**, for example Chicago, on which to display the reference line.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data Panel, click the **Analytics** icon .
3. Click **Add Statistics** , and select **Reference Line**.
4. Use **Column** to select a measure, date, or non-date attribute.
5. In the Analytics pane select properties to update.
6. Click **Save**.

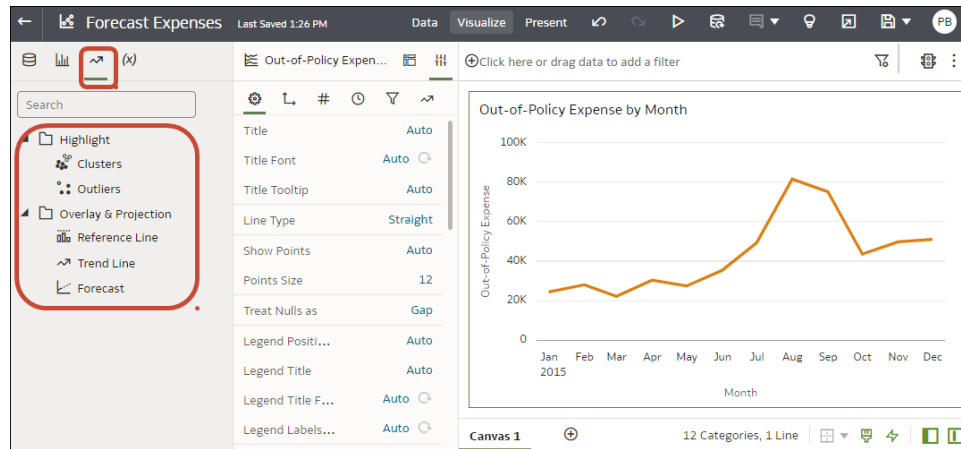
Create a Cluster or Outlier in a Visualization

Add clusters or outliers to your workbooks.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Make sure that you have the required data in your visualization for the type of analytics you want to add.

For example, for a forecast, you need at least one time dimension and a measure or metric.

3. In the Data Panel or Grammar Panel, click the **Analytics** icon .



4. Drag and drop **Clusters** or **Outliers** from the **Analytics** pane to a visualization.
5. To configure the analytics function, use the Analytics pane on the Grammar panel.

Create a Legend Visualization

You create a legend visualization to display a single canvas visualization legend for multiple visualizations, eliminating the need to display duplicated legend information in each visualization.

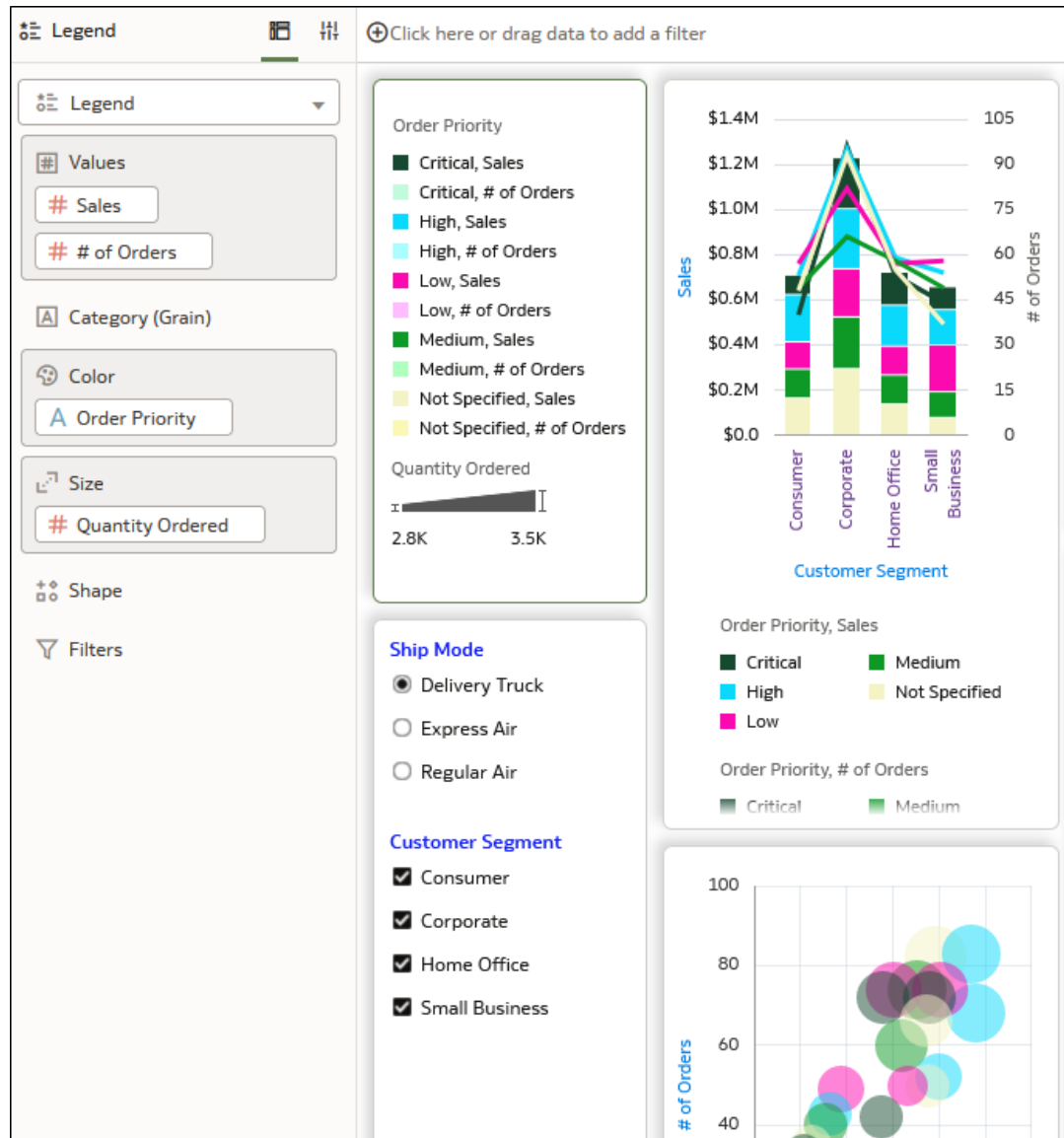
You create a legend visualization by adding data elements to it, and then you hide the legends in the other remaining visualizations to avoid duplication and improve the appearance of the visualizations.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.

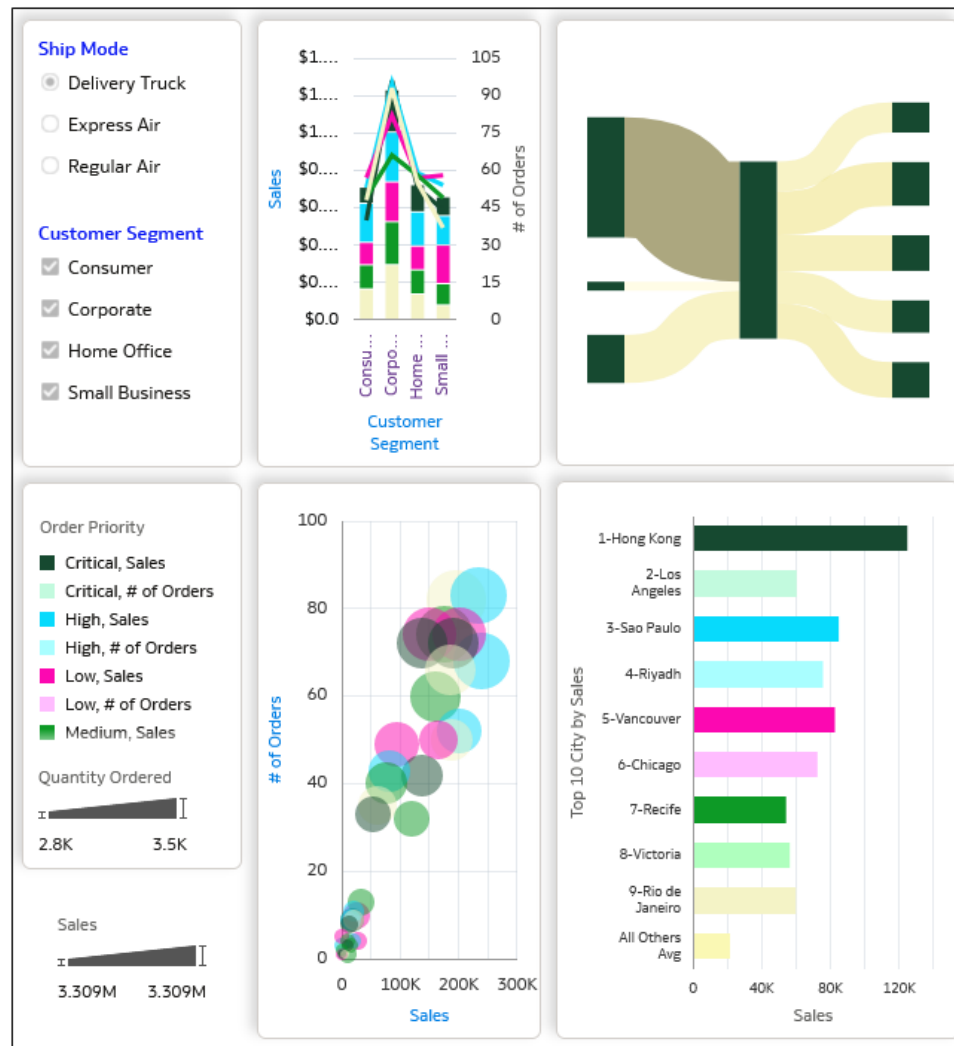


- Click **Edit** , click **Visualize** and in the Data panel select **Visualizations**.
- Drag and drop a **Legend**  visualization from the **Visualizations** pane onto the canvas.
You can place the legend on the canvas in the location most appropriate for your workbook
- Click **Data** then drag and drop data elements that are used in the canvas visualizations, and drop them to appropriate sections in the grammar pane.

For example, in the image, **Order Priority** is dragged to **Color** in the Grammar pane, **Sales** and **# of Orders** are dragged to **values** in the Grammar pane, and **Quantity Ordered** is dragged to **Size** in the Grammar pane.



- To hide the legends from each visualization, select a visualization and click **Properties**. In the **Legend Position** row, click **Auto** and select **None**. Repeat for each visualization.
- Click **Save**.



Use Spark Charts to Examine Trends

You can add a spark chart to a tile visualization to view aggregate data trends over time.

The red dot on the spark chart line shows the lowest value, and the green dot shows the highest value. The tooltip shows the first, last, lowest, highest and average aggregate values for the selected category. Hover your cursor anywhere over the spark chart to display the tooltip.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Close Auto Insights.
3. In the Data pane, drag a measure to the canvas.
4. In the Data pane drag a time-based data element to **Category (Chart)** to add a spark chart to the tile visualization. For example, select and drag **Month**.
5. If you want to add a filter, drag a data element from the Data pane to **Click here or drag data to add a filter**.

For example, **Year**.

The filter changes the spark line to show the trend for the filtered data.

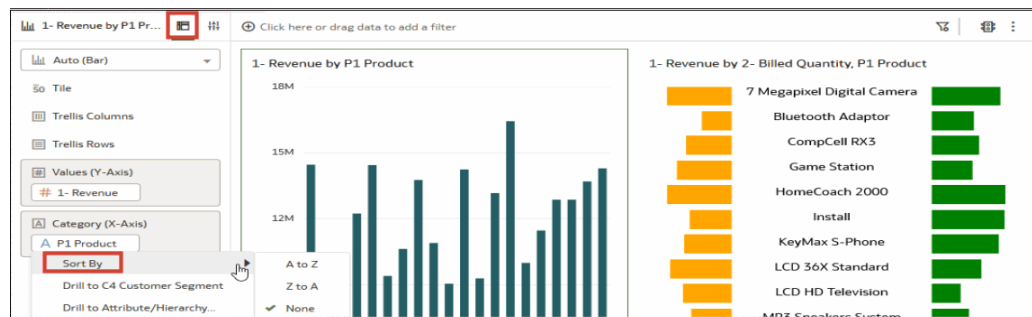
6. If you want to change spark chart display settings, click **General** in the Properties pane.
 - Click **Chart** to display one of the following spark charts, Line with Area, Line, Bar, or Area.
 - Click **Color** to assign a color to the spark chart.
 - Click **Position** to place the chart after or below the primary tile measure.
 - Click **Width or Height** to specify the size of the spark chart.
 - Click **High/Low Marks** to hide or show the high and low marks, displayed as a green and a red dot.
 - Click **Reference Line** to display or remove a reference line. Use the **Average** option to display a reference line showing the average trend. Use the **None** option to remove the reference line.
7. Click **Save**.

Sort Data in Visualizations

Sometimes you're working with a lot of data in visualizations. To optimize your view of that data in the workbook's visualization canvas, you need to sort it.

If your workbook doesn't have a visualization, create one. See [Begin to Build a Workbook and Create Visualizations](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Visualize canvas, do one of the following:
 - In the main editing panel, right-click the data element you want to sort, hover over **Sort By** next to the element label, and select a sorting option (for example, Low to High, High to Low, None).
 - In the Visualization Grammar Panel, **Grammar** pane, right-click the data element you want to sort, hover over **Sort By** then click a sorting option (for example, Low to High, A to Z, None).



Undo and Redo Edits

You can quickly undo your last action and then redo it if you change your mind. For example, you can try a different visualization type when you don't like the one you've just selected, or you can go back to where you were before you drilled into the data.

The undo and redo options are useful as you experiment with different visualizations. You can undo all the edits you've made since you last saved a workbook. However, in some cases, you can't undo and then redo an edit. For example, in the Create Dataset page, you've selected an

analysis from an Oracle Application data source to use as a dataset in the workbook. In the next step, if you use the undo option to remove the dataset, you can't redo this change.

- To undo or redo an edit, go to the toolbar for the workbook or the dataset and click **Undo Last Edit** or **Redo Last Edit**. You can use these options only if you haven't saved the workbook since making the changes.



- When you're working on a workbook, click **Menu** on the workbook toolbar and select **Revert to Saved** to undo all the edits you've made since you last saved your workbook. **Revert to Saved** is enabled after you've saved the workbook for the first time. This option is automatically disabled if you select the **Auto Save** option.

Create a Custom Error Message for Visualizations with No Data

You can create your own message that's displayed for visualizations that have no data to display in a workbook.

When the selected data elements and possibly the filters for a visualization don't produce results, the message 'No Data Found' is displayed. As the workbook author you can create a custom message to help explain why the visualization didn't display any results. For example, you might create a custom error message 'There is no data for the selected year' to display when a visualization contains no data. The message is displayed for all visualizations in the workbook.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the workbook **Menu** and **Workbook Properties**.
3. For No Data Text click **Auto**, and select **Custom**.
4. Enter your custom error message text.
5. Click **OK**.

About Refreshing a Workbook's Data

You should refresh the data in a workbook to ensure that it uses current data.

When you click the **Refresh Data** button for a workbook, it runs the queries for the visualizations on the canvas. How the datasets are configured and the data sources they use determines where the canvases get their refreshed data.

If a dataset table's access mode is set to **Live**, then the table bypasses any presentation caches to fetch new data from the source. If a datasets table's access is set to **Automatic Caching**, then the table re-queries the cached data.

Refreshing data doesn't trigger a data cache reload. Sometimes the cached data is stale, so if you refresh the data and the data isn't the most current, then the datasets may need to be reloaded. See [Reload a Dataset's Data](#).

Oracle recommends that you refresh a workbook's dataset rather than replace it. Replacing a dataset can be destructive. Don't replace a dataset unless you understand what can happen:

- If the columns and data types don't match between the existing dataset and the new dataset, then replacing a dataset breaks the workbooks that use the existing dataset.

- Any modified or added columns in the existing dataset are lost and workbooks using the dataset are likely to break.

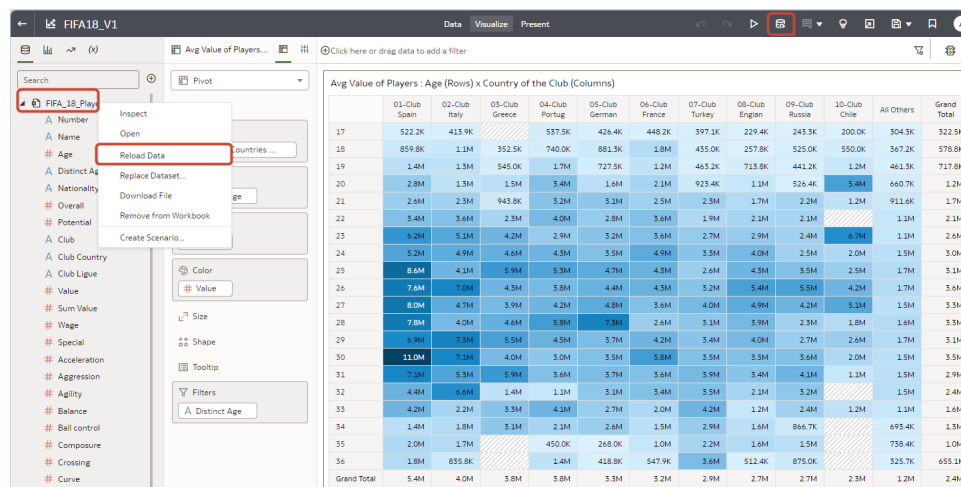
Refresh a Workbook's Data

Refresh the data in a workbook to ensure that your visualizations contain the most current data.

See [About Refreshing a Workbook's Data](#).

You can set the **Refresh Data when Canvas Is Opened**, **Auto Refresh Data**, and **Refresh Interval** properties to automatically refresh the canvas' data. See [About Canvas Data Refresh Properties](#).

- On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
- On the Data panel, right-click the connection name or table name and select **Reload Data**.



Pause Data Queries in a Workbook

You can disable the Auto Apply Data option to pause issuing new queries as you change visualization content in a workbook.

You can quickly configure a visualization without having to wait for data updates after each change.

- On the Home page, hover over a workbook, click **Actions**, then select **Open**.
- Click **Visualize**.
- Click the **Auto Apply Data** button to pause data queries.

Data queries are temporarily disabled.

- Make changes to a visualization in the workbook.

Your changes are displayed but data isn't updated, and a bubble is displayed indicating the number of data requests that have been skipped.

- Click the bubble if you want to refresh the data now.

Data queries are still disabled.

- Click the **Auto Apply Data** button to re-enable data queries.

Work with Canvas Properties

You can work with canvas properties, such as layout, width, height, synchronizing visualizations on a canvas, and refreshing data.

Topics:

- [About Canvas Layout Properties](#)
- [Update Canvas Properties](#)
- [Align Visualizations Using Canvas Grid Guidelines](#)
- [About Brushing Between Visualizations on a Canvas](#)
- [About Synchronizing Visualizations in a Canvas](#)
- [About Canvas Data Refresh Properties](#)

About Canvas Layout Properties

You can configure the layout, width, and height of visualizations on a canvas.

You configure how visualizations are displayed in a canvas using canvas layout property settings.

Layout

Configures whether visualizations are displayed in the canvas as freeform or auto fit.

- **Auto Fit** - Use to automatically arrange or correctly align visualizations on a canvas when there are multiple visualizations. You can also resize a visualization by dragging its edges to the appropriate dimensions.
- **Freeform** - Use to rearrange a visualization on the canvas using drag and drop to a space between visualizations where you want to place it. You can also resize a visualization by dragging its edges to the appropriate dimensions.
The **Order Visualization** option (only available when you use the **Freeform** canvas layout) enables you to use **Bring to Front**, **Bring Forward**, **Send Backward**, or **Send to Back**, to move a visualization on a canvas with multiple visualizations.

Width and Height

Use **Width**, and **Height** settings in conjunction with **Layout** settings to specify the layout size of visualizations in a canvas

- **Screen** - Layout fits in the available screen space.
Not available when you select **Freeform**.
- **Grow** - Layout automatically grows in height or width to accommodate a visualization at its optimal size.
For example, if you add multiple visualizations, or rows of visualizations to a canvas, the layout grows so that the added visualizations display at their optimum size.
- **Fixed** - Layout uses the specified size.

For information about designing a canvas layout with visualizations that are conditionally shown or hidden, see [Use a Parameter to Conditionally Show or Hide a Visualization](#).

Update Canvas Properties

You can use the canvas properties dialog to perform many different tasks. For example, add a description to display as a tooltip, change the layout, set brushing, synchronize visualizations, configure canvas refresh settings, and specify the background color and image.

You can also toggle grid settings and layout positioning options for a canvas. See [Align Visualizations Using Canvas Grid Guidelines](#).

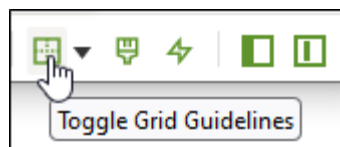
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Right-click a canvas tab and click **Canvas Properties**.
3. Update the canvas properties.
4. Click **Save**.

Align Visualizations Using Canvas Grid Guidelines

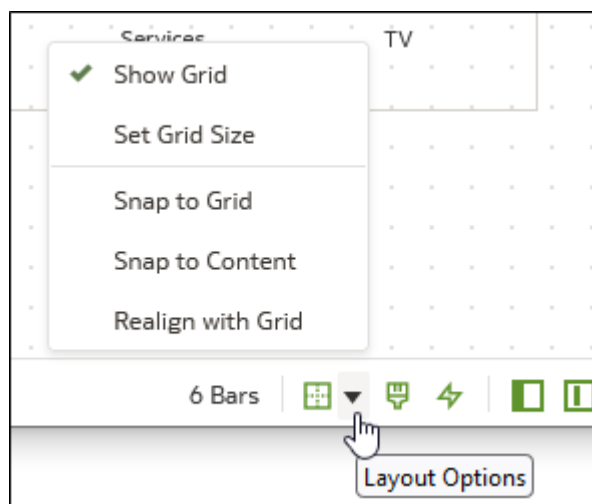
You can help to control the alignment of visualizations in a canvas using grid guideline settings when the canvas Layout property is set to **Freeform**.

You can use these settings to make it easier to align visualizations using canvas grid guideline settings.

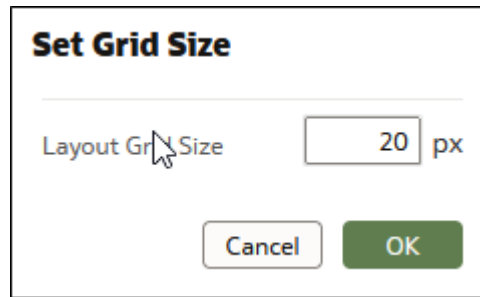
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Toggle Grid Guidelines** to display grid guidelines.



3. Click **Layout Options**.



4. Click **Set Grid Size** and enter the distance in pixels between the grid guidelines.



- Click and drag visualizations into the positions that you require them to be in on the canvas.
- Click **Snap to Grid**, and **Realign with Grid** to automatically realign all of the visualizations in the canvas with their nearest grid guideline.

Realign with Grid becomes active when you select **Snap to Grid**, and you previously realigned visualizations away from the grid guidelines.

About Brushing Between Visualizations on a Canvas

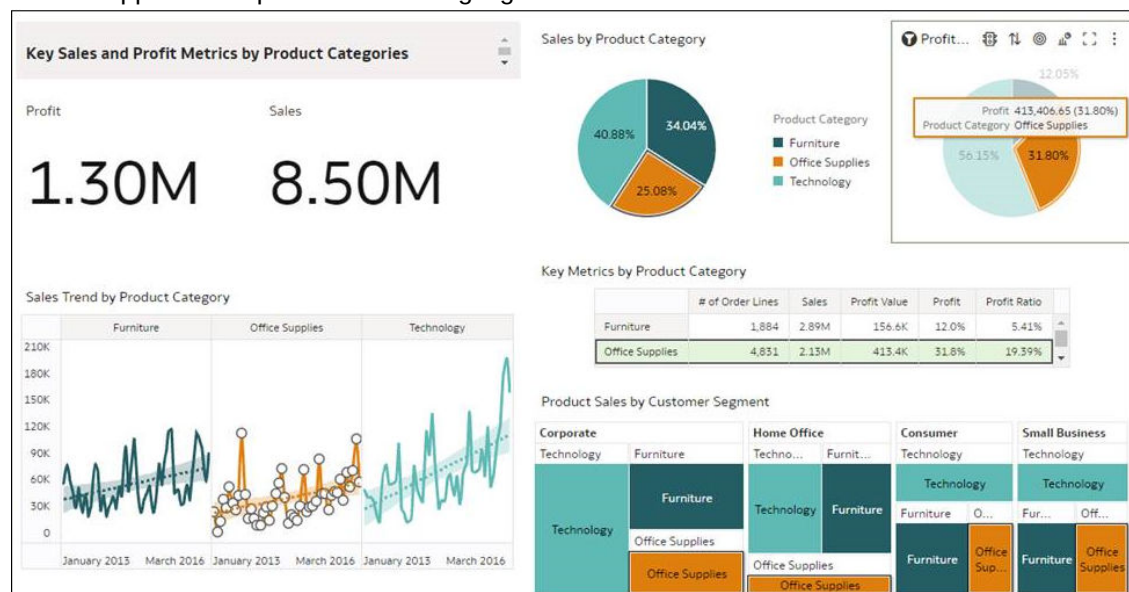
You can configure brushing on a canvas so that when a user selects data points in a visualization, the datapoints are automatically highlighted in other visualizations.

Brushing can only work when visualizations share the same dataset.

You can set the **Brushing**  canvas property to be **on** or **off**, for a selected canvas. See [Update Canvas Properties](#).

- On** - If you select one or more data points in a visualization, then corresponding data points are highlighted in the other visualizations on the canvas that use the same dataset.
- Off** - If you select one or more data points in a visualization, then corresponding data points are not highlighted in other visualizations on the canvas.

For example, if you select Office Supplies in the Pie chart and Brushing is set to **On**, then Office Supplies data points are also highlighted in the other visualizations on the canvas.



About Synchronizing Visualizations in a Canvas

You can specify whether or not to synchronize Visualizations in a canvas.

You use the **Synchronize Visualizations** setting to specify how the visualizations on your canvas interact. By default, visualizations are linked for automatic synchronization.

When **Synchronize Visualizations** is set to **On**, and you add or remove data values from a visualization, this automatically adds or removes the values in corresponding visualizations. When **Synchronize Visualizations** is set to **Off**, this unlinks your visualizations and turns off automatic synchronization.

When **Synchronize Visualizations** is **On**, then all filters on the filter bar and actions that create filters, such as drill, apply to:

- All the visualizations in a canvas with a single dataset.
- All the visualizations of joined datasets with multiple datasets.

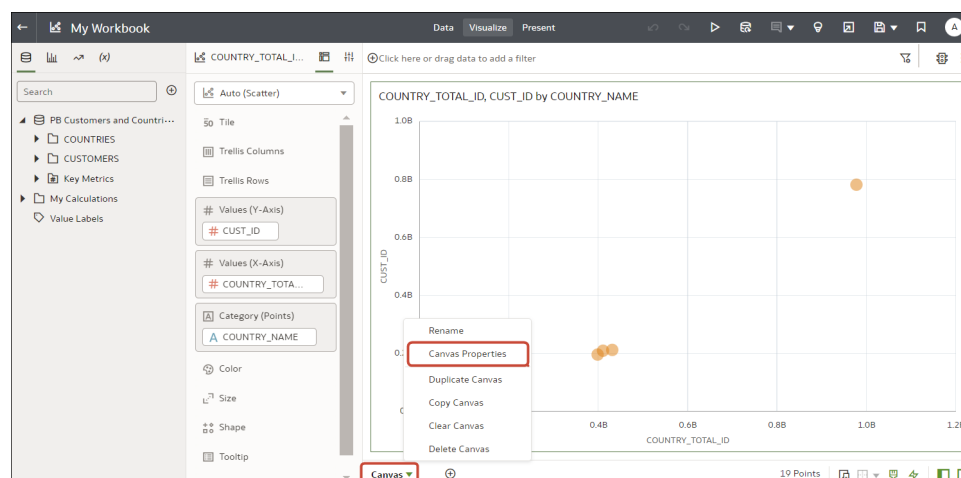
If a data element from a dataset is specified as a filter but isn't matched with the joined datasets, then the filter only applies to the visualization of the dataset that it was specified for.

When **Synchronize Visualizations** is set to **Off**, then analytic actions such as Drill affect only the visualization to which you applied the action.

About Canvas Data Refresh Properties

You can configure canvas data to refresh when you open a canvas, or to refresh automatically at a specified interval.

You configure how canvas data is refreshed using canvas property settings. Click the down-arrow next a canvas name and click **Canvas Properties** to set properties.



Refresh Data when canvas is opened

Configures whether to refresh data when a user opens the canvas.

- **On** - Use to refresh the data when the canvas is opened. The client and server caches are cleared every time the canvas is opened, ensuring that you see the current data.

- **Off** - Use to not refresh the data when the canvas is opened.

Auto Refresh Data

Configures whether to automatically refresh the canvas data at specified time intervals.

- **Enabled** - Use to automatically refresh the canvas data using a **Refresh Interval** that you enter.
- **Disabled** - Use to not automatically refresh the canvas data.

Auto start for viewers

Configures whether to start the automatic data refresh when the canvas is opened.

- **On** - Refresh canvas data when the canvas is opened, and then at the specified intervals.
- **Off** - Don't refresh the canvas when the canvas is opened.

Design Canvas Layouts for Different Screen Sizes

You can design canvas layouts to respond to different sized devices optimizing the content to fit in the browser for each screen size.

Topics:

- [About Designing Canvas Layouts to Display on Devices with Different Screen Sizes](#)
- [Design Canvas Layouts to View on Different Devices](#)

About Designing Canvas Layouts to Display on Devices with Different Screen Sizes

You can design canvas layouts to fit different sized devices optimizing content in the browser, for example on a mobile, a tablet, or a laptop.

Optimize canvas layouts for different screen sizes

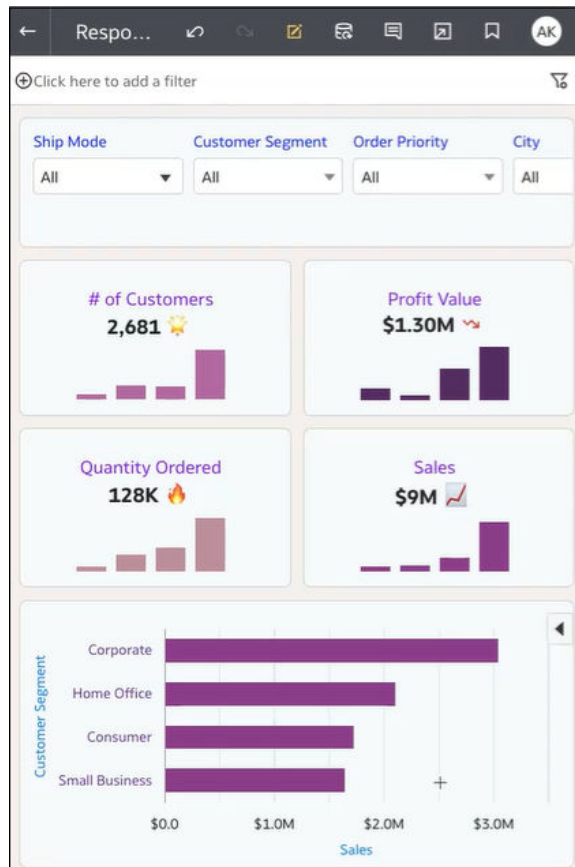
When you open a workbook on different sized devices, the canvas screen size scales to the browser screen size using the browser's defaults. Resizing the browser by decreasing its size can impact your ability to see the details in visualizations. For example, the data in a scattergraph, a heatmap, or most of the measure data in a tile visualization may become hard to read, making it impossible to see crucial information.

When you reduce the canvas size in a browser, visualizations can become too small to display data properly.



As an author you can design canvas breakpoints so that when the canvas screen size reduces in size, the rendering of visualizations changes to fit the new screen size. For example, if the available screen size is too small to display a complete visualization, you can rearrange or hide the visualization to work better with the smaller screen size. You specify different canvas screen sizes and layouts using canvas breakpoints, where each breakpoint represents a different arrangement of visualizations displayed for each screen size.

An optimized canvas for a smaller screen size breakpoint contains visualizations that are rearranged to make viewing easier on the smaller device.



You use a slider to define screen sizes for when consumer users display canvases on different sized devices. For example, you can change how the visualizations display by rearranging their location, size, or visibility on the canvas.

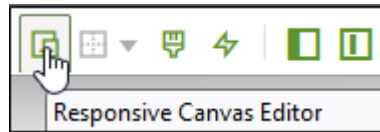
When you add a breakpoint to a canvas, the breakpoint screen size determine how visualizations display when viewed at that screen size. You can reposition, resize, or remove visualizations for a canvas breakpoint to optimize how users see visualizations. You can specify different visualization configurations for each breakpoint, and the differences for each breakpoint are only displayed to the consumer user when the browser screen size resolution matches the breakpoint screen size for which the changes are made.

Design Canvas Layouts to View on Different Devices

You can create canvas breakpoints to determine how visualizations display to consumer users on devices with different screen sizes. For example, you can set different breakpoints to optimize viewing on a mobile device browser, a tablet, or a laptop.

Tutorial

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit** to display the workbook for editing.
3. Expand the canvas to maximum size and in **Canvas Properties**, set the **Layout** to Autofit, and click **OK**.
4. On the footer click **Responsive Canvas Editor** to open the editor where you can define breakpoints to view the canvas on different devices.



5. Set a canvas breakpoint:

- **Add a breakpoint at the current slider position** - Click and drag the slider to the value in pixels for the screen size that you want to use for this breakpoint,



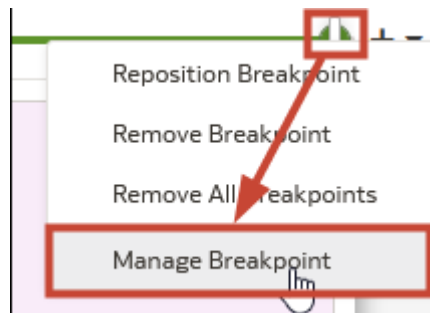
then click **Add Breakpoint**  to add the breakpoint at the current slider location.

- **Manually enter a value for a breakpoint** - Click **Open the Responsive Canvas Editor Menu**, click **Add Breakpoint** and enter a number in the **Position** field for where you want this breakpoint.

A dialog box titled "Add Breakpoint". It has a "Position" label next to a text input field containing "1417". Below the input field are two buttons: "Cancel" and "OK".

6. Repeat the previous step to define additional canvas breakpoints.
7. Include or exclude visualizations for each canvas breakpoint:

- Right-click the canvas breakpoint that you want to manage () and click **Manage Breakpoint**.



- Click a visualization from the list to exclude or include in the canvas for this canvas breakpoint, then click **OK**.

Manage Breakpoint

Position

1417

Visualization

☒ Sales by City (Horizontal Bar Chart)
☒ P4 Brand, P3 LOB, P2 Product Type, 1- Revenue, 5- Target Revenue (Pivot)
☒ Dashboard Filter Visualization
☒ Product Sub Category, City (Dashboard Filter Visualization)
☒ # of Customers (Performance Tile)
☒ Quantity Ordered (Performance Tile)
☒ Profit Value (Performance Tile)
☒ Sales by Product Sub Category (Horizontal Bar Chart)
☒ # of Customers by Product Sub Category, Order Priority (Stacked Area Chart)
☒ Sales (Performance Tile)

Cancel
OK

8. Optional: Create a visualization and add it to a breakpoint by selecting data from the Data panel, and adding it to the canvas.

The new visualization is added to the current breakpoint only, however you can add the visualization to other breakpoints on the canvas by selecting the visualization from the list in the Manage Breakpoint dialog for that breakpoint.

9. Optional: Optimize the display of visualizations for a canvas breakpoint.

You might want to optimize the content to display on a smaller device, such as a mobile.

- **Rearrange visualizations** - Click and drag visualizations to a new position.
- **Optimize visualizations** - Use the Properties panel to hide unnecessary content, such as the title, or the legend.

When you optimize visualizations for a breakpoint those changes don't apply to other breakpoints in the canvas.

10. Click **Save**.

Copy and Paste a Visualization or Canvas

You can copy and paste a visualization or canvas within the same workbook, to another open workbook, or to another workbook open in a different browser tab.

When you copy a visualization or canvas from one workbook to another, Oracle Analytics does the following:

- **Data** - The dataset for the pasted visualization or canvas is added to the target workbook. When you open or create the target workbook that you're pasting to, it doesn't need to include the dataset used by the visualization or canvas that you'll copy and paste.
- **Filters** - The filters in the target workbook and in the pasted visualization or canvas are maintained. You don't need to add the visualization or canvas filters to the target workbook. If there's a conflict between the target workbook and the pasted visualization or canvas filters, then the pasted filters won't overwrite the target's filters.
- **Color assignments** - The color scheme of the target workbook is applied to the pasted visualization or canvas.
- **Calculations** - If the same calculation name exists in the target workbook, then the pasted calculation is added and renamed.

Use the following steps to copy and paste a visualization or canvas:

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Visualize canvas, copy a visualization or canvas.
 - To copy a visualization, click its **Menu**, hover over **Edit**, and then click **Copy Visualization**.
 - To copy a canvas, right-click it and click **Copy Canvas**.
3. Navigate to a visualization or canvas and paste the object.
 - To paste a visualization into a canvas that contains visualizations, click an existing visualization's **Menu**, hover over **Edit**, and then click **Paste Visualization**.
 - To paste a visualization into a blank canvas, right-click the canvas bar and select **Add Canvas**. Right-click the new canvas, hover over **Edit**, and then click **Paste Visualization**.
 - To paste a canvas, right-click the canvas bar and then click **Paste Canvas**.

Copy and Paste a Visualization's Data

You can copy all of a visualization's data to the clipboard and then paste the data to an another application, like Word or Excel.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click a visualization's **Menu**, hover over **Edit**, and then click **Copy Data**.
This copies the visualization data to the clipboard.
3. Open a target application and paste in the visualization's data.

Work with Multiple Visualizations on a Canvas

You can work with multiple visualizations at the same time, update common visualization properties, copy and paste multiple visualizations, and delete multiple visualizations on a canvas.

Topics:

- [Update Common Properties for Multiple Visualizations on a Canvas](#)

- [Copy and Paste Multiple Visualizations on a Canvas](#)
- [Delete Multiple Visualizations on a Canvas](#)
- [Display Multiple Visualizations Equally on a Canvas](#)

Update Common Properties for Multiple Visualizations on a Canvas

You can update common properties for multiple selected visualizations on a canvas.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Visualize canvas, use Ctrl-click to select multiple visualizations on the canvas.
3. In **Common Properties** click the property to change and apply your changes.

Common property values are displayed when they share the same value for each of the selected visualizations.

4. Click **Save**.

Copy and Paste Multiple Visualizations on a Canvas

You can copy and paste multiple selected visualizations on a canvas.

1. On the Home page, hover over a workbook that contains the visualizations you want to copy and paste, click **Actions**, and then select **Open**.
2. In the Visualize canvas, use Ctrl-click to select multiple visualizations on the canvas.
3. To copy the selected visualizations, hover over the selected visualizations, right-click, click **Edit**, and then click **Copy Visualizations**.
4. To paste the copied multiple visualizations, click a canvas location where you want to paste the copied visualizations, right-click and click **Paste Visualizations**.
5. Click **Save**.

Delete Multiple Visualizations on a Canvas

You can delete multiple selected visualizations on a canvas.

1. On the Home page, hover over a workbook that contains the visualizations you want to delete, click **Actions**, and then select **Open**.
2. In the Visualize canvas, use Ctrl-click to select multiple visualizations.
3. Right-click, and select **Delete Visualizations**.
4. Click **Save**.

Display Multiple Visualizations Equally on a Canvas

You can select visualizations in a row or in a column to resize the width or height respectively and display equally on a canvas.

1. On the Home page, hover over a workbook that contains the visualizations you want to resize, click **Actions**, and then select **Open**.
2. In the Visualize canvas, use Ctrl-click to select a row, or a column of visualizations.
The canvas **Layout** property must be set to **Auto Fit**.
3. Hover over the selected visualizations and right-click:

- Choose **Distribute Width** to make the width the same for each visualization selected in the row.
 - Choose **Distribute Height** to make the height the same for each visualization selected in the column.
4. Click **Save**.

Change Visualization Types

You can change visualization types to best suit the data you're exploring.

When you create a workbook and add data elements to the canvas, Auto Visualization mode chooses the most appropriate visualization type based on the selected data element. The Auto Visualization mode is on (selected) by default. If you add more data elements, the visualization type is automatically updated, and the best type is selected based on the data elements.

If you want to use a different visualization type, then you need to select it from the visualization type list. When you change the visualization type, Auto Visualization mode is turned off. When the Auto Visualization mode is off (deselected), adding more data elements to the canvas won't change the visualization type automatically.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Select a visualization on the canvas, and on the visualization toolbar, click **Change Visualization Type**.
3. Select a visualization type. For example, select Treemap to change the visualization type from Pivot to Treemap.

When you change the visualization type, the data elements are moved to matching drop target names. If an equivalent drop target doesn't exist for the new visualization type, then the data elements are moved to a Grammar Panel section labeled **Unused**. You can then move them to the Grammar Panel section you prefer.

About Visualization Properties

You can customize the appearance and functionality of a visualization by changing its properties.

The options available in the Properties pane depend on the visualization type.

Property	Icon	Description
Action		Use to add a URL to tiles, images, and text box visualizations.
Analytics		Use to add advanced analytics functions.
Axis		Use to display or hide gridlines, to show or hide horizontal (x) and vertical (y) axis labels, and to update and format the axis label text.
Data Layers		Use with maps and overlay charts to add data layers, and to configure the settings for each data layer.
Date/Time Format		Use with date or time elements, to set display and format properties.
Edge Labels		Use with tables and pivot tables to update the header text for columns, to show or hide headers, to display null values for hierarchies in table columns and in pivot table columns and rows, and to format header text.
Filters		Use to change and format the filter title and selection names.

Property	Icon	Description
General		Use to modify the title, legend, tooltip, visibility parameter, labels, tile settings, points settings, alignment, style, size, position, and other visualization settings.
Map		Use to control the zoom, the data focus, and to scale and select a background map.
Totals		Use with tables and pivot tables, to position and format totals.
Values		Use to change the display, placement, and format of data labels, and hide and display a Y2 axis.

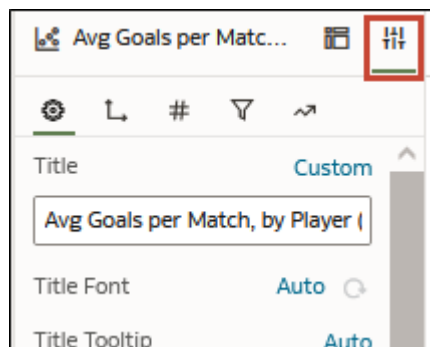
Adjust Visualization Properties

You can customize how the visualizations in your workbook are displayed, for example, you can change the title, legend, labels, number format, background, border, and shadow.

The tabs and fields displayed under the Properties pane depend on the type of visualization that you're working with.

If your workbook doesn't have a visualization, create one. See [Begin to Build a Workbook and Create Visualizations](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit** to open the workbook in author mode.
3. In the Visualize canvas, select a visualization.
4. Use the tabs in the Properties pane  to adjust the visualization's properties as needed.



Set Visualization Border Properties

You can enhance the appearance of your visualizations by adding a border and specifying various properties such as line width, style, and color.

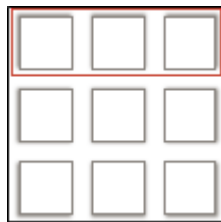
1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit** to open the workbook for editing.
3. In the Visualize canvas, select one or more visualizations to apply border settings to.
4. Click the **General** tab in the Properties pane.
5. In the **Border** field, click **None**, and then define the border settings:

- Click **Square** or **Round** to create a standard border with square or round edges.
 - Click **Custom** to define your own border color, border width, edge radius, and line style (solid, dashed, or dotted line).
6. Click **Save**.

Set Visualization Shadow Properties

You can specify shadow properties for one or more visualizations, including where the shadow appears, and other characteristics including shadow color.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit** to open the workbook for editing.
3. In the Visualize canvas, select one or more visualizations to apply border settings to.
4. Click the **General** tab in the Properties pane.
5. Click **Shadow** to display the options, and then define your shadow settings:
 - Click one of the squares to define the position of the shadow (for example, top-left, or top, or top-right).



- Click **Custom** to select **Shadow Color**, **Horizontal Offset** (the gap to the side before the shadow begins), **Vertical Offset** (the gap above before or below before the shadow begins), **Blur** (how blurred or solid the shadow is), and **Spread** (how far the shadow spreads).
6. Click **Save**.

Change Display Names in Tables and Pivots

You can customize a visualization column name in tables and pivot tables by entering your own text.

The column name change is only a displayed name change and it does not change the column name in the dataset or in the source data.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit**.
3. In the workbook, select a table or pivot visualization.
4. Click **Properties**. In Properties, click **Edge Labels** .
5. Expand a column. In the **Display Header** row, click **Auto**, and then click **Custom**.
6. Enter the new custom display name for the column.
7. Click **Save**.

Change the Size of Data Points in Visualizations

You can specify the size of points for visualizations with points, such as scatter, combo, area, radar, box plot, and line graphs.

You might want to change the size of points to make them easier to view. For example, when points overlap and it's difficult to identify individual points.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit**.
3. Select the visualization with data points.
4. Click **Properties**, and **General** and then expand **Points**.
5. When there's no measure in the Size grammar, click the **Size** row, enter a value to increase or decrease the points size or use the slider.
6. When there's a measure in the Size grammar:
 - To change the minimum points size, in the **Min Size** row, click **Auto**, select **Custom**, and enter a value.
 - To change the maximum points size enter a value in the **Max Size** row.
7. Click **Save**.

Change the Pattern and the Width of Lines in Graphs

You can specify the line pattern and the line width in graphs such as line, area, combo, overlay, radar, reference, trend, or forecast graphs.

You might want to change the appearance of lines in a graph to make them easier to view. For example, you might use a dotted line for Sales to indicate that the Sales line is an estimate.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit**.
3. Select the graph that uses lines.
4. Click **Properties**.
5. If you want to change the default line pattern and width settings for all lines in this graph, select **General** and then expand **Line**.
 - To change the line pattern from Solid, click **Solid** and select **Dashed** or **Dotted**.
 - To change the line width, click the **Width** field, select a value, or click **Custom** and enter a number for the line width in pixels. For example, enter 2.5px.
6. If you want to change the line pattern and width to override the default value for a selected measure, select **Value**, and then expand the measure. For example, expand Sales.
 - To change the value of **Line Pattern**, click the current value, click **Auto**, and then select **Solid**, **Dashed**, or **Dotted**.
 - To change the value of **Line Width**, click the current value and select a value, or click **Custom** and enter a number in pixels. For example, enter 2.5px.
7. Click **Save**.

Highlight Important Data Events with Conditional Formatting

Use conditional formatting to highlight important data events in your visualizations so that you can take action.



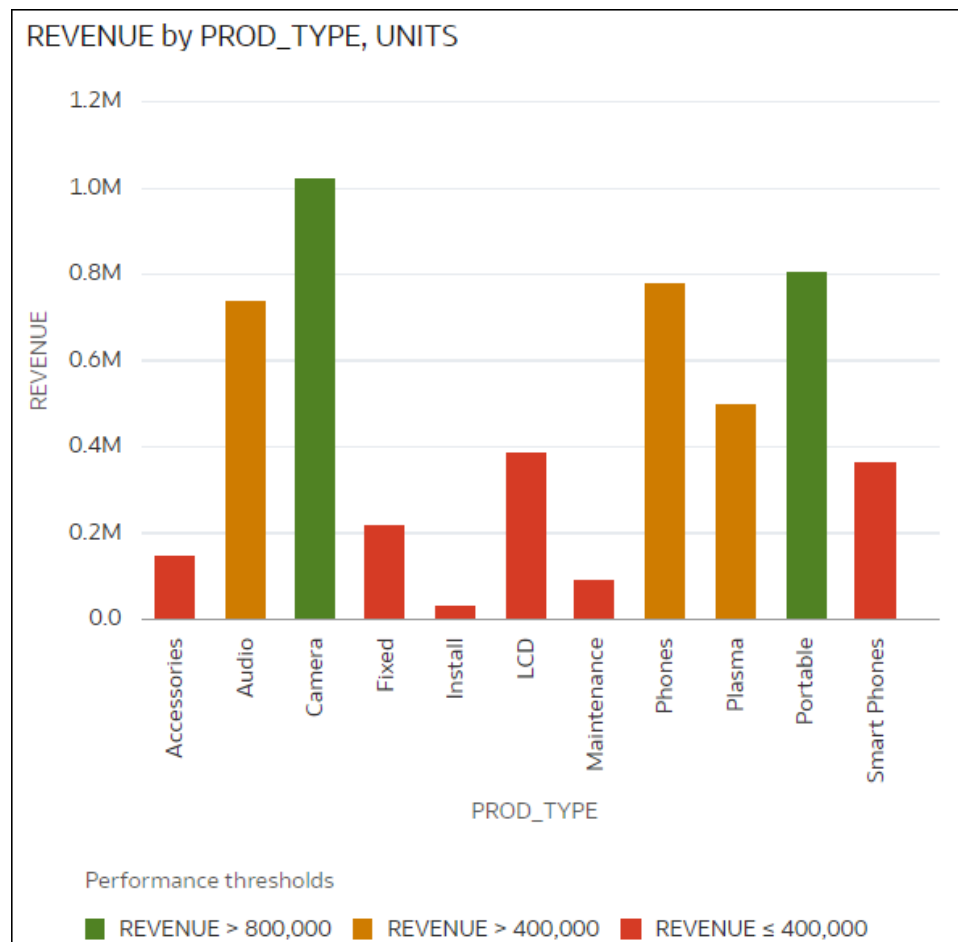
[Video](#)

Topics:

- [What Can I Do with Conditional Formatting?](#)
- [Format Data with Existing Conditional Format Rules](#)
- [Add Conditional Formatting to Data](#)
- [Example - Compare a Measure to a Set of Thresholds](#)
- [Example - Compare a Measure to a Target or Goal](#)
- [Example - Compare a Measure to a Complex Expression Value](#)
- [Example - Compare a Measure to a Percentage of a Value](#)
- [Example - Highlight Values with Emojis](#)

What Can I Do with Conditional Formatting?

With conditional formatting, you apply rules to your data to highlight when something important happens. For example, you might use stoplight colors to show when revenues meet high, medium, and low thresholds.



You can make conditional formatting rules available at workbook level or visualization level.

Conditional formatting provides a way for business users to see events or changes in their data. For example, if users want to see when revenues meet high, medium, or low thresholds, you can create a conditional formatting rule that colors the revenue data points as green, orange, or red.

As a content author you can:

- Apply multiple rules at the same time.
- Apply multiple rules to a measure at the same time.
- Change the order in which rules are applied.
- Turn rules on and off.

Conditional formatting compares measures, such as revenue for a year, the number of units of a product, the number of students that didn't return to school during an academic year, with one of the following:

- A set of thresholds.
For example, highlight values in red if my blood pressure is above 90 or under 70.
- A target or goal.
For example, highlight values in red if my costs exceed my budget.
- A percentage of a target.
For example, highlight values in green when I reach 80% of my sales goal.

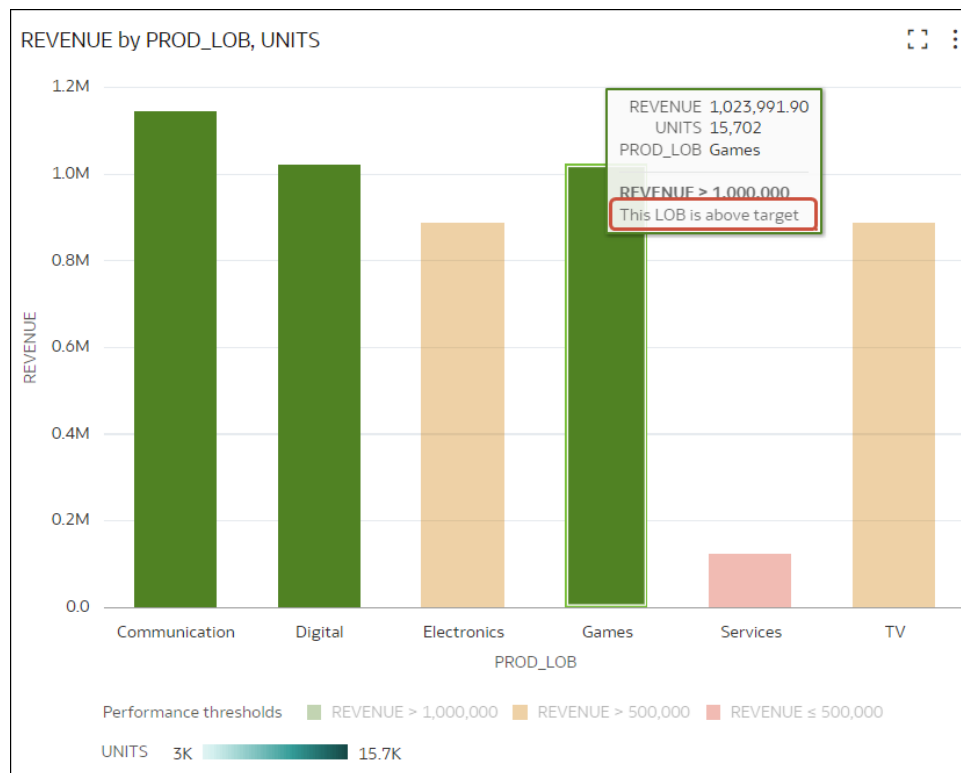
- A complex expression.
For example, highlight values in green when I achieve 5% growth in sales compared to the same period last year.

You can:

- Format the fill color and color density.
- Format the font, font size, font color, and font style.
- Display emojis and icons (in Table, Pivot, or Tile visualizations).

You can also:

- Apply conditional formatting to maps.
- Add labels, tooltips, and legends. For example, when you hover over a data point, display a label "This LOB is above target" to identify the rule applied.



- Combine the formatting of values that match more than one rule, using the **Enable rule blending** option). For example, if rule 1 is revenue greater than one million and highlights in green with the italic Calibri font, and rule 2 is revenue less than target and highlights in red with the Monospace font, then a revenue greater than one million but less than target will have the italic Calibri font with the background highlighted in red. If you're applying multiple rules to a measure, the last rule that evaluates to true is the one that colors the item. For example, if rule 1 is revenue greater than one million and highlights in green, and rule 2 is revenue less than target and highlights in red, an item where revenue meets both criteria will highlight in red.

Format Data with Existing Conditional Format Rules

To highlight important events in your data, you can activate or deactivate existing conditional formatting rules. For example, you might want to show when revenues meet high, medium, and low thresholds.



Video



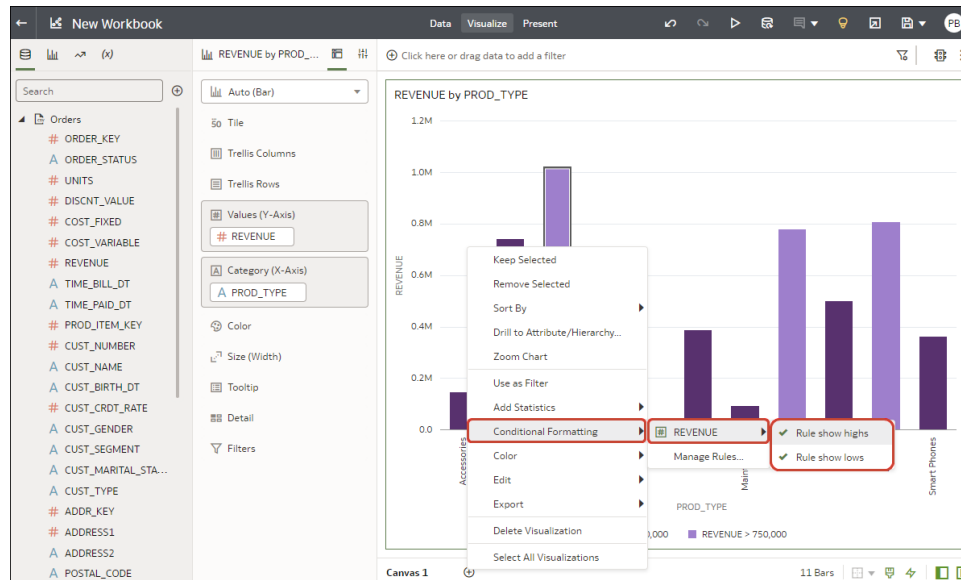
Tutorial

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize**.
3. From the visualization editor, hover over a visualization, right-click, then select **Conditional Formatting** to show measures with rules available.

If a measure has no rules available, click **Manage Rules** to display the Conditional Formatting dialog, where you can create rules.

4. Click a measure (for example, REVENUE), to display rules available for measure.

In this example, REVENUE has two rules available, 'Rule show highs' and 'Rule show lows'. Active rules have a check mark.



5. Click on rules to activate or deactivate them.

Add Conditional Formatting to Data

Add conditional formatting to highlight important events in your data. For example, you might want to show when occupancy rates for a rental property meet high, medium, and low thresholds.



Video



Tutorial

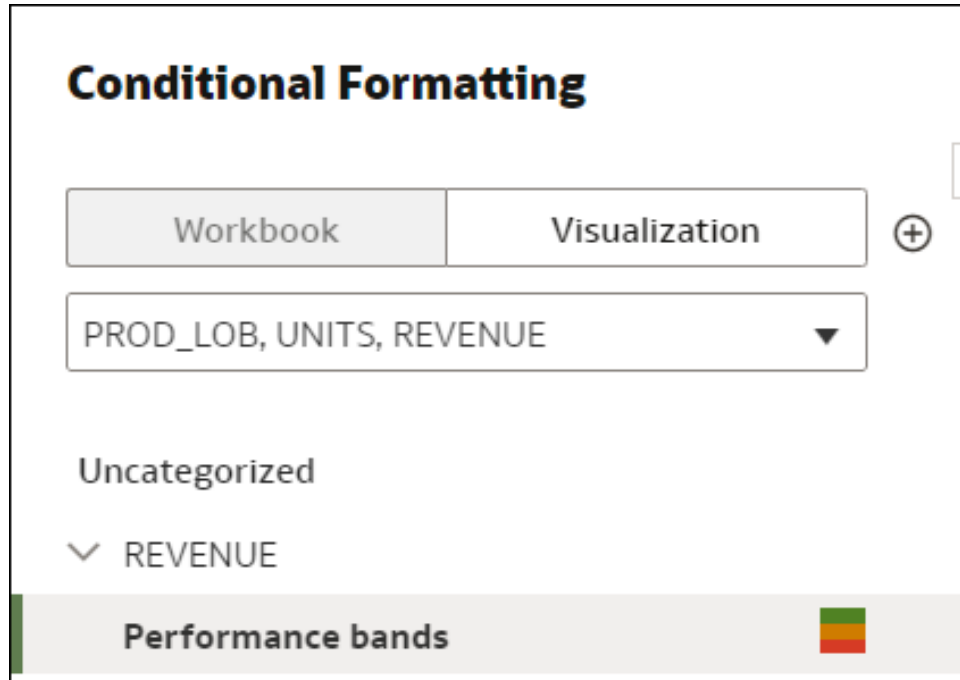
To apply conditional formatting to totals and subtotals, see:

 Tutorial

Note: You can only display icons and emojis in Table, Pivot, or Tile visualizations.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize**.
3. From the visualization toolbar, click **Conditional Formatting** 

Existing rules are listed under their target measure. Rules are displayed as **Uncategorized** until their target measure is specified. For example, in this screenshot, the rule "Performance bands" is listed under the measure REVENUE.



4. Click **Workbook** or **Visualization** to add conditional formatting to the whole workbook, or specific to a visualization.

Tip: If you need to start again, click **Add New Rule**.

Conditional Formatting

Workbook Visualization ⊕

PROD_LOB, UNITS, REVENUE

Uncategorized

▼ Uncategorized

New Rule

☒ Enable rule blending

Name: New Rule

Measure:

Presets: Green Yellow Orange Red

Measure: > Target:

> Scope

Clear Rule Cancel Save

5. In **Name**, change the default name to a more user-friendly term.

6. In **Measure**, select the data measure that the rule evaluates.

For example, to highlight when revenue meet high, medium, and low thresholds, you might select REVENUE.

7. Use the operator field and adjacent value field to specify the threshold.

For example, to highlight REVENUE rates greater than 1,000,000, select the greater than symbol > in the operator field and enter 1,000,000 in the value field.

Tip: You can also create a rule by clicking one of the **Presets** and defining a value for each threshold. For example, click **3 Steps Threshold** to create a set of stoplight thresholds.

Conditional Formatting

Workbook Visualization ⊕

Uncategorized

▼ REVENUE

Stoplight

☒ Enable rule blending

Name: Stoplight

Measure: REVENUE

Presets: Green Yellow Orange Red

REVENUE > 800,000

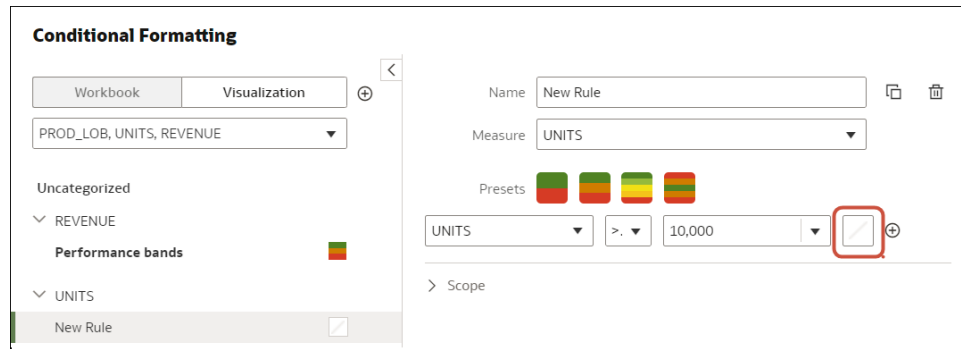
≤ 800,000

> 400,000

≤ 400,000

Clear Rule Cancel Save

8. Click **Format** to configure the fill color, font, icon or emoji (tabular data), note, and legend for the new rule.



9. To add additional rules, repeat Steps 4 to 8.

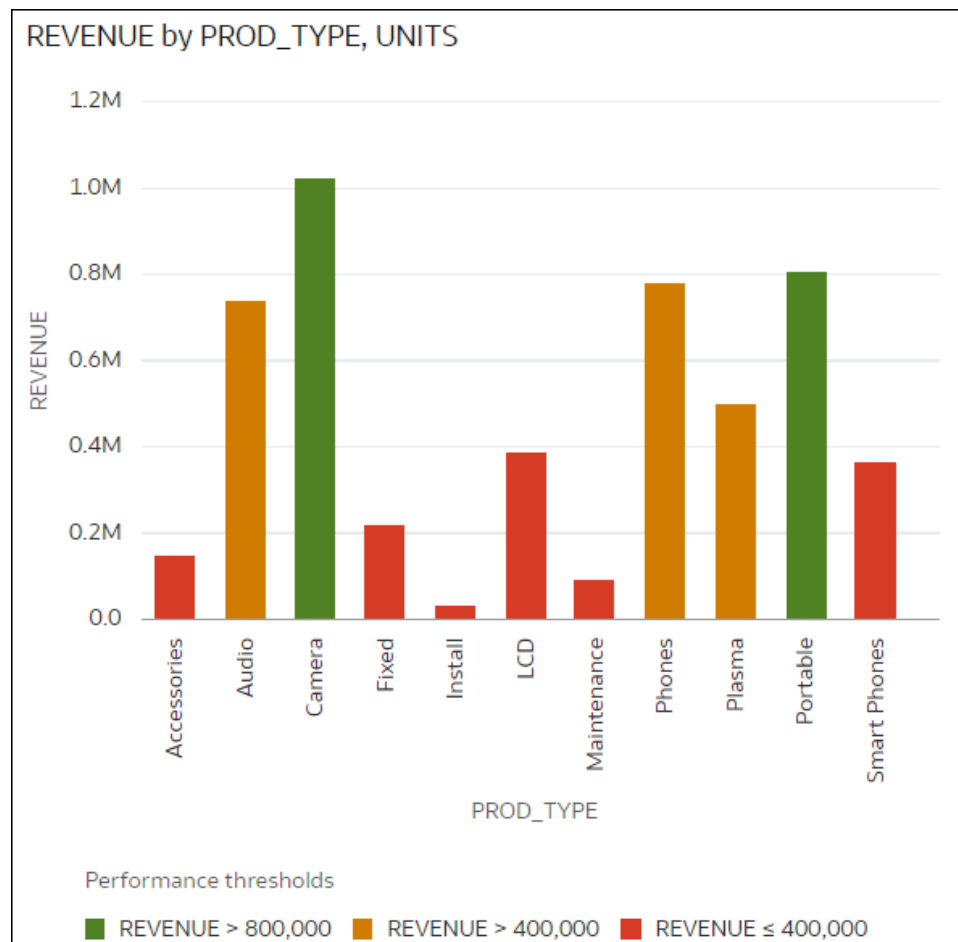
If you're applying multiple rules to the same measure, use the grab handles to position the rules in the order you want (rules at the top activate first), and click **Enable rule blending** if you want to combine text font and styling but retain background color differentiation.

10. Click **Save**.

Example - Compare a Measure to a Set of Thresholds

This example shows how to use conditional formatting to compare a measure to low, medium, and high thresholds, also known as stoplight formatting.

In this example you highlight the revenue level for product types such as audio, phones, and accessories. You show the revenues over 800,000 in green, revenues between 400,000 and 800,000 in amber, and revenues below 400,000 in red.



Here's how to configure this example using the Conditional Formatting dialog.

- In the **Name** field, enter Stoplight.
- In the **Measure** field, select Revenue.
- In **Presets**, click **3 Steps Threshold** to display a three-step template.
- In the first step, select the greater than symbol > and enter 800,000 as the value.
- In the second step, select the greater than symbol > and enter 400,000 as the value.

Conditional Formatting

Workbook Visualization

Uncategorized

REVENUE

Stoplight

Name: Stoplight

Measure: REVENUE

Presets: [3 Steps Threshold]

REVENUE > 800,000

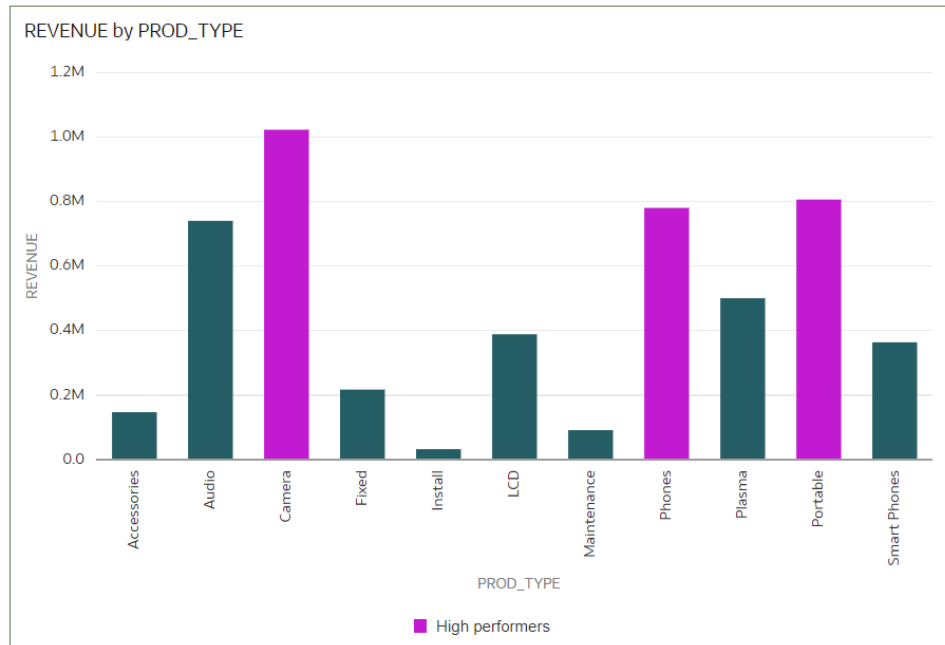
REVENUE > 400,000

REVENUE ≤ 400,000

Example - Compare a Measure to a Target or Goal

This example shows how to use conditional formatting to compare a measure to a target or goal.

In this example you highlight product types such as audio, phones, and accessories with a revenue of more than 750,000.



Here's how to configure this example using the Conditional Formatting dialog.

- In the **Name** field, enter High performers.
- In the **Measure** field, select Revenue.
- In the operator list, select the greater than symbol $>$, and in the value box, enter 750,000.
- Click **Format** to display the color picker and select a purple shade.

Dataset

Workbook

Visualization

REVENUE

☒ High performers

Name

High performers

Measure

REVENUE

Presets

REVENUE

>

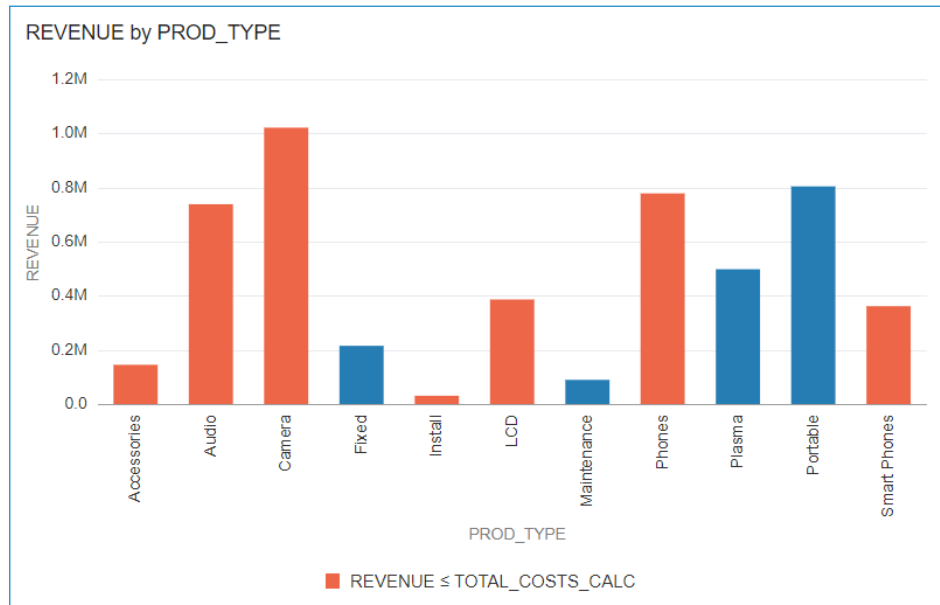
750,000

Format

Example - Compare a Measure to a Complex Expression Value

This example shows how to use conditional formatting to compare a measure to a value calculated by an expression.

In this example, you compare revenue to total costs, which you calculate using an expression that sums fixed costs, variable costs, and discount value.



Here's how to configure this example using the Conditional Formatting dialog.

- In the **Name** field, enter Compare revenue to costs.
- In the **Measure** field, select Revenue.
- In the operator list, select the equal to or less than symbol $\leq$.
- In the value box, click the down arrow, then click **f(x)** to display the calculation editor.
- In the **Name** field, specify TOTAL_COSTS_CALC, and in the calculation field specify $\text{COST\_FIXED} + \text{COST\_VARIABLE} + \text{DISCNT\_VALUE}$.

Calculation

Name
TOTAL_COSTS_CALC
f(x)

COST_FIXED + COST_VARIABLE + DISCNT_VALUE

Validate
Cancel
Save

- Validate the expression and click **Save**.
- Click **Format** to display the color picker and select a red shade.

Conditional Formatting

Dataset
Workbook
Visualization

REVENUE

☒ Compare revenue to costs

Name
Compare revenue to costs

Measure
REVENUE

Presets

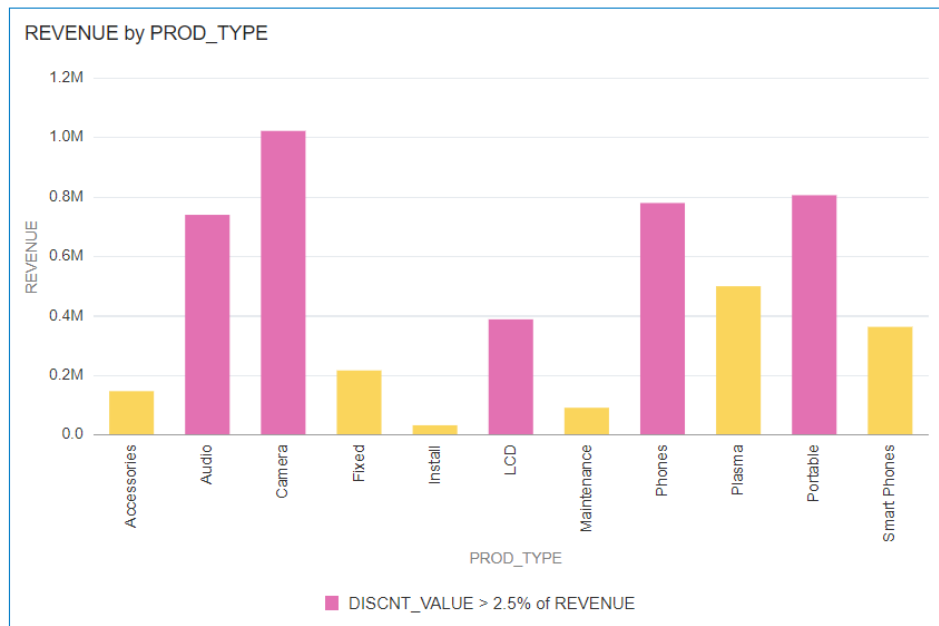
REVENUE ≤ TOTAL_COSTS_C...

Scope

Example - Compare a Measure to a Percentage of a Value

This example shows how to use conditional formatting to compare a measure to a percentage of a value.

In this example you highlight product types such as audio, phones, and accessories where the discount value (stored in DISCNT_VALUE) is greater than 2.5% of revenue.



Here's how to configure this example using the Conditional Formatting dialog.

- In the **Measure** field, select Revenue.
- In the drop down list below **Presets** select DISCNT_VALUE.
- In the operator drop down list, select the greater than symbol '>', in the value box enter '2.5', and click %
- Click **Format** to display the color picker and select a purple shade.

Example - Highlight Values with Emojis

This example shows how to use emojis in conditional formatting to highlight values.

In this example you highlight product types such as audio, phones, and accessories with an emoji where the revenue is greater than 700,000, in addition to spotlight formatting.

PROD_LOB, PROD_TYPE, UNITS, REVENUE

PROD_LOB	PROD_TYPE	UNITS	REVENUE
Communication	Phones	6,622	780,632.36
Communication	Smart Phones	4,142	363,871.65
Digital	Camera	8,555	1,023,235.09
Electronics	Accessories	2,792	147,311.94
Electronics	Audio	4,748	740,476.83
Games	Fixed	5,127	217,348.13
Games	Portable	10,575	806,643.77
Services	Install	2,881	32,733.01
Services	Maintenance	6,508	91,771.55
TV	LCD	1,537	388,825.84
TV	Plasma	1,454	500,511.00

Stoplight 🟢 REVENUE > 700,000 🟡 REVENUE 200,000 - 700,000 🔴 REVENUE ≤ 200,000

Here's how to configure this example using the Conditional Formatting dialog.

- Create a rule and click the **3 Steps Threshold** in **Presets**.
- Select **REVENUE** as the measure and configure the thresholds as greater than 700,000, between 200,000 and 700,000, and less than 200,000.
- Click **Format** for the greater than 700,000 threshold.

Conditional Formatting

Dataset Workbook Visualization

PROD_LOB, PROD_TYPE, UNITS, REVENUE

Orders

REVENUE

Stoplight

Name: Stoplight

Measure: REVENUE

Presets

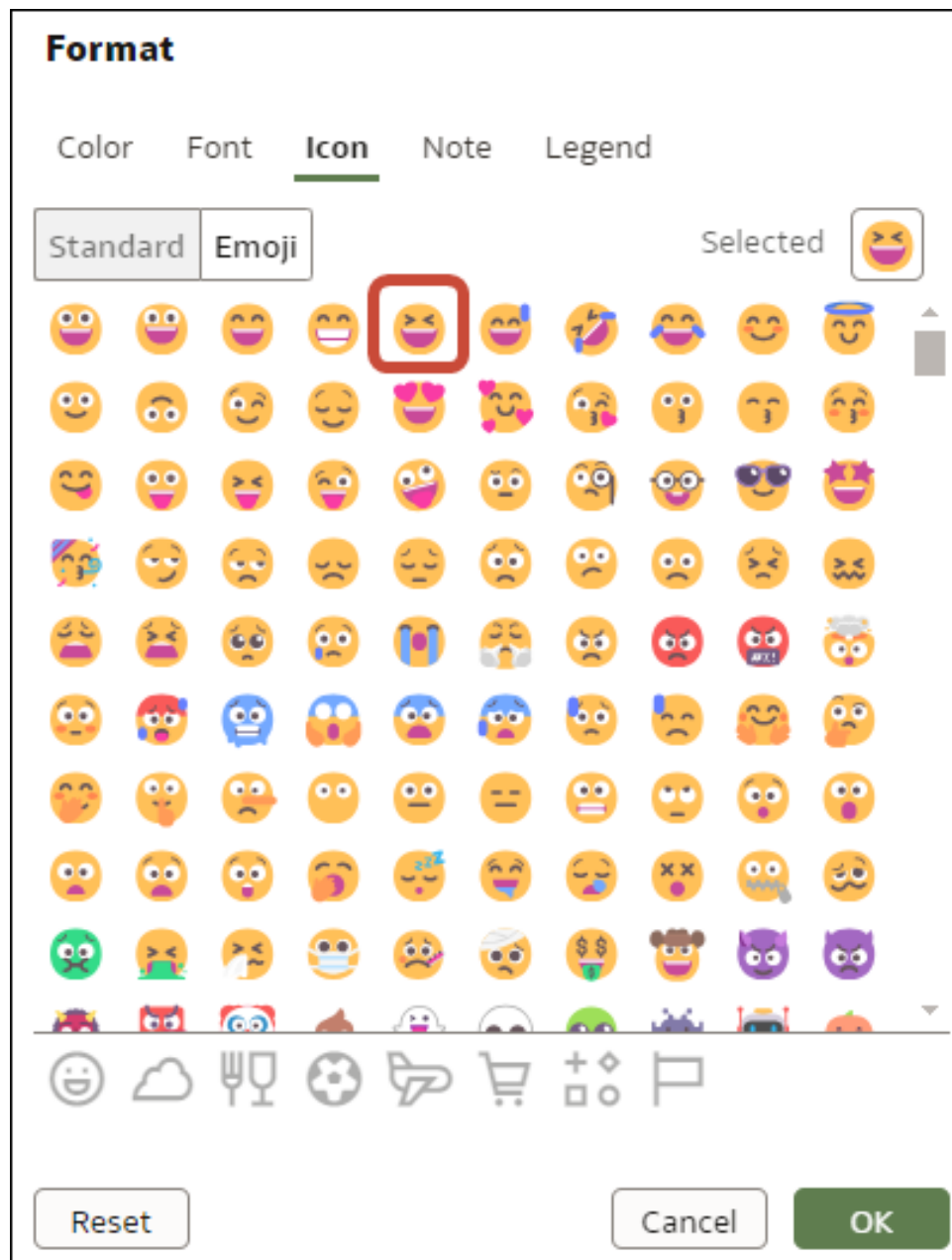
REVENUE > 700,000

≤ 700,000

> 200,000

≤ 200,000

- Click **Icon**, then click **Emoji**, and select a smile emoji.



Apply Color to Visualizations

Use color to enhance your visualizations. For example, you might change the default color palette for analyses in a workbook.

Topics:

- [About Color Assignments in Visualizations](#)
- [Access Color Options](#)
- [Change the Visualization Color Palette](#)
- [Assign Colors to Columns](#)

About Color Assignments in Visualizations

Use color in visualizations to make them more attractive, dynamic, and informative. You can assign color to a series of measure values (for example, Sales or Forecasted Sales) or a series of attribute values (for example, Product and Brand).

Your color choices are shared across all visualizations on the canvas, so if you change the series or data point color in one visualization, then it appears on the other visualizations.

The **Visualize** canvas has a Color section in the Grammar Panel where you can put a measure column, attribute column, or set of attributes columns. The canvas assigns color to the columns that are included in the Color section:

- When a measure is in the Color section, then you can select different measure range types (for example, single color, two color, and three color) and specify advanced measure range options (for example, reverse, number of steps, and midpoint).
- When you've one attribute in the Color section, then the stretch palette is used by default. Color palettes contain a set number of colors (for example, 12 colors), and those colors repeat in the visualization. The stretch palette extends the colors in the palette so that each value has a unique color shade.
- If you've multiple attributes in the Color section, then the hierarchical palette is used by default, but you can choose to use the stretch palette, instead. The hierarchical palette assigns colors to groups of related values. For example, if the attributes in the Color section are Product and Brand and you've selected Hierarchical Palette, then in your visualization, each brand has its own color, and within that color, each product has its own shade.

Access Color Options

You can set color options for workbook and visualizations in your workbook.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit** to open the workbook in author mode.
3. Click **Menu** on the workbook toolbar and select **Workbook Properties** to edit continuous coloring for the workbook.
4. If you want to edit visualization color menu options.
 - a. Select the visualization, click **Menu** and select **Color**. The available color options depend on how the measures and attributes are set up in your visualization.
 - b. Select **Stretch Palette** to turn this option on or off.
Color palettes have a set number of colors, and if your visualization contains more values than the number of color values, then the palette colors are repeated. Use the Stretch Palette option to expand the number of colors in the palette. Stretch coloring adds light and dark shades of the palette colors to give each value a unique color. For some visualizations, stretch coloring is used by default.
 - c. Select **Reset Visualization Colors** to revert to the original colors.

Change the Visualization Color Palette

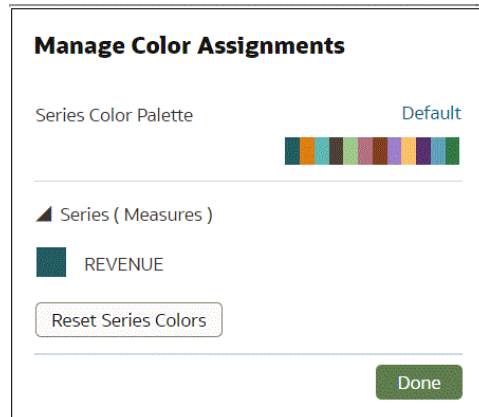
You can switch between the various color palettes until you find the one you want.



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Each color palette contains 12 colors that you can apply to a visualization.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Click **Edit** to open the workbook in author mode.
3. Select a visualization to change the color palette.
4. Click **Menu**, select **Color**, and then select **Manage Assignments**.
5. In Manage Color Assignments, click the color palette.

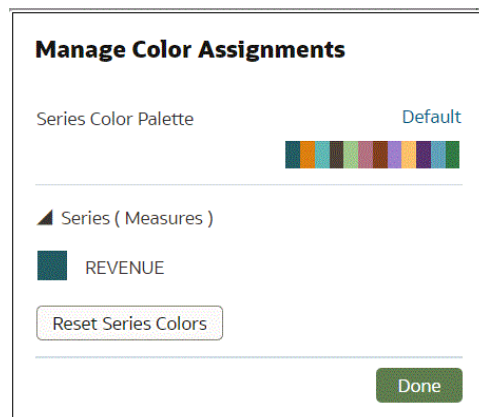


6. From the Series Color list, click a color palette and click **Done**.

Assign Colors to Columns

Instead of using the palette's default colors, you can choose specific colors to fine-tune the look of your visualizations.

1. On the Home page, hover over a workbook, click **Actions**, and select **Open**.
2. Click **Edit** to open the workbook in author mode.
3. Click the visualization's **Menu**, select **Color**, and then select **Manage Assignments**.
4. Click the box containing the color assigned to the column. From the color picker dialog, select the color that you want to assign to the column. Click **OK**.
5. Specify how you want the color range to be displayed for the column (for example, reverse the color range, pick a different color range, and specify how many shades you want in the color range).



Format Numeric Values of Columns

You can format numeric values of a column in your visualizations using a wide range of ready-to-use formats. For example, you might change the aggregation type from Sum to Average.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Data Panel, select the column.
3. In the properties pane for the selected column, use the **General** or **Number Format** tabs to change the numeric properties.
 - **General** - Change the column name, data type, treat as (measure or attribute), and aggregation type.
For example, to change how a number is aggregated, use the **Aggregation** option.
 - **Number Format** - Change the default format of a number column.
4. Click **Save**.

Format Numeric Values of Visualizations

You can format numeric properties of a visualization using a wide range of ready-to-use formats.

For example, you can change how you display data labels, currency, decimal places, abbreviation preset to scale number or currency options, negative numbers, tooltip numbers, and aggregation method.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize** and select a visualization.
3. In the properties pane for the selected visualization, use the **Values** tab to change the numeric properties.
For example, to change number format to display negative values in red, under **Number Format**, click **Negative Values** and select a red option, 123 or (\$123).
4. Click **Save**.

Set Scale Options for Numbers and Currency Values

You can select an abbreviated preset scale option for a visualization column to display numbers or currency for thousands (K), millions (M), billions (B), or trillions (T).

You can change a column number scale format such as 32,810.00, to display in an abbreviated preset number scale format such as 32.81K. For example, select **K** to change a Sales column from displaying a value such as \$37,723.21 to display the same value as \$37.72K.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize** and select a visualization.
3. In the properties pane for the selected visualization, select the **Values** tab and expand a measure column.
4. Under **Number Format**, click **Abbreviate**.
5. Select a value.

- Select **On** if you want to automatically scale and abbreviate numbers.
 - Select a value if you want to choose a specific scale and abbreviation value.
 - Select **Off** if you want to disable abbreviations.
6. Click **Save**.

Set Currency Symbols for Visualizations

You can set measure values in a visualization to display an appropriate currency symbol.

You can configure a measure to use a custom currency to display the symbol associated with a currency. For example, if you set a canvas filter to display a European Ledger, then the Euro symbol is displayed for each measure value that's associated with the custom currency property. The workbook data must contain a currency code column, for example, a Ledger Currency column. The currency code column enables the display of an appropriate currency symbol for the measure column, for example, a Profit column.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Properties panel for a selected measure, click the **Values** tab, click **Number Format**, and select **Currency**.
3. In the **Currency** field, click the currently displayed value and select **Custom**.
4. In the **Custom** field, add the column that determines the currency code.
5. Click **Save**.

Tip: If you're your currency values are prefixed with country code and currency symbol in a Chrome browser, use the Languages settings in Chrome to set the Language value, which affects the format displayed in workbooks. For example, set the Language to "English (United States)" to prefix currency values with \$ instead of US\$.

Add Notes to Visualizations

Annotate your visualizations with notes to call out areas of interest or emphasize specific data points.

Topics:

- [Add Notes to a Visualization](#)
- [Connect a Note to Data Points in a Visualization](#)
- [Show or Hide a Note's Data Point Connectors](#)
- [Delete a Note's Data Connectors](#)
- [Show or Hide a Visualization's Notes](#)

Add Notes to a Visualization

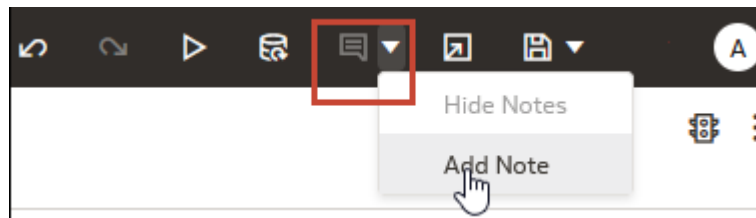
You can add notes to call out important information in a workbook's visualizations. You can use notes to annotate one or all of the visualizations in a canvas, or to emphasize specific data points in a visualization, such as columns in a table or clusters in a scatter plot.

There are many formatting options that you can use to customize a note's content. For example, you can choose font type, size, and color; add a bulleted or numbered list; and add URL links.

When you add a note, you can add data connectors to call out specific points in the visualization, or you can create the note and add or adjust the data point connectors later. See [Connect a Note to Data Points in a Visualization](#).

By default, the notes that you add are displayed, but you can hide a visualization's notes. See [Show or Hide a Visualization's Notes](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the workbook, click **Visualize**.
 - To add a note without data point connectors, click the **Notes** icon and select **Add Note**.
 - To add a note with data point connectors, go to the visualization where you want to add the note and hold down the Ctrl key and click up to ten data points that you want the note to connect to. Then click the **Notes** icon and select **Add Note**.



3. In the note box, enter the note text and use the formatting options to specify the note's font style, color, size, and so on.
4. Optional: To add a link to the note, highlight the note text that you want to make into a link. Click **Link** and in the Hyperlink dialog, enter a URL. Click **OK**.
5. Click **Save**.

Connect a Note to Data Points in a Visualization

Add connectors to a note to identify specific data points in a visualization.

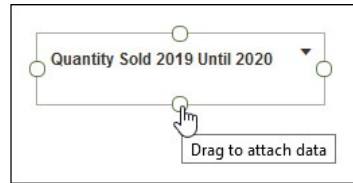
 [LiveLabs Sprint](#)

You can connect a note to up to ten data points on a visualization or canvas. You can't connect a note to a data point on these visualization types:

- Chord Diagram
- Correlation Matrix
- List
- Map
- Parallel Coordinates
- Tile

By default, a note's data point connectors are displayed, but you can hide them. See [Show or Hide a Note's Data Point Connectors](#).

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Locate and hover over the note that you want to attach to data points. Click and hold a circle and drag the line to the data point that you want to connect the note to. You can connect a circle to multiple data points.

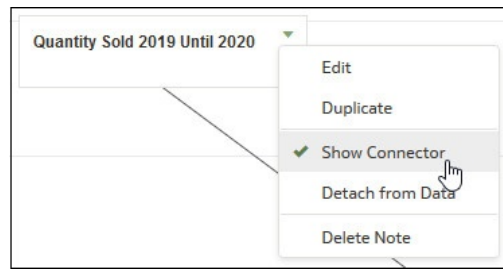


3. Click **Save**.

Show or Hide a Note's Data Point Connectors

By default a note's data point connectors are displayed, but you can hide or show them as needed.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Locate and hover over the note with the connectors to hide or show. Click **Click to edit** and then click **Show Connector**.



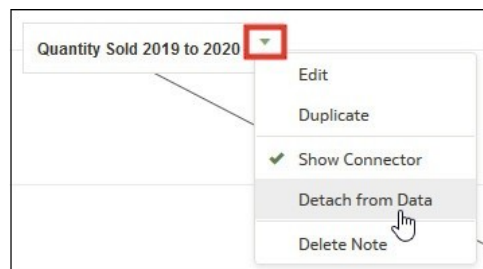
3. Click **Save**.

Delete a Note's Data Connectors

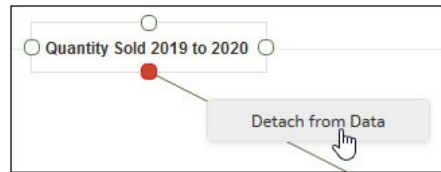
You can delete one or more of a note's data connectors.

Instead of deleting a note's data connectors, you can hide them. See [Show or Hide a Note's Data Point Connectors](#).

1. On the Home page, hover over a workbook, click **Actions** and then select **Open**.
2. Optional: To delete all connectors, locate and hover over a note with connectors. Click **Click to edit** and then click **Detach from Data**.



3. Optional: To delete an individual connector, hover over and right-click a connector, and then click **Detach from Data**.



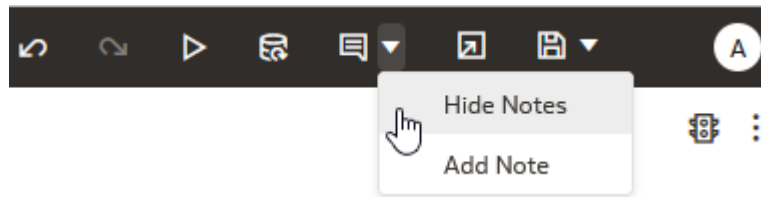
4. Click **Save**.

Show or Hide a Visualization's Notes

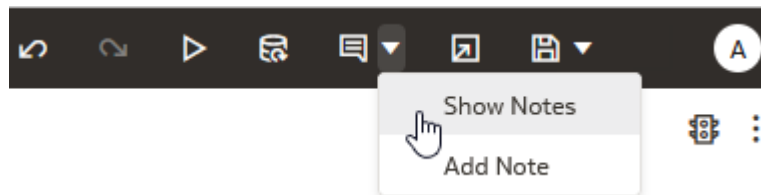
By default a workbook's visualization notes are displayed, but you can hide or show all notes.

If you create a presentation flow from a workbook, then all of the included canvases' notes are displayed in the dashboard even if you hide all notes in Visualize. In the Present page where you add canvases to create the presentation flow and workbook, you can use a canvas' **Notes** properties to show and hide individual notes for the canvas. If your presentation flow and workbook contains multiple canvases, then you can set to show and hide individual notes for each canvas. See [Show or Hide Canvas Notes in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. Optional: If the workbook's notes are displayed, then click **Hide Notes**.



3. Optional: If the workbook's notes aren't displayed, then click **Show Notes**.



4. Click **Save**.

Sort, Drill, and Select Data in Visualizations

You can narrow your focus to explore certain aspects of your data by sorting, drilling, and selecting data.

[LiveLabs Sprint](#)

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Select a visualization and click **Menu**.
3. Select one of the following:

- Click **Sort By** and then select **Custom**, or click **Sort** in the visualization tool bar to display the Sort Order dialog where you can sort one or more attributes in a visualization. You can create and view sorts, define sort attributes, arrange the sort order for multiple sorts, and view and resolve sort conflicts. You can also sort an attribute by a measure column that isn't used in the visualization. If the table includes subtotals or contains a dimension, then all column sorts on columns after the subtotal or dimension, are sorted in the subtotal group.

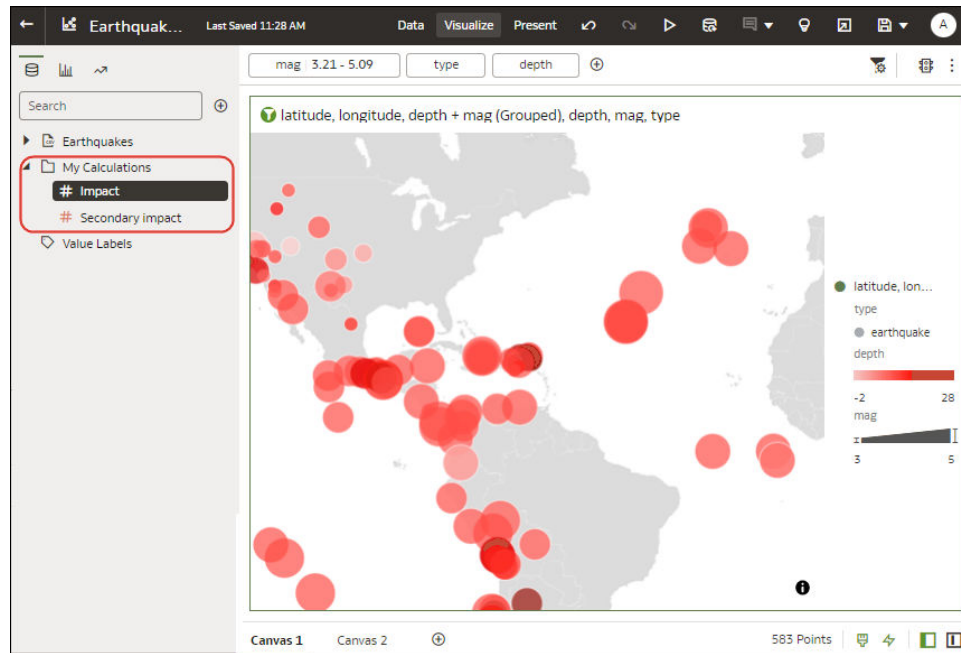
If you're working with a table view with multiple sorts, then the system always sorts the last column that you sorted first. In some cases where specific values display in the left column, you can't sort the center column. For example, if the left column is Product and the center column is Product Type, then you can't sort the Product Type column. To work around this issue, swap the positions of the columns and try to sort again.

- Click **Drill** to create a drill to a data element, and to create a drill through hierarchies in data elements, for example you can create a drill to weeks within a quarter. You can also create drills using multiple data elements. For example, you can select two separate year members that are columns in a pivot table, and drill into those members to see the details.
- Click **Drill to [Attribute Name]** to directly drill to a specific attribute within a visualization.
- Click **Keep Selected** to keep only the selected members and remove all others from the visualization and its linked visualizations. For example, you can keep only the sales that are generated by a specific sales associate.
- Click **Remove Selected** to remove selected members from the visualization and its linked visualizations. For example, you can remove the Eastern and Western regions from the selection.

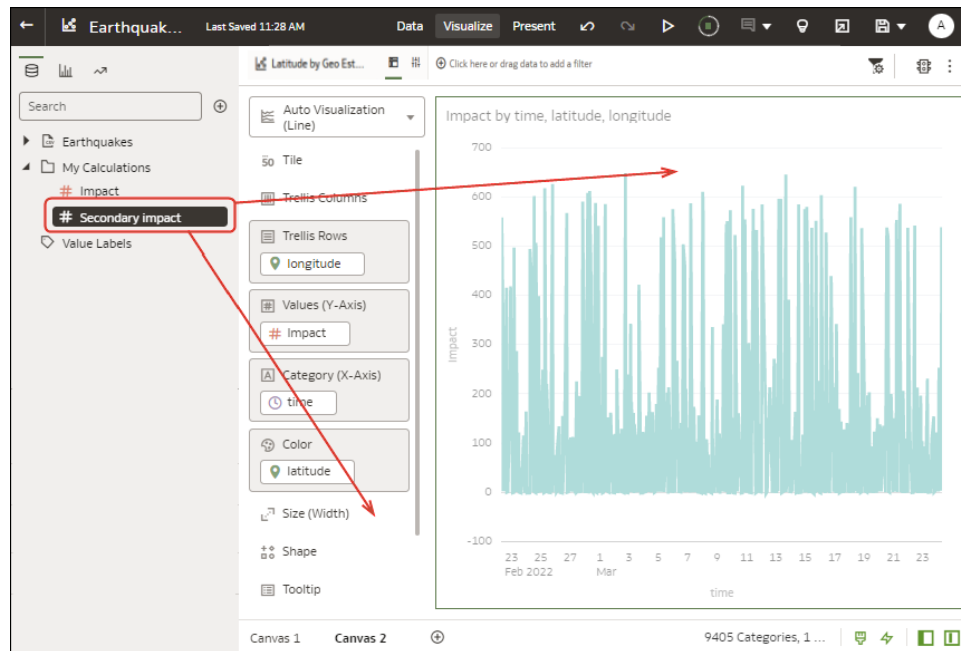
Use Calculations in Visualizations

You can create and modify custom calculations to use with your datasets when building visualizations in a workbook.

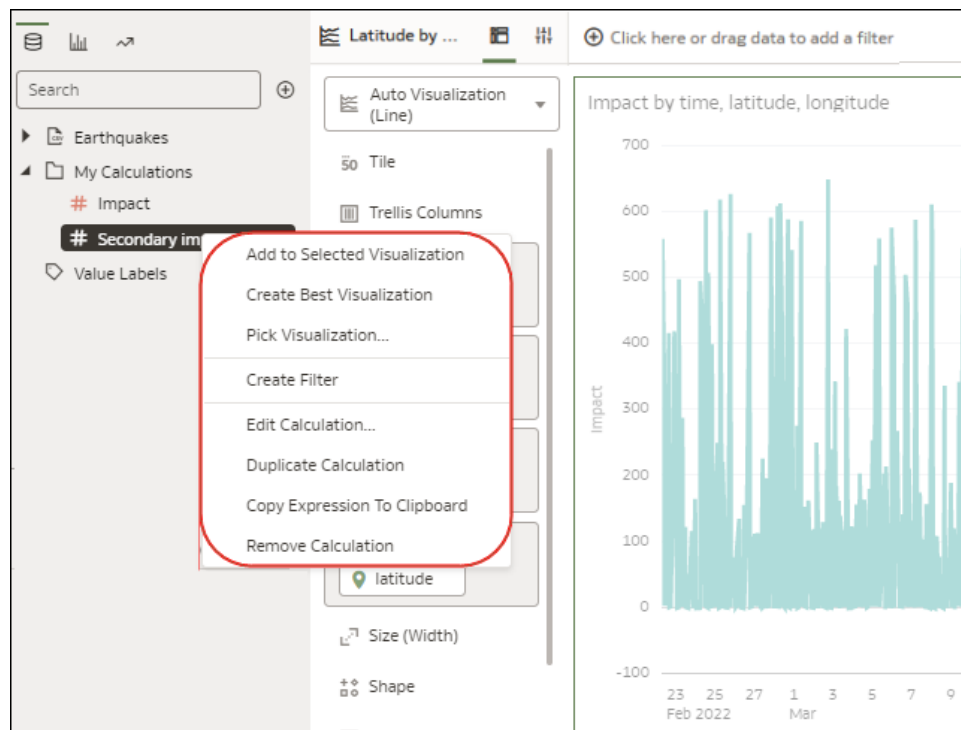
- Calculations are stored in the **My Calculations** area of the Data Panel, where you can reuse them in any visualization in the workbook. For example, if you have data elements for height and width, you might calculate area by multiplying height by width (that is, height * width). You can reuse the area calculation in other visualizations in a workbook. You can also use calculations in other calculations.
- In the workbook editor, review existing calculations in the My Calculations area, and select a calculation to display its attributes in the Data Panel.



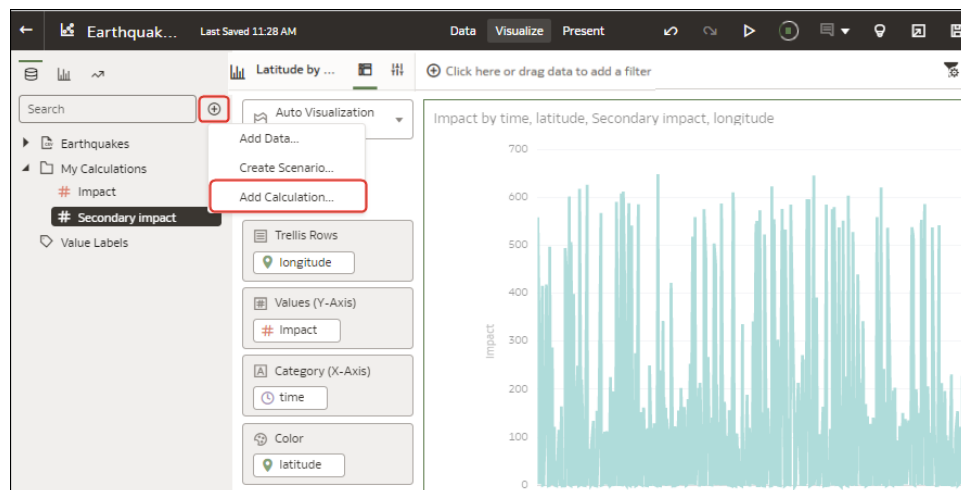
- To add a calculation to a visualization, drag it from the My Calculations area to the visualization or Grammar Panel.



- Right-click a calculation to its editing options. For example, you might add it to the selected visualization, use it to filter your data, or let Oracle Analytics choose the best visualization type for you (that is, **Create Best Visualization**).



- To calculate a new value to use in your workbook, click **Add**, then **Calculation** to display the New Calculation dialog, where you can specify the details (for example, height * width). The new calculation is added to the My Calculations area.



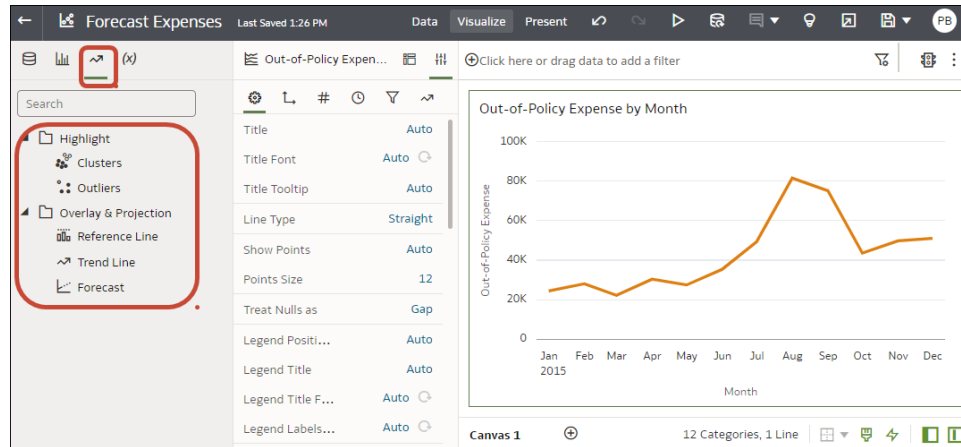
Create a Cluster or Outlier in a Visualization

Add clusters or outliers to your workbooks.

- On the Home page, hover over a workbook, click **Actions**, then select **Open**.
- Make sure that you have the required data in your visualization for the type of analytics you want to add.

For example, for a forecast, you need at least one time dimension and a measure or metric.

3. In the Data Panel or Grammar Panel, click the **Analytics** icon 



4. Drag and drop **Clusters** or **Outliers** from the **Analytics** pane to a visualization.
5. To configure the analytics function, use the Analytics pane on the Grammar panel.

Analyze Data with Explain

Explain uses machine learning to find useful insights about your data.

Topics:

- [What is Explain?](#)
- [What Are Insights?](#)
- [Use Explain to Discover Data Insights](#)

What is Explain?

Explain analyzes the selected column within the context of its dataset and generates text descriptions about the insights it finds. For example, for any column you'll find out basic facts, key drivers, segments that explain the column, and anomalies.



Explain uses Oracle's machine learning to generate accurate, fast, and powerful information about your data, and creates corresponding visualizations that you can add to your workbook's canvas.

Explain is for data analysts who might not know what data trends they're looking for, and don't want to spend time experimenting by either dragging and dropping columns onto the canvas, or using data flows to train and apply predictive models.

Explain is also a useful starting point for data analysts to confirm a trend that they're looking for in their data, and then use that information to create and tune predictive models to apply to other datasets.

What Are Insights?

Insights are categories that describe the selected column within the context of its dataset.



The insights that Explain delivers are based on the column type or aggregation that you chose and will vary according to the aggregation rule set for the chosen metric. Explain generates only the insights that makes sense for the column type that you chose.

Insight Type	Description
Basic Facts	Displays the basic distribution of the column's values. Column data is broken down against each of the dataset's measures. This insight is available for all column types. - For a selected metric, this insight shows the distribution of the aggregated metric value for each member of each attribute column. - For a selected attribute, this insight shows the value of each metric in the dataset across the member values of the attribute.
Key Drivers	Shows the columns in the dataset that have the highest degree of correlation with the selected column outcome. Charts display the distribution of the selected value across each correlated attributes value. This tab displays only when explaining attribute columns, or when explaining a metric column that has an average aggregation rule.
Segments	Displays the key segments (or groups) from the column values. Explain runs a classification algorithm on the data to determine data value intersections and identifies ranges of values across all dimensions that generate the highest probability for a given outcome of the attribute. For example, a group of individuals of a certain age range, from a certain set of locations, with a certain range of years of education form a segment that has a very high probability of purchasing a given product. This tab displays only when explaining attribute columns.
Anomalies	Identifies a series of values where one of the (aggregated) values deviates substantially from what the regression algorithms expect.

Use Explain to Discover Data Insights

When you select a column and choose the Explain feature, Oracle Analytics uses machine learning to analyze the column in the context of the dataset. For example, Explain searches the selected data for key drivers and anomalies.

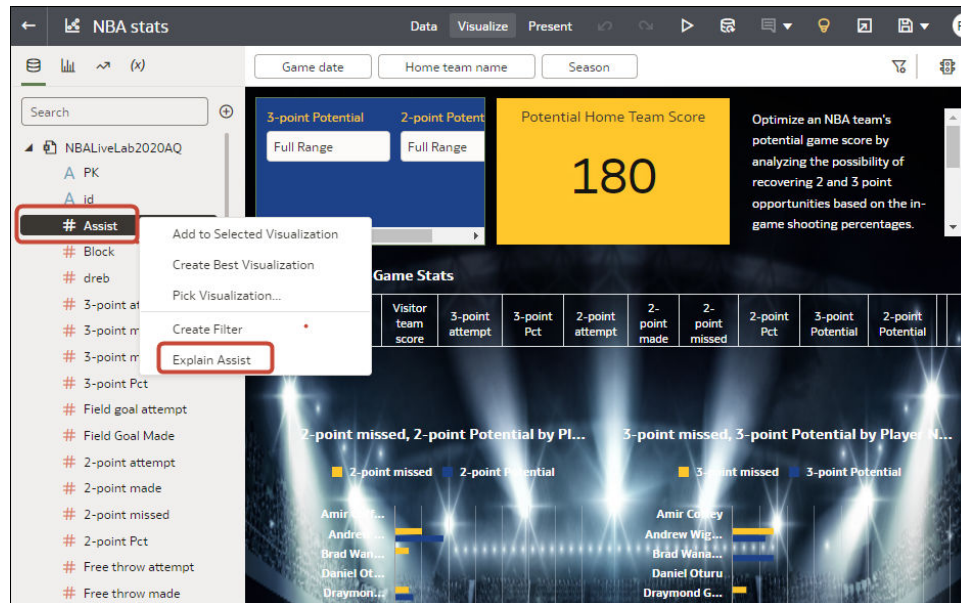
Explain displays its findings to you as text descriptions and visualizations, which you can add to your workbook's canvas.



If you perform explain on a column and the results contain too many correlated and highly ranked columns (for example, ZIP code with city and state), then excluding some columns from the dataset so that Explain can identify more meaningful drivers. See [Hide or Delete a Column](#).

Explain is available after you install machine learning into your local Oracle Analytics Desktop directory. See [How do I install Machine Learning for Desktop?](#)

1. In the Home page, click **Create** and then **Workbook** to create a new workbook.
2. Click **Visualize** to open the Visualize page.
3. In the Data Panel, right-click a column and select **Explain <Data Element>**.

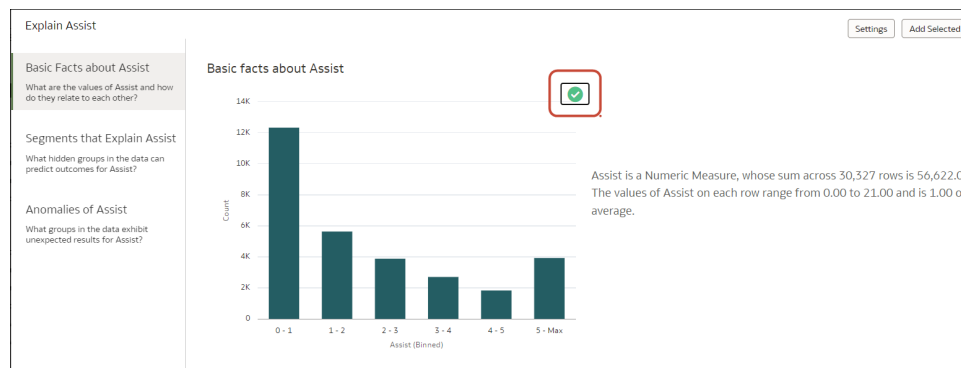


For Explain to successfully analyze an attribute, the attribute must have three to 99 distinct values.

The Explain dialog displays basic facts, anomalies, and other information about the selected column.

4. Review the suggested insights in other categories by clicking on the tabs. For example, Basic Facts about <attribute> or Anomalies of <attribute>.
5. For each insight that you want to include in your workbook's canvas, hover over it and click **Select for Canvas**.

You'll see a green tick (✓) next to selected items.

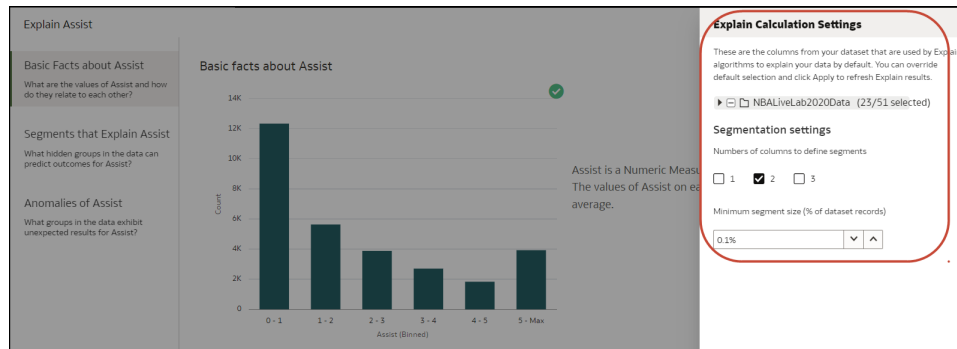


You can select multiple insights from any of the tabs.

6. Click **Add Selected** to add insights marked with a green tick on any of the tabs.

You can manage the Explain insights like any other visualizations you've manually created on the canvas.

To fine-tune the insights, click **Settings** to change which columns are analyzed and configure options for that category, for example, select the minimum size for segments.



About the Warning for Data Issues in Visualizations

You see a data warning icon when the full set of data associated with a visualization isn't rendered or retrieved properly.

If the full set of data can't be rendered or retrieved properly, then the visualization displays as much data as it can as defined for the fixed limit, and the remaining data or values are either truncated or not displayed.

Set Workbook Thumbnails

Data authors can show or hide the thumbnail for an individual workbook on the Home page. Hiding a workbook thumbnail can be useful for protecting sensitive data from being exposed to users that don't have the same access as the data author.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. If the workbook opens for viewing, click **Edit**.
3. Click **Menu** on the workbook toolbar and select **Workbook Properties**.
4. Set **Save thumbnails** to **On** to display a thumbnail for the workbook on the Home page or **Off** to hide it.
5. Click **OK**.
6. Click **Save**.

Set Visualization Loading Overlay Opacity

Data authors can adjust the white overlay opacity around visualizations that displays while a workbook loads the data. Setting a lower opacity level can enable canvases with a dark background to show through while rendering visualizations.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. If the workbook opens for viewing, click **Edit**.
3. Click **Menu** on the workbook toolbar and select **Workbook Properties**.
4. Use the **Visualization Loading Overlay** slider to set the opacity of the visualization overlay to a value between 1-100, where 1 is transparent, and 100 is opaque.
5. Click **OK**.
6. Click **Save**.

Open a Custom Workbook Extension

You can select a workbook extension to expand and enhance your workbook's functionality.

You or the developers in your company can create custom workbook extensions that provide additional workbook functionality. After you upload one or more of these custom workbook extensions to Oracle Analytics Desktop, the **Custom Workbook Extension** icon displays in the workbook toolbar.

Workbook extensions aren't workbook specific. All the workbook extensions that your administrator uploads display from the toolbar.

1. Create or open a workbook.
2. On the workbook toolbar, click **Custom Workbook Extension** .
3. From the list, click an extension to open or run it.

8

Filter Data

Use filters in Oracle Analytics to focus the data in your workbooks to create effective and interactive dashboards for your end users.

Topics:

- [About Filters](#)
- [Use Workbook and Canvas Filters](#)
- [Use Dashboard Filters](#)
- [Use Visualization Filters](#)
- [Change the Filter Type](#)
- [Filter Data Using an Expression Filter](#)
- [Exclude Selected Filter Values](#)
- [Include Null Filter Values](#)
- [Disable Multi Select for Filters](#)
- [Disable a Filter](#)

About Filters

Filters reduce the amount of data shown in visualizations. Oracle Analytics lets you filter the data in your workbooks in many different ways and configure the filter properties to customize the dashboard experience for your end users.

Topics:

- [Filter Scopes](#)
- [Filter Types](#)
- [Filter Properties](#)
- [How the Number of Datasets Affects Filters](#)
- [How Filters Limit Each Other](#)
- [About Filter Personalizations](#)
- [Ways to Use Parameters with Filters](#)

Filter Scopes

You can apply filters at different scopes in your workbook in Oracle Analytics, from broadly filtering the entire workbook down to filtering a single visualization on a canvas.

You can apply filters at the following levels:

- **Workbook** - A workbook filter is used in the workbook filter bar and applies to all canvases in the workbook. See [Use Workbook and Canvas Filters](#).

- **Canvas** - A canvas filter is also used in the workbook filter bar, but applies only to a single canvas in the workbook. See [Use Workbook and Canvas Filters](#).
- **Dashboard** - A dashboard filter is used directly on a canvas to enable end users to filter data on that canvas. See [Use Dashboard Filters](#).
- **Visualization** - A visualization filter applies only to a single visualization. See [Use Visualization Filters](#).

Filter Types

Oracle Analytics supports many different types of filters that you can use depending on the filter scope and the data element you're using to filter.

Filter Type	Description
List	A list filter can be applied to data elements that are text and date data types, and number data types that can't be aggregated. A list filter provides a simple list of values to choose from and lets you see which values are selected and which aren't. They work well for attributes with a long list of values. Availability: List filters are available for all filter scopes. Properties: • Multi Select • Default Value • Exclude • Nulls • Disable • Selection Parameter Binding • Excludes Mode Parameter Binding For more information about these properties, see Dashboard Filter Control Properties. Limitations: While list filters don't have a limit to the number of values they can display, performance can decline if more than 10,000 values are selected.
List box	A list box filter is similar to a list filter and can be applied to text, uncountable values, and dates. It also provides a simple list of values but only lets you select one or All. Availability: List box filters are available only for dashboard filters. Properties: • Custom Values • Default Value • Exclude • Nulls • Selection Parameter Binding • Excludes Mode Parameter Binding For more information about these properties, see Dashboard Filter Control Properties. Limitations: • You can't disable a list box filter. • Multi Select isn't available for list box filters. • Parameter binding isn't available for list box filters that use a derived date column.

Filter Type	Description
Checkbox / Radio Button	A checkbox or radio button filter can be applied to text, uncountable values, and dates. When Multi Select is on, the filter uses a checkbox, and when it's off, the filter uses a radio button. Availability: Checkbox or radio button filters are available only for dashboard filters. Properties: • Multi Select • Default Value • Exclude • Nulls • Visible Values • Selection Parameter Binding • Excludes Mode Parameter Binding For more information about these properties, see Dashboard Filter Control Properties. Limitations: • By default, this filter type is optimized to display only the first 50 data values. For a filter column with more than 50 values, Oracle recommends that you use a different filter type, for example a list box filter. • You can't disable a checkbox or radio button filter. • Parameter binding isn't available for checkbox or radio button filters that use a derived date column.
Top Bottom N	A top bottom N filter can be applied to measure and attribute data elements. For example, you might filter a visualization by the top 10 customers based on sales. Availability: Top bottom N filters are available for all filter scopes. Properties: • Method - Specifies whether to filter by Top (highest values) or Bottom (lowest values). • Count - Specifies the number of values to display. • By - Specifies which measure or attribute to limit by.
Range	A range filter can be generated for data elements that are number data types and that have an aggregation rule set to something other than none. Range filters are applied to data elements that are measures, and that limit data to a range of contiguous values, such as revenue of \$100,000 to \$500,000. Or you can create a range filter that excludes (as opposed to includes) a contiguous range of values. Such exclusive filters limit data to noncontiguous ranges (for example, revenue less than \$100,000 or greater than \$500,000). Availability: Range filters are available for all filter scopes. Properties: • Start - Specifies the minimum value. • End - Specifies the maximum value. • By - Specifies which measure or attribute to limit by.
Date Range	A date range filter uses calendar controls to adjust time or date selections to limit data to a specific period of time. You can either select a single contiguous range of dates, or you can use a date range filter to exclude dates within the specified range. Availability: Date range filters are available for all filter scopes. Properties: • Range - Requires a start and end date to filter on. • Start at - Requires only a start date to filter from. • End at - Requires only an end date to filter to. • Equal - Requires a specific date to filter on.

Filter Type	Description
Relative Time	A relative time filter focuses on values for a specified time period relative to today or end of last period. For example, you can focus on the last three years, the next three years, or year to date through the last fiscal period. The current date and time used in queries is the Oracle Analytics server host's date and time in the server's timezone (not the browser host's time or timezone). Availability: Relative time filters are available for all filter scopes. Properties: • Type - Specifies whether the filter is relative to a past or future time period, or to today's date. – Last - Uses the Increment and Time Level values to specify a time period up to either today's date or the end of the last period. Last filters that are based on a DateTime column and which have a grain of Day or longer (for example, Year, Quarter, Month, Week, Day), retrieve data from the same time of day on the starting day. For example, if the server date/time is currently Thursday 3:15pm, a Last 2 Days filter on a DateTime column retrieves data with timestamps between Tuesday 3:15pm and Thursday 3:15pm in the server's timezone. Filter queries that are based on a Date column (which by definition have no time of day associated) only depend on the server host's date, not the time of day. – Next - Uses the Increment and Time Level values to specify a time period after either today's date or the start of the next period. – To Date - Use the Time Level value to specify the time period from the beginning of the Time Level value up to today's date. For example, Month to Date retrieves data from midnight of the first day of this month up until the current date and time (that is, Today). • Increment - Specifies the increment of the unit of time to use for the filter. • Time Level - Specifies the unit of time to use for the filter. • Relative To - Specifies whether the filtered data is relative to Today, Start of Next Period, or End of Last Period. Limitations: You can apply a relative time filter only to date columns that already exist in the data source, not to derived columns such as Year, or Quarter. The relative time filter type supports Date and DateTime column types.
Slider	A slider filter can be used to animate visualizations and show dynamically how your data changes over a given dimension such as time. A slider filter can be applied to text, uncountable values, and dates. Availability: Slider filters are only available for dashboard filters. See Filter and Animate Visualizations using a Slider Dashboard Filter. Properties: • Font - Value and Label • Auto Play - On, Off, Speed, and Repeat For more information about these properties, see Dashboard Filter Control Properties. Limitations: • You can't disable a slider filter. • Parameter binding isn't available for slider filters.

To change the filter type of an existing filter, see [Change the Filter Type](#).

The following filter options are also available in Oracle Analytics:

- **Expression Filter** - An expression filter lets you define more complex filters using SQL expressions. See [Filter Data Using an Expression Filter](#).
- **Use as Filter** - A visualization can be used to filter other visualizations on the same canvas. See [Use a Visualization as a Filter](#).

Filter Properties

You can customize the appearance and functionality of filters in Oracle Analytics by setting the filter properties. The options available depend on the filter scope, filter type, and other property settings.

- [Filter Bar Properties](#)
- [Dashboard Filter General Properties](#)
- [Dashboard Filter Date/Time Properties](#)
- [Dashboard Filter Control Properties](#)
- [Dashboard and Visualization Filters Properties](#)

Filter Bar Properties

You can modify these properties found in the Filter Bar Menu for workbook and canvas filters.

Property	Description
Limit Values By	Specifies how the filters in the filter bar control get their selection values. See Specify Limit Values for Workbook and Canvas Filters .
Filter Values	Specifies whether the values for the filters in the filter bar are displayed. Options • Show All - Displays filter values for all existing filters in the filter bar. • Hide All - Hides filter values for all existing filters in the filter bar. • Show by Default - Shows filter values for filters that you add next. Filters that you added before selecting this option aren't affected. See Display or Hide Selected Values in the Workbook or Canvas Filter Label.
Auto-Apply Filters	Specifies whether the filter selections in the filter bar are automatically applied. Options • On - Applies filter data values as you select them in the filter bar. • Off - Doesn't automatically apply filter data values as you select them in the filter bar. Adds an Apply button to the Filter dialog. See Manually Apply Workbook and Canvas Filters.
Move to Dashboard Filter	Converts all canvas filters in the workbook to dashboard filters. Adds a dashboard filter visualization to each canvas and moves the canvas filters for that canvas from the filter bar into the visualization. Options • Horizontal - Orients the new dashboard filters visualization horizontally. • Vertical - Orients the new dashboard filters visualization vertically. See Convert Canvas Filters to Dashboard Filters.

Dashboard Filter General Properties

You can modify these properties found under the General tab in the Properties panel to customize the appearance of your dashboard filters visualization.

These properties are available depending on the filter type and other property settings you're using.

Property	Description
Title	Specifies whether the visualization title is displayed and how it's generated. Options • Auto - Generates a title based on the column names used in the visualization. • Custom - Lets you create your own title. • None - Doesn't display a title.
Title Font	If the Title property is set to Auto or Custom, specifies the font formatting used for the visualization title. Options - The default is Auto, or you can modify the following properties: • Font • Size • Style • Color
Title Tooltip	If the Title property is set to Auto or Custom, specifies whether the visualization title is displayed in a tooltip and how it's generated. Options • Auto - Uses the visualization title • Custom - Lets you create your own tooltip title. • None - Doesn't display a title.
Filter Style	Specifies how the filter controls are displayed. Options • Standard - Displays the name of the filtered data element above the filter selector. • Filter Chip - Displays dashboard filters in a compact style where the filter selector is hidden. This option merges the filtered data element name and the filter selector and provides a count of any selected values. See Change the Dashboard Filter Style.
Show Values	If the Filter Style is set to Filter Chip, specifies whether the filter values are displayed. You can hide the filter values when you need canvas space.
Label Font	Specifies the font formatting used for the filter control labels. Options - The default is Auto, or you can modify the following properties: • Font • Size • Style • Color
Label Location	Specifies the placement of the filter control labels in relation to the filter selectors. Options • Before • After • Above

Property	Description
Values Font	Specifies the font formatting used for the values displayed in the filter selectors. Options - The default is Auto, or you can modify the following properties: • Font • Size • Style • Color
Orientation	Specifies the orientation of the visualization itself. Options • Vertical • Horizontal • Auto - Automatically chooses the orientation based on the visualization's position and the space available on the canvas. See Change the Orientation of Dashboard Filters.
Wrap	Specifies whether the filter controls stay on one line or wrap within the visualization.
Max Control Width	Specifies the maximum width of the filter controls within the visualization as displayed to end users in the dashboard. Options • Auto • Fill • Custom - You can specify a width of 121 or greater.
Control Style	Specifies the formatting of the filter controls. Options - The default is Auto, or you can select Custom to modify the following properties: • Color - Changes the color of the filter selectors. • Transparency - Changes the transparency of the color applied to the filter selectors. • Outline - Hides or displays the outline for the filter selectors.
Buttons	Specifies whether the Reset or Apply buttons are available for end users to use when selecting dashboard filters. Options • Reset - End users can click the button to clear their filter value selections and reset the filters to their original state. • Apply - If the Apply button is visible, filter value selections aren't applied until the user clicks the button.
Align	Specifies the alignment of the filter controls inside the dashboard filters visualization.
Visibility Parameter	Specifies whether the visualization is always displayed or conditionally hidden for the end user based on the selected value of a parameter. For more information, see Use a Parameter to Conditionally Show or Hide a Visualization.
Background	Specifies the formatting of the visualization background. Options - The default is Auto, or you can click Custom to modify the following properties: • Fill Color - Changes the background color. • Color Transparency - Changes the transparency of the color applied to the background. • Image Source - Adds an image as the background using either a URL or an uploaded file.

Property	Description
Border	Specifies whether the visualization has a border and the format of the border. See Set Visualization Border Properties .
Shadow	Specifies whether the visualization has a shadow and the format of the shadow. See Set Visualization Shadow Properties .
Size and Position	If the canvas layout is set to Freeform, specifies the size and position of your visualization on the canvas. Options • Width • Height • X Position • Y Position

Dashboard Filter Date/Time Properties

You can modify these properties found under the Date/Time tab in the Properties panel for dashboard filters visualizations that use a date or time column.

Property	Description
Show By	For date columns in a dataset, specifies the time intervals in which the filter values available to select are displayed.
Format	Specifies the format of the values based on the selection for Show By .

Dashboard Filter Control Properties

You can modify these properties found under the Filter Controls tab in the Properties panel to customize the appearance and functionality of your dashboard filters visualization.

These properties are available depending on the filter type and other property settings you're using.

Property	Description
Filter Type	Specifies the type of filter to use based on the data element you're using as a filter. See Filter Types .
Label	Specifies how the filter control label is generated and whether it's displayed. Options • Auto - Generates a label based on the data element being used as the filter. • Custom - Lets you create your own label. • None - Doesn't display a label.

Property	Description
Value Font	If the filter type is Slider, specifies the font formatting used for the values displayed in the slider filter control. Options - The default is Auto, or you can modify the following properties: • Font • Size • Style • Color
Slider Label Font	If the filter type is Slider, specifies the font formatting used for the slider filter control label. Options - The default is Auto, or you can modify the following properties: • Font • Size • Style • Color
Play	If the filter type is Slider, specifies whether the slider filter control is animated automatically. Options - If Play is set to On, the following options are available on the slider filter control: • Speed • Repeat See Filter and Animate Visualizations using a Slider Dashboard Filter.
Multi Select	If the filter type is List or Checkbox / Radio Button, specifies whether more than one value can be selected in the filter control. See Disable Multi Select for Filters.
Custom Values	If the filter type is List Box, specifies whether users can type a value into the filter's value selection field.
Null Selection	If the filter type is List Box or Checkbox / Radio Button, specifies whether the <NULL> option is included in the filter's value selection list. For list filters, the Nulls option is available in the filter dialog. See Include Null Filter Values.
Exclude Selection	If the filter type is List Box or Checkbox / Radio Button, specifies whether values selected in the filter's value selection list are excluded or not. For list filters, the Exclude option is available in the filter dialog. See Exclude Selected Filter Values.
Default Value	If the filter type is List, List Box, or Checkbox / Radio Button, specifies whether the filter control has a default value and what it is. Options • First in List • Custom • None
Selection Required	If the filter type is List, List Box, or Checkbox / Radio Button, specifies if the user is required to select a filter value.
Limit Values By	Specifies how the dashboard filter control gets its selection values. See Specify Limit Values for Dashboard Filters.

Property	Description
Visible Values	If the filter type is Checkbox / Radio Button, specifies how many value selection options are displayed. Options • Fit - Displays the first 50. • Custom - You can choose a number to display from 1-50.
Selection Parameter Binding	If the filter type is List Box or Checkbox / Radio Button, specifies whether a parameter is bound to the filter. For all other filter types, the Bind to Parameter option is available in the filter dialog. See About Binding Parameters to Filters .
Excludes Mode Parameter Binding	If the filter type is List Box or Checkbox / Radio Button, specifies whether the filter excludes data values and is bound to an excludes parameter. For list filters, the Exclude Bind to Parameter option is available in the filter dialog. See Create and Bind a Parameter to Exclude Filter Values .

Dashboard and Visualization Filters Properties

You can modify these properties found under the Filters tab in the Properties panel for dashboard filters visualizations and for visualizations using visualization filters.

These properties are available depending on the visualization, filter type, and other property settings you're using.

Property	Description
Visualization Filter Bar	Specifies whether the Visualization Filter Bar is displayed on the visualization. To hide individual filters in the Visualization Filter Bar, see Show or Hide a Visualization Filter in Present .
Use as Filter	For visualizations that can be used to filter other visualizations, specifies whether the visualization is being used as a filter. See Use a Visualization as a Filter .
Show Filter Toggle	For visualizations that can be used to filter other visualizations, specifies if the Use as Filter icon is visible on the visualization itself.
Titles Font	Specifies the font formatting used for the filter labels. Options - The default is Auto , or you can modify the following properties: • Font • Size • Style • Color
Selections Font	Specifies the font formatting used for the displayed filter values. Options - The default is Auto , or you can modify the following properties: • Font • Size • Style • Color

Property	Description
Label	For visualization filters, specifies how the filter label is generated and whether it's displayed. Options • Auto - Generates a label based on the data element being used as the filter. • Custom - Lets you create your own label. • None - Doesn't display a label.
Multi Select	For visualization filters, if the data element being used as the filter is text, uncountable values, or dates, specifies whether more than one value can be selected. See Disable Multi Select for Filters.
Filter This Viz By	Specifies the workbook, canvas, or dashboard filters that are applied to the visualization.
Apply This Filter To	For dashboard filters, specifies the visualizations they apply to. See Apply a Dashboard Filter to Visualizations on the Canvas.

How the Number of Datasets Affects Filters

Filters can interact differently with visualizations depending on the number of datasets and whether the datasets are joined.

If there's a single dataset in a workbook, and you add a filter, there are no restrictions on which data the filter applies to.

If a workbook contains multiple datasets, make sure that they're joined if you want to use data elements from one dataset as filters in your workbook. Filters based on data elements from one dataset don't work on visualizations using data from another dataset if the datasets aren't joined.

How Filters Limit Each Other

You can set the limit values properties for filters at different levels in a workbook. Carefully designing how filters behave and interact provides the end user with filters that contain predictable and intuitive filter values to choose from.

Limit Values Setting Levels

Before you add different filters to your workbook, it's important to understand how the limit values settings cascade and affect each other.

Level	Location	Description
1	Console	Your administrator sets the Oracle Analytics Default Limit Values By for Filters system setting. This is the highest-level limit filter values setting and is applied to all workbooks. You can override this setting at various levels within a workbook. The option chosen by the administrator is used as the default setting in the workbook filter bar.

Level	Location	Description
2	Workbook filter bar	The workbook filter bar inherits the system setting by default but you can use the Limit Values By setting for the filter bar to override the system setting. The setting you specify in the workbook filter bar is applied to all filters in the filter bar. See Specify Limit Values for Workbook and Canvas Filters.
3	Individual filters in the workbook filter bar	Any workbook (pinned) or canvas (unpinned) filters that you add to the filter bar inherit the Limit Values By setting selected for the filter bar. You can select an individual filter and use Limit Values to override the filter bar's setting for that particular filter. See Specify Limit Values for Workbook and Canvas Filters.
4	Dashboard filters	Dashboard filters are limited by the workbook or canvas filter selections depending on the Limit Values By setting on the filter bar and the Limit Values setting on the individual workbook or canvas filters. You can select an individual dashboard filter and use Limit Values to override the workbook or canvas filters' or workbook filter bar's setting. See Specify Limit Values for Dashboard Filters.
5	Visualization filters	Visualizations display data according to the limitations you set for any existing workbook, canvas, and dashboard filters. If you add a visualization filter for the same column as a dashboard filter or a filter in the filter bar, the visualization filter is limited by the filter selections for that dashboard filter or filter in the filter bar.

Limit Values Setting Options

When configuring the **Limit Values By** setting for the workbook filter bar or the **Limit Values** setting for individual filters in the filter bar and dashboard filters, you can choose from these options.

Option	Description
Default	For the filter bar, uses the Default Limit Values By for Filters system setting that your administrator set. For individual workbook or canvas filters in the filter bar, uses the Limit Values By setting from the filter bar. For dashboard filters, uses the Limit Values By setting from the filter bar. Or if the canvas contains a workbook or canvas filter and a dashboard filter that use the same column, the default uses the Limit Values setting for the workbook or canvas filter.
Auto	For both the filter bar and individual workbook or canvas filters in the filter bar, limits the filter selection values by the other filter selections in the filter bar. For dashboard filters, limits the filter selection values by the other dashboard filter and workbook or canvas filter selections.

Option	Description
None	For both filter bar and individual workbook or canvas filters in the filter bar, doesn't limit the filter selection values by the other filter selections in the filter bar. For dashboard filters, doesn't limit filter selection values by the other dashboard filter and workbook or canvas filter selections.
Filter Name	For individual workbook and canvas filters in the filter bar, uses the selected workbook, canvas, or dashboard filter's selections to limit selection values. For dashboard filters, uses the selected workbook, canvas, or other dashboard filter's selections to limit selection values. You can choose more than one.

Example

Suppose you have the following filters in your workbook:

- Workbook (pinned) filters: Customer Segment and Customer Name
- Dashboard filters: Customer Segment and City
- Visualization filter: Ship Date

If the filter bar's **Limit Values By** is set to **Auto** and you select values for the Customer Segment workbook filter:

- Only the customer names associated with the chosen customer segments are available for selection in the Customer Name workbook filter. You can override this by setting the Customer Name workbook filter's **Limit Values** to None or another specific filter.
- The Customer Segment dashboard filter inherits the values selected for the Customer Segment workbook filter. You can override this by setting the dashboard filter's **Limit Values** to None or another specific filter.
- Only the cities associated with the chosen customer segments are available for selection in the City dashboard filter. You can override this by setting the dashboard filter's **Limit Values** to None or another specific filter.
- Only the ship dates associated with the chosen customer segments are available for selection in the Ship Date visualization filter. You can't override this at the visualization filter level.

About Filter Personalizations

User selected dashboard or visualization filter values persist when the user closes and reopens the workbook.

Filter personalizations save end users time because they can pick up where they left off with the workbook and don't have to set filter values for their data each time they open the workbook. While in the workbook, end users can click **Revert all changes** to change the filter values back to the values set by the workbook's author.

If you're a workbook author and change filters, this is how those changes impact personalizations:

Change	Impact
Add filter	Retains user personalizations.

Change	Impact
Hide filter	Retains user personalizations.
Disable filter	Removes user personalizations.
Delete filter	Removes user personalizations.

By default, personalizations are enabled for each workbook. As a workbook author, you can update the workbook's presentation flow to specify if the filter values persist when the user reopens the workbook. See [Specify Personalization Options in Present](#).

Ways to Use Parameters with Filters

In Oracle Analytics, you can use parameters and filters together to dynamically manipulate the data in your workbook.

Use parameters and filters together in the following ways:

- Bind a parameter to a filter to pass a selected filter value to the parameter everywhere it's used in the workbook. See [Bind Parameters to Filters](#).
- Add a parameter to the workbook filter bar to set the parameter value for the workbook or canvas. See [Use a Parameter in the Filter Bar](#).
- Add a parameter to a dashboard filter visualization as a filter control. See [Use a Parameter as a Dashboard Filter Control](#).

If you use a parameter as a filter, keep in mind that parameters have a limit of 10,000 available values that can be cached and also a limit of 1,000 initial values.

You can also use a parameter and a filter together to conditionally show or hide visualizations on a canvas based on a user's selections. See [Use a Parameter to Conditionally Show or Hide a Visualization](#).

Use Workbook and Canvas Filters

You can add filters to the workbook filter bar to broadly limit the data on a specific canvas or all canvases in a workbook. For example, limit the data to the year 2024.

Topics:

- [About Workbook and Canvas Filters](#)
- [Add Workbook and Canvas Filters](#)
- [Specify Limit Values for Workbook and Canvas Filters](#)
- [Display or Hide Selected Values in the Workbook or Canvas Filter Label](#)
- [Manually Apply Workbook and Canvas Filters](#)
- [Convert Canvas Filters to Dashboard Filters](#)
- [Use a Parameter in the Filter Bar](#)

About Workbook and Canvas Filters

Workbook filters limit the data on all canvases in the workbook, and canvas filters limit the data on a single canvas.

These filters go in the filter bar (pinned workbook filters and unpinned canvas filters) are generally the first level of filters that you add to a workbook. You can then add other levels of filtering to fine tune the data, for example, add dashboard filters that allow end users to select their own filter values, or add visualization filters that cascade selected values from one visualization to another.

You can hide the filters in the filter bar from end users for a cleaner dashboard experience (see [Show or Hide the Workbook Filter Bar in Present](#)) or you can customize the level of interactivity you want your users to have with the filter bar (see [Specify Workbook Filter Options in Present](#) and [Specify Canvas Filter Actions in Present](#)).

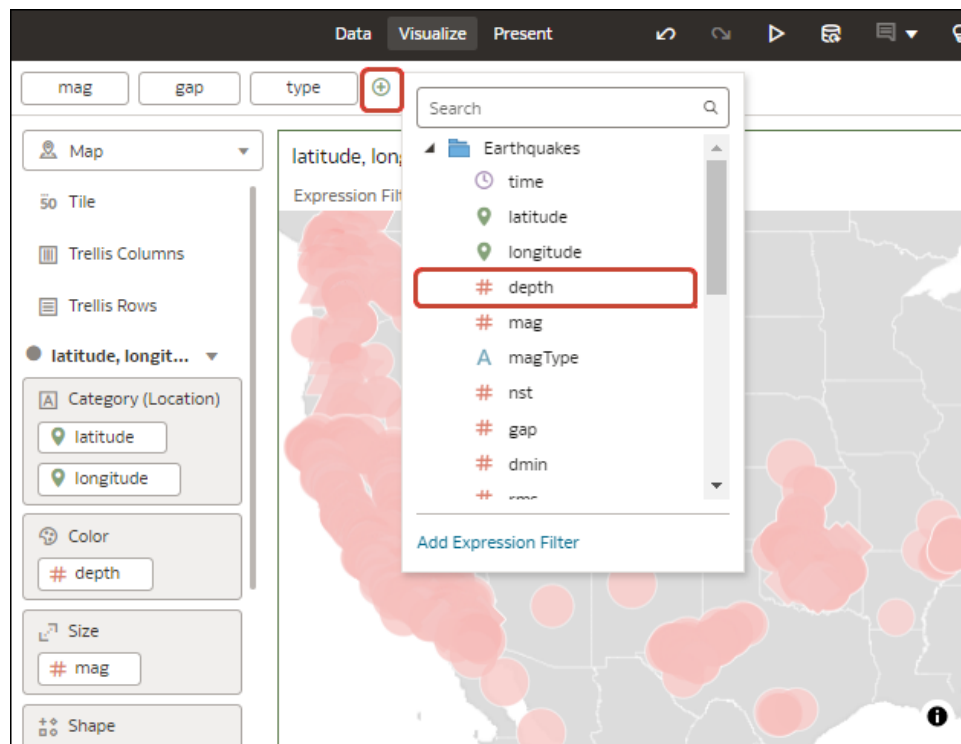
Add Workbook and Canvas Filters

When you add a filter to the filter bar, the filter applies to only the current canvas and is called a canvas filter. You can pin that filter to apply it to every canvas in the workbook and turn it into a workbook filter.

A pinned workbook filter functions the same on every canvas, so any filter data values that you select from any canvas are passed to the pinned filter on all canvases in the workbook. And any configurations you make for the filter are the same on every canvas, for example exclude, null, limit values, and disable filter.

For information about the different types of filters you can use, see [Filter Types](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the Filter Bar, click **Add Filter** (+) and select the column you want to filter on.



3. In the Filter dialog, select the data values to filter on.
4. Optional: To make the filter a workbook filter that applies to all canvases, hover over the filter and click Pin to All Canvases.
5. Click **Save**.

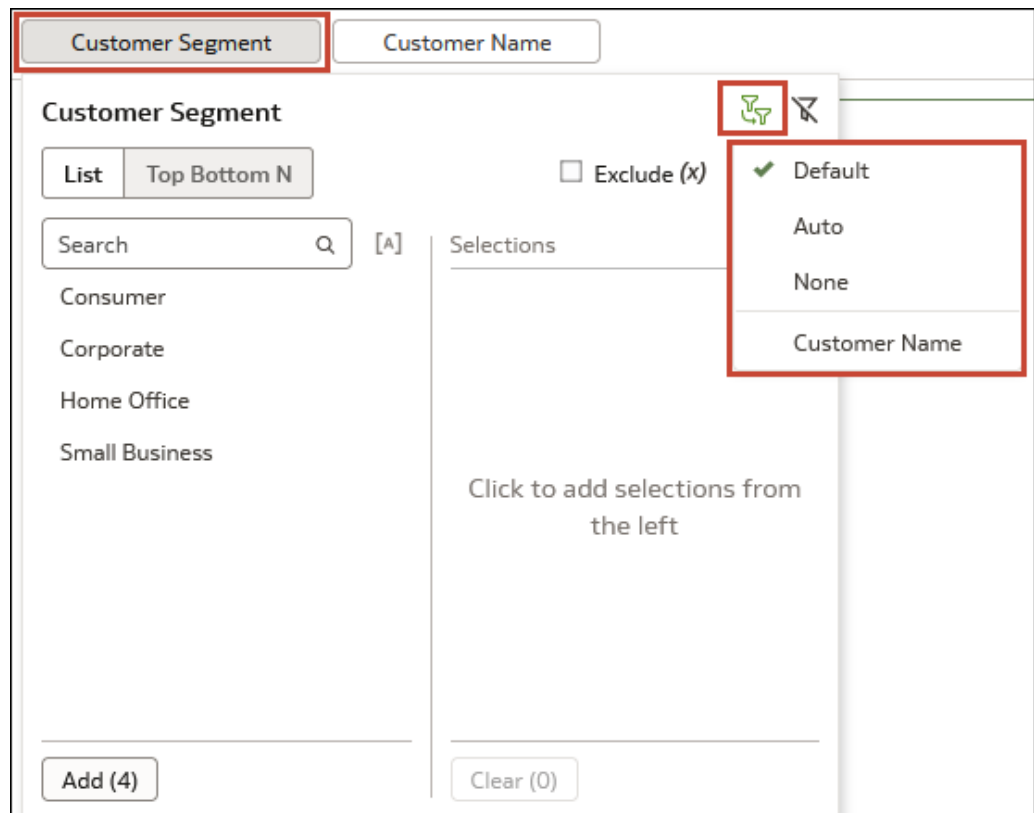
Specify Limit Values for Workbook and Canvas Filters

On the workbook filter bar and on individual filters in the filter bar, you can specify if the selections from one filter determine the available selections for other filters.

Before you add different filters to your workbook, it's important to understand the limit values settings and how they affect each other, see [How Filters Limit Each Other](#).

The **Limit Values By** setting that you select for the workbook filter bar is used for each filter that you add to it. You can use an individual filter's **Limit Values** setting to override the filter bar's **Limit Values By** setting.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. To set the Limit Values By setting for the filter bar:
 - a. Click **Filter Bar Menu**, then hover over **Limit Values By** .
 - b. Click an option to select it.
3. To set the Limit Values setting for an individual filter on the filter bar:
 - a. Click the filter to open the Filter dialog.
 - b. Click **Limit Values** and click an option to select it.



4. Click **Save**.

Display or Hide Selected Values in the Workbook or Canvas Filter Label

You can display the selected filter values in the filter labels in the filter bar so that you don't have to open the Filters dialog to check the filter's selected values. Or you can hide the selected values to reduce clutter on the filter bar.

Use the **Filter Values** property to show or hide the filter values in the filter bar. For more information about this property, see [Filter Bar Properties](#).

For a pinned workbook filter, you can change the filter values display settings from any canvas.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the filter bar, click **Filter Bar Menu** .
3. Hover over **Filter Values** and click an option to select it.
 - Show All
 - Hide All
 - Show by Default
4. Click **Save**.

Manually Apply Workbook and Canvas Filters

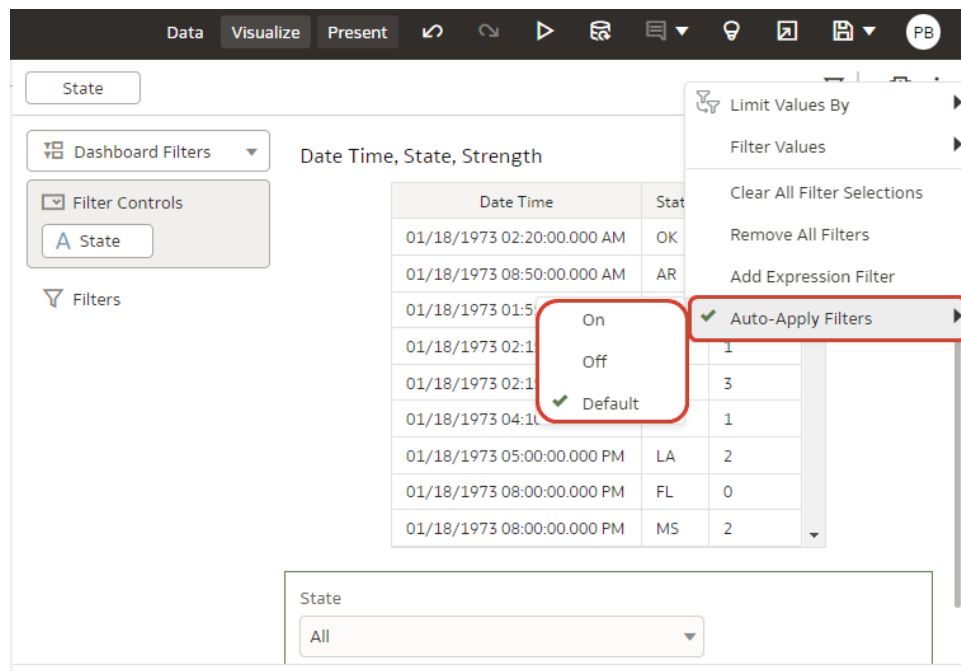
As you select filter values for filters in the filter bar, Oracle Analytics automatically applies them. You can change this behavior when you want to manually apply the filter selections instead.

Use the **Auto-Apply Filters** property in the **Filter Bar Menu** to specify if you want to manually apply the filters. When you set this property, it applies to all filters in the filter bar across all canvases.

When set to **Off**, you can select filter values and then click the **Apply** button when you want to apply the filter selections.

For more information about this property, see [Filter Bar Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the filter bar, click **Filter Bar Menu**, hover over **Auto-Apply Filters**, and then click an option to select it.



3. Click **Save**.

Convert Canvas Filters to Dashboard Filters

Convert canvas (unpinned) filters in the filter bar to dashboard filters when you want to use the functionality, style, layout, and personalization options that dashboard filters provide. Convert filters to avoid manually adding dashboard filters and deleting existing canvas filters.

Use the **Move to Dashboard Filter** option to move the canvas filters from the filter bar into a dashboard filters visualization on each canvas. This option converts all canvas filters in the workbook at once. Pinned workbook filters apply to all canvases in the workbook and therefore can't be converted to dashboard filters.

Filter settings such as selected data values, exclude, null, and limit by are moved with the canvas filter to the dashboard filter. Parameters bound to the canvas filter are also migrated to the dashboard filter control.

For more information about this property, see [Filter Bar Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the filter bar, click **Filter Bar Menu** .
3. Hover over **Move to Dashboard Filter** and click a layout option to select it.
4. Click **Save**.

Use a Parameter in the Filter Bar

Adding a parameter to the filter bar allows you to set the parameter value for the whole workbook or an individual canvas.

This tutorial provides a use case explaining how to use a parameter in the filter bar:

 [Tutorial](#)

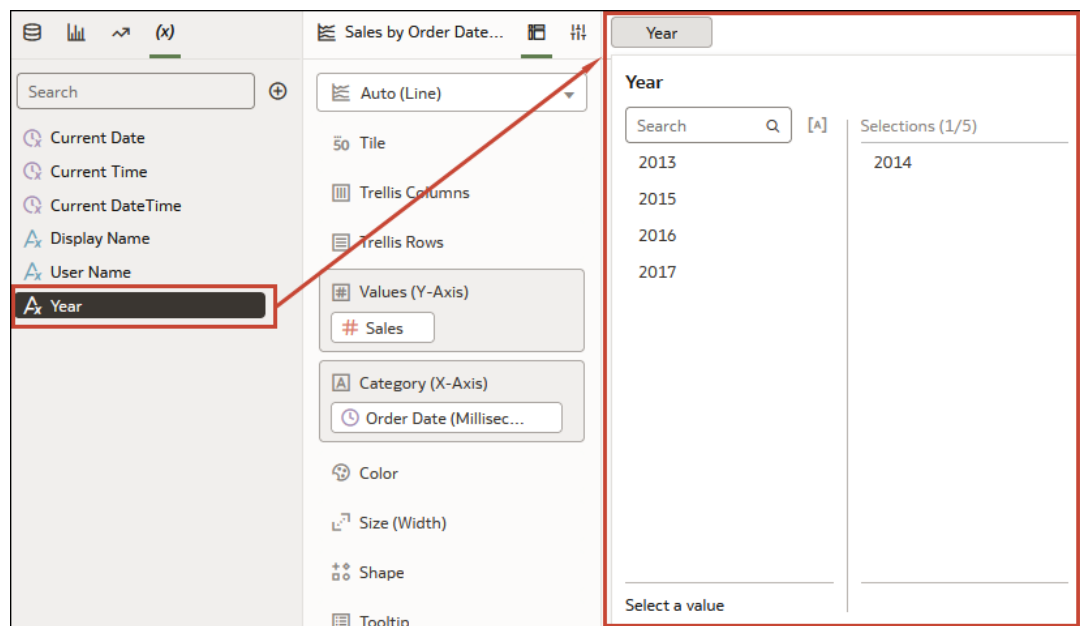
**Note:**

Adding a parameter as a workbook (pinned) or canvas (unpinned) filter in the filter bar functions as a column selector, it doesn't filter the data.

Using a parameter in the filter bar doesn't provide the same features as a standard filter. For example, it doesn't provide the exclude, nulls, or limit values functionalities.

You can also create and bind a parameter to a workbook filter, see [Create and Bind a Parameter to a Workbook Filter](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data panel, click **Parameters**.
3. Drag and drop a parameter to the filter bar.



4. Click **Save**.

Use Dashboard Filters

You can add dashboard filters to your canvases to enable end users to select and change the values they want to see in the visualizations.

Topics:

- [About Dashboard Filters](#)
- [Add Dashboard Filters](#)
- [Specify Limit Values for Dashboard Filters](#)
- [Apply a Dashboard Filter to Visualizations on the Canvas](#)
- [Filter a Dashboard Filter Visualization by Other Filters](#)
- [Change the Orientation of Dashboard Filters](#)

- [Change the Dashboard Filter Style](#)
- [Use a Parameter as a Dashboard Filter Control](#)
- [Filter and Animate Visualizations using a Slider Dashboard Filter](#)

About Dashboard Filters

Dashboard filters provide filter controls for end users on an individual canvas.

As an author, you usually add and set filters in the filter bar to broadly limit the data in your workbook, see [Use Workbook and Canvas Filters](#). You can then add and configure dashboard filters on each canvas to allow end users to select their own filter values to change the data in the visualizations.

Dashboard filters are contained in the Dashboard Filters visualization. After you add the Dashboard Filters visualization to the canvas, you can then drag and drop columns to this visualization to create dashboard filters. Oracle Analytics assigns default properties based on the column you chose to create the filter but you can modify the filter's properties to better suit the data and improve the user experience.

Add Dashboard Filters

Use the Dashboard Filters visualization to create and configure your dashboard filters.

Dashboard filters enable end users to select their own filter values to change the data in the visualizations.

For information about the different types of filters you can use, see [Filter Types](#).

For information about dashboard filter properties, see [Filter Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Visualizations Panel, click **Visualizations**, scroll to Dashboard Controls, and drag **Dashboard Filters** to the canvas.
3. In the Data Panel, click **Data** and drag one or more columns to the new dashboard filters visualization to create the dashboard filter controls.

The screenshot shows the Oracle Analytics interface. On the left, there is a sidebar with a search bar and a list of data fields. The main area displays the 'Dashboard Filters' visualization. This visualization has two filter controls: 'City' (set to 'All') and 'Profit' (set to 'Full Range'). Below the filters, there are two visualizations: 'Total Sales' (a line chart showing sales over time) and 'Sales by Customer Segment' (a table showing sales data for different customer segments). Red arrows point from the 'City' and 'Profit' filter controls to the corresponding data fields in the left sidebar.

Customer Segment	Sales	Shipping Cost	Discount	Profit
Consumer	1,722,719.78	23,865.38	88,014.18	209,166....
Corporate	3,040,035.94	41,900.26	152,696....	503,018....
Home Office	2,097,629.77	28,885.68	105,547....	270,641....
Small Business	1,639,614.51	23,557.52	78,741.40	317,173....

- Optional: Click a filter control to open the Filter dialog, then select the data values filter on.
- Click **Save**.

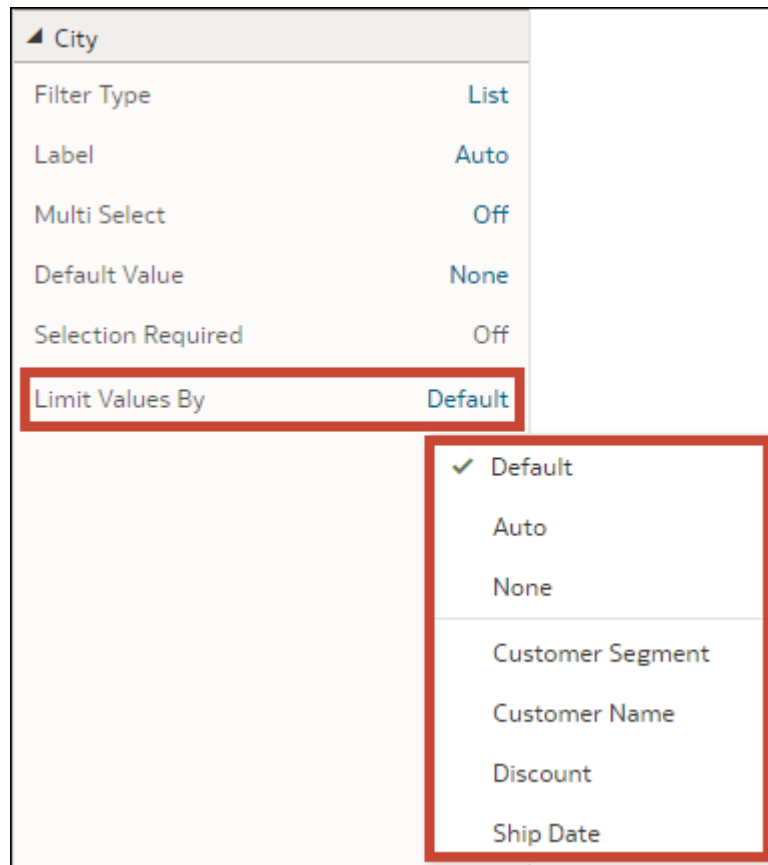
Specify Limit Values for Dashboard Filters

You can specify how a dashboard filter gets its selection values, for example from the workbook filter bar or other dashboard filters.

Before you add different filters to your workbook, it's important to understand the limit values settings and how they affect each other, see [How Filters Limit Each Other](#).

Use the **Limit Values** setting to modify the limit values for dashboard filters.

- On the Home page, hover over a workbook, click **Actions**, then select **Open**.
- Click the dashboard filters visualization to select it.
- Click **Properties** to open the Properties panel, then click **Filter Controls**.
- Locate and expand the filter you want to set the limit by for.
- Click the **Limit Values By** field and select how you want to limit the filter's selection values.

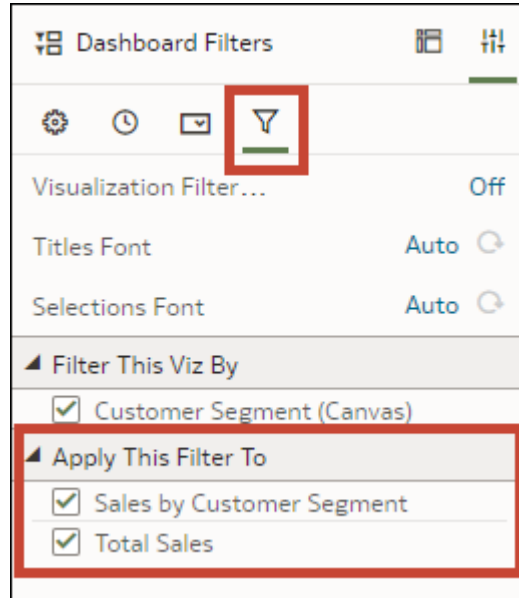


- Click **Save**.

Apply a Dashboard Filter to Visualizations on the Canvas

When you add a dashboard filter, Oracle Analytics applies it to all visualizations on the canvas. You can specify which of the visualizations you want to apply the dashboard filter to.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the dashboard filters visualization to select it.
3. Click **Properties** to open the Properties panel, then click **Filters**.
4. In the Apply This Filter To section, select the visualizations that you want the filter to apply to.

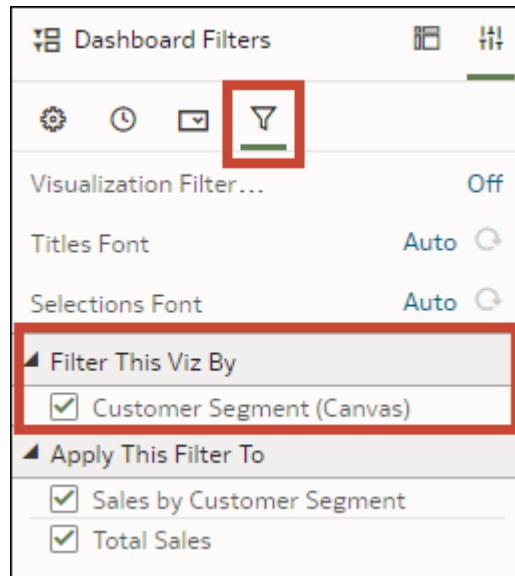


5. Click **Save**.

Filter a Dashboard Filter Visualization by Other Filters

When you add a dashboard filter visualization, Oracle Analytics applies all of the workbook's existing dashboard filters and any filters in the filter bar to it. You can specify which of the filters you want to apply to the new dashboard filter.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the dashboard filters visualization to select it.
3. Click **Properties** to open the Properties panel, then click **Filters**.
4. In the Filter This Viz By section, select the filters you want to apply to the dashboard filter.



5. Click **Save**.

Change the Orientation of Dashboard Filters

Where you add a dashboard filters visualization to the canvas determines if the filter controls are displayed horizontally or vertically.

You can change the dashboard filters visualization's orientation to provide a canvas layout and filter experience that works best for your users.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the dashboard filters visualization to select it.
3. Click **Properties** to open the Properties pane, then click **General**.
4. Click the **Orientation** field and select an orientation.
5. Click **Save**.

Change the Dashboard Filter Style

You can choose how you want the filter controls in the dashboard filters visualization to display to provide a canvas layout and filter experience that works best for your users.

Use the Filter Style property to change the dashboard filter style to either of the following:

- Standard

Customer Segment Consumer, Corporate	Continent Europe	Product Category Technology

- Filter Chip

Customer Segment (2) Consumer, Corporate	Continent (1) Europe	Product Category (1) Technology

For more information about this property, see [Dashboard Filter General Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the dashboard filters visualization to select it.
3. Click **Properties** to open the Properties pane, then click **General**.
4. Click the **Filter Style** field and select a style.
5. Click **Save**.

Use a Parameter as a Dashboard Filter Control

You can use a parameter as a dashboard filter control to select and change the dimension and measure column values for the visualizations on a canvas.

These tutorials provide use cases explaining how to use a parameter in the dashboard filter control:

 [Tutorial](#)

 [Tutorial](#)



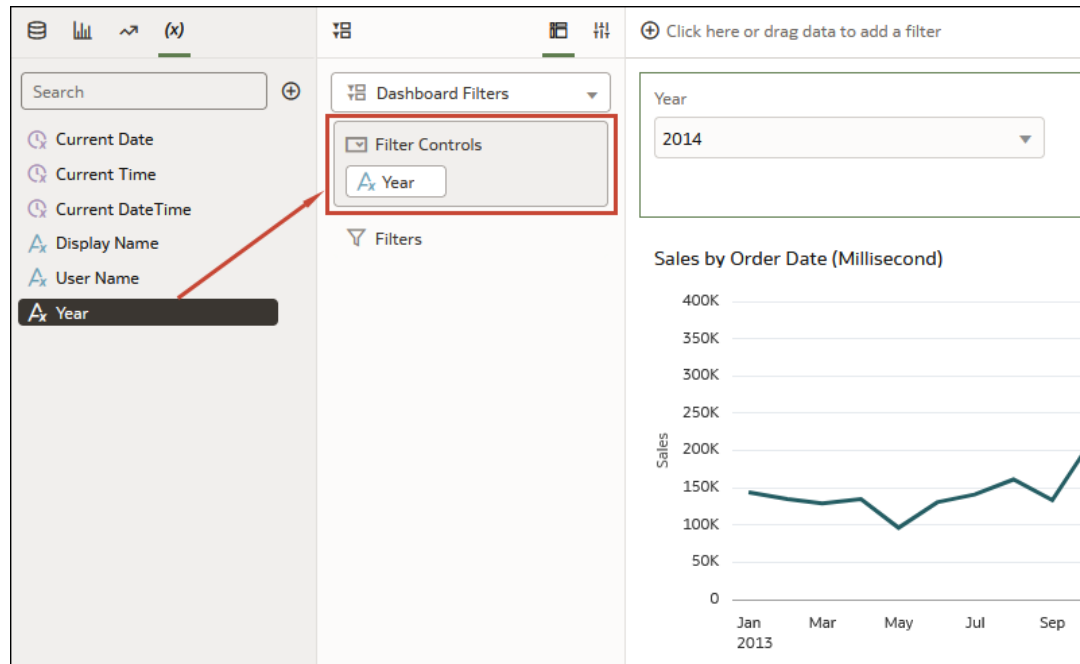
Note:

Adding a parameter as a dashboard filter control functions as a column selector, it doesn't filter data.

Using a parameter as a dashboard filter control doesn't provide the same features as a standard filter. For example, it doesn't provide the Top Bottom N, exclude, nulls, or limit values functionalities.

You can also use parameters to bind a dashboard filter to a corresponding filter in other canvases in the workbook. This allows you to pass a selected filter value from one canvas to another. See [Create and Bind a Parameter to a Dashboard Filter](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data panel, click **Visualizations**, scroll to the Dashboard Controls section, and drag **Dashboard Filters** to the canvas.
3. In the Data panel, click **Parameters**, and drag and drop a parameter to **Filter Controls** in the Dashboard Filter visualization's grammar panel.



4. Click **Save**.

Filter and Animate Visualizations using a Slider Dashboard Filter

You can add a slider dashboard filter to a workbook canvas and animate visualizations to show how the data changes relative to a specified dimension. End users can select a dimension value interactively, or automatically play through dimension values, similar to a time-lapse video or animation.

This tutorial provides a use case explaining how to create a dashboard filter with a slider control to see how revenue and product type data changes over the years.

Tutorial

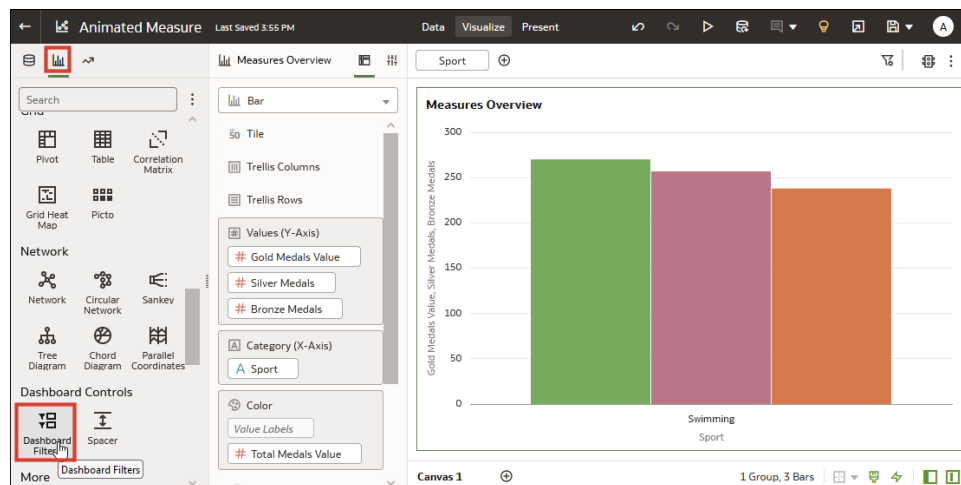
As another example, you might analyze Olympic medals between 2000 and 2012 in an animation showing the numbers changing over the years.

Before you can create a slider dashboard filter, you need to have one or more visualizations on your canvas for which the dimension, in this case, Year, can be used as a filter. Each visualization must include the same dimension data.

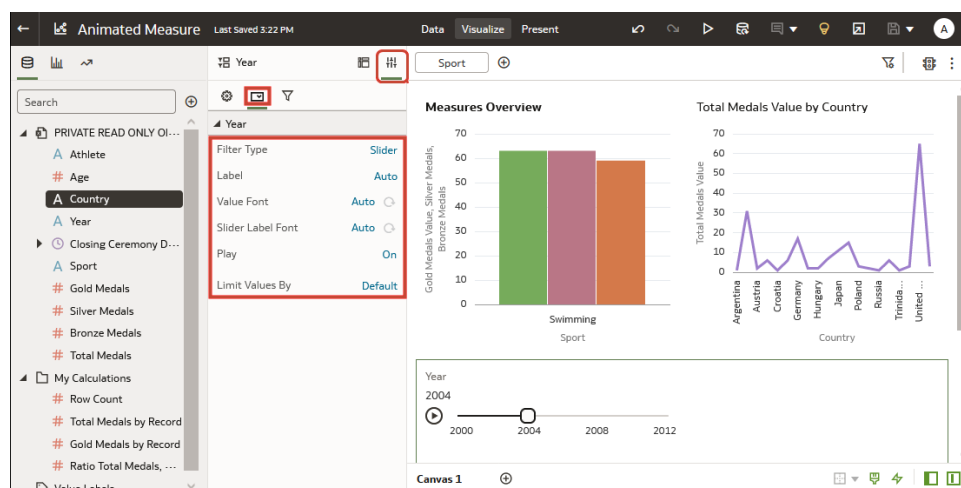
For this example, to filter on Year so that you can analyze Olympic medal data between year 2000 and year 2012, you need to add Year to your dashboard filter visualization.

For more information about slider filters, see [Filter Types](#). For more information about slider dashboard filter properties, see [Dashboard Filter Control Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data panel, click **Visualizations**, scroll to the Dashboard Controls section, and drag **Dashboard Filters** to the canvas.



3. In the Data panel, click **Data**, and drag a dimension-based data element to the new dashboard filters visualization.
4. Click **Properties** to open the Properties pane, then click **Filter Controls**.
5. Locate and expand the filter you just added.
6. Click the **Filter Type** field and select **Slider**.



7. Click the **Play** field to turn auto-play on or off.
8. If you enabled play, in the slider filter control, click **Play** to see how your visualizations play with the default settings.

Use Visualization Filters

You can add visualization filters to individual visualizations to filter them without affecting the rest of the workbook.

Topics:

- [About Visualization Filters](#)
- [Add Visualization Filters](#)

- [Use a Visualization as a Filter](#)

About Visualization Filters

Visualization filters filter the data for only one visualization.

As an author, you usually add and set workbook and canvas filters in the filter bar to broadly limit the data in your workbook, see [Use Workbook and Canvas Filters](#). You can then add and configure dashboard filters on each canvas to allow end users to select their own filter values to view the data in the visualizations on that canvas, see [Use Dashboard Filters](#).

Oracle Analytics offers another, narrower filter scope in the form of visualization filters which you can add so that a user can select the values they want to see in that particular visualization without affecting the rest of the workbook. You can also set visualization filters yourself and then hide them from the end user, see [Show or Hide a Visualization Filter in Present](#).

Add Visualization Filters

Add visualization filters to a visualization to filter the data in that visualization only, without affecting anything else in the workbook.

For information about the different types of filters you can use, see [Filter Types](#).

For information about visualization filter properties, see [Dashboard and Visualization Filters Properties](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click a visualization to select it.
3. Click **Grammar** to open the Grammar pane.
4. In the Data Panel, click **Data**, and drag and drop one or more columns to **Filters** in the Grammar panel to create the visualization filters.

The screenshot shows the Oracle Analytics interface. On the left is the Data Panel with a search bar and a list of columns under 'sample_order_lines'. The 'City' column is highlighted. In the center is the Grammar pane with sections for Rows, Columns, Color, Size, Shape, Tooltip, and Filters. The 'Filters' section is highlighted with a red box, and a red arrow points from the 'City' column in the Data Panel to it. The 'City' column is also listed in the 'Filters' section. On the right is a visualization titled 'Sales by Customer Segment' showing a table with columns: Customer Segment, Sales, Shipping Cost, Discount, and Profit. The 'City' filter is set to 'All'.

Customer Segment	Sales	Shipping Cost	Discount	Profit
Consumer	1,722,719.78	23,865.38	88,014.18	209,166.75
Corporate	3,040,035.94	41,900.26	152,696.82	503,018.81
Home Office	2,097,629.77	28,885.68	105,547.60	270,641.33
Small Business	1,639,614.51	23,557.52	78,741.40	317,173.11

5. Click **Save**.

Use a Visualization as a Filter

You can use the data selections from one visualization to filter all other visualizations on the canvas, depending on the visualization type.

If a visualization's **Use as Filter** icon is displayed in green , it means that it's functioning as a filter on the canvas. When you select a data element in the visualization, the other visualizations on the canvas that also use that data element are updated to display their data based on your selection.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Hover over the visualization that you want to use as a filter.
3. Click the **Use as Filter** icon  to activate.
4. Click **Save**.

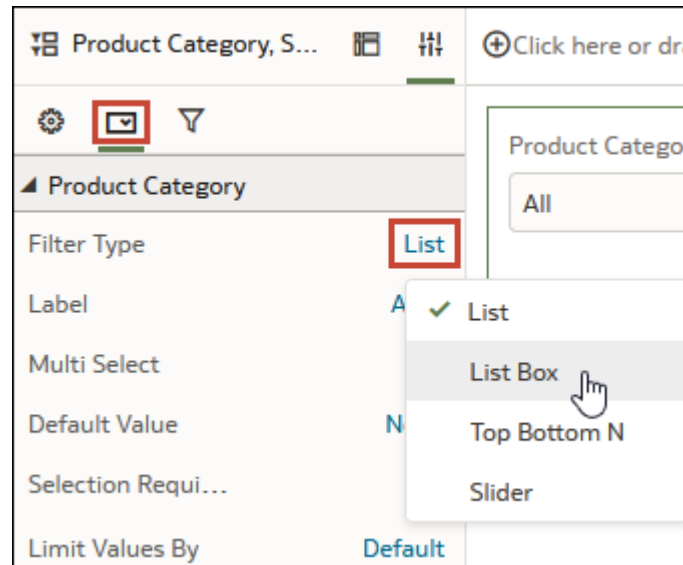
Change the Filter Type

Switch your filter from the default filter type assigned by Oracle Analytics to another compatible filter type to best suit your needs.

You can change the filter type of any filter but the compatible filter types available depend on the filter scope and data element you're using.

For more information about the filter types available, see [Filter Types](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. For a workbook or canvas filter, in the filter bar, click the filter to open the Filter dialog, and then click the filter type you want to use.
3. For a dashboard filter:
 - a. Click the dashboard filters visualization to select it.
 - b. Click **Properties** to open the Properties pane, then click **Filter Controls**.
 - c. Locate and expand the filter you want to change the filter type for.
 - d. Click the **Filter Type** field and select the type of filter you want to use.



4. For a visualization filter, in the visualization, click the filter to open the Filter dialog, and then click the filter type you want to use.
5. Click **Save**.

Filter Data Using an Expression Filter

Using expression filters, you can define more complex filters using SQL expressions. Expression filters can reference zero or more data elements.

For example, you can create and apply the expression filter "Sample Sales"."Base Facts"."Revenue" < "Sample Sales"."Base Facts"."Target Revenue" to see the items that didn't achieve their target revenue.

You can use expression filters in the workbook filter bar to apply to a canvas or the whole workbook, or you can use one as a visualization filter to apply only to a single visualization.

You can also use a parameter in an expression filter's SQL expression, see [Use a Parameter in an Expression Filter](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. For a workbook or canvas filter, on the filter bar, click **Add Filter** and then select **Create Expression Filter**.
3. For a visualization filter:
 - a. Click the visualization to select it.
 - b. Click **Grammar** to open the Grammar pane, scroll to the Filters area, click **Drop Target Options**, and then select **Create Expression Filter**.
4. In the Expression Filter panel, in the **Label** field, give the expression a name.
5. In the **Expression** field, compose an expression.
6. Click **Validate** to check if the syntax is correct.
7. When the expression filter is valid, then click **Apply**.

Exclude Selected Filter Values

You can configure a filter to exclude rather than include the selected data values.

You can exclude data values for filters created on certain column types using certain filter types. For example, you can exclude data values for an attribute column filter but the filter type must be List, List Box, or Checkbox / Radio Button. You can't exclude data values for filters on measure columns.

You can use also parameters to pass excluded values between filters, see [Create and Bind a Parameter to Exclude Filter Values](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. For a workbook or canvas filter, on the filter bar, click the filter to open the Filter dialog, and then select **Exclude**.
3. For a dashboard filter:
 - a. If the filter type is List, in the dashboard filters visualization, click the filter to open the Filter dialog, and then select **Exclude**.
 - b. If the filter type is List Box or Checkbox / Radio Button, click **Properties** to open the Properties pane, and then click **Filter Controls**.
 - c. Locate and expand the filter you want to exclude values for, click the **Exclude Selection** field, and then select **On**.
4. For a visualization filter, in the visualization, click the filter to open the Filter dialog, and then select **Exclude**.
5. Click **Save**.

Include Null Filter Values

You can configure a filter to include rather than exclude null values.

You can include null values for filters created on certain column types using certain filter types. For example, you can include null values for an attribute column filter, but the filter type must be List, List Box, or Checkbox / Radio Button. You can't include null values for filters on measure columns.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. For a workbook or canvas filter, on the filter bar, click the filter to open the Filter dialog, and then select **Nulls**.
3. For a dashboard filter:
 - a. If the filter type is List, in the dashboard filters visualization, click the filter to open the Filter dialog, and then select **Nulls**.
 - b. If the filter type is List Box or Checkbox / Radio Button, click **Properties** to open the Properties pane, and then click **Filter Controls**.
 - c. Locate and expand the filter you want to include null values for, then click the **Null Selection** field, and select **On**.
4. For a visualization filter, in the visualization, click the filter to open the Filter dialog, and the select **Nulls**.
5. Click **Save**.

Disable Multi Select for Filters

You can configure a dashboard filter or visualization filter to allow only single value selections. For example, you must configure this setting to Off when you use a list filter to bind a parameter to a dashboard filter.

The Multi Select property is set to **On** by default and is available only for the filter types List and Checkbox / Radio Button.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. For a dashboard filter:
 - a. Click the dashboard filters visualization to select it.
 - b. Click **Properties** to display the Properties pane, then click **Filter Controls**.
3. For a visualization filter:
 - a. Click the visualization to select it.
 - b. Click **Properties** to display the Properties pane, then click **Filters**.
4. Locate and expand the filter you want to disable Multi Select for.
5. Click the **Multi Select** field and select **Off**.
6. Click **Save**.

Disable a Filter

You can disable a filter to turn it off temporarily without deleting it so you can use it again in the future.

You can disable a filter for these filter types only:

- List
 - Top Bottom N
 - Range
 - Date Range
 - Relative Time
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
 2. For a workbook or canvas filter, on the filter bar, click the filter to open the Filter dialog.
 3. For a dashboard filter, in the dashboard filters visualization, click the filter to open the Filter dialog.
 4. For a visualization filter, in the visualization, click the filter to open the Filter dialog.
 5. Click **Disable Filter** .
 6. Click **Save**.

9

Create and Use Parameters

This topic describes how to create parameters to store and manage values that you can use in various parts of a workbook.

Topics:

- [What Are Parameters?](#)
- [About System Parameters](#)
- [About Parameter Properties](#)
- [About Modifying and Deleting Parameters](#)
- [Create a Parameter](#)
- [Syntax for Referencing Parameters](#)
- [Bind Parameters to Filters](#)
- [Use Parameters in Workbooks](#)

What Are Parameters?

A parameter functions as a user-defined variable that holds and manages a current value or values that you want to use in multiple places in a workbook. Use parameters to dynamically manipulate the workbook's data.

You can use parameters:

- In workbooks and visualizations as column selectors
- In workbook titles and visualization labels
- In expression filters
- In workbook, dashboard, and visualization filters
- In calculations
- In Logical SQL expressions
- In a visualization's properties to conditionally show or hide the visualization
- In data actions

When you create a parameter, you can specify a value that Oracle Analytics uses to initialize the parameter's current value. You can specify a list of available and initial values for a parameter by manually entering the values or using a Logical SQL query.

A parameter's scope is only within the workbook where you define it. You can't share parameters with other workbooks.

About System Parameters

Each workbook contains system parameters that you can use when you want a workbook to contain data based on the user's system information such as current date or time.

System parameters are independent of the workbook's dataset or subject area, and are designed to cover the most common parameters use cases so that you don't have to create these parameters for each workbook.

In the workbook's Parameters tab, you can hover over a system parameter to view its definition. You can't add, modify, or delete a workbook's system parameters.

The system parameters are:

- Current Date
- Current Time
- Current DateTime
- Display Name
- User Name

About Parameter Properties

How and where you want to use a parameter in the workbook determines the properties that you set for it. For example, you might set different properties for a parameter that you want to use as a filter control versus a parameter that you want to use in an expression.

These are the properties that you can set when you create or modify a parameter:

Data Type

Specifies the kind of data the parameter contains and the values or range of values that the parameter accepts. The data type is also used to validate that the parameter is compatible and any expressions are generated correctly for the location where you use the parameter.

Allow Multi Select

Determines if the parameter can accept a single initial value or multiple initial values.

After you enable multiple values, you use the **Initial Value** field to specify more than one initial values or write a SQL expression to provide initial values. When your parameter includes multiple initial values and you use the parameter as a filter control, the user can choose one or more initial values.

Alias

Provides an override display value for the data element or key value passed by the parameter.

Many datasets use unfriendly names for the data elements. Use an alias to help users understand what the data element is. For example, instead of LST_OR_DT, you can create an alias "Last Order Date" to make the data element name user-friendly.

Use aliases to provide more familiar, user-friendly names for users to choose from filter controls. For example, for a data value of 1, you can provide an alias of East Sales Region, and for a data value of 2, you can provide an alias of West Sales Region.

For data actions, use aliases in a parameter to pass a key value and display value. Then when the target workbook applies the incoming parameter values, it also applies the incoming display values for each incoming key value.

Format Numbers

Determines if the parameter's numeric values contain the thousands and decimal formats. This option is available for Integer and Double data types.

When **Format Numbers** is toggled to on, parameter values use number formatting determined by the browser's language setting, for example, 12,500 or 12.500.

When **Format Numbers** is toggled to off, parameter values contains no number formatting, for example, 12500.

Available Values

Specifies the list of values that the parameter can hold. A parameter's available values are any, value, column, a Logical SQL query, and a range of values. Up to 10,000 available values can be cached.

- Select **Any** to allow users to enter any value supported by the data type.
- Select **Value** to provide one or more values that the user can choose from. If **Allow Multiple Values** is enabled, then users can choose more than one value.
- Select **Column** to choose a column from which to fetch a list of values. When you select this option, the column selection field displays all of the workbook's subject area or dataset columns (including derived dates), and any key metrics and calculations.

Derived dates are columns of different levels of granularity that Oracle Analytics automatically generates for any Date, Time, or Timestamp columns in datasets.

- Select **Logical SQL Query** to enter a Logical SQL expression to return one or more available values. You can reference other parameters within the Logical SQL expression. After you enter a Logical SQL expression, you can click the **Validate** icon to validate the expression.
- Select **Range** to provide start and end values to limit the value a user can choose from.

Enforce Validation

When you create or modify a parameter, this option checks the parameter's initial value or values against the list of available values.

At runtime, this option validates that the specified parameter value or values is included in the list of available values.

At design time, if in the **Available Values** field you select **Value**, enabling the **Enforce Validation** option provides the available values list in the **Initial Value** field.

Initial Value

The initial value is the parameter's default value that is applied and displayed when the user opens the workbook.

- Select **Value** and leave the value field blank when you don't want to apply a default initial parameter value. If you don't specify an initial value, then all values are used.
- Select **Value** and specify a value that you want to apply as the default initial parameter value. Note the following:

- If you selected **Allow Multi Select**, you can specify more than one initial value, up to 1,000 initial values.
- If you selected **Enforce Validation**, you can select from the values specified in the **Available Values** field.
- Select **First Available Value** to apply and display the first value in the parameter's value list as the default initial value. If you're working with an attribute column that contains letters, then the first value is determined by the list returned by the Logical SQL expression. The returned list is always in alphabetical order.
- Select **Logical SQL Query** to enter a Logical SQL statement to dynamically fetch a list of values from the data source. You can reference other parameters within the Logical SQL expression. After you enter a Logical SQL expression, you can click the **Validate** icon to validate the expression.

About Modifying and Deleting Parameters

Before you modify or delete a parameter, check the workbook to make sure that you know where and how the parameter is used.

For example, check to see if the parameter that you want to modify or delete is referenced in an expression or logical SQL query.

Understanding where and how the parameter is used before you modify or delete it prevents broken visualizations, queries, and calculations.

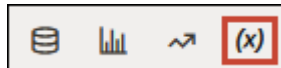
You can modify or delete only the parameters that you create in a workbook. You can't modify or delete a workbook's system parameters, for example Current Date or Current Time.

Create a Parameter

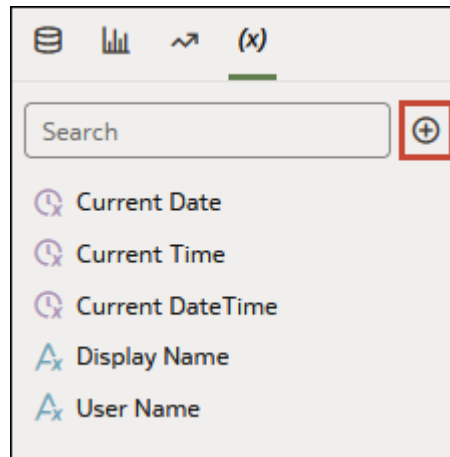
Create a parameter to hold and manage a current value or values that you want to use in multiple places in a workbook.

For information about how to choose the parameter's properties, see [About Parameter Properties](#).

1. On the Home page, select the workbook to add a parameter to, click **Actions**, and then select **Open**.
2. In the **Data Panel** click **Parameters**.



3. In the Parameters Pane, click **Add**.



4. In the **Name** field, enter a unique name.
5. Click **Data Type** and choose the type of data you want the parameter to accept.

Create Parameter

Name

Description

Data Type **Text**

Allow Multi Select ☐

Alias

Possible Values

Initial Value

6. In the **Available Values** field select how you want specify the parameter's value.
7. In the **Initial Value** field, choose how you want the parameter's initial value to be determined. If you don't want to use an initial value, then select **Value** and leave the value blank.
8. Click **OK**.

9. Click **Save**.

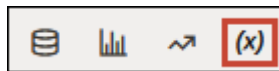
Create a Parameter that Uses a Logical SQL Query for a Double Column

If your workbook contains a double column, you can create a parameter and provide a Logical SQL to select the display column and the descriptor ID column.

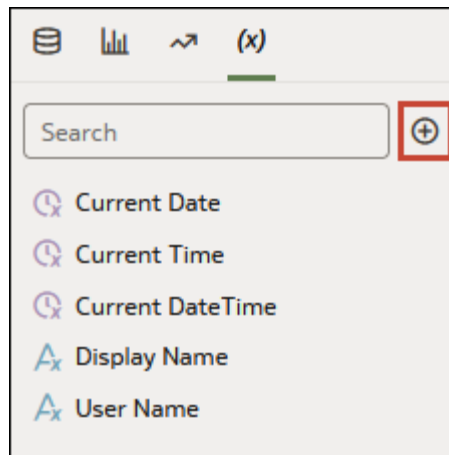
Double columns are available only in datasets created from local subject areas. In a double column, one column represents the data descriptor value and is displayed to the end user. The second column represents an identifier of the data descriptor and isn't displayed to the end user.

If you want to use a parameter in a double column type filter, you can create a parameter from and bind it to a filter from the filter's properties. See [Create and Bind a Parameter to a Double Column Type Filter](#).

1. On the Home page, select the workbook to add a parameter to, click **Actions**, and then select **Open**.
2. In the **Data Panel** click **Parameters**.



3. In the Parameters Pane, click **Add**.



4. In the **Name** field, enter a unique name.
5. In the **Available Values** field, select **Logical SQL Query**.
6. In the text box, write the Logical SQL, making sure to include the display column and the descriptor ID column. For example,


```
SELECT "A - Sample Sales"."Double Column Products"."P10 Product (Dble Column)", DESCRIPTOR_IDOF("A - Sample Sales"."Double Column Products"."P10 Product (Dble Column)") FROM "A - Sample Sales"
```
7. Go to the **Initial Value** field and confirm that either **Value** or **First Available Value** is selected.
8. Click **Save**.

Syntax for Referencing Parameters

Use the syntax provided in this topic to reference parameters from a workbook visualization's properties, SQL expression, or calculations.

Use this syntax to reference a parameter:

```
@parameter("parameter name") ('default value')
```

This table contains expression syntax examples:

Parameter Expression	Description
@parameter("Supplier")('Brembo')	References the Supplier parameter. The parameter value is 'Brembo' unless the Supplier parameter is passed into the workbook via data actions or URL parameters.
@parameter("StartDate")(DATE'2021-10-08')	References a parameter named StartDate with a default date of October 8, 2021.
@parameter("CurrentTime")(TIME'18:00:00')	References a parameter named CurrentTime with a default time of 18:00:00.
@parameter("CurrentDateTime") (TIMESTAMP'2023-02-28T18:00:00')	References a parameter named CurrentDateTime with a default date of February 28, 2023 and a default time of 18:00:00.
@parameter("NumOccurrences")(5)	References a parameter named NumOccurrences with a default of 5.
@parameter("SelectedColumn")("A - Sample Sales"."Offices"."D2 Department")	References a parameter named SelectedColumn, and defaults to "A - Sample Sales"."Offices"."D2 Department".
@parameter("Supplier", style="delimited", separator="/")('Brembo','Bosch')	References a parameter named Supplier, and the value defaults to "Brembo/Bosch" when used.
@parameter("Supplier", style="individual")('Brembo','Bosch')	References a parameter named Supplier, and is used by data actions to separate parameters: &myParam=Brembo&myParam=Bosch
@parameter("Supplier", type="alias")('Brembo','Bosch')	References a parameter named Supplier and uses any configured alias values, if they exist. Alias uses values if alias isn't configured.
@parameter("Supplier", type="value")('Brembo','Bosch')	References a parameter named Supplier and uses any configured values, regardless of whether an alias is configured.

Bind Parameters to Filters

This topic describes how to create a parameter and bind it to a filter or choose an existing parameter to bind to a filter.

Topics:

- [About Binding Parameters to Filters](#)
- [Create and Bind a Parameter to a Workbook Filter](#)
- [Create and Bind a Parameter to a Dashboard Filter](#)

- [Create and Bind a Parameter to Exclude Filter Values](#)
- [Create and Bind a Parameter to a Double Column Type Filter](#)
- [Bind an Existing Parameter to a Filter](#)

About Binding Parameters to Filters

Bind a parameter to a filter when you want to pass a selected filter value from one canvas to another in a workbook, or you want to have more control over how dashboard filters behave and are exposed to the user.

Binding a parameter to a filter is one-way binding, meaning a parameter doesn't limit the list of available filter values that the user can choose from. A parameter's properties define the values that it can accept from the filter.

When bound to a filter, the parameter listens to the filter's selections and when the parameter accepts a filter value, it passes that value to wherever you use the parameter in the workbook.

Binding a parameter to a filter has many uses. For example, by default when you add the Dashboard Filters control to a canvas, it only applies filters to that canvas. You can use parameters bound to filters to pin the dashboard filters across multiple canvases in the workbook. When multiple canvases include a dashboard control with the same filters bound to the same parameters, any filter values selected by the user are applied to each canvas.

Create and Bind a Parameter to a Workbook Filter

Select a workbook filter's data values and then use the **Create Parameter** option to create and bind a parameter to the filter. After you create the parameter, you can bind it to other filters in the workbook to pass data values between filters.

The parameter you create uses the filter's selected values and corresponding column's name as its properties, and is added to the workbook's **Parameters** tab. The parameter shares the filtered column's name, for example, if you bind a parameter to a City column filter, the binding creates a parameter named City.

For more information about how to use parameter binding in a workbook's filters, see [About Binding Parameters to Filters](#).

You can also select an existing parameter to bind to the workbook filter. See [Bind an Existing Parameter to a Filter](#).

1. On the Home page, select the workbook where you want to create a workbook filter and add and bind a parameter to, click **Actions**, and then select **Open**.
2. Create or locate and click the workbook filter where you want to create and bind the parameter.
3. Optional: Select the filter values.
4. Click **Bind to Parameter** (x) and then click **Create Parameter** to create and bind the parameter to the filter.
5. Optional: Go to the workbook's **Data Panel**, click **Parameters**, right-click the parameter you created from the filter, and select **Edit Parameter** to review and update the parameter's properties. Click **OK**.

Create and Bind a Parameter to a Dashboard Filter

You can create and bind a parameter to most dashboard filter types. After you create the parameter, you can bind it to other filters in the workbook, for example to the same filter on another canvas, to pass data values between filters.

You can select the dashboard filter's data values and use the **Create Parameter** option to create and bind a parameter to the filter. The parameter you create uses the selected values and corresponding column as its properties, and is added to the workbook's **Parameters** tab. The parameter shares the filtered column's name, for example, if you bind a parameter to a City column filter, the binding creates a parameter named City.

For more information about how to use parameter binding, see [About Binding Parameters to Filters](#).

You can also select an existing parameter to bind to the dashboard filter. See [Bind an Existing Parameter to a Filter](#).

1. On the Home page, select a workbook, click **Actions**, select **Open**, and click **Edit**.
2. In the Data Panel, click the **Visualizations** tab, and drag and drop **Dashboard Filters** to the canvas.
3. In the Data Panel, click the **Data** tab, and drag and drop the column that you want to use to filter the canvas into the dashboard filters visualization.
4. Optional: Select the filter values.
5. Click **Properties** to open the Properties panel, then click **Filter Controls**.
6. Locate and expand the filter you just added, click the **Filter Type** field and select an appropriate filter type.
7. If you selected **List**, **Range**, or **Top Bottom N**, then click the dashboard filter, click **Bind to Parameter** (x), and select **Create Parameter** to use the selected filter values to create and bind the parameter to the filter.
8. If you selected **List Box** or **Checkbox / Radio Button**, then in the Properties pane, under Filter Controls, go to **Parameter Binding (Selection)** and click **None**. Select **Create Parameter** to use the selected filter values to create and bind the parameter to the filter, or select an existing parameter to bind to the filter.
9. Optional: To specify if the user is required to select a filter value, go to the Properties pane and under Filter Controls, click the **Selection Required** field, and select **On**.
10. Click **Save**.

Create and Bind a Parameter to Exclude Filter Values

Set a filter to exclude data values and then use the **Bind to Parameter** option to create and bind an excludes parameter to the filter. After you create the parameter, you can bind it to other filters in the workbook to pass excluded data values between filters.

This tutorial provides a use case explaining how to use a parameter to exclude filter values that you pass to another canvas.

 [Tutorial](#)

This tutorial provides a use case explaining how to apply an exclusion list filter to all canvases in a workbook.

 [Tutorial](#)

You can create and bind a parameter to exclude data values for List, List Box, Checkbox / Radio Button, and Range filters.

The excludes parameter you create uses the Integer data type and contains Boolean values, and is added to the workbook's **Parameters** tab. The excludes parameter shares the filtered column's name, for example, if you bind an excludes parameter to a City column filter, the binding creates a parameter named Excludes City.

You can also select an existing excludes parameter to bind to a filter. An existing excludes parameter must use the Integer data type and contain Boolean values.

Before you create and bind an excludes parameter, you must set the filter's values and bind a parameter to the filter. This is to ensure that the exclusion list is passed to the parameter.

1. On the Home page, select the workbook with the filter you want to create and bind an excludes parameter to, click **Actions**, and then select **Open**.
2. Locate and click the filter that you want to bind the excludes parameter to.
3. For a list or range filter:
 - a. In Selections, confirm that the filter values are set to the values you want to exclude and that the **Bind to Parameter** icon (x) is green, indicating that a parameter is bound to the filter.
 - b. Click **Exclude**, click **Bind to Parameter** (x), and then click **Create Parameter** to create and bind the excludes parameter to the filter.
4. For a list box or checkbox / radio button dashboard filter:
 - a. Click **Properties** and click **Filter Controls**.
 - b. Go to the **Parameter Binding (Selection)** field and confirm that a parameter name is displayed, indicating that a parameter is bound to the filter.
 - c. Go to the **Exclude Selection** field and set it to **On**.
 - d. Locate the **Parameter Binding (Excludes Mode)** field and click **None**. Click **Create Parameter** to create and bind the excludes parameter to the filter.
5. Click **Save**.

Create and Bind a Parameter to a Double Column Type Filter

You can select the double column filter's data values and then use the **Create Parameter** option to create and bind a parameter to the filter. The parameter you create uses the selected values and corresponding column as its properties, and is added to the workbook's **Parameters** tab.

This tutorial provides a use case explaining how to bind a double column list filter to a parameter:

 [Tutorial](#)

For more information about how to use parameter binding in a workbook's filters, see [About Binding Parameters to Filters](#).

Double columns are available only in datasets created from local subject areas. In a double column, one column represents the data descriptor value and is displayed to the end user. The second column represents an identifier of the data descriptor and isn't displayed to the end user.

When you create a parameter for a double column, the **Alias** field in the parameter's property is turned on by default. An alias is required for a double column parameter, so you can't switch the **Alias** field to off.

When you create a parameter from a filter, the parameter uses the filtered column's name.

1. On the Home page, select the workbook where you want to create a double column type filter and add and bind a parameter to, click **Actions**, and then select **Open**.
2. Create or locate and click the double column type filter where you want to create and bind the parameter. The filter displays the double column's display values and not its ID values.
3. Click **Bind to Parameter** (x) and then click **Create Parameter** to create and bind the parameter to the filter.
4. Optional: Go to the workbook's **Data Panel**, click **Parameters**, right-click the parameter you created from the filter, and select **Edit Parameter** to reviews and update the parameter's properties.
5. Click **OK**.

Bind an Existing Parameter to a Filter

Choose a system parameter or an existing workbook parameter to bind to a filter and pass a selected filter value to the parameter.

For more information about how to use parameter binding in a workbook's filters, see [About Binding Parameters to Filters](#).

You can also create a parameter from and bind it to a filter. See [Create and Bind a Parameter to a Workbook Filter](#).

When you click **Bind to Parameter**, Oracle Analytics lists the workbook's parameters that are compatible and available for you to bind to the filter.

Hover over a parameter's exclamation icon  for information about the parameter's compatibility with the filter. This information is just a warning and doesn't prevent you from binding the parameter to the filter.

The warning "The filter supports multiple values but the parameter doesn't," means that you can select multiple values in the filter but the parameter definition accepts only the first value specified in the filter value selection list. If you want to fix this issue, go to the filter's properties and change its **Multi Select filter** control to match the parameter's **Allow Multi Select** setting.

1. On the Home page, select the workbook with the filter that you want to bind a parameter to, click **Actions**, and then select **Open**.
2. Create or locate and click the filter that you want to bind the parameter to.
3. Click **Bind to Parameter** (x) and then click the parameter that you want to bind to the filter.
4. Click **OK**.

Use Parameters in Workbooks

This topic describes how you can use parameters in a workbook, for example, in visualization labels and expressions.

Topics:

- [Use a Parameter to Conditionally Show or Hide a Visualization](#)
- [Use a Parameter in a Visualization's Title](#)
- [Use a Parameter as a Visualization's Axis Label](#)
- [Use a Parameter in an Expression Filter](#)

- [Use a Parameter in a Workbook Calculation](#)
- [Use an Analytics Link Data Action to Pass Parameter Values](#)
- [Use a URL Navigation Data Action to Pass Parameter Values](#)
- [Bind a Parameter to a Reference Line or Band](#)
- [Bind a Parameter to a Request Variable](#)

Use a Parameter to Conditionally Show or Hide a Visualization

This topic describes how to use a parameter to conditionally show or hide a visualization based on an end user's selections.

Topics:

- [About Using Parameters to Show or Hide Visualizations](#)
- [Use a Parameter as a Filter to Conditionally Show or Hide a Visualization](#)

About Using Parameters to Show or Hide Visualizations

You can show or hide visualizations based on the selected value of a parameter to save space on the canvas and enable your end users to focus on specific data.

You can configure the Visibility Parameter property for any ready-to-use visualization to show or hide the visualization based on how a parameter's specified available values match the user-selected values. Using the parameter as a filter enables your end users to select the parameter values and control whether the visualization is shown or hidden.

The visualizations are hidden only in Viewer mode, not in Edit mode.

When a visualization is conditionally hidden, the canvas layout doesn't change. This means that if you design the canvas layout using Auto Fit, when the visualization is hidden, there's an empty space where it was on the canvas. You can use the Freeform canvas layout to overlay visualizations on top of each other so that one is shown in the space on the canvas while the other is hidden.

Visibility Parameter Settings

The Visibility Parameter property has the following options:

- **None** - Doesn't conditionally hide the visualization, it's always visible. This is the default setting.
- **Parameter Name** - Lets you select a parameter from a list of existing parameters, if available. You can create a parameter in advance specifically for the purpose of showing or hiding the visualization, and then select it from the list.
- **Create a Parameter** - Creates a basic parameter for you called Show Visual with two available values, Show and Hide. You can modify this parameter to suit your needs.

When you select a parameter for the Visibility Parameter property, you must use the Visibility Settings dialog to choose a condition and specify which of the parameter's available values to apply it to. Then, when a user selects a value, the visualization is shown or hidden depending on the condition you set.

The following conditions are available:

- **Any** - Displays the visualization when any of the values specified in the parameter condition are included in the user-selected values.

- **Subset** - Displays the visualization when any of the values specified in the parameter condition are the only user-selected values.
- **Exact Match** - Displays the visualization when all of the values specified in the parameter condition match all of the user-selected values.
- **Superset** - Displays the visualization when all of the values specified in the parameter condition are included in the user-selected values.

Condition Examples

Suppose you select a parameter called Year using the Visibility Parameter property for a visualization.

The parameter has the following available values:

- 2021
- 2022
- 2023
- 2024

Create Parameter

Name

Year

Description

Data Type

Text

Allow Multi Select

☒

Alias

☐

Available Values

Value

2021

2022

2023

2024

+

Enforce Validation

☐

Initial Value

Value

2021

+

Cancel

OK

Suppose you select 2023 and 2024 for the parameter condition in the Visibility Settings dialog.

This is what happens when you choose the following conditions:

- **Any** - The visualization is displayed when a user includes either 2023 or 2024, or both in their selections.
- **Subset** - The visualization is displayed when a user selects either 2023 or 2024, or both, and nothing else.
- **Exact Match** - The visualization is displayed when a user selects both 2023 and 2024, and nothing else.

- **Superset** - The visualization is displayed when a user includes both 2023 and 2024 in their selections.

Use a Parameter as a Filter to Conditionally Show or Hide a Visualization

Create a parameter and then use the Visibility Parameter property for a visualization together with a filter to show or hide the visualization based on the values an end user selects for the parameter.

Before you configure the Visibility Parameter property, do the following:

1. If a suitable parameter doesn't already exist, create a parameter and specify the available values you want users to choose from. See [Create a Parameter](#).
2. Create a filter using the parameter so that end users can select values. See [Use a Parameter in the Filter Bar](#) or [Use a Parameter as a Dashboard Filter Control](#).

Then you can configure the Visibility Parameter and Visibility Settings for your visualization.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the visualization that you want to conditionally show or hide to select it.
3. Click **Properties** to open the Properties pane.
4. Under **General**, in the **Visibility Parameter** field, click **None** and then select the parameter you created.
5. Beside the Visibility Parameters field, click **Visibility Settings** .
6. In the Visibility Settings dialog, select a condition, then select which of the parameter's available values to apply the condition to.

Year

Select the condition and members that will determine when the visualization will be shown. Note: Visualizations will only be hidden in Viewer mode.

Condition: **Exact Match**

Search: 2021, 2022

Selections (2/4): 2023, 2024

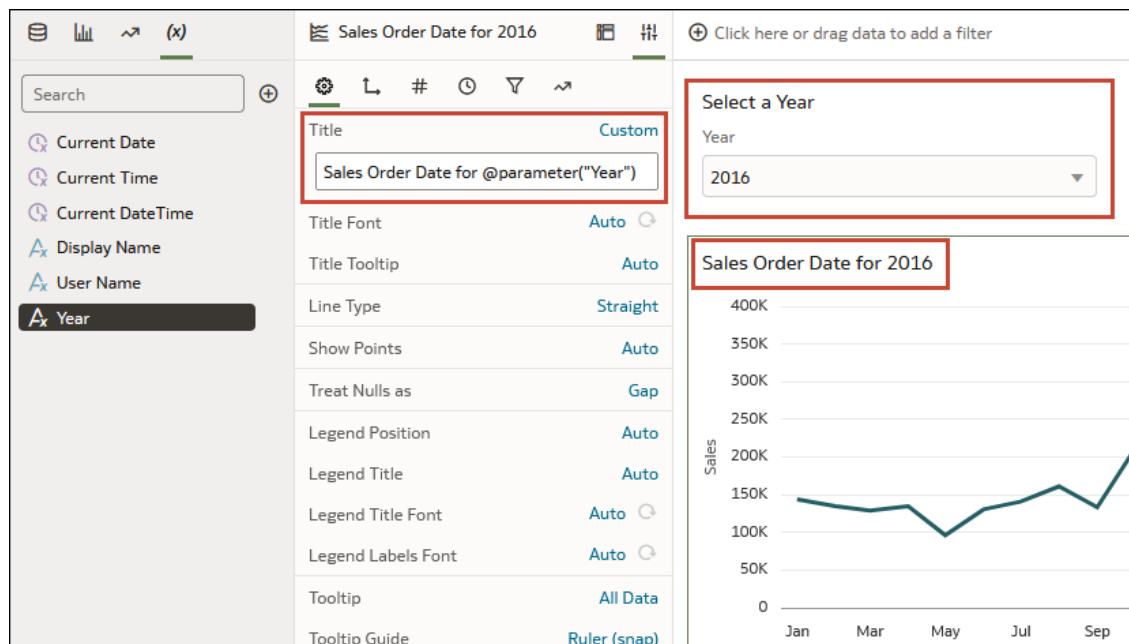
Add (2) Clear (2)

7. Click **Save**.
8. To test that the functionality works as intended for end users, click **Preview**  and try out the filter selections.

Use a Parameter in a Visualization's Title

Add a parameter to the visualization's title when you want to display the parameter's value in the context of the title.

For example, you can create a parameter called Year and add it to a dashboard filter on the canvas. Then you can reference the parameter in a visualization's title so that when the user chooses a year value, the title is updated to include the selected year.



1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click a visualization to select it, and then click **Properties** to display the Properties panel and click **General** to display the general properties.
3. Locate the **Title** field and click **Auto**. Select **Custom**.
4. Clear or modify the default title and use this syntax to include a parameter in the title:

```
@parameter("parameter name")
```

For example:

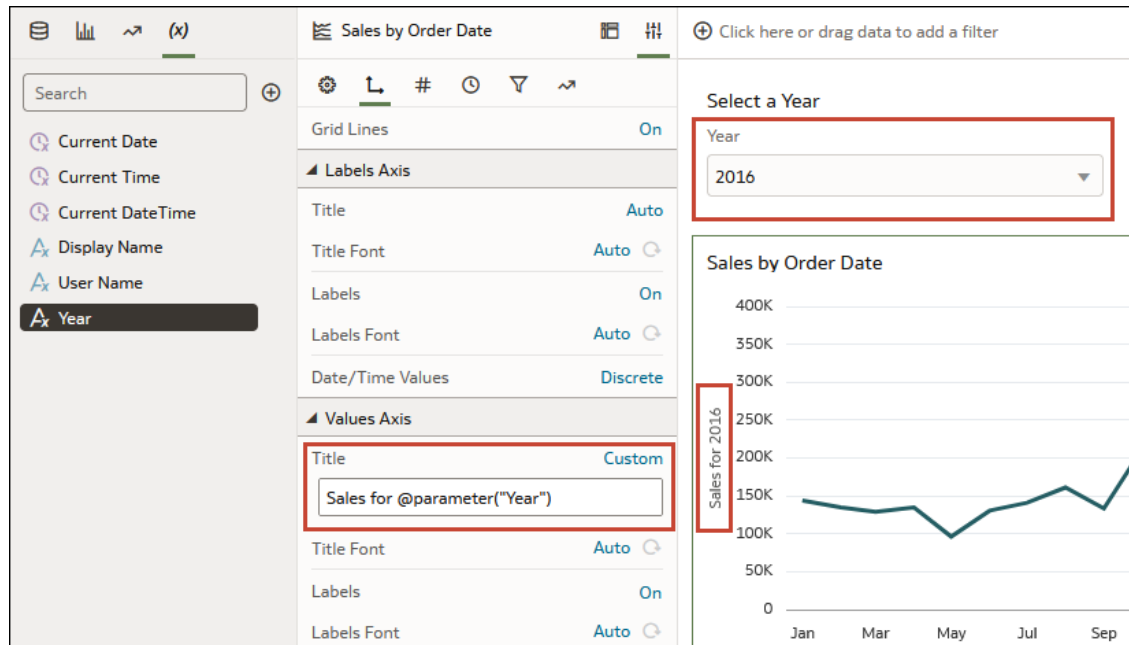
```
Sales by Order Date for @parameter("Year")
```

5. Click **Save** to save the workbook.

Use a Parameter as a Visualization's Axis Label

A parameter value can be dynamically passed to a visualization's axis labels. The current value of the parameter is used as the axis label's name.

For example, you can create a parameter called Year and add it to a dashboard filter on the canvas. Then you can reference the parameter in a visualization's value axis so that when the user chooses a year value, the value axis title is updated to include the selected year.



1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the canvas, select a visualization and click **Properties** to display the Properties panel and click **Axis** to display the axis properties.
3. Locate the axis label where you want to use the parameter. Go to the **Title** property, click **Auto**, and then click **Custom**.
4. Clear or modify the default title and use this syntax to include a parameter in the:

```
@parameter("<parameter name>")
```

For example:

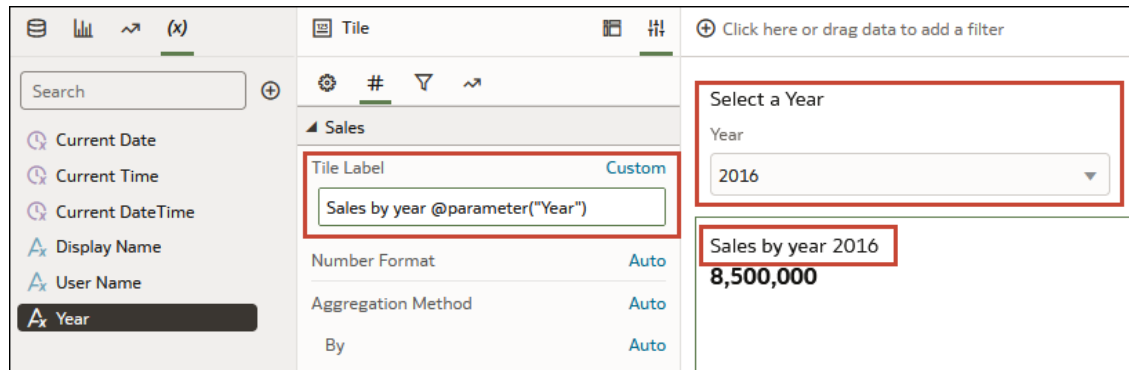
```
@parameter("Year")
```

5. Click **Save** to save the workbook.

Use a Parameter in a Tile Visualization's Measure Label

A parameter value can be dynamically passed to a tile visualization primary and secondary measure labels.

For example, suppose you want the workbook to include a dashboard filter measure selector, and when the user selects a measure value, the selected value is passed to the measure's label to give the tile visualization more context.



1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click a tile visualization to select it, click **Properties** and then click **Values** to display the Values panel.
3. Locate the measure's **Tile Label** field and click **Auto**. Select **Custom**.
4. Clear or modify the default title and use this syntax to include a parameter in the title:

```
@parameter("parameter name")
```

For example:

```
@parameter("Measure")
```

5. Click **Save** to save the workbook.

Use a Parameter in an Expression Filter

You can include a parameter in an expression filter's SQL expression to create a complex visualization filter.

This tutorial provides a use case explaining how to use a parameter in an expression filter:



[Tutorial](#)

See [Syntax for Referencing Parameters](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the visualization that you want to add the expression filter to and confirm that the visualization's **Grammar** panel is displayed.
3. In the Grammar panel, scroll to the **Filters** area, click **Drop Target Options**, and select **Create Expression Filter**.
4. In **Label**, enter a name for the expression filter.
5. In the **Expression** field, use this syntax to build the expression:

```
@parameter("parameter name")('default value')
```

For example:

```
rank(Sales)<=@parameter("Top N")(10)
```

6. Click **Validate**, and then click **Apply** to save the expression filter.

Use a Parameter in a Workbook Calculation

Use a parameter to replace a constant in a calculation that you create in the workbook's My Calculations folder.

This tutorial provides a use case explaining how to use a parameter in a workbook calculation:

 [Tutorial](#)

See [Syntax for Referencing Parameters](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the **Data Panel** click **Data**.
3. Locate the My Calculations folder, right-click it, and select **Create Calculation**.
4. In New Calculation, enter a name for the calculation.
5. In the calculation field, use this syntax to build the calculation:

```
@parameter("parameter name")('default value')
```

For example:

```
@parameter("Dimensions")('Order Priority')
```

6. Click **Validate** to validate the calculation, and then click **Save** to save the calculation.
7. Click **Save** to save the workbook.

Use an Analytics Link Data Action to Pass Parameter Values

You can create a data action to pass the selected parameter values to a canvas in another workbook.

This tutorial provides a use case explaining how to use a parameter in an analytics link:

 [Tutorial](#)

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Menu** on the workbook toolbar and click **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link.
4. Click the **Type** field and select **Analytics Link**.
5. Click the **Anchor To** field and select the columns from the current visualization to associate with this data action. Don't select measure columns or hidden columns. If you don't specify a value for the **Anchor To** field, then the data action applies to all data elements in the visualizations.
6. In the **Target** field, click the **This Workbook** field and select **Select from Catalog** and browse for and select the workbook that you want to use for the anchor.
7. Click the **Canvas Link** field and select the canvas that you want to use.
8. If you want to pass a filter value, then click the **Pass Values** field and select which values you want the data action to pass.

- **All** - Dynamically determines the intersection of the cell that you click and passes all filter values for the selected data.
 - **Anchor Data** - Ensures that the data action is displayed at runtime, but only if the required columns specified in the **Anchor To** field are available in the view context.
 - **None** - Opens the page (URL or canvas) but no filter values are passed for the selected data.
 - **Custom** - Passes only user selected custom filter values for the selected data.
9. Click the **Pass Parameter Values** field and select which parameter values you want the data action to pass.
- **All** - Dynamically determines the intersection of the cell that you click and passes all parameter values for the selected data.
 - **None** - Opens the page (URL or canvas) but no parameter values are passed for the selected data.
 - **Custom** - Passes only user selected custom parameter values for the selected data.
10. Click **Supports Multiple Selection** to set the value.
- **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error.
11. Optional: Click **Open in** to set how the data action opens for a consumer user.
- **Auto** - If the target is this workbook, the data action navigates to the specified canvas in the current workbook in the same tab. If the target is an external item, the data action opens in a new tab. If the data action is invoked in an embedded workbook, the target opens in a new tab, even when the target is this workbook.
 - **New Tab** - The data action opens in a new tab in same browser window.
 - **Same Tab** - The data action opens in the current tab, replacing the current canvas. If the data action is invoked in an embedded workbook, the target opens in a new tab even when the Open in property is set to Same Tab.
 - **Pop Up** - The data action opens in a pop-up window.
12. Click **OK** to save.

Use a URL Navigation Data Action to Pass Parameter Values

You can create a data action that uses a URL to pass the selected parameter values from a workbook to another application.

For example, suppose your workbook contains a parameter that allows a user to select an employee ID value. You can create a URL navigation data action to pass the employee ID value to your HCM application.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Menu** and select **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link.
4. Click the **Type** field and select **URL Navigation**.

5. Click the **Anchor To** field and select the columns that you want the URL to apply to. If you don't specify a value for the **Anchor To** field, then the data action applies to all data elements in the visualizations.
6. Enter a URL and optionally include any URL options such as separator, style, or type.
For example, `http://www.example.com/search?q=@parameter("City",separator=" ",type="value") ('')`
7. Click **Supports Multiple Selection** to set the value.
 - **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
8. Optional: Click **Open in** to set how the data action opens for a consumer user.
 - **Auto** - The data action opens in the current mode for opening data actions. The default is to open in a new tab in the same browser window.
 - **New Tab** - The data action opens in a new tab in same browser window.
 - **Same Tab** - The data action opens in the current tab, replacing the current canvas.
 - **Pop Up** - The data action opens in a pop-up window.
9. Click **OK** to save.

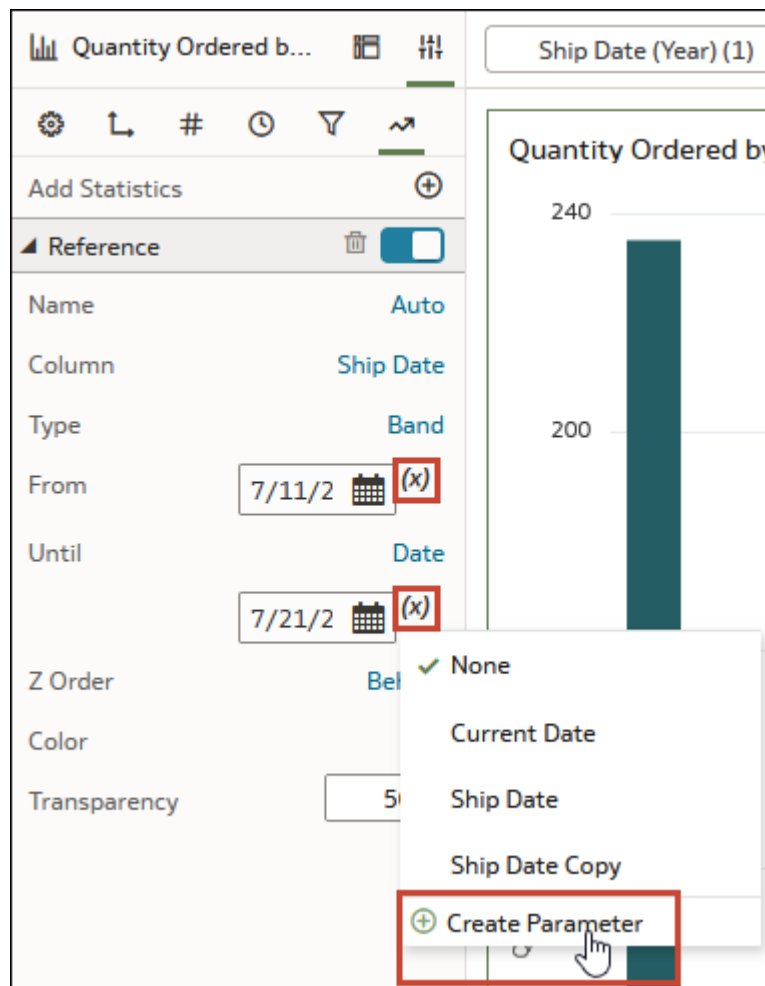
Bind a Parameter to a Reference Line or Band

You can bind a parameter to a visualization's reference line or band's date value or date range when you want to use a parameter value to place the reference line or band on the visualization.

When you bind a parameter to a reference line or band, you can add the same parameter as a dashboard filter so that the user can enter a date value or range to control the placement of a visualization's reference line or band.

See [Add a Reference Line to a Visualization](#).

1. On the Home page, select the workbook with the visualization containing the reference line or band that you want to bind to a parameter, click **Actions**, and then select **Open**.
2. Click to select the visualization and in the Grammar Panel, click **Properties**, and click **Analytics**.
3. For a reference line, go to the **Value** field or for a reference band go to the **From** and **Until** field and click (x) **Bind to Parameter**.
4. Click **Create Parameter** to create and bind the parameter to the reference line or band.



The new parameter's name matches the column name.

5. Optional: Go to the workbook's **Data Panel**, click **Parameters**, right-click the parameter you created from the date value or range, and select **Edit Parameter** to review and update the parameter's properties.
6. Click **Save**.

Bind a Parameter to a Request Variable

Bind a parameter to a request variable when you want to temporarily set the request variable to the parameter's value.

For example, this is useful if you want a user to be able to select a currency type in a workbook so they can display the data in the visualizations in a specific currency. The request variable is set to the parameter's value only for the duration of a specific query in the workbook.

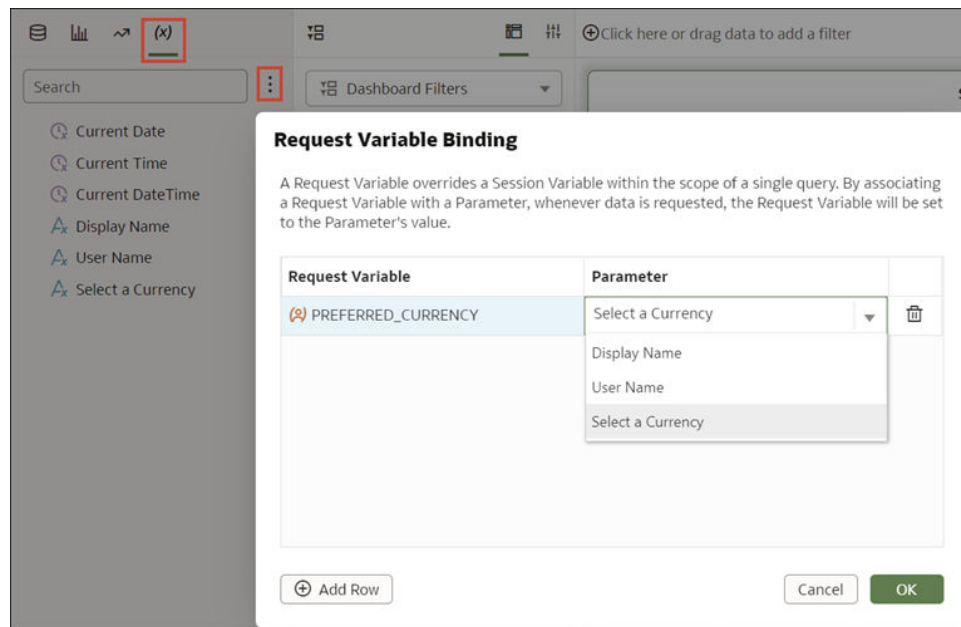
This tutorial provides a use case explaining how to bind a parameter to a request variable:

 [Tutorial](#)

If the parameter a request variable is bound to accepts multiple initial values, the request variable is set to the first value and the remaining values are ignored. You can bind only one parameter to a request variable.

You need to know the request variable name to bind a parameter to it. Your semantic model developer can provide the request variable name.

1. On the Home page, hover over a workbook, click **Actions**, and then select **Open**.
2. In the Data Panel, click **Parameters**.
3. In the Parameters Pane, click **Menu** and select **Request Variable Binding**.



4. In the **Request Variable** field, enter the name of the request variable exactly as it is defined in the semantic model.
5. In the **Parameter** field, select the parameter from the drop-down list.
You can also type the name of a parameter that does not exist yet and then create it after you finish this binding procedure. See [Create a Parameter](#).
6. Click **OK**.

Apply Map Backgrounds and Map Layers to Enhance Visualizations

You can use geographical information to enhance the analysis of your data.

Topics:

- [About Map Backgrounds](#)
- [Enhance Visualizations with Map Backgrounds](#)
- [Use Different Map Backgrounds in a Workbook](#)
- [Interpret Data Values with Color and Size in Map Visualizations](#)
- [Add Custom Map Layers](#)
- [Update Custom Map Layers](#)
- [Apply Multiple Data Layers to a Single Map Visualization](#)
- [Apply Reference Layers to Map Visualizations](#)
- [Use an Image as a Map Background and Draw Map Layer Shapes on the Image](#)
- [Assign a Map Layer to a Data Column](#)
- [Auto Focus on Data for a Map Visualization](#)
- [Configure Zoom in Map Visualizations](#)
- [Review Location Matches for a Map Visualization](#)
- [Create Heatmap Layers on a Map Visualization](#)
- [Create Cluster Layers on a Map Visualization](#)
- [Represent Point Data with Custom Icons on a Map](#)
- [Select Points or Area on a Map](#)
- [Represent Line Data Using Size and Color on a Map](#)
- [Make Map Layers and Backgrounds Available to Users](#)
- [Use a Map Background as the Default](#)
- [Add Map Backgrounds](#)
- [Add Data Labels to a Map](#)

About Map Backgrounds

You can enhance map visualizations in workbooks by adding and maintaining map backgrounds.

You can apply the ready-to-use map backgrounds to a workbook. You can also add backgrounds from the available list of Web Map Service (WMS) providers such as Google Maps and Baidu Maps, or you can add a map background by specifying appropriate Web Map Service or Tiled Web Map details. Background maps from these providers offer details and

language support (such as city or region name) that certain geographic regions (such as Asian countries) require.

You can modify backgrounds in the following ways:

- Modify the background parameters such as map type, format and API keys. The parameters are different for each WMS provider.
- Assign or change the default background in a workbook.
- Reverse the inherited default background settings in a workbook.

You can add a WMS provider and perform the following types of functions:

- Add the WMS map servers, and make them available as additional map background options.
- Select one or more map backgrounds available from the WMS provider.
- Assign an added WMS provider's map as the default map background.

Enhance Visualizations with Map Backgrounds

You can use map backgrounds to enhance visualizations in a workbook.



[LiveLabs Sprint](#)



[Tutorial](#)

Based on the column values, a specific set of dimensions and metrics is displayed on the map visualization. You'll see either the default map background or an existing Oracle map background if no default is set.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize**.
3. To select a column and render it in a map view, do one of the following:
 - Right-click a map-related column in the Data Element pane and click **Pick Visualization**, then select **Map**.
 - Drag and drop a map-related column from the Data Element pane to the blank canvas, or between visualizations on the canvas. On the visualization toolbar, click **Change Visualization Type** and select **Map**.
4. In the properties pane, click **Map** and specify the visualization properties.
5. If you want to use a different map background, click the **Background Map** value in the properties pane and select a background. For example, select Google Maps, and the visualization displays Google Maps as the map background.
 - If you want to see the list of available map backgrounds or change the backgrounds that you can use, do one of the following:
 - Click the **Background Map** value and select **Manage Map Backgrounds** to display the Map Background tab.
 - Open the Console page, click **Maps** and select the Backgrounds tab.
 - Select another map background such as Satellite, Road, Hybrid, or Terrain.
6. Click **Save**.

Use Different Map Backgrounds in a Workbook

As an author you can use different map backgrounds in map visualizations.

Here is an example of how you might use a map background in a workbook.

1. On the Home page click **Create**, then click **Workbook**.
2. Select a dataset in the Add Dataset dialog.
3. Click **Add to Workbook**.

The Workbook pane and list of Data Elements is displayed.

4. Select a map-related data element (for example, click **City**), and click **Pick Visualization**.
5. Select **Map** from the list of available visualizations.

Either the default map background or an existing Oracle map background if no default is set is displayed.

6. In the visualization properties pane, select the **Map** tab.
7. Click the **Background Map** value and select a map from the drop-down list.

For example, select Google Maps and Google Maps as the map background is displayed.

8. Optional: Click another value to change the type of map (such as Satellite, Road, Hybrid, or Terrain).
9. Optional: Click **Manage Map Backgrounds** from the **Background Map** options to display the Map Backgrounds pane.

Use this option to maintain the map backgrounds that you want to use.

Interpret Data Values with Color and Size in Map Visualizations

You can use the color and size of a shape such as a polygon or a bubble, to interpret values in a map visualization.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Select a column and render it in a map view, doing one of the following:
 - Right-click a map-related column in the Data Element pane and click **Pick Visualization**, then select **Map**.
 - Drag and drop a map-related column from the Data Element pane to the blank canvas, or between visualizations on the canvas. On the visualization toolbar, click **Change Visualization Type** and select **Map**.
3. Drag and drop columns to the following sections on the Visualization Grammar Pane.
 - Use **Color** to change the color for geometries displayed in the corresponding map layer (for example, polygon fill color, bubble color) based on the values.
 - Use **Size (Bubble)** to change color bubble size based on the measure column values. To change the size of the color bubble you've to drag and drop measure columns only. The size shows the aggregated measure for a specific geographic location in a map visualization.
 - Use **Trellis Columns / Rows** to Compare multiple map visualizations based on the column values using filters.

In the map visualization, you can also use the following to interpret measure columns and attribute values:

- **Legend** - If a measure column or an attribute has multiple values, then the legend is displayed that shows values by size or color.
- **Tooltip** - If you hover the mouse pointer over a color bubble or data point, then the values are displayed in a tooltip.

Add Custom Map Layers

You can add custom map layers to use in map visualizations.



You add a custom map layer using a geometric data file with the .json extension that conforms to GeoJSON schema <https://en.wikipedia.org/wiki/GeoJSON>. You then use the custom map layer to view geometric map data in a workbook. For example, you might add a Mexico_States.json file to enable you to visualize geometric data in a map of Mexico States.

The maximum upload size for an individual GeoJSON file is 100 MB (compressed). The overall limit for GeoJSON files is 200 MB (compressed). Compressed GeoJSON files are smaller (up to half the original size) than uncompressed GeoJSON. Oracle Analytics compresses files that you upload by stripping out whitespace and truncating precision to 6 decimal points.

- Map layer files containing polygons with 12 or more decimal points might reduce in size by 50%.
- Map layer files that contain point geometries might reduce in size by 15-20%.

If preferred, you can compress your map layer files before you upload them to Oracle Analytics using tools such as mapshaper.org.

When creating a custom map layer, you must select layer keys that correspond with data columns that you want to analyze in a map visualization. For example, if you want to analyze Mexican States data on a map visualization, you might start by adding a custom map layer for Mexican States, and select HASC code layer key from the Mexican_States.json file. Here's an extract from the Mexican_States.json file that shows some of the geometric data for the Baja California state.

```
{,
{
  "type": "Feature",
  "properties": {
    "adml_code": "MEX-2706",
    "OBJECTID_1": 745,
    "diss_me": 2706,
    "adml_cod_1": "MEX-2706",
    "iso_3166_2": "MX-",
    "wikipedia": "",
    "iso_a2": "MX",
    "adm0_sr": 6,
    "name": "Baja California",
    "name_alt": "",
    "name_local": "",
    "type": "Estado",
    "type_en": "State",
    "code_local": "",
    "code_hasc": "MX.BN",
    "note": ""
```

If you wanted to use the `Mexican_States.json` file, the layer keys that you select must match columns that you want to analyze from the Mexican States Data tables. For example, if you know there's a data cell for the Mexican state Baja California then select the corresponding name field in the JSON file to display state names in the Map visualization. When you create a workbook and select column (such as State, and HASC), then Mexican states are displayed on the map. When you hover the mouse pointer over a state, the HASC code (such as MX BN) for each state is displayed on the map.

1. On the Home page, click **Navigator**, and then select **Console** to display the Console page.

2. Click **Maps** to display the Map Layers page.

You can enable and disable System Map Layers but you can't create or delete them.

3. To add a custom map layer, click **Add Custom Layer** or drag and drop a JSON file from File Explorer to the Custom Maps area.

4. Browse the Open dialog, and select a JSON file (for example, `Mexico_States.json`).

The JSON file must be a GeoJSON file that conforms to the standard specified in <https://en.wikipedia.org/wiki/GeoJSON> (the maximum file size allowed is 20MB).

Custom layers that use the Line String geometry type aren't fully supported. The Color and Size section on Visualization Grammar pane doesn't apply to line geometries.

5. Click **Open** to display the Map Layer dialog.

6. Enter a **Name** and an optional **Description**.

7. Select the layer keys that you want to use from the Layer Keys list.

The layer keys are a set of property attributes for each map feature, such as different codes for each state in Mexico. The layer keys originate from the JSON file. Where possible, select only the layer keys that correspond with your data.

8. Click **Add**. A success message is displayed when the process is complete and the layer is added.

Update Custom Map Layers

You can maintain custom map layers.

1. On the Home page click **Navigator**, and then click **Console**.

2. Click **Maps**, click **Map Layers** and click **Custom Map Layers**.

3. To include or exclude a custom map layer from being available, click the tick symbol  for the layer. For example, if you want to exclude `us_states_hexagon_geo` from maps, click the tick to disable it and remove it from searches.

4. Click **Options** and select any of the following options:

- a. Optional: To change settings for the custom map layer select **Inspect**.

You can specify the Name, Description, Layer Keys, and choose an image or a map to use as the default background for this layer.

- b. Optional: To upload a JSON file again select **Reload**.

- c. Optional: To save the JSON file locally select **Download**.

- d. Optional: To delete the custom map layer, select **Delete**.

Switch to Use Another Map Layer

You can change which map layer you use in a map visualization.

1. On the Home page, hover over a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. Click **Data Layers** in the Properties pane.
3. Click the current **Map Layer** for example Mexican States. This displays a list of available map layers that you can choose from.
4. Click the map layer that you want to use to match your data points.

Apply Multiple Data Layers to a Single Map Visualization

You can add data layers that provide details about dimensions and metrics to a map visualization. Data layers overlay the base map visualization.

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. Drag and drop measure or attribute columns containing map-related data from the Data Panel to the Category (Location) section on the Grammar Panel.
3. Click **Layer options** in the Category (Location) section of the Grammar pane and click **Add Layer** to add a new data layer (for example, Layer 2).
4. Drag and drop a column to the Category (Location) section. Based on the column values the map visualization automatically updates with a different set of dimensions, and it overlays on the previous layer.
5. Optional: Click **Data Layers** in the Properties pane. Depending on the layer type, you can select:
 - **Name** - Change the layer name.
 - **Layer Type** - Change the layer type. For example, Polygon.
 - **Transparency** - Change the visibility of the layer.
 - **Outline** - Change the layer outline to **Custom** to select an **Outline Color** and set the **Outline Width**.
 - **Size** - Change the size of the layer in relation to the map.
 - **Tooltip** - Modify the data that appears on the tooltip when hovering over the layer on the map.
 - **Show Layer** - Display or hide the layer.
 - **Show Legend Title** - Display or hide the legend.
 - **Data Labels Position** - Display and select a position for data labels on the map for selected data columns.
 - **Auto Zoom** - Automatically zoom to this layer's extent whenever the map visualization renders.
 - **Enable Selection** - Enable selection of data for this layer using the **Rectangle**, **Radial**, or **Polygon** selection toggles, or using left or right mouse click.
6. Click **Save**.

Apply Reference Layers to Map Visualizations

You can add reference layers that don't display any data to overlay a map visualization. You might add a reference layer to show how the path of a storm impacts customer locations displayed on the map.

A static reference layer with no data is defined in a custom GEOJSON file that an administrator must add to the **Reference Layers** section in **Maps** in the Console. See [Add Custom Map Layers](#).

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. Click **Layer options** in the Category (Location) section of the Grammar pane, click **Add Layer** and select **Add Reference Layer**.
3. Click **Layers** in the Properties pane, expand the new reference layer, click **Map Layer** and select the appropriate custom GEOJSON file that you want to display (for example, one that shows the path of a storm).
4. Optional: If you want to specify a display color for the reference layer, click **Color**, select **Custom**, click **Fill Color** and choose a color, then click **OK**.
5. Click **Save**.

Use an Image as a Map Background and Draw Map Layer Shapes on the Image

You can upload an image, prepare the image as a map background, draw map layer shapes onto the image, and associate data with the map background layer.

 [LiveLabs Sprint](#)

 [Video](#)

Topics:

- [Upload an Image as a Map Background](#)
- [Draw Custom Map Layer Shapes on an Uploaded Image](#)
- [Associate a Dataset with Map Layer Shapes Drawn on an Uploaded Image](#)

Upload an Image as a Map Background

You can upload an image as a map background and then draw layer shapes on top of the uploaded image.

1. On the Home page, click **Navigator**, and then click **Console**.
2. On the Console page, click **Maps**.
3. In Maps, click the **Backgrounds** tab, and expand **Image Backgrounds**.
4. Click **Add Image**, select your image, and click **Open**.
5. Enter a name and description for the uploaded image, and click **Save**.

Draw Custom Map Layer Shapes on an Uploaded Image

You can draw and edit custom map layer shapes on an uploaded image and associate the shapes with data in map visualizations.

1. On the Home page, click **Navigator**, and then click **Console**.
2. On the Console page, click **Maps**.
3. In Maps, click the **Backgrounds** tab, and expand **Image Backgrounds**.
4. In Image Backgrounds, select the image, click **Options**, and then select **Create Map Layer**.
5. Select **Polygon**, **Line**, or **Point**, and draw a shape onto the image.

Shape	Actions
Polygon	Click the image, drag and click to draw each edge of the polygon until the shape is complete, then click to finish.
Circle	Click the image, drag to increase the circle size until the circle reaches the required size, then click to finish.
Line	Click the image, then drag and click to draw each line edge until the line is complete.
Point	Click the image in the location where you want to draw a data point.

If you uploaded a motorcycle image, you could draw a shape outline over each visible part. For example, you might draw a polygon to represent an irregular shape like the fuel tank, or a line to represent a fork, or a circle to represent a tire, and so on.

Each new shape that you create is given a default name and is listed under Features.

6. Enter a name for each shape that corresponds to a key column value in the dataset.
For example, if you drew a petrol tank polygon shape and the key column PartID in the dataset has the value PT for petrol tank, then you must enter `PT` as the shape name.
You can also edit a shape name by clicking the corresponding object in the Features list.
7. Optional: If you want to reposition a shape, click the shape, then drag it to move it to a new position.
8. Optional: If you want to resize a shape, click and hold the shape, or edge, and drag it until it reaches the required size, then click again to finish.
9. Click **Save**.

Associate a Dataset with Map Layer Shapes Drawn on an Uploaded Image

You can associate a dataset with the map background layer shapes that you drew on an uploaded image, and use it in a workbook.

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1. In the Home page, click **Create** to bring in a dataset file that you want to associate with your map background.

For example, you might select `motorbike.xls` to create a motorcycle dataset with a `PartID` key column containing values that match the part names of the shapes that you drew.

2. In the key column of the dataset, click **Options**, select **Location Details**, choose the custom map layer, and click **OK** to assign the key column to the selected map layer.
3. Create a workbook.
4. Drag and drop the key column into the visualization. This automatically places the column into Category (Location).

A map visualization is suggested based on the key column, and the associated map background is displayed.

5. Continue to add columns, and create visualizations as required.
6. Click **Save**.

Assign a Map Layer to a Data Column

Assign a map layer to a data column to use it consistently in any workbook.

You can assign a map layer to a column that contains text or numeric attributes, for example, columns such as Airport Name, Latitude, and Longitude. When you select a data column with a map layer assignment for a visualization, Oracle Analytics automatically creates a map visualization.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Data** to go to the Data page.
3. In the **Data Diagram** select the dataset that contains the column that you want to prepare and click the dataset's **Edit** icon.

If the dataset contains multiple tables, the Dataset editor is displayed and you'll see the Join Diagram with a tab for each table. Select the table that contains the column you want to prepare to open it in the Transform editor.

4. In the Transform editor, click **Options** for any numeric or text attribute column, and then click **Location Details**.
5. In Location Details, review the associated map layer, change the map layer if you want to, and then click **OK**.

The property change is listed as a Change Property step in the Preparation Script pane.

6. Depending on your dataset, in the Preparation Script pane click **Apply Script**, or on the toolbar click **Save Dataset**.

The updated column displays the location icon indicating that the location preference has been set.

7. In the Properties panel for the updated column, click the **Location** icon to verify the map layer associated with the column.
8. Create a visualization with the data columns for which you have set the location details.

The visualization type is now automatically set as Map and the map layer is available for the specific columns. You no longer need to set the location details for each visualization.

Auto Focus on Data for a Map Visualization

You can override the current visible area when you focus on new data in a map visualization.

The ability to auto focus on data enables you to view the visualization for the specific data that you displayed in a map. For example, if your map visualization displays sales by countries and you have first viewed sales for Australia, the map zooms to Australia. However, if you focus on sales for Italy, the map zooms to Italy.

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. In Visualization Properties, click **Map**, and then set **Auto Focus on Data** to **On**.

The default value of this property is **Off**.

Configure Zoom in Map Visualizations

You can configure zoom to enable users to zoom in and out of a map visualization.

When Zoom Control is On, it displays the magnification control that enables you to zoom in or out of the map. When Zoom Interaction is On, it enables you to use the mouse wheel or a touch screen to zoom in or out of a selected map area. When Zoom Control and Zoom Interaction are On, you can zoom in or out of the map using the magnification control, mouse wheel, or a touch screen.

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. In Visualization Properties, click **Map**.
3. Click **Zoom Control** and **Zoom Interaction** to **On**.

Review Location Matches for a Map Visualization

You can review mismatch issues between data and match results in map layers, such as when there are ambiguous or partial matches between words.

If ambiguous results are present, consider adding more columns to the map visualization to get the specific match. For example, your map might have layers for City, Country, and Continent. You can also exclude rows of data.

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. Click the **Visualization** tab.
3. Right-click the map visualization and select **Location Matches** from the menu to display the Location Matches dialog.
4. Select a tab representing a map layer in the current visualization to inspect how well your data matches the map layer.

For example, select the **Country** tab to see how well your data matches with the Country map layer.

5. Optional: Click **Map Layer** to select a different layer or click **Manage Map Layers** to display the Console page.
6. Review and resolve data mismatches use the columns.

Use **Match** to see what data items match with the map layer information. A match can be anything from No Match, Partial Match, to a 100% match. Matches are displayed initially sorted top down from the worst to the best matches.

- **No Match** - Displays a red warning triangle indicator.
- **A Match with an issue** - Displays a yellow warning triangle indicator. The warning doesn't indicate a poor match but an imperfect match for which you might want to review the use case.
- **A Perfect Match** - Displays no warning triangle indicator.
- If you are matching Latitude and Longitude, the match values are Valid or Invalid.

The summary section above the table displays the number of locations and any issues.

7. Click the filter icon in the **Match** column title and select a filter option.
 - Use **All Data** to display all types of matches.
 - Use **Good Matches** to display only 100% perfect matches.
 - Use **All Issues** to display partial matches, multiple matches and no match.
 - Use **Partial Matches** to indicate the percentage difference between the strings being matched. For example: Part of a string is exactly right, such as Paulo versus Sao Paulo. Most of a word is exactly right, such as Caiyro versus Cairo.
 - Use **Multiple Matches** to indicate how many matches exist for ambiguous cases. For example, you may see Barcelona, Spain matching with Barcelona Argentina. In this case you might want to revisit the data to add more detail to your GEO columns to ensure that you only match the correct columns.
8. Click in the **Exclude** column for each row of data that you want to exclude.
9. Click the **Exclude** menu:
 - Click **Select All** or **Deselect All**.
 - Click one of **Workbook Scope**, **Canvas Scope**, or **Visual Scope**.
10. Optional: Add in more columns to the Category (Location) edge on the visualization to make your match more specific. For example, add Country data to remove a mismatch like Barcelona, Spain versus Barcelona, Argentina.
11. Display the Location Matches dialog to check the summary for any remaining mismatches, and click **OK** when you are satisfied, or repeat previous steps as required.

Create Heatmap Layers on a Map Visualization

You can use a heatmap as a data layer type on a map visualization to identify the density or high concentration of point values or metric values associated with the points. For example, you can use a heatmap to identify the high profit stores in a geographic region or country.

You can create two types of heatmap layers:

- **Density heatmap** - Uses only map-related column data (such as latitude and longitude columns). Density heatmap layers show the cumulative sum of a point, where each point carries a specific weight. A point has a radius of influence around it, such that other points that fall in the same area also contribute to the total cumulative result of a point.
- **Metric heatmap** - Uses measure column data in the same layer. For example, if you add a measure column to the Color section on the Grammar Panel the heatmap is updated to show interpolated metric values.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Create an empty map visualization.
3. Drag and drop attribute columns containing map-related data from the Data Panel to the Category (Geography) section on the Grammar Panel.
 - If you're creating a workbook with a map visualization, in the Data Panel, right-click an attribute column and click **Pick Visualization** then select **Map**.
4. Go to the Data Layers tab of the properties pane.
 - Alternatively, click **Layer options** in the Category (Geography) section and click **Manage Layers**.
5. To create a density heatmap, click **Layer Type** value and select **Heatmap**.
 - Alternatively, you can add a new map layer, change the layer type to **Heatmap** and then add attribute columns to the Category (Geography) section.
6. To create a metric heatmap, drag and drop a metric column from the Data Panel to the Color section. The heatmap visualization changes from density to metric.
7. In the Data Layers tab of the properties pane, specify the options for the heatmap layer such as Radius, Interpolation, Transparency, and Color.
 - The default interpolation method is automatically selected based on the aggregation rule of the metric column or value that you've selected for the layer.
 - You can select the radius value in pixels (px). The radius value is the extent of influence of a measure around a point value on a map.

The heatmap is automatically updated based on the options selected in the Data Layers tab.

Create Cluster Layers on a Map Visualization

You can use a cluster layer as a type of data layer on a map visualization. In a cluster layer, points that are positioned near each other are grouped together into a common bubble.

The number of points clustered in the group is indicated in the bubble's label. If selected points are grouped with unselected points, the circle is dotted to indicate a partial selection. Individual points are displayed as pin icons to emphasize the distinction between grouped and ungrouped points. Points are grouped based on their proximity in pixels and on the map's zoom factor.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Create an empty map visualization by dragging the Map visualization from the Data Panel to the canvas.
3. Drag and drop attribute columns containing map-related data from the Data Panel to the Category (Geography) section on the Grammar Panel.

If you're creating a workbook with a map visualization, in the Data Panel, right-click an attribute column and click **Pick Visualization** then select **Map**.
4. Click the Data Layers tab of the properties pane.

Alternatively, click **Layer options** in the Category (Geography) section and click **Manage Layers**.
5. To create a point cluster, click **Layer Type** value and select **Cluster**.

Alternatively, you can add a new map layer, change the layer type to **Cluster** and then add attribute columns to the Category (Geography) section.

The point cluster is automatically updated based on the zoom level.

Represent Point Data with Custom Icons on a Map

You can use the Shapes edge to represent point data with custom icons in a map visualization.

You can associate a column with the Shape edge to display a custom shape for point data. For example, you can distinguish between cities by displaying them using custom shapes (for example, a square, a triangle, or a currency symbol). You can also change which custom shape you want to apply to one or more data points.

1. On the Home page, select a workbook containing a map visualization that contains point data, click **Actions**, and then select **Open**.
2. Drag and drop an attribute column containing point data (for example, city) from the Data Panel to the Category (Geography) edge on the Grammar Panel.
3. Drag and drop a column from the Data Panel to the **Shapes** edge and optionally to the **Color** edge on the Grammar Panel.

The map visualization automatically updates based on your selection and overlays the previous layer.

4. Optional: You can change how you assign custom shapes to data points and to the map legend.
 - a. Highlight one or more data points on the map using one of the selection tools, or use Ctrl-click to select one or more data points.
 - b. Right-click one of the multiple-selected data points, select **Custom Shapes** and then select **Series** or **Data Point**.
 - c. Select a custom shape and click **Done**.

Custom shapes are applied as follows:

- **Series dialog** - custom data point shape not previously set
Replaces highlighted data points and series items with the custom shape.
- **Series dialog** - custom data point shape previously set
Replaces only corresponding series items with the custom shape.
- **Data Point dialog**
Replaces only highlighted data points with the custom shape.

5. If you want to reassign the custom shape for a data point:
 - a. Right-click any data point, select **Shape**, and click **Custom Shapes**.
 - b. To change the custom shape assigned to a data point, click the shape corresponding to the data point that you want to change.
 - c. Select a new custom shape and click **Done**, then click **Done** again.
6. If you want to reset all of the custom shapes currently applied to data points on a map visualization, right-click any data point, select **Shape**, and click **Reset Custom Shapes**.

This resets all of the shapes applied to data points on the map to the default setting.

Select Points or Area on a Map

You can select multiple points on the map in a specific area that you define using the selection tools.

1. On the Home page, select a workbook containing a map visualization, click **Actions**, and then select **Open**.
2. In the Visualize canvas, select the map visualization.
3. On the visualization toolbar, do one of the following:
 - Click the **Rectangle Selection** tool and drag a rectangle on the map to select the points or area you want.
 - Click the **Radial Selection** tool and select a point on the map, then drag outward to create a circle. The unit shows the total distance covered on the map.
 - Click the **Polygon Selection** tool and drag a freehand border around the points or area you want to select on the map.

The selected points or area is highlighted on the map.

Represent Line Data Using Size and Color on a Map

You can represent the weight of line data through thickness and color in a map visualization.

You can associate a measure with the Size edge to indicate the relative weight of a line. For example, to compare delays in airline routes, you can display flight routes with varying line thickness, where a thicker line and a darker color correspond to a higher number of delays.

1. On the Home page, select a workbook with a map visualization that contains line data, click **Actions**, and then select **Open**.
2. In the Visualize canvas, select the map visualization that displays the line data.
3. Drag and drop a column containing line data (for example airline routes) from the Data Panel to the Category (Geography) edge on the Grammar Panel.
4. Drag and drop a line measure column from the Data Panel to the **Size** edge and optionally to the **Color** edge on the Grammar Panel.

The map visualization automatically updates based on your selection and overlays the previous layer.

Make Map Layers and Backgrounds Available to Users

For visualization workbooks, you can hide or display map layers and backgrounds for users.

1. On the Home page, click **Navigator** and then click **Console**.
2. Click **Maps** and then click **Backgrounds** or **Map Layers**.
3. Click the **Include** blue tick option to make the selected row item available or hidden from users.

You can hide or display map backgrounds, image backgrounds, custom map layers, and system map layers.

Use a Map Background as the Default

For visualization workbooks, you can make a map background the default for users.

1. On the Home page, click **Navigator**, and then click **Console**.
2. Click **Maps**, click **Backgrounds** and then click **Map Backgrounds**.
3. Click the **Default** column field in the row of a map background to make it the default.

The map background is used by default in new visualizations.

Add Map Backgrounds

You can add Google, Baidu, and other web map service backgrounds to use in visualizations.

Topics:

- [Add Google Map Backgrounds](#)
- [Add Baidu Map Backgrounds](#)
- [Add Web Map Service \(WMS\) Backgrounds](#)
- [Add Tiled Web Map \(XYZ\) Backgrounds](#)
- [Web Map Background Troubleshooting Tips](#)

Add Google Map Backgrounds

You can add Google map backgrounds to use in map visualizations.

1. On the Home page, click **Navigator**, and click **Console**.
2. In the Console, select **Maps**, click **Backgrounds**, and then click **Map Backgrounds**.
3. Click **Add Background** and select a **Google** from the list.
4. Enter a helpful description if needed.
5. Click **Account Type** to select your account.
6. Copy and paste your Google Maps API access key.

To use Google Maps tiles, you must obtain a Google Maps API access key from Google. Google prompts you to enter your Maps API access key and, when applicable, your Google "Client ID". Usage of the tiles must meet the terms of service specified by Google in the Google Developers Site Terms of Service.

7. Click **Default Map Type** if applicable.
8. Click **Save** to include the map in the list of available map backgrounds.

Add Baidu Map Backgrounds

You can add Baidu map backgrounds to use in map visualizations.

1. On the Home page, click **Navigator**, and click **Console**.
2. In the Console, select **Maps**, click **Backgrounds**, and then click **Map Backgrounds**.
3. Click **Add Background** and select **Baidu** from the list.
4. Enter a helpful description if needed.
5. Copy and paste your Baidu Maps API access key.

To use the Baidu Maps tiles, you must obtain a Baidu Maps API access key from Baidu. Baidu prompts you to enter your Maps API access key. Usage of the tiles must meet the terms of service specified by Baidu in their user agreement.

6. Click **I agree to trust this external host** if applicable.
7. Click **Save** to include the map in the list of available map backgrounds.

Add Web Map Service (WMS) Backgrounds

You can add web map service backgrounds and use them in map visualizations.

Web map service backgrounds are hosted dynamically on a web server using the Web Map Service (WMS) protocol. You can use them to integrate maps containing information that you might not have in your enterprise, and easily present it spatially with your data.

1. On the Home page, click **Navigator**, and click **Console**.
2. In the Console, select **Maps**, click **Backgrounds**, and then click **Map Backgrounds**.
3. Click **Add Background** and select **Web Map Service** from the list.
4. Click the **General** tab and enter a name and description.
5. In **URL**, enter the full URL for the web map service.

Contact your web map service provider to find out the correct URL.

For example, `https://www.gebco.net/data_and_products/gebco_web_services/web_map_services/mapserv`.

Version automatically displays the web map service protocol version used by the WMS provider. The default value is 1.1.1 but you can select an alternative version from the drop-down list.

Coordinate Reference System automatically displays the reference system used by the host provider. The default value EPSG:3857 is the coordinate system used for projecting maps in 2 dimensions. Hover over the tooltip icon for details.

6. Click **I agree to trust this external host** to automatically add the host to your list of safe domains.
7. In **Layers**, enter the name of each background map layer that you want to use. Click the cross (x) icon to remove a layer.
8. Click **Format** if you need to change the image type.
9. Display the **Parameters** tab and click **Add Parameter**.

Parameters that you enter are included in the URL and tell the hosting server what to display in the map background (for example, image type, layer, geographic extent of the map, size of the returned image).

10. Enter parameters that you want to pass in the URL to the host server in `key:value` format.

Use this URL to find parameters that you can use for this web map service:

`http://<url_of_the_map_server>?request=getCapabilities&service=wms`

11. Click **Save** to add the background map layer to the list of available map backgrounds.

You must refresh a page to see any changes.

12. Click **Preview** to display a preview of the map background.

The Preview tab only becomes available after the page is saved and refreshed. This is because the refresh enables recognition of the safe domains.

Add Tiled Web Map (XYZ) Backgrounds

You can add tiled web map (XYZ) backgrounds and use them in map visualizations.

Tiled web map (XYZ) backgrounds are displayed in a browser by seamlessly joining dozens of individually requested image or vector data files over the Internet through a web server. You can use them to integrate maps containing information that you might not have in your enterprise, and easily present them spatially with your data.

You configure tile URL strings to specify vector tiles or raster tiled map images to load. The host evaluates each string and determines which tile to load.

Contact your tiled web map service provider to find out the correct URLs. Parameters in the URLs tell the hosting server what to display in the map background. For example, the map name, version, and the number of tiles to use at the specified focus. Here are some examples of Mapbox tiled web map background URLs:

- `https://api.mapbox.com/styles/v1/mapbox/streets-v11/tiles/256/{z}/{x}/{y}`
- `https://api.mapbox.com/styles/v1/mapbox/satellite-v9/tiles/256/{z}/{x}/{y}`
- `https://api.mapbox.com/styles/v1/mapbox/light-v10/tiles/256/{z}/{x}/{y}`
- `https://api.mapbox.com/styles/v1/mapbox/dark-v10/tiles/256/{z}/{x}/{y}`
- `https://api.mapbox.com/styles/v1/mapbox/outdoors-v11/tiles/256/{z}/{x}/{y}`

1. On the Home page, click **Navigator**, and click **Console**.
2. In the Console, select **Maps**, click **Backgrounds**, and then click **Map Backgrounds**.
3. Click **Add Background** and select **Tiled Web Map** from the list.
4. Click the **General** tab and enter a name and description.
5. In **URL**, enter the full URL for the host tiled web map service.
6. Click the plus (+) icon to enter additional server URLs in the same domain, for load balancing.
7. Click **I agree to trust this external host** to automatically add the host to your list of safe domains.
8. Display the **Parameters** tab and click **Add Parameter**.

Parameters that you enter are included in the URL and tell the hosting server what to display in the map background (for example, image type, layer, geographic extent of the map, size of the returned image).

For example, you might enter `access_token` with a value of `exampleaccessTokenXyZ123456789nnnxxxZZz`.

Contact your provider for details.

9. Enter parameters that you want to pass in the URL to the host server in `key:value` format.
10. Click **Save** to add the specified tiled web maps to the list of available map backgrounds.
You must refresh a page to see any changes.
11. Click **Preview** to display a preview of the map background.

The Preview tab only becomes available after the page is saved and refreshed. This is because the refresh enables recognition of the safe domains.

Web Map Background Troubleshooting Tips

You might experience errors when you add a web map background. For example, a web map background image isn't displayed in the Preview tab or in a visualization.

Use these methods to find and diagnose web map background errors:

- Click **F12** to display the browser Developer Tools application and search for errors in the browser console tab. For example, search for `error` or `CORS`. Error messages are displayed in red text.
- If you see an error message similar to `Access to image at http://example.com has been blocked by CORS policy...`, contact the host provider to resolve the issue. Error messages that refer to the Cross Origin Resource Sharing (CORS) policy can only be resolved by the host provider.

Add an Outline to Points and Shapes on a Map

You can add an outline to highlight the boundaries of points and shapes on a map visualization.

An outline highlights the boundaries of points and shapes so that users can quickly identify the visual information presented on a map. The Outline property is only available on maps that use the Point layer type; Heatmap and Cluster layer types don't have the Outline property.

1. Open the workbook containing the map visualization, click **Actions**, and then select **Open**.
2. Click **Properties**. In Properties, click **Data Layers**.
3. In the Outline row, click **Auto** and select **Custom**.
4. Click the **Outline Color** field to select a color. In **Outline Width**, use the up arrow to increase the width and the down arrow to decrease the width.
5. Click **Save**.

Add Data Labels to a Map

You can include data labels on a map visualization to describe individual data points.

Data labels in maps make the maps clear and informative. Data labels help to highlight specific data points or regions of interest, and users can quickly interpret the visual information presented in the maps.

1. Open the workbook containing the map visualization, click **Actions**, and then select **Open**.
2. In the map visualization, use the rectangular selection tool and select the data element to use for the label, and then click **Menu**.
3. Click **Properties**, and then in Properties, click **Data Layers**.
4. Select and turn on **Data Labels**.
5. Configure the data labels.
 - **Data Labels Position** - Select a position for the label.
 - **Columns** - Select one or more columns to source the data labels.
If you select more than one column, turn on the Multi Line property to show the second label in a new line.

- **Allow Overlap** - Turn on to show all data labels regardless of the spacing and zoom level.
- **Font** - Select the size and color of the data labels.
- **Halo** - Select **Auto** or **Custom** to add a halo effect to enhance the data label text. If you select **Custom** you can click **Halo Color** to choose a color for the halo.

Use Data Actions

A Data Action link can pass context values as parameters to external URLs, filters to other workbooks or to visualizations embedded in external containers.

When a link navigates to a workbook, the data context is displayed in the form of canvas scope filters in the filter bar. The links data context may include attributes associated with the selections or cell from which the link was initiated.

Topics:

- [Create Data Actions to Connect Canvases](#)
- [Create Data Actions to Connect to External URLs from Visualization Canvases](#)
- [About Creating HTTP API Data Actions](#)
- [Create HTTP Data Actions](#)
- [Use Data Actions to Connect to Oracle Analytics Publisher Reports](#)
- [Invoke Data Actions from Visualization Canvases](#)
- [How Data Actions Affect Filters](#)
- [Tips on Using Data Actions](#)

Create Data Actions to Connect Canvases

You can create data actions to navigate to a different canvas in the current workbook or to a canvas in another workbook. You might want to navigate to other canvases to quickly view different visualizations displaying data that's complimentary to the current canvas.



Video

You can also use data actions to pass context-related information such as an order number, to a workbook or canvas with customer-specific data. See [Invoke Data Actions from Visualization Canvases](#). If you don't specify a value, then the data action applies to all data elements in the visualizations. See [Tips on Using Data Actions](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Menu** on the workbook toolbar and select **Data Actions**.
3. In Data Actions, click **Create Action** and enter a name for the new navigation link.
4. In Data Actions, enter a name. Select **Analytics Link** from the **Type** list.
5. Optional: In the **Anchor To** row click **Add Data**, select a data element or calculation.
6. In the **Target** row click **This Workbook** and select an option. Choose Use This Workbook or Select from Catalog. This choice lets you choose a workbook from the catalog.
7. Optional: If you chose Use This Workbook in the **Target** row, click the **Canvas Link** field and select target canvas to display.

8. Optional: To retain context when workbook users navigate using the data action, use the **Pass Values** option to select which values you want to retain. See [How Data Actions Affect Filters](#).

For example, if in the **Anchor To** field, you specified order number column, then in the **Pass Values** field, select **Anchor Data** to pass the specified column values.

- **All** - Dynamically determines the intersection of the cell that you click and passes those values to the target. For example, when the user clicks a data action on a STATE data point 'California', the target canvas is filtered on 'California'.
 - **Anchor Data** - Ensures that the data action is displayed at runtime, but only if the required columns specified in the **Anchor To** field are available in the view context.
 - **None** - Opens the page (URL or canvas) but doesn't pass any data. For example, when the user clicks a data action on a STATE data point 'California', the target canvas shows data for all states.
 - **Custom** - Enables you to specify which columns to pass.
9. Optional: Click **Supports Multiple Selection** to set the value.
 - **On** - The data action can be invoked when a user selects one or more data points.
 - **Off** - The data action can be invoked only when a user selects a single data point. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
 10. Optional: Click **Open in** and select an option for opening the data action or use the default **Auto** to open in a new tab.
 11. Click **OK**.

Create Data Actions to Connect to External URLs from Visualization Canvases

You can use data actions to navigate to an external URL from a canvas so that when you select a column such as the supplier ID, it displays a specific external website.



1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Menu** and select **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link.
You can add multiple navigation links.
4. Click the **Type** field and select **URL Navigation**.
5. Click the **Anchor To** field and select the columns that you want the URL to apply to. If you don't specify a value for the **Anchor To** field, then the data action applies to all data elements in the visualizations.
6. Enter a URL address and optionally include notation and parameters.
For example, where `http://www.example.com?q=${keyValuesForColumn:"COLUMN"}` is displayed like `www.oracle.com?q=${keyValuesForColumn:"Sales"."Products"."Brand"}`
The column names that you select here are replaced with values when you invoke the data action.
7. Click **Supports Multiple Selection** to set the value.

- **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
8. Optional: Click **Open in** to set how the data action opens for a consumer user.
 - **Auto** - The data action opens in the current mode for opening data actions. The default is to open in a new tab in the same browser window.
 - **New Tab** - The data action opens in a new tab in same browser window.
 - **Same Tab** - The data action opens in the current tab, replacing the current canvas.
 - **Pop Up** - The data action opens in a pop-up window.
 9. Click **OK** to save.
 10. In the **Canvas**, click a cell, or use Ctrl-click to select multiple cells.
 11. Right-click and select from the menu the navigation name that you created earlier.

Selecting the cells determines the values to pass to the parameters (that is, the URL tokens).

About Creating HTTP API Data Actions

You can create HTTP API data actions to connect to a REST API from a workbook.

You configure an HTTP API data action to pass selected column values from a workbook to a REST API which returns a response. Note the following:

- There's no limit to the number of data actions you can create.
- A URL can contain tokens that pass contextual values to a data action, for example, data values, user name, workbook path, canvas name.

The following REST API URL example includes a Category column token value that displays the Google books API: `http://www.googleapis.com/books/v1/volumes?q=${valuesForColumn:"Category"}`. The value that you select from a cell in the Category column, for example, "Books", passes to the REST API which displays the requested page.

- If you use a POST method, or custom HTTP header that overrides the HTTP header, the following apply:
 - Enter each parameter as a name-value pair with the name and value separated by "=".
 - You can use the same URL token syntax in the name-value pairs as required by the API that you're calling. For example:

```
* paramName1=paramValue1
```

```
* paramName2=${valuesForColumn:"Product"}
```

- A custom header works if the target of the HTTP request specifically allows the HTTP headers that you're using to be set on the request. If the headers aren't allowed, the browser blocks the request and displays an error message, for example a Cookie header, containing `Content-Type=application/json` will be blocked.

Create HTTP Data Actions

You can use an HTTP API data action in a workbook so that when you select a column, it sends the value to a REST API which returns a response.

You must configure the domain that you're trying to connect to as a safe domain before you create an HTTP API data action. See [Register Safe Domains](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click workbook **Menu** and then select **Data Actions**.
3. Click **Add Action** and enter a name for the new HTTP API data action. For example, enter `HTTP API Example`.
4. Click the **Type** field and select **HTTP API**.
5. Click the **Anchor To** field and select the columns that you want the HTTP API data action to apply to. Don't select measure columns or hidden columns. If you don't specify a value for the **Anchor To** field, then the data action applies to all data elements in the visualizations.
6. In the **HTTP Method** list select a method.
7. Enter the URL for the REST API that starts with `http` or `https` and optionally includes replacement tokens.
8. If you selected the POST method:
 - When you select the **Payload Type** value `Form Data`, enter each parameter on a separate line.
 - When you select the **Payload Type** value `Raw Data`, enter the raw data.
9. Enter a custom HTTP header if you want to add or override the HTTP header to suit the API that you're interfacing with.
10. Click **Supports Multiple Selection** to set the value.
 - **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
11. Click **OK** to save.
12. Click a data point in the visualization.

For example, you might select "Books" from a token Category column to display a particular REST API.
13. Right-click and select **HTTP API Example** to display the result.

The selected data-points determine which values to pass to the URL tokens.

A success or failure message is displayed confirming the REST API has been successfully invoked using the selected value.

Use Data Actions to Connect to Oracle Analytics Publisher Reports

Use data action links to pass context values as URL parameters in Publisher reports.

When you click a link to open a Publisher report, the link might include attributes associated with the column selected in the visualization.

Topics:

- [About Creating Data Actions to Connect to Oracle Analytics Publisher Reports](#)
- [Create Data Actions to Connect to Oracle Analytics Publisher Reports](#)
- [Create Custom Column Names in Data Actions to Pass in Oracle Analytics Publisher Report URLs](#)

About Creating Data Actions to Connect to Oracle Analytics Publisher Reports

You can create a data action to link to an Publisher report.

You configure a data action to pass selected column values from a visualization to display in a Publisher report.

- You must store your Publisher report in a local folder.
- When the Publisher report uses the analysis as the data model, prompts in the underlying analysis must have **User Input** value set to **Choice List** to enable selected values to pass to prompts in the Publisher report.
- You can pass lists of values and list filters to display as prompts in your Publisher report. However, you can't pass number filters, date filters, or expression filters.

Create Data Actions to Connect to Oracle Analytics Publisher Reports

You can create an analytics data action link to transfer selected data points from an Oracle Analytics workbook to an Oracle Analytics Publisher report.

The Oracle Analytics workbook, Publisher report, and analysis can be in different folders.

1. On the Home page, select a workbook that uses the data model used in the Publisher report, click **Actions**, and then select **Open**.
2. Click **Menu** and select **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link.
4. Click the **Type** field and select **Analytics Link**.
5. Enter a name for the data action in the **Name** field.
6. Click the **Target** field, select **Select from Catalog**, then browse to select the Publisher report that you want the data action to pass data to, and click **OK**.
7. Verify that **Parameter Mapping** is set to **Default**.
8. Verify the **Pass Values** field value is set to **All**.
9. Click **Supports Multiple Selection** to set the value.
 - **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
10. Optional: Click **Open in** to set how the data action opens for a consumer user.

- **Auto** - The data action opens in the current mode for opening data actions. The default is to open in a new tab in the same browser window.
 - **New Tab** - The data action opens in a new tab in same browser window.
 - **Same Tab** - The data action opens in the current tab, replacing the current canvas.
 - **Pop Up** - The data action opens in a pop-up window. This option isn't available for Publisher reports.
11. Click **OK**.
 12. Select data points in the visualization and choose the data action to test that the values are passed to the Publisher report.

Create Custom Column Names in Data Actions to Pass in Oracle Analytics Publisher Report URLs

You can create a data action link that passes custom column names in the URL of an Oracle Analytics Publisher report.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Menu** and select **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link.
4. Click the **Type** field and select **Analytics Link**.
5. Enter a name for the data action in the **Name** field.
6. Click the **Target** field, select **Select from Catalog**, then browse to select the Publisher report that you want the data action to pass data to, and click **OK**.
7. Click **Parameter Mapping** and select **Set Custom Mapping** to specify custom column names to pass as URL parameters to the Publisher report.
8. Click **Add Row** and click **Select a Column** for each column that you want to pass to the Publisher report using a custom name.
9. Click **Enter Parameter** and enter a custom name for each column name that you want to replace.

The custom name passes to the Publisher report in the URL.

10. Verify the **Pass Values** field value is set to **All**.
11. Click **Supports Multiple Selection** to set the value.
 - **On** - The data action can be invoked when one or multiple data points are selected.
 - **Off** - The data action can only be invoked when a single data point is selected. This setting is particularly useful when the selection of multiple data points might result in an error (for example, with some third-party REST APIs).
12. Optional: Click **Open in** to set how the data action opens for a consumer user.
 - **Auto** - The data action opens in the current mode for opening data actions. The default is to open in a new tab in the same browser window.
 - **New Tab** - The data action opens in a new tab in same browser window.
 - **Same Tab** - The data action opens in the current tab, replacing the current canvas.
 - **Pop Up** - The data action opens in a pop-up window. This option isn't available for Publisher reports.

13. Click **OK**.
14. Select data points in the visualization and choose the data action to verify that the custom column names are displayed in the URL of the Publisher report.

Invoke Data Actions from Visualization Canvases

You can invoke data actions from a workbook canvas to navigate to other canvases or URLs.

When you use data actions, these rules apply to matching data elements passed as values with data elements on the target canvas:

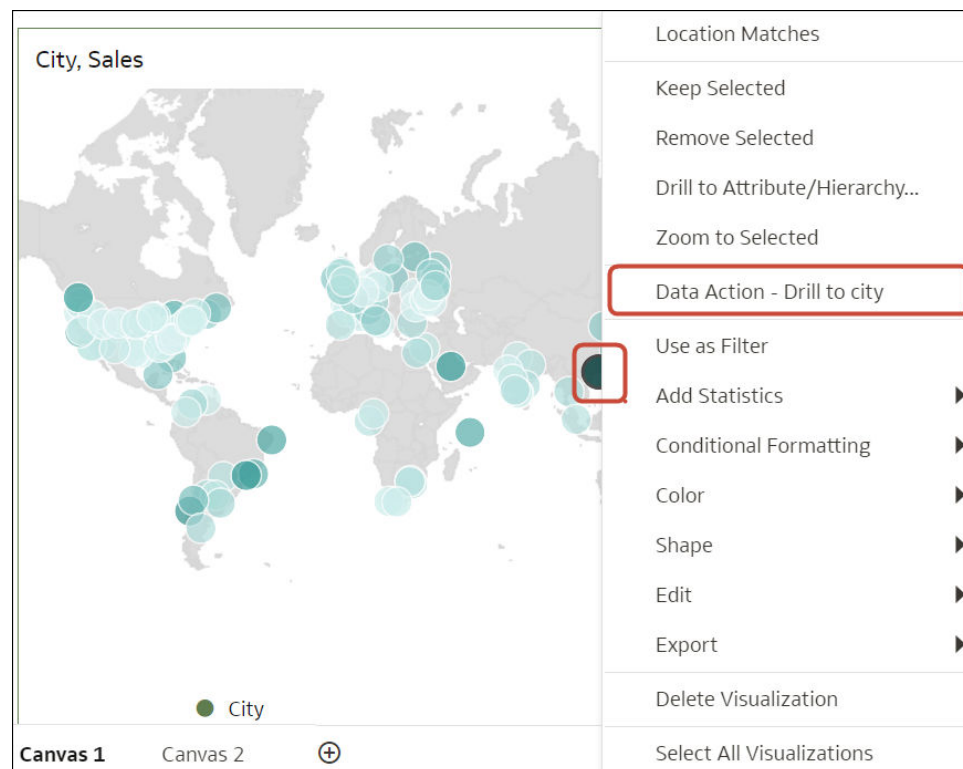
- If the same data element is matched in the target workbook's canvas, and if the target canvas doesn't have an existing canvas filter for the data element, a new canvas filter is added. If there is an existing canvas filter, it's replaced by the value from the source workbook's canvas.
- If the expected dataset is unavailable but a different dataset is available, the match is made by using the column name and data type in the different dataset, and the filter is added to that.
- If there are multiple column matches by name and data type, then the filter is added to all those columns in the target workbook or canvas.

See [How Data Actions Affect Filters](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the canvas that contains a data action link, right-click one or more data elements.

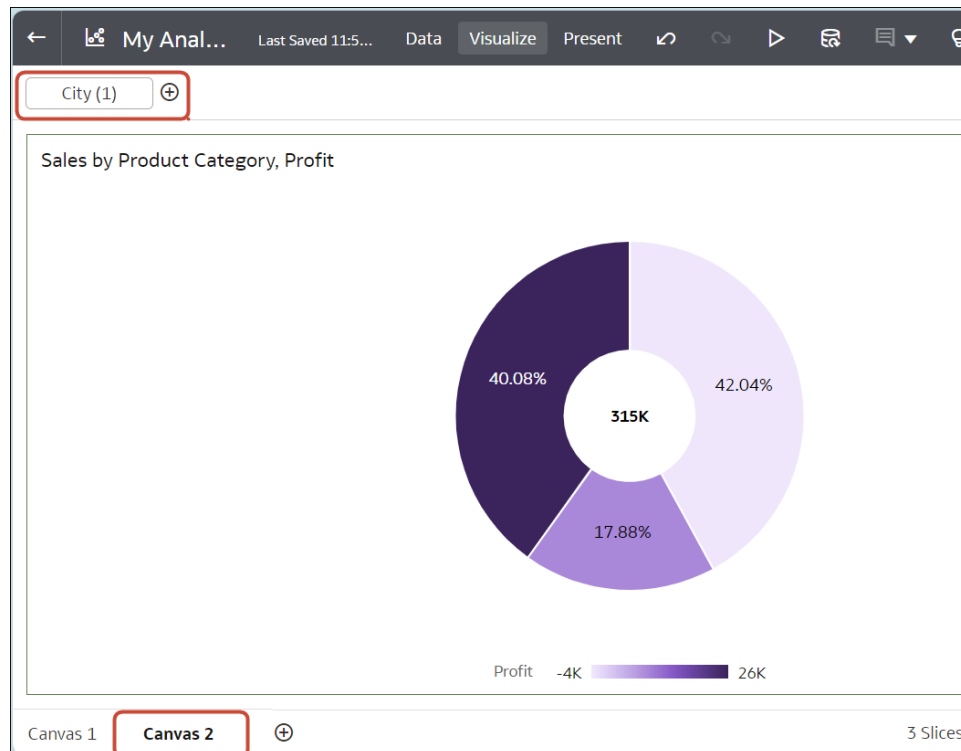
If a data action is anchored to multiple columns, make sure that you select data elements from all of the columns to display the data action in the context menu. See [Tips on Using Data Actions](#).

3. In the context menu, click the data action that you want to invoke.



The name of the data actions that apply in the current view context are displayed in the context menu. For example, on Canvas 1 you right-click Hong Kong and select the data action named "Data Action - Drill to city".

When you click a data action you navigate to the target workbook canvas, and if the data action was configured to pass workbook values, the target workbook is filtered based on the data points selected in the starting canvas. For example, if you right-click Hong Kong in the starting workbook and select the data action named "Data Action - Drill to city", you navigate to Canvas 2 and the content is filtered to show data relating to Hong Kong (a City filter is displayed on the filter bar).



See [How Data Actions Affect Filters](#).

How Data Actions Affect Filters

Use the rules set out here to understand how data actions affect filters in target workbooks, canvases, and dashboards.

You configure a data action to pass selected column values from a workbook to another workbook filter, canvas filter, or dashboard filter. Data actions can change dashboard filters and workbook filters. You can't change dashboard and workbook filters if the filter bar is hidden.

Filter values from a data action apply by default at the workbook level or at the canvas level, but if a matching user-visible filter exists in the target workbook, then the data action filter values can override it. The filter values from a data action can't override visualization filters.

These are use case scenarios logic for data action filter values:

- Filter values from data actions change dashboard filter bar column selection values - This happens when the target workbook has a dashboard filter bar that uses the same columns, and has a matching filter type.
- Filter values from data actions change workbook or canvas filter values - This happens when changes to the dashboard filter aren't possible. The system then looks at the top level filter bar (workbook or canvas filters), and makes a change if there's a match to the incoming column selection, the filter bar is visible to the user, and the specific matching filter is visible and interactive (not read-only).
- Filter values from data actions create a canvas filter in the filter bar - This happens when the top level filter bar or a matching filter is hidden, or read-only. The default Limit By behavior is retained.

Use these rules to understand how data action filters interact with existing filters in target dashboards and workbooks:

- A data action can't add filters to a dashboard filter bar; it can only reuse existing filters on the dashboard filter bar.
- A data action can only reuse dashboard filters if a matching filter exists in the target workbook.
- A data action gives precedence to matching filters on the dashboard filter bar. This means that if there is a choice between a data action reusing a matching filter in a dashboard filter bar or a canvas filter bar, then the data action reuses the matching dashboard filter in preference to the matching canvas filter.
- A data action creates a canvas filter in the workbook filter bar if a compatible dashboard filter doesn't exist in the target workbook.
- A data action never creates a workbook filter in the target workbook. You need to bind the filter to a parameter to achieve this functionality.
- A data action can't change visualization filters because they aren't the target of data actions. This includes visualization filters selected on the dashboard filter bar. You need to bind these filters to parameters to change the values.
- A data action doesn't reuse an expression filter but instead creates a canvas expression filter.

Tips on Using Data Actions

Get the most from using data actions in workbooks using these tips.

Anchoring Data Actions to Columns

When you create a data action, you can anchor it to specific columns displayed on the canvas. If you anchor a data action to specific columns, the data action is only available to workbook users if they select data points in all specified columns.

On the Data Actions dialog, select **Add Data** under **Anchor To** and select one or more columns.

Data Actions

Actions

+

▲ Data Action - Drill to city

Name

Data Action - Drill to city

Type

Analytics Link ▼

Anchor To

Select Data

+

Target

This Workbook

Canvas Link

Canvas 2 ▼

Pass Values

All ▼

Supports Multiple Selection

On

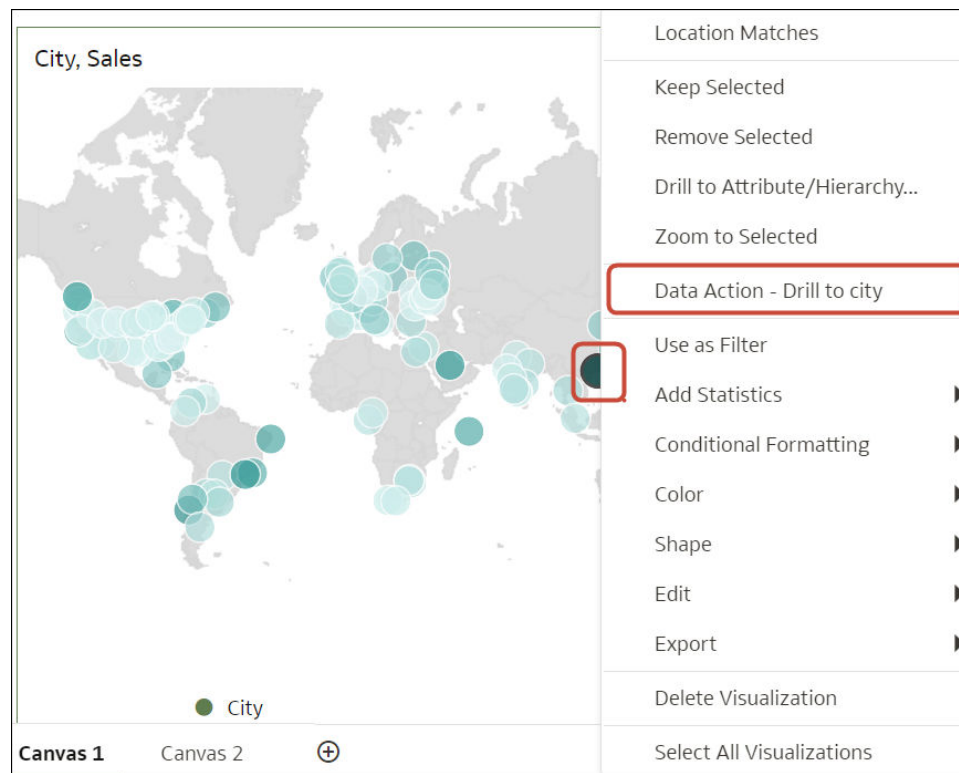
Open In

Auto ▼

Cancel

OK

If you anchor a data action to multiple columns, the user must multi-select data points from all of the specified columns in order to see the data action displayed in the right-click context menu. For example, if no columns are anchored to the data action "Data Action - Drill to city", the user can click anywhere on the source canvas to have access to "Data Action - Drill to city".



General Tips

- Don't anchor data actions to measure columns or hidden columns.

Use Other Functions to Visualize Data

This topic describes other functions that you can use to visualize your data.

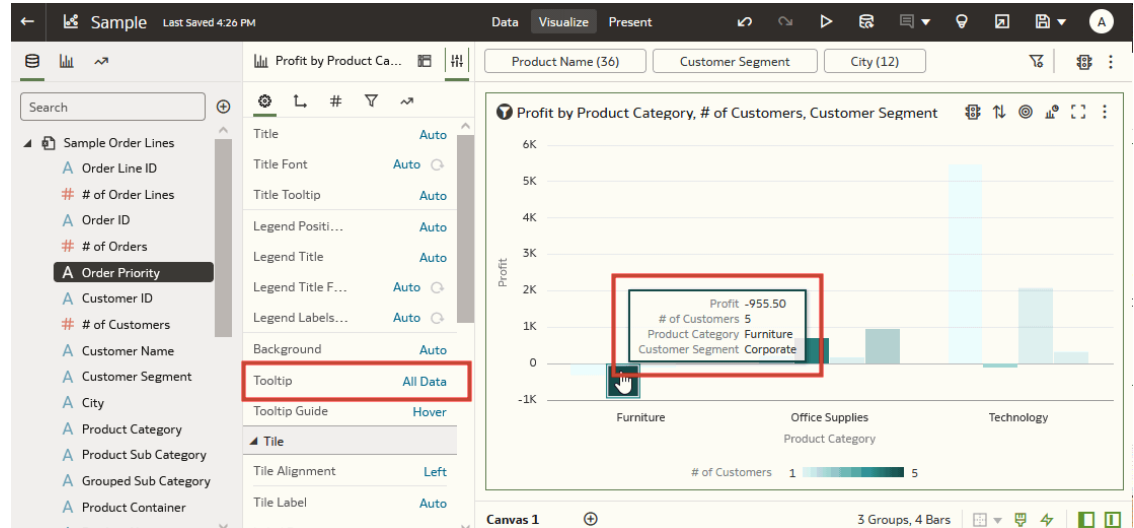
Topics:

- [Identify Content with Tooltips](#)
- [Compose Expressions](#)
- [Generate Visualizations from the Home Page with Questions](#)
- [Save Your Changes Automatically](#)
- [Sort the Items in a Page](#)

Identify Content with Tooltips

Use tooltips to make your visualizations more interactive without cluttering them with too much information.

In the visualization designer page, use the Tooltip pane to display measures and labels when users click on a measure or hover over a visualization.



Compose Expressions

Compose expressions to use in expression filters or in calculations using the Expression window. Expressions that you create for expression filters must be Boolean (that is, they must evaluate to true or false).

While you compose expressions for both expression filters and calculations, the end result is different. A calculation becomes a new data element that you can add to your visualization. An expression filter, on the other hand, appears only in the filter bar and can't be added as a data

element to a visualization. You can create an expression filter from a calculation, but you can't create a calculation from an expression filter. See [Create Calculated Data Elements](#) and [Build Expression Filters](#).

You can compose an expression in various ways:

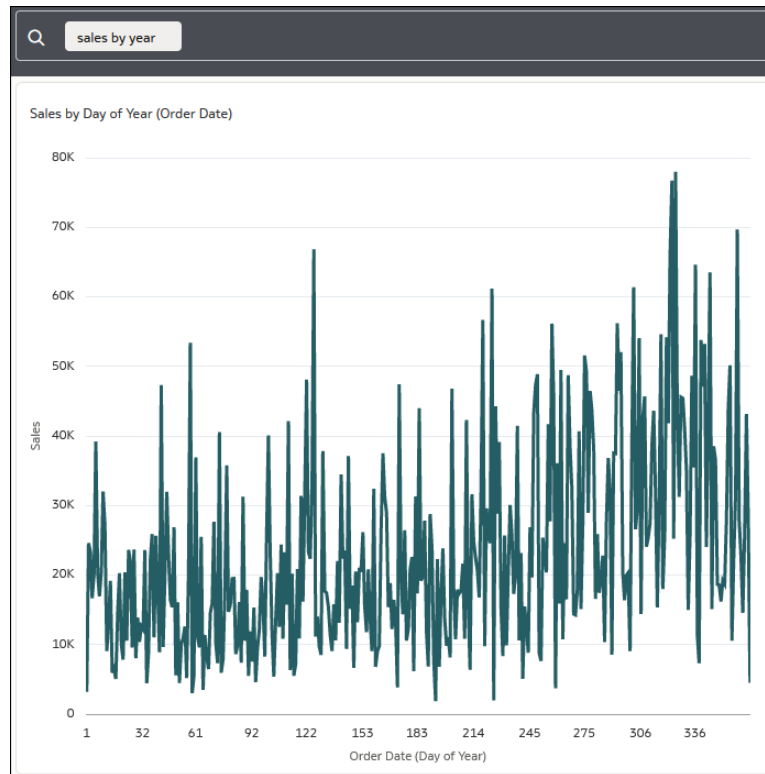
- Directly enter text and functions in the Expression window.
- Add data elements from the Data Elements pane (drag and drop, or double-click).
- Add functions from the function panel (drag and drop, or double-click).

See [Expression Editor Reference](#).

Generate Visualizations from the Home Page with Questions

You can enter prompts into the search bar on the Home page to generate visualizations.

1. On the Home page, click the search bar.
2. Enter search terms for the data that you want to visualize, for example Sales by Year, and press **SHIFT + ENTER**.



3. Optional: In the visualization, click **Explore as Workbook** .

Find Data, Workbooks, and Visualizations

This topic describes how you can search for items such as objects, workbooks, and columns.

 [LiveLabs Sprint](#)

Topics:

- [How Is Data Indexed?](#)
- [Search for Content](#)
- [Search Options](#)
- [Search Tips](#)

How Is Data Indexed?

When you search or visualize data from the Home page, your results are determined by what information has been indexed.

The system runs a process to index your saved objects, workbook content, and dataset column information. The indexing process also updates the index file to reflect any objects, workbooks, or datasets that you deleted from your system so that these items are no longer displayed in your search results.

For all datasets, the column metadata is indexed. For example, column name, the data type used in the column, aggregation type, and so on. Column data is indexed for Excel spreadsheet, CSV, and TXT dataset columns with 1,000 or fewer distinct rows. Note that no database column data is indexed and therefore that data isn't available in your search results.

Search for Content

Use the search bar on the Home page to find items such as datasets, workbooks, and machine learning scripts.

1. On the Home page, locate the search bar.
2. Enter your search criteria. Note the following options:
 - Click in the search bar for a drop down list of all content types, such as workbook, report, and dataset. Click a content type to add it to the search bar. Or below the search bar, click one of the search tags to add it to the search bar.
 - Build or modify a search tag by adding or removing other items.
 - Specify the full or partial name of what you're looking for. The search is case-insensitive.
 - To clear your search terms, in the search bar click X or select search tags and delete.
3. In the search results, click an object to display it.

Search Options

You can enter advanced search commands in the search bar to tailor your search results for exact matches, multi-term matches, and field-level matches.

You can combine multiple search terms with commands to narrow or widen your search. For example, `name: (revenue AND Analysis)`. Search commands and search terms are case-insensitive.

Search Command	Description	Example
AND	Enter AND between search terms to only display content which contains all the search terms. All forms of AND , such as, and , && , or entering two search terms together, will return the same results.	Revenue AND Forecast Revenue and Forecast Revenue && Forecast Revenue Forecast
OR	Enter OR between search terms to display content that contains any of the search terms.	Revenue OR Profit Revenue or Profit Revenue Profit
NOT	After entering a search term, enter NOT followed by more search terms to exclude any content from the results which match the search terms entered after the NOT command.	Revenue NOT Product Revenue not Product
?	Enter the question mark (?) character in a search term as a wildcard to signify a single unknown character. This ensures that the search results include content with words matching the known characters from the search term. For example, searching for st?r would include results containing star and stir .	st?r
*	Enter the asterisk (*) character at the end of a partial search term or root word as a wildcard to find all content that contains the partial search term as well as content that contain variations of the root word. For example, searching for employ* would include results for employee , employment , or employer .	Employ*
name:	Enter name: followed by a search term to search for content where the search term is part of the Name field.	name:Revenue Analysis
description:	Enter description: followed by a search term to search for content where the search term is contained in the Description field of the content.	description:template desc:template
owner:	Enter owner: followed by a search term to search for content where the search term is contained in the Owner field of the content.	owner:Admin
columns:	Enter columns: followed by a search term to search for objects that reference columns matching the search term.	columns:product
text:	Enter text: at the beginning of a search followed by a search term to search for content where the search term is contained in any of the content's fields.	text:Revenue
" "	Enclose a search term with double quotation marks to search for content that includes phrases or stop words which match the search term.	"Balance Letter" "Research by analysis"
\	Enter the escape character backward slash (\) before each special character (+ - & ! () { } [] ^ " ~ * ? : \) in a search. For example, to search for revenue+city enter revenue\+city .	revenue\+city

Search Tips

Use these tips to help you find your content.

- **Searching in Non-English Locales** - When you enter criteria in the search field, what displays in the drop-down list of suggestions can differ depending upon your locale setting. For example, if you're using an English locale and enter *sales*, then the drop-down list of suggestions contains items named *sale* and *sales*. However, if you're using a non-English locale such as Korean and type *sales*, then the drop-down list of suggestions contains only items that are named *sales* and items such as *sale* aren't included in the drop-down list of suggestions.
- **Searching for New Objects and Data** - If you create or save a workbook or create a dataset and then immediately try to search for it, then it's likely that your search results won't contain matches. If this happens, refresh your browser. If you still can't find the new object or data, then wait a few minutes for the indexing process to run, and retry your search. Users can access only the data they've been given permission to access.

Save Your Changes Automatically

You can use the auto save option to save your updates to a visualization workbook in real-time automatically.

If you've already saved your workbook in a specific location, the Save Workbook dialog isn't displayed after you click **Auto Save**.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. From the Save menu, select **Auto Save**.
3. In the Save Workbook dialog, enter the **Name** and optional **Description** to identify your workbook.
4. Select the folder where you want to save your workbook.
5. Click **Save**. Any workbook updates are saved in real-time.

Suppose that two users are updating the same workbook and **Auto Save** is enabled. The **Auto Save** option is automatically disabled when different types of updates are made to the workbook. A message is displayed that states that another user has updated the workbook.

Sort the Items in a Page

You can quickly reorganize items in the Catalog, Data, and Machine Learning pages by sorting the items based on their attributes.

As you add more data or workbooks, sorting items helps you to control the order in which they're listed. For example, you can reorganize datasets on the Data page based on their modification dates and times.

1. On the Home page, click **Navigator**, and then click **Console**.
2. Click either **Catalog**, **Data**, or **Machine Learning** depending on which items you want to sort.
3. Click the **Sort By** menu on the page toolbar and select a sort option such as **Modified** or **Reverse Order**.
4. Click the **List View** icon to switch to list view. In the table, click a column header to sort the items in that column in ascending or descending order.

The selected sort and column options are saved as user preferences.

13

Build a Presentation Flow

This chapter explains how to use Present to create a presentation flow from the workbook you created in Visualize. The presentation flow determines the workbook for the consumer.

Topics:

- [What Is a Presentation Flow?](#)
- [What Are Auto and Manual Modes in Present?](#)
- [Manual Mode and How Canvases Synch](#)
- [Switch Between Auto and Manual Modes in Present](#)
- [View Canvas Layout Breakpoints in Present](#)
- [Open the Presentation Flow](#)
- [Specify the Canvases Layout in Present](#)
- [Set the Workbook Properties in Present](#)
- [Set Canvas Properties in Present](#)
- [Preview a Presentation Flow](#)

What Is a Presentation Flow?

Use the presentation flow to customize the workbook for consumers. A presentation flow hides the complexity of the workbook's design and provides consumers with the most effective way to navigate and interact with their data.

By default Oracle Analytics creates a presentation flow based on the workbook that you design in Visualize. The default presentation flow is displayed the first time you access Present. The presentation flow is identical to the workbook you designed in Visualize and contains all of the workbook's canvases, visualizations, filters, and so on.

If you preview the workbook from Visualize and are happy with the design and functionality, then you don't have to do anything. But if you want to fine tune the workbook, you can use Present to modify the presentation flow to better suit the workbook consumer's needs. Present gives you as the author the ability to provide the best navigation and interactivity.

You can use Present to modify the workbook to:

- Hide unfinished canvases.
- Hide visualizations.
- Provide more options on a visualization's toolbar or menu.
- Hide the workbook's filter bar.
- Change the order of the canvases.

Remember that if you want to change a canvas' content, for example add a new visualization, then you use Visualize. Any changes you make in Visualize are included in the presentation

flow in Present. But when you use Present to polish the end user experience, any changes you make aren't applied to the workbook's design in Visualize.

What Are Auto and Manual Modes in Present?

Auto Mode and Manual Mode determine the types of changes that you can make while designing the presentation flow in Present.

See [What Is a Presentation Flow?](#)

The first time that you open a workbook's presentation flow in Present, by default the presentation flow's properties and settings match those of the workbook design in Visualize. It's important to remember that the changes you make in Auto Mode or Manual Mode aren't applied to the workbook or canvas in Visualize.

Auto Mode is enabled the first time you open a workbook's presentation flow. You can switch to Manual Mode, which provides additional Present options.

Present Option	Available in Auto Mode?	Available in Manual Mode?
Change canvas order	No	Yes
Delete a canvas	No	Yes
Duplicate a canvas	No	Yes
Hide a canvas	Yes	Yes
Rename canvas	No	Yes
Move or resize a visualization on a canvas	No	Yes

When you work in Manual Mode, the Visualize and Present workbook and canvases can become out of synch. For example, you add a canvas to the workbook in Visualize, and when working in Manual Mode in Present the added canvas is automatically set to hidden. See [Manual Mode and How Canvases Synch](#) and [Reset a Canvas in Present](#).

What happens when you switch modes?

Switching from Manual Mode to Auto Mode resets any of the manual changes listed above to match the workbook settings in Visualize. Switching from Manual Mode to Auto Mode preserves all other workbook or canvas-level properties that you set in Present.

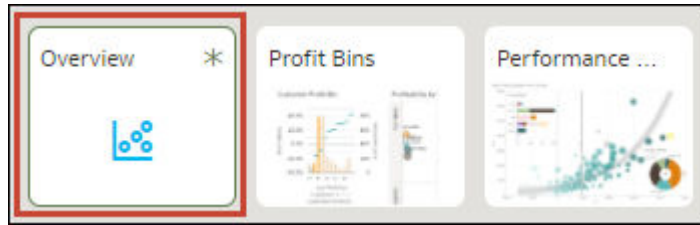
Switching from Auto Mode to Manual Mode allows you to make the additional changes listed above. Any of these changes that you make differ from the workbook settings in Visualize.

Manual Mode and How Canvases Synch

By default a canvas in Present matches its corresponding canvas in Visualize. However, when you use Manual Mode in Present, some of the adjustments you make cause the canvas to become out of synch with the corresponding canvas in Visualize.

See [What Are Auto and Manual Modes in Present?](#).

In Present, a canvas that is out of synch with Visualize displays an asterisk that you can click to reset the Present canvas to match the Visualize canvas.



Your Present canvas become out of synch when you're working in Manual Mode and:

- You change filter values in the Present canvas.
- You edit a visualization on a canvas that is already out of synch with its base canvas in Visualize.

Use the information in these tables to understand how the canvases in Visualize and canvases in Present synch, and how Auto Mode or Manual Mode determines how canvases synch.

This table explains how canvases synch between Visualize and Present.

Visualize Update	Present Auto Mode	Present Manual Mode
Add canvas	Canvas is added to the presentation flow and is visible to the consumer.	Canvas is added to presentation flow as hidden. The canvas isn't visible to the consumer.
Duplicate canvas	Canvas is added to presentation flow and visible to the consumer.	Canvas is added to presentation flow as hidden. The canvas isn't visible to the consumer.
Delete canvas	Canvas is deleted.	Canvas is deleted.

This table explains how visualizations synch between Visualize and Present.

Visualize Update	Present Auto Mode	Present Manual Mode
Add visualization	Visualization is added to the canvas	Visualization isn't added to the canvas if the canvas is out of synch with the Visualize canvas. Canvas displays an asterisk if its out of synch.
Duplicate visualization	Visualization is duplicated to the canvas	Visualization isn't duplicated to the canvas if the canvas is out of synch with the Visualize canvas. Canvas displays an asterisk if its out of synch.
Delete visualization	Visualization is deleted.	Visualization isn't deleted from the canvas if the canvas is out of synch with the Visualize canvas. Canvas displays an asterisk if its out of synch.

This table explains how workbook filters behave between Visualize and Present.

Visualize Update	Present Auto Mode	Present Manual Mode
Add workbook filters	Filters are added as read-only.	Filters are added. You can change filter values, which makes the canvas out of synch with the Visualize canvas.
Delete workbook filters	Filters are deleted.	Filters are deleted if the filter values aren't modified in the Present canvas. Filters aren't deleted if the filter values are modified.

Switch Between Auto and Manual Modes in Present

Setting Auto Mode or Manual Mode in Present determines what type of changes you can make to the presentation flow's canvases and visualizations.

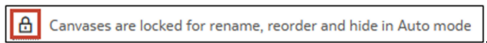
See [What Are Auto and Manual Modes in Present?](#) and [Manual Mode and How Canvases Synch](#).

This tutorial provides a use case explaining how to create a presentation flow in auto mode:

 [Tutorial](#)

This tutorial provides a use case explaining how to create a presentation flow in manual mode:

 [Tutorial](#)

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present** and go to the bottom of the Present page and locate the mode button

3. Depending on which mode you're using, do one of the following:
 - Click **Switch to Manual mode**  to switch from auto mode to manual mode.
 - Click **Switch to Auto mode**  to switch from manual mode to auto mode.

View Canvas Layout Breakpoints in Present

In Present, you can view the canvas layout breakpoints that you added in Visualize. Breakpoints determine how the visualizations display on the canvas for different screen sizes.

Go to Visualize to modify a canvas' breakpoints. See [Design Canvas Layouts to View on Different Devices](#).

When you work in Present's Manual Mode you can hide visualizations for a specific breakpoint. Hiding visualizations can impact the canvas layout for that breakpoint. Oracle recommends that if your canvas uses breakpoints that you go to Visualize to hide visualizations.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and click **Responsive Canvas Editor** .
4. Go to the breakpoint slider bar at the top of the canvas and click a breakpoint to view how the canvas is displayed for that screen size.

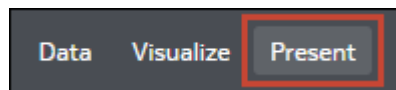
Open the Presentation Flow

Open the workbook's presentation flow to fine-tune how the workbook and its canvases look and function for the end user.

The changes you make to the presentation flow are saved in Present and displayed in the end user workbook. Changes aren't saved to the workbook design in Visualize. For example, if in Present you customize the workbook's name and hide the filters bar, those changes aren't transferred to the workbook in Visualize.

See [Set the Workbook Properties in Present](#) and [Set Canvas Properties in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.



Specify the Canvases Layout in Present

The presentation flow workbook inherits the layout you specified in Visualize. You can use Present to specify how the canvases are displayed in the presentation flow and the end user workbook.

Topics:

- [Rearrange the Canvases in Present](#)
- [Duplicate a Canvas in Present](#)
- [Remove a Duplicate Canvas in Present](#)
- [Hide a Canvas in Present](#)
- [Display a Hidden Canvas in Present](#)
- [About Moving or Hiding Visualizations on a Canvas in Present](#)
- [Change a Visualization's Placement on a Canvas in Present](#)
- [Reset a Canvas in Present](#)

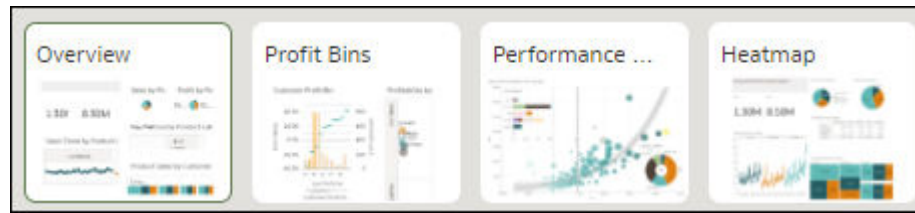
Rearrange the Canvases in Present

When working on the presentation flow in manual mode, you can change the order of the workbook's canvases.

Any changes that you make to the canvas order in Present are saved to the presentation flow and not to the workbook design in Visualize.

See [Switch Between Auto and Manual Modes in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.



4. In the Canvases panel, drag and drop a canvas to a new position in the canvas display order.
5. Optional: Drag and drop more canvases to rearrange them in the canvas display order.
6. Click **Save**.

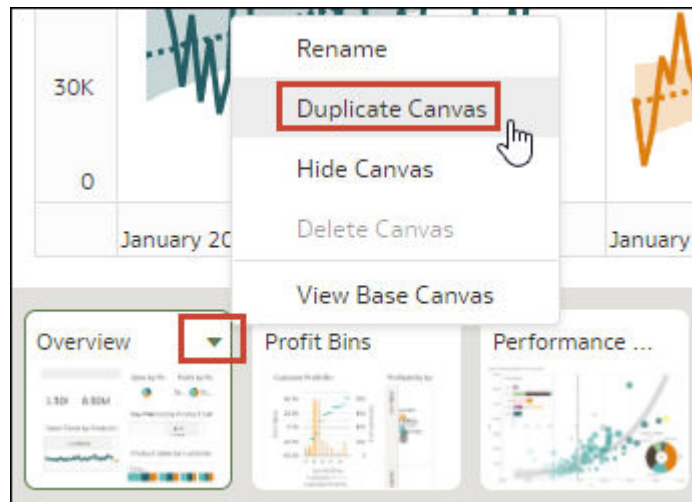
Duplicate a Canvas in Present

When working on the presentation flow in manual mode, you can add the same canvas multiple times to the presentation flow. You might add a canvas multiple times when you want users to see different filter values on each version of a duplicated canvases.

Any canvases that you duplicate in Present are saved to the presentation flow and not to the workbook design in Visualize.

See [Switch Between Auto and Manual Modes in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.
4. In the Canvases panel, hover over a canvas, click the down arrow, and select **Duplicate Canvas**.



5. Click the duplicate canvas and modify it.
6. Click **Save**.

Remove a Duplicate Canvas in Present

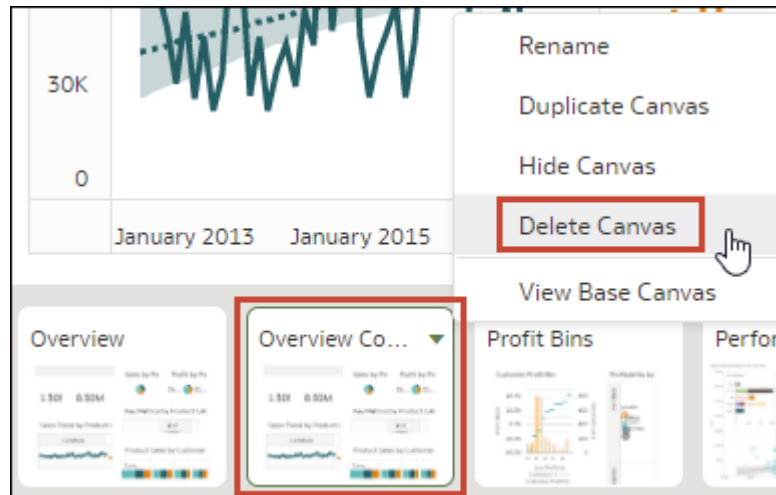
When working on the presentation flow in manual mode, you can delete any duplicate canvases from the presentation flow.

The Delete Canvas option is only available for canvases that you duplicated. You can hide but not delete any other canvases in Present.

Any changes that you make to the canvas display in the presentation flow are saved to Present and not to the workbook design in Visualize.

See [Switch Between Auto and Manual Modes in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.
4. In the Canvases panel, hover over a canvas, click the down arrow icon, and select **Delete Canvas**.



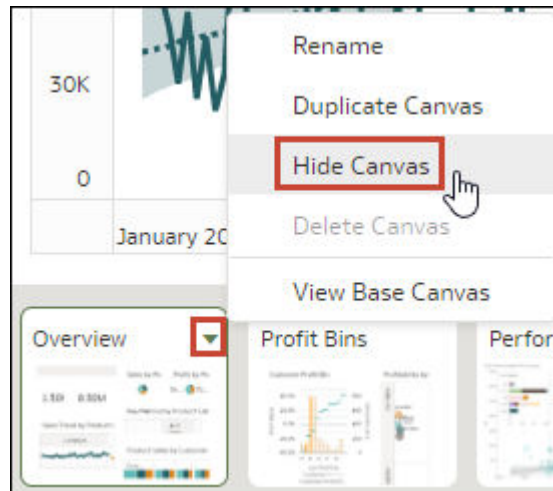
5. Click **Save**.

Hide a Canvas in Present

When working on the presentation flow in either manual or auto mode, you can hide a canvas that you don't want end users to see in the workbook.

Any changes that you make to the canvas display in Present are saved to the presentation flow and not to the workbook design in Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.
4. In the Canvases panel, hover over a canvas, and select **Hide Canvas** to hide the canvas.



5. Click **Save**.

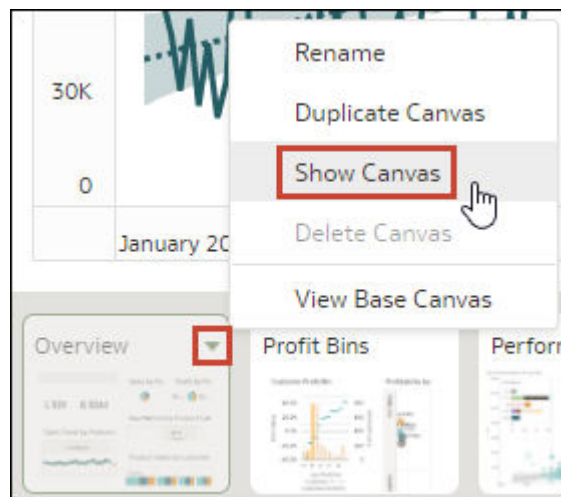
Display a Hidden Canvas in Present

When working on the presentation flow in either manual or auto mode, you can display any hidden canvases.

If you're working in Present in manual mode, any canvases added in Visualize are displayed as hidden in the presentation flow. You can choose to keep the canvases hidden or you can display them in Present.

Any changes that you make to the canvas display in the presentation flow are saved to Present and not to the workbook design in Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.
4. In the Canvases panel, hover over a canvas, click the down arrow icon, and select **Show Canvas** to reveal the canvas.



5. Click **Save**.

About Moving or Hiding Visualizations on a Canvas in Present

When working on the presentation flow in Manual Mode, the base canvas' **Layout** property in Visualize determines if the canvas includes white spaces or overlaps when you adjust the canvas' layout in Present.

See [About Canvas Layout Properties](#) and [Update Canvas Properties](#).

When the base canvas' **Layout** property is set to **Auto Fit** in Visualize, then in Present the canvas layout automatically adjusts to accommodate any visualizations that you move or hide. When you preview the canvas or select **Reset Adjustments** to remove the canvas' layout changes, no white spaces and overlaps are displayed.

When the base canvas' **Layout** property is set to **Freeform** in Visualize, then the canvas layout doesn't automatically adjust to accommodate any visualizations that you move or hide in Present. When you preview the canvas or select **Reset Adjustments** to remove the canvas' layout changes, white spaces and overlaps are displayed.

If your canvas is set to **Freeform** and in Present you move or hide visualizations, or reset the canvas, be sure to rearrange the visualizations to prevent any white spaces or overlaps. See [Show or Hide Canvas Visualizations in Present](#) and [Reset a Canvas in Present](#).

Change a Visualization's Placement on a Canvas in Present

You can drag and drop visualizations to new positions on the canvas using Manual Mode in Present.

The canvas' **Layout** property in Visualize determines if your canvas contains white spaces and overlaps when you reposition visualizations. See [About Moving or Hiding Visualizations on a Canvas in Present](#).

Any changes that you make to the canvas display in Present are saved to the presentation flow and not to the workbook design in Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas with the visualizations that you want to reposition.
4. In the canvas, drag and drop the visualizations to reposition them.
5. Click **Save**.

Reset a Canvas in Present

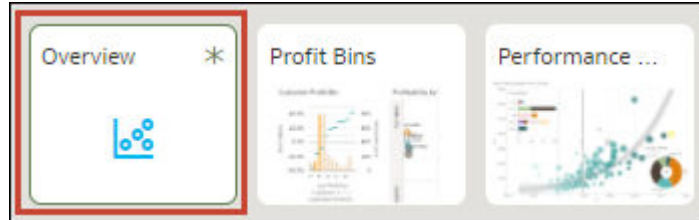
When working in manual mode, you can use the **Reset Adjustments** canvas option to synch the canvas in Present with its base canvas in Visualize.

You can reset any canvas that displays an asterisk. The asterisk indicates that the canvas' layout adjustments or filter settings are out of synch with its base canvas in Visualize.

The canvas' **Layout** property in Visualize determines if your canvas contains white spaces and overlaps when you reset the canvas. See [About Moving or Hiding Visualizations on a Canvas in Present](#).

See [Manual Mode and How Canvases Synch](#) and [Switch Between Auto and Manual Modes in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. Go to the bottom of the Present page and locate the Canvases panel.
4. In the Canvases panel, hover over a canvas displaying an asterisk.



5. Click the down arrow icon, and select **Reset Adjustments** to reset the canvas layout properties, or select **Reset Filters** to reset the filter values to match the canvas in Visualize.
6. Click **Save**.

Set the Workbook Properties in Present

The workbook inherits the properties that you set in Visualize. You can use Present to specify how you want the workbook to display to the end user and how the end user navigates and interacts with the workbook.

Topics:

- [Specify Workbook Canvas Navigation in Present](#)
- [Show or Hide the Workbook Header Bar in Present](#)
- [Modify the Workbook Header Title in Present](#)
- [Modify the Workbook Header Color in Present](#)
- [Add an Image to the Workbook Header in Present](#)
- [Show or Hide the Zoom Control in Present](#)
- [Specify Workbook Zoom Control Options in Present](#)
- [Show or Hide the Workbook Toolbar in Present](#)
- [Select Workbook Toolbar Options in Present](#)
- [Show or Hide the Workbook Filter Bar in Present](#)
- [Specify Workbook Filter Options in Present](#)
- [Show or Hide Workbook Filters in Present](#)
- [Specify the Workbook Visualization Actions in Present](#)
- [Change the Workbook Canvases Visualization Alignment in Present](#)
- [Turn On or Off All Workbook and Canvas Actions in Present](#)
- [Specify Personalization Options in Present](#)

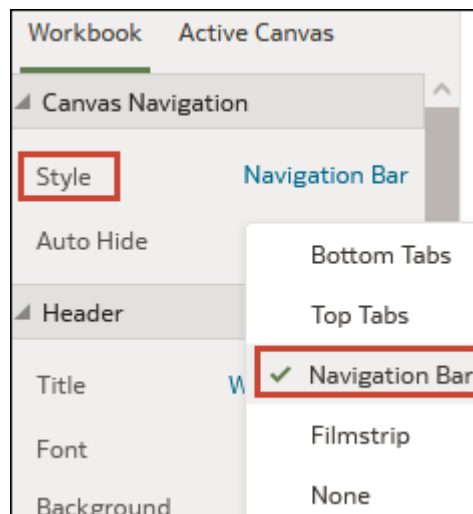
Specify Workbook Canvas Navigation in Present

When you design a presentation flow, you can choose between navigation options to best fit how you want the end user to move between the workbook's canvases.

You can choose to always display the workbook's canvas navigation bar, or to display it only when the user hovers over the bottom of the workbook. You can also choose a navigation control corresponding to how you want to represent the canvases on the workbook's navigation bar.

The navigation control options are:

- **Bottom Tabs** - Displays each canvas as a tab including the canvas' title at the bottom of the workbook. The user clicks the tabs to navigate between canvases.
 - **Top Tabs** - Displays each canvas as a tab including the canvas' title at the top of the workbook. The user clicks the tabs to navigate between canvases.
 - **Navigation Bar** - Displays each canvas as a circle at the bottom of the workbook. The user clicks the circles to navigate between canvases.
 - **Filmstrip** - Displays each canvas as a thumbnail at the bottom of the workbook. The user clicks the thumbnails to navigate between canvases.
 - **None** - Removes the navigation control from the workbook.
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
 2. Click **Present**.
 3. In the Present page, click the **Workbook** tab.
 4. In the Canvas Navigation section, click the **Style** field and select how you want the user to move between workbook canvases.



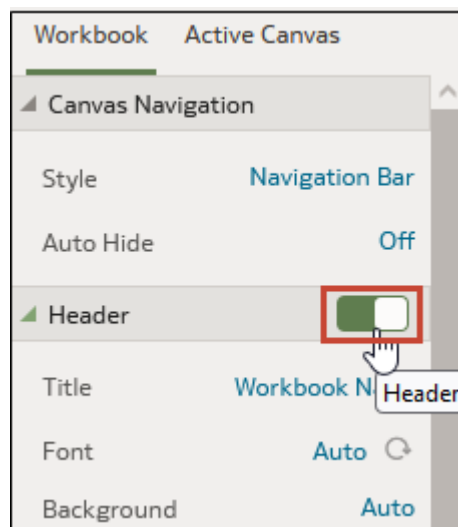
5. Optional: Click the **Auto Hide** field and select **On** if you want to display the navigation panel when the user mouses over the bottom of the workbook.
6. Click **Save**.

Show or Hide the Workbook Header Bar in Present

When you design a presentation flow, the workbook's header bar is set to display by default. You can choose to show or hide the header bar.

The header bar displays the workbook title that you specify. For example, canvas name, workbook name, or a custom name.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Header section, click **Header** to toggle it to **Off** to hide the header bar, or click it to toggle it to **On** to show the header bar.



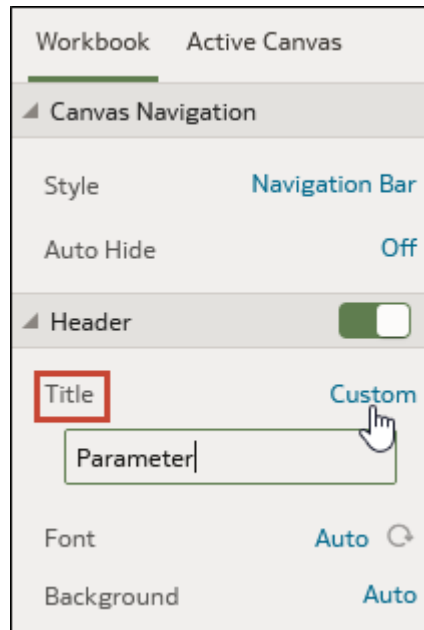
5. Click **Save**.

Modify the Workbook Header Title in Present

When you design a presentation flow, you can specify which name you want to display as the workbook's header and how you want to format the header text.

You can also add an image to the workbook header. See [Add an Image to the Workbook Header in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Header section, click the **Title** field and select the name you want to use as a title, or select **Custom** and enter a title.

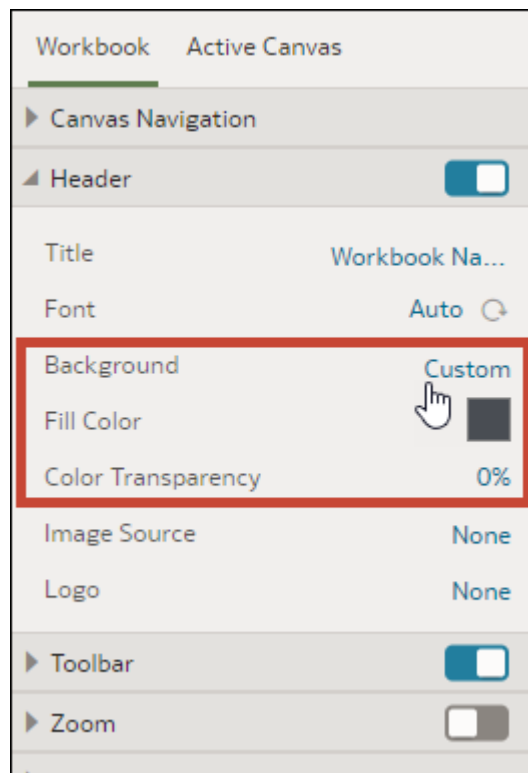


5. Optional: Click the **Font** field and specify the font style, font size, and any formatting that you want to use in the title, for example, bold or italic.
6. Click **Save**.

Modify the Workbook Header Color in Present

When you design a presentation flow, you can customize the workbook header background's color and transparency.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Header section, click the **Background** field and select **Custom**.

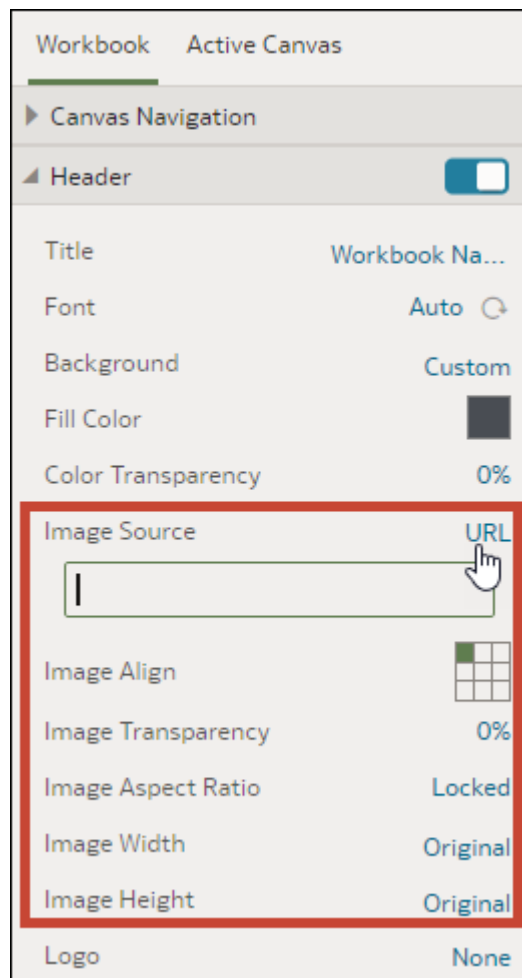


5. In the Header section, use the **Fill Color** and **Color Transparency** fields to specify how you want the header's background to display.
6. Click **Save**.

Add an Image to the Workbook Header in Present

When you design a presentation flow, you can add an image from a file or URL to the workbook header and specify how you want the image to display.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Header section, click the **Background** field and then select **Custom**.
5. In the Header section, click the **Image Source** field and choose where to get the image from.
 - If you select **URL**, then paste the image source's URL into the text field.
 - If you select **File**, then click the file upload icon  and browse for and select the file you want to use.
6. In the Header section, specify the image's display properties, for example image width and height.



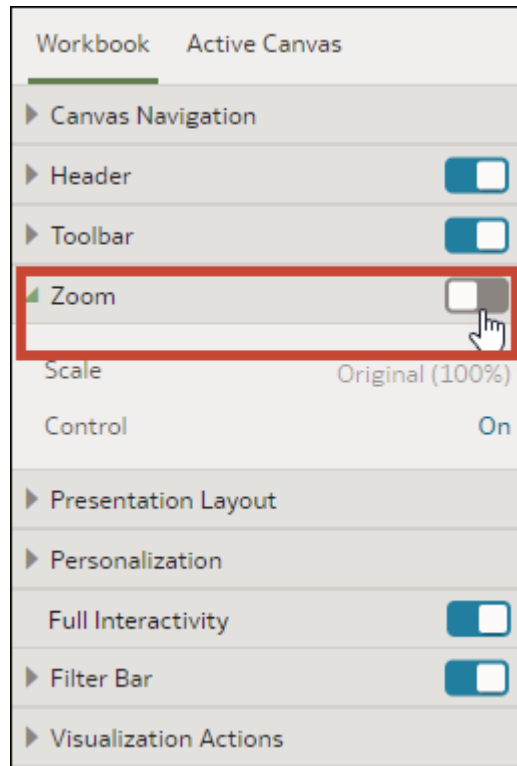
7. Click **Save**.

Show or Hide the Zoom Control in Present

When you design a presentation flow, the workbook's header bar zoom control is set to hide by default. You can choose to show or hide the zoom control for all canvases.

When the zoom control is set to show, the zoom control is displayed in the header bar for all workbook canvases with the **Layout** canvas property set to **Freeform**.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Zoom section, click **Zoom** to toggle it to **On** to show the zoom control in the header bar, or click it to toggle it to **Off** to hide the zoom control in the header bar.



5. Click **Save**.

Specify Workbook Zoom Control Options in Present

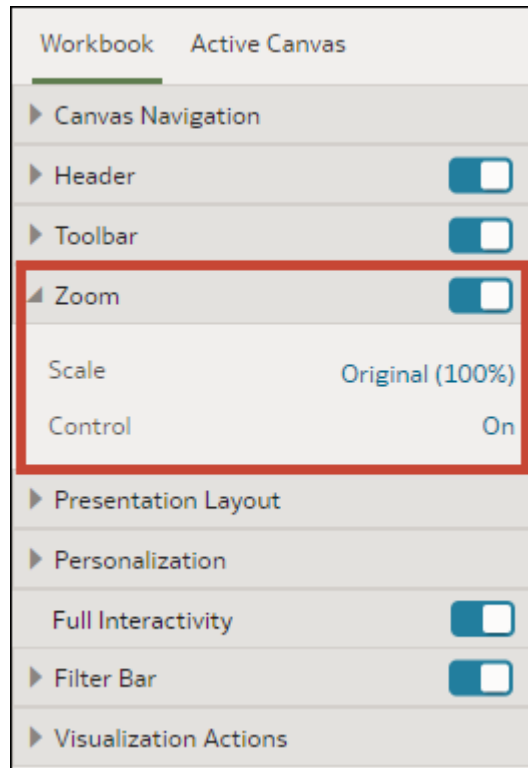
When you design a presentation flow, you can choose the default zoom setting used when the user opens a canvas.

The Zoom/Layout controls button allows consumers to zoom in and out of the whole active canvas to best fit their screen. Although you set the control for the workbook, the zoom control is displayed only for canvases with the **Layout** canvas property set to **Freeform**.

The zoom control properties that you set on the **Workbook** tab are carried over to the Active Canvas' zoom properties. You can override the **Workbook** tab's zoom properties on any individual canvas.

The Zoom section's toggle must be set to **On** before you can update the **Scale** property.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.



4. In the Zoom section, click **Scale** and select the zoom size used to display the canvas when a user opens it.
5. In the Zoom section, click **Control** to set it to **Off** to hide the zoom control in the workbook's header bar for all canvases, or click it to set it to **On** to show the zoom control in the workbook's header bar for all canvases.

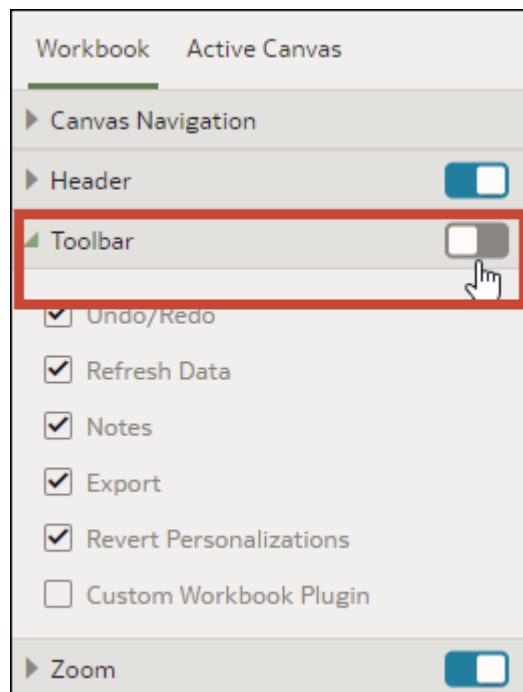
Set this option to **Off** when your workbook contains many canvases and you want to use the Active Canvas option to display the zoom control on only a few canvases.

6. Click **Save**.

Show or Hide the Workbook Toolbar in Present

When you design a presentation flow, the workbook's toolbar displays by default. You can choose to show or hide the workbook's toolbar for users.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present, click the **Workbook** tab.
4. In the Toolbar section, click **Toolbar** to toggle it to **Off** to hide the toolbar, or click it to toggle it to **On** to show the toolbar.



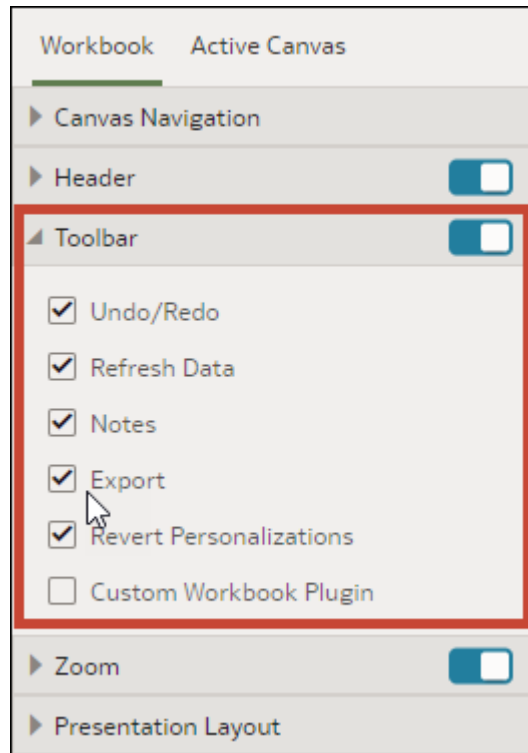
5. Click **Save**.

Select Workbook Toolbar Options in Present

You can specify which of the workbook's toolbar options you want to display to the user.

You can select the Toolbar properties that you want to display to users in Present. Toolbar properties include undo and redo changes, refresh the workbook's data, show notes, allow export, reset filter personalizations, and display the custom workbook extension icon and list.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Toolbar section, deselect the toolbar options that you want to hide, or select the toolbar options that you want to display.



5. Click **Save**.

Show or Hide the Workbook Filter Bar in Present

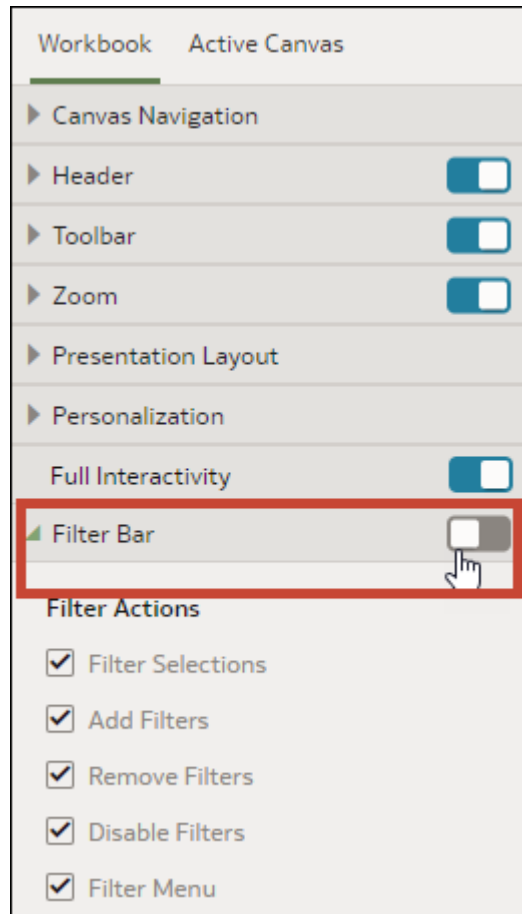
When you design a presentation flow, you can show or hide the workbook's filter bar.

Showing the filter bar allows users to view, set, and modify the workbook's filter values. You can set filter values and then hide the filter bar so that the workbook includes specific data. Hiding the filter bar prevent users from changing the filter values.

The filter bar properties that you set on the **Workbook** tab are carried over to the Active Canvas' Filter Actions properties. You can override the **Workbook** tab's filter bar properties on any individual canvas.

All Filter Actions options are grayed out when the **Full Interactivity** option is set to **Off**. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present, click the **Workbook** tab.
4. In the Filter Bar section, click **Filter Bar** to toggle it to **Off** to hide the filter bar, or click it to toggle it to **On** to show the filter bar.



5. Click **Save**.

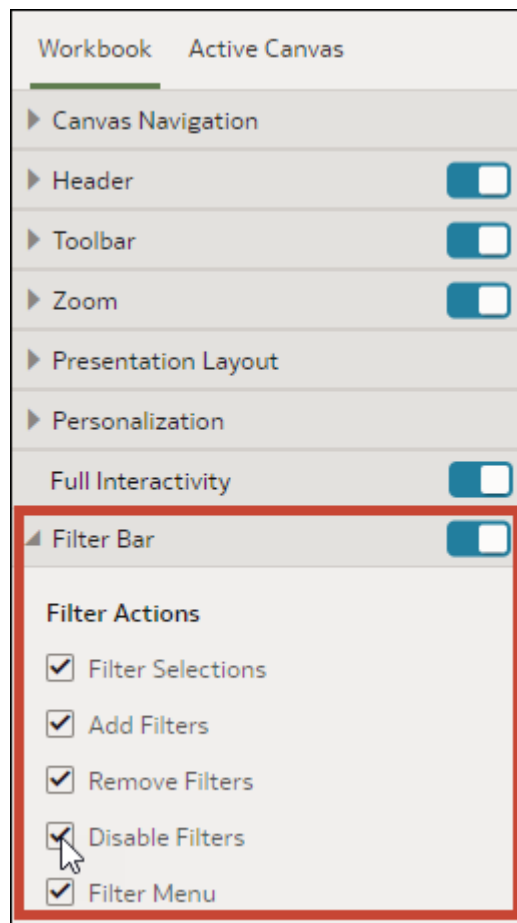
Specify Workbook Filter Options in Present

When you design a presentation flow, you can specify which workbook filter options you want to provided to the user, for example, add filters or change filter values.

The options you set on the **Workbook** tab are carried over to the Active Canvas' Filter Actions properties. You can override the **Workbook** tab's filter bar properties on any individual canvas.

All Filter Actions options are grayed out when the **Full Interactivity** option is set to **Off**. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Filter Bar section, deselect the filter actions options that you want to hide, or select the filter action options that you want to display.



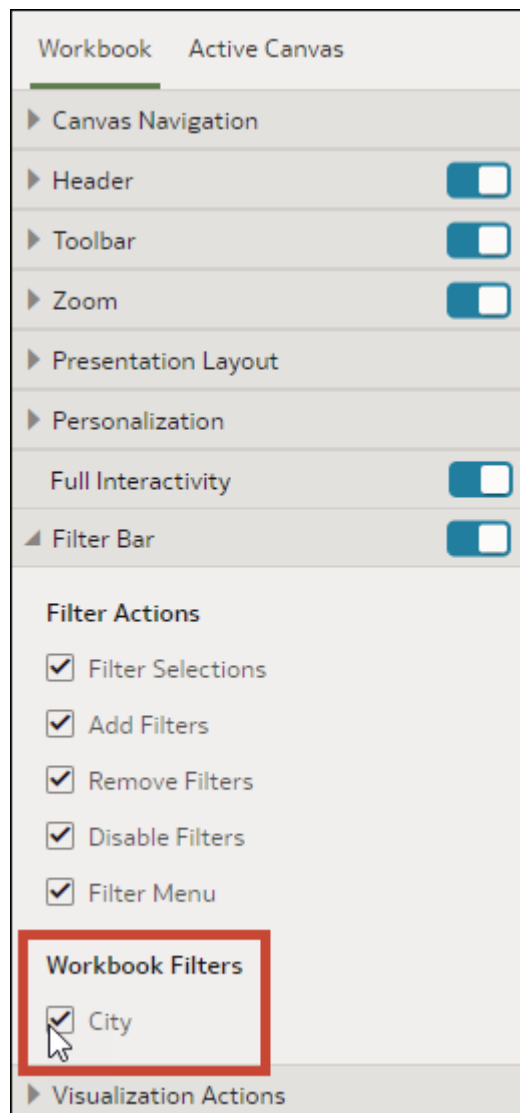
5. Click **Save**.

Show or Hide Workbook Filters in Present

When you design a presentation flow, you can hide or show any individual workbook filters.

When working with filters in the presentation flow, any filters that you hide or show are saved in Present and aren't saved in Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Workbook Filters section, deselect the filters that you want to hide, or select the filters that you want to display.



5. Click **Save**.

Specify the Workbook Visualization Actions in Present

When you design a presentation flow, you can choose which visualization actions to make available to users in a workbook. For example, you can specify that the workbook provides visualization toolbar items like sort, maximize, or add to watchlist, and visualization menu items like drill, export to file, email or print, or copy data.

The visualization properties that you set on the **Workbook** tab are carried over to the Active Canvas' Visualization Actions properties. You can override the **Workbook** tab's visualization properties on any individual canvas. See [Select Canvas Visualization Toolbar Options in Present](#) .

All Visualization Actions options are grayed out when the **Full Interactivity** option is set to **Off**. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.

3. In the Present page, click the **Workbook** tab.
4. In the Visualization Actions section, deselect the actions that you don't want users to perform, or select the actions that you want users to perform.

Workbook Active Canvas

▸ Canvas Navigation

▸ Header ☒

▸ Toolbar ☒

▸ Zoom ☒

▸ Presentation Layout

▸ Personalization

Full Interactivity ☒

▸ Filter Bar ☒

▾ Visualization Actions

Visualization Toolbar

☐ Sort

☐ Show Assignments

☐ Change Visualization Type

☒ Maximize

☒ Map Actions

☐ Add to Watchlist

Visualization Menu

☒ Keep/Remove Selections

☒ Sort by

☒ Drill

☒ Zoom Chart

☒ Data Action

☒ Copy Data

☒ Export

5. Click **Save**.

Change the Workbook Canvases Visualization Alignment in Present

When you design a presentation flow, you can control where the visualizations are displayed on the workbook's canvases. This allows you to choose the best placement of the visualizations based on the end user's screen size and resolution.

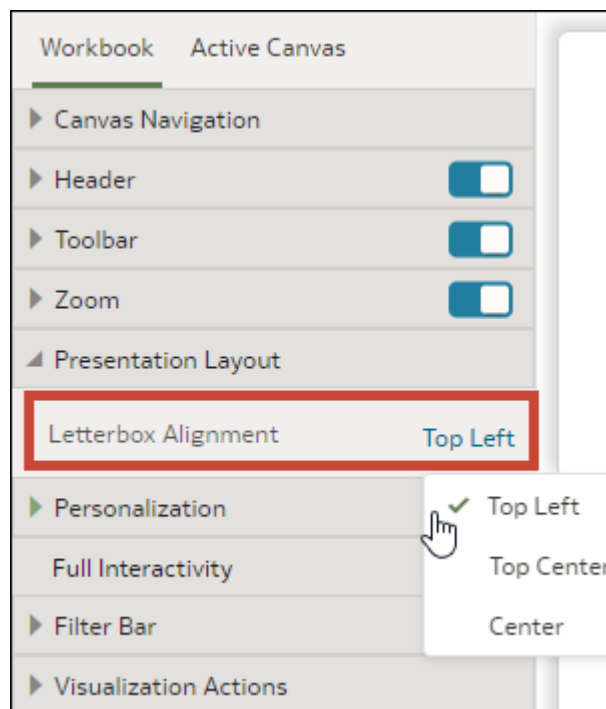
For example, if the workbook's canvases each contain one visualization, then you can choose **Center** to add white space around the visualizations to center them on the canvases.

The alignment options are:

- **Top Left** - Adds white space to the right of the visualizations on the canvas, but not to the top and left of the canvas. This is the default.
- **Top Center** - Adds white space to the left and right of the visualizations on the canvas, but not to the top of the canvas.
- **Center** - Adds white space to the top, left, and right of the visualizations on the canvas.

You can also change the positions of the visualizations on a canvas. See [Change a Visualization's Placement on a Canvas in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Presentation Layout section, go to the **Letterbox Alignment** field and choose an alignment.



5. Click **Save**.

Turn On or Off All Workbook and Canvas Actions in Present

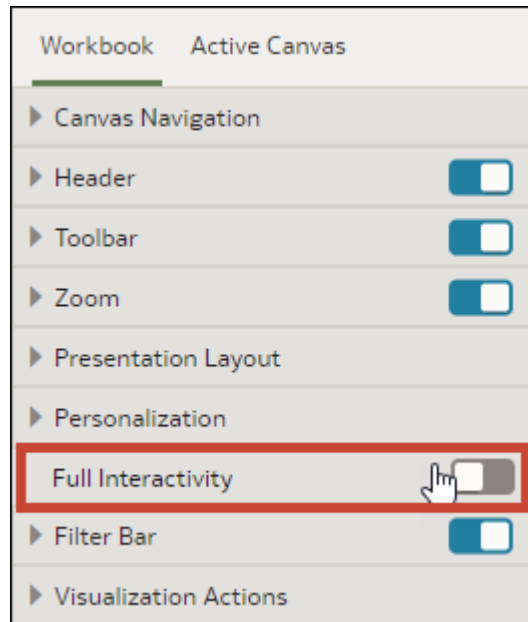
When you design a presentation flow, all filter bar and visualization actions are on by default. You can turn off and on actions individually, or use the **Full Interactivity** option to turn off or on all actions for the workbook's canvases.

Examples of filter actions are add filters, remove filters, and change filter value selections. Examples of visualization actions are drill, export, and sort by.

To turn off all filter and visualization actions that the user can perform on all canvases, set **Full Interactivity** field to **Off**.

Setting the **Full Interactivity** field to **On** allows you to set individual filter and visualization actions to specify how you want the user to interact with the workbook and canvases.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. In the Present page, click the **Workbook** tab.
4. In the Interactivity section, go to the **Full Interactivity** field.



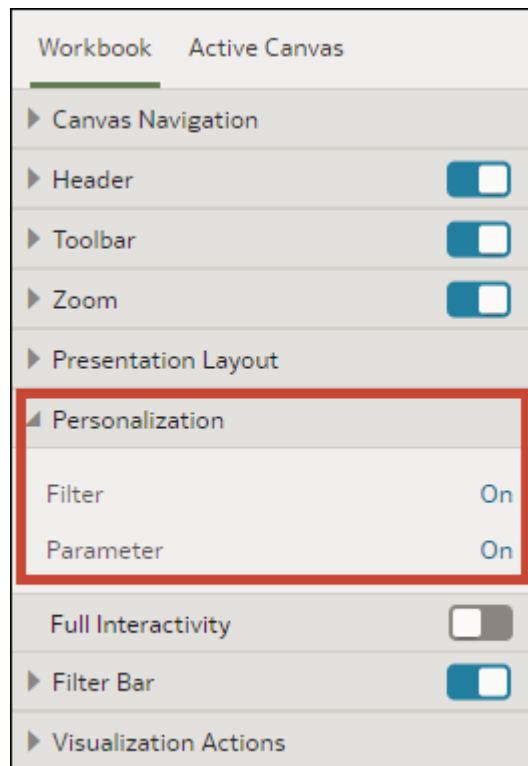
- Select **Off** to disable all filter and visualization actions on all canvases.
 - Select **On** to enable all filter and visualization actions on all canvases.
5. Click **Save**.

Specify Personalization Options in Present

When you design a presentation flow, you can specify if the filter values the end user selects are automatically reapplied when the user reopens the workbook.

The personalization options are:

- **Filter** - Select to reapply dashboard filter selections, visualization filters selections, and any visualizations with **Use as Filter** enabled when a user reopens the workbook. See [About Filter Personalizations](#).
 - **Parameter** - Select to reapply dashboard filter selections and visualizations filter selections that use parameters as their filter controls when a user reopens the workbook. See [Use a Parameter as a Dashboard Filter Control](#).
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
 2. Click **Present**.
 3. In the Present page, click the **Workbook** tab.
 4. In the Personalization section, deselect the user's filter selections you don't want applied or select the user's filter selections you want applied when the user reopens a workbook.



5. Click **Save**.

Set Canvas Properties in Present

In the presentation flow, each canvas inherits the workbook properties that you set in the **Workbook** tab in Present. You can change any canvas' inherited properties.

Topics:

- [Specify Canvas Filter Actions in Present](#)
- [Show or Hide Canvas Filters in Present](#)
- [Select Canvas Visualization Toolbar Options in Present](#)
- [Specify Canvas Visualization Menu Options in Present](#)

- [Show or Hide Canvas Visualizations in Present](#)
- [Show or Hide a Visualization Filter in Present](#)
- [Specify Canvas Zoom Control Options in Present](#)
- [Show or Hide Canvas Notes in Present](#)

Specify Canvas Filter Actions in Present

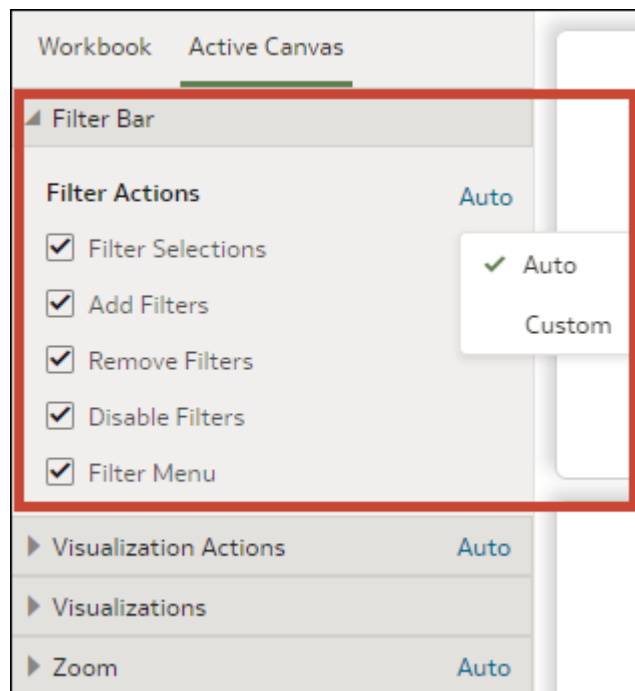
When you design a presentation flow, each canvas inherits the filter actions you set on the **Workbook** tab. You can use the **Active Canvas** tab to customize an individual canvas' filter actions, for example, add filters or change filter values.

Showing the filter bar allows users to view, set, and modify the canvas' filter values. You can set filter values and then hide the filter bar so that the canvas includes specific data. Hiding the filter bar prevent users from changing the filter values.

Any filter settings that you change or filter values that you add or remove in Present are saved to the presentation flow's canvas and not to the canvas in Visualize.

All Filter Actions options are grayed out when the **Full Interactivity** option is set to **Off** on the **Workbook** tab. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas that you want to update filters for.
4. In the Present page, click the **Active Canvas** tab.
5. Scroll to the Filter Bar section and in the Filter Actions area, deselect the filter bar options that you want to hide, or select the options that you want to display.



6. Optional: Click **Custom** and then click **Auto** to reset all visualization actions to the default settings you specified in the **Workbook** tab.

7. Click **Save**.

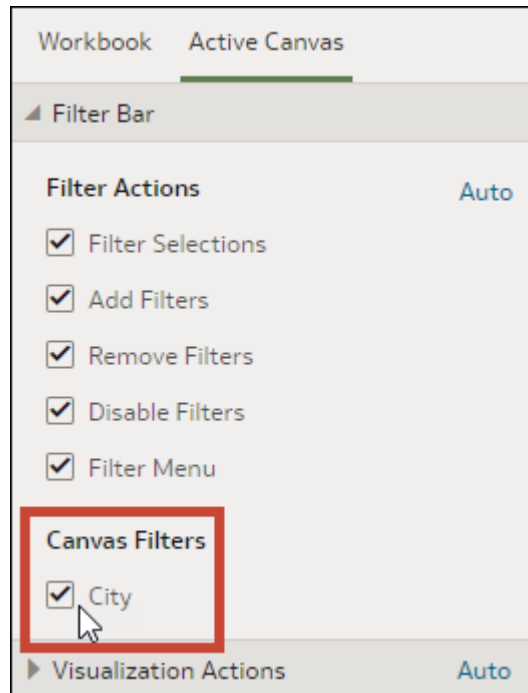
Show or Hide Canvas Filters in Present

When you design a presentation flow, you can hide or show any individual canvas filters.

Any filters that you hide or show in Present are saved to the presentation flow's canvas and not to the canvas in Visualize.

All Canvas Filters options are grayed out when the **Full Interactivity** option is set to **Off** on the **Workbook** tab. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas that you want to update filters for.
4. In the Present page, click the **Active Canvas** tab.
5. In the Canvas Filters area, deselect the filters that you want to hide on the canvas, or select the filters that you want to display.



6. Click **Save**.

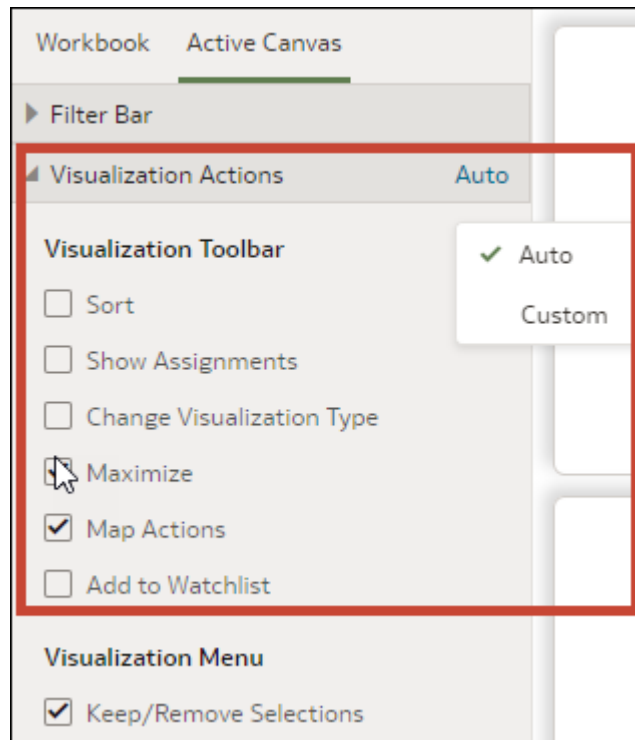
Select Canvas Visualization Toolbar Options in Present

When you design a presentation flow, each canvas inherits the visualization toolbar options you set on the **Workbook** tab. You can use the **Active Canvas** tab to override the visualization toolbar options that are set for the workbook, for example Map Actions or Add to Watchlist.

Any visualization settings that you change in Present are saved to the presentation flow's canvas and not to the canvas in Visualize.

All Visualization Actions options are grayed out when the **Full Interactivity** option is set to **Off** on the **Workbook** tab. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas that you want to update filters for.
4. In the Present page, click the **Active Canvas** tab.
5. Scroll to the Visualization Toolbar section, click to hide the actions in that you don't want users to perform from the visualization's toolbar, or click to add the actions that you want users to perform from the visualization's toolbar.



6. Optional: Click **Custom** and then click **Auto** to reset all visualization actions to the default settings you specified in the **Workbook** tab.
7. Click **Save**.

Specify Canvas Visualization Menu Options in Present

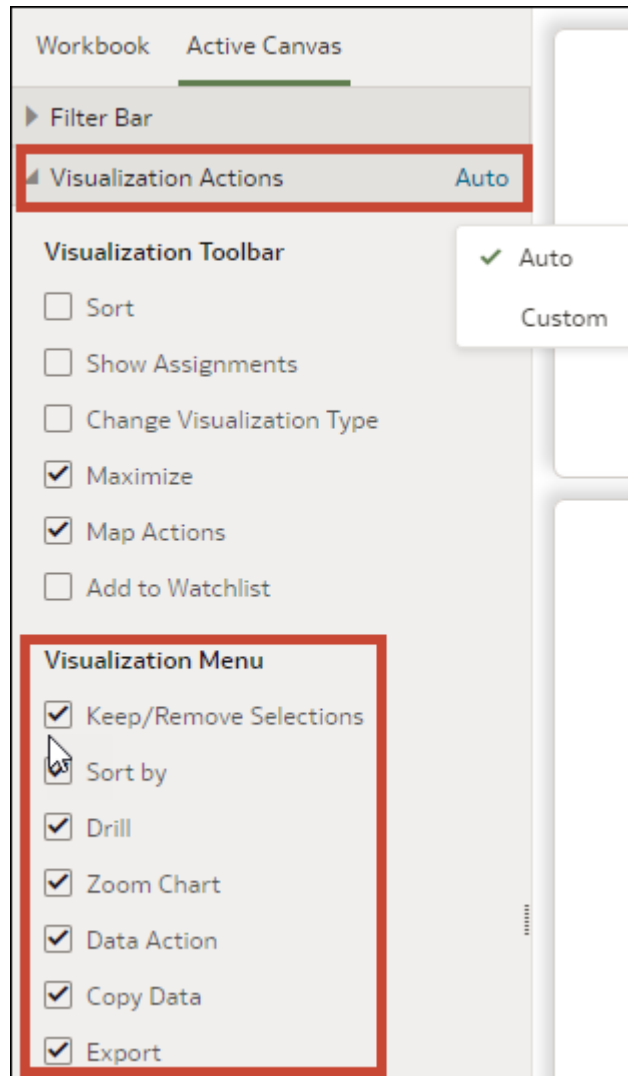
When you design a presentation flow, each canvas inherits the visualization menu options you set on the **Workbook** tab. You can use the **Active Canvas** tab to specify which visualization menu options you want to provide to the user, for example, drill or export.

Any visualization settings that you change in Present are saved to the presentation flow's canvas and not to the canvas in Visualize.

All Visualization Actions options are grayed out when the **Full Interactivity** option is set to **Off** on the **Workbook** tab. See [Turn On or Off All Workbook and Canvas Actions in Present](#).

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.

3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas that you want to change user actions for.
4. In the Present page, click the **Active Canvas** tab.
5. Scroll to the Visualization Menu section, click to hide the actions that you don't want users to perform from the visualization's menu, or click to add the actions that you want users to perform from the visualization's menu.



6. Optional: Click **Custom** and then click **Auto** to reset all visualization actions to the default settings you specified in the **Workbook** tab.
7. Click **Save**.

Show or Hide Canvas Visualizations in Present

When working in manual mode, you can hide or display individual visualizations on a canvas.

Note:

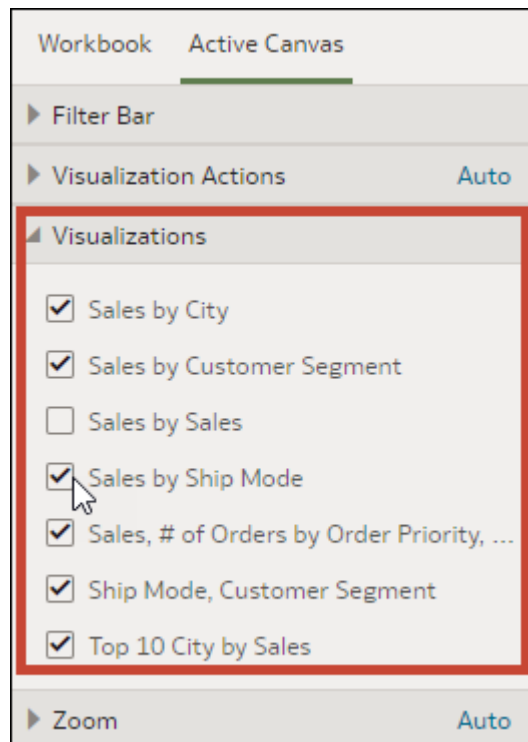
When you work in Present's Manual Mode you can hide visualizations at a specific breakpoint. Hiding visualizations can impact the canvas layout for that breakpoint. Oracle recommends that if your canvas uses breakpoints that you go to Visualize to hide visualizations. See [View Canvas Layout Breakpoints in Present](#).

The canvas' **Layout** property in Visualize determines if your canvas contains white spaces and overlaps when you hide or show visualizations. See [About Moving or Hiding Visualizations on a Canvas in Present](#).

See [Switch Between Auto and Manual Modes in Present](#).

When you show or hide visualizations in Present, the changes are saved to the presentation flow's canvas and not to Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas where you want to show or hide visualizations.
4. In the Present page, click the **Active Canvas** tab.
5. Scroll to the Visualizations section and deselect the visualizations that you want to hide, or select the visualizations that you want to display on the canvas.



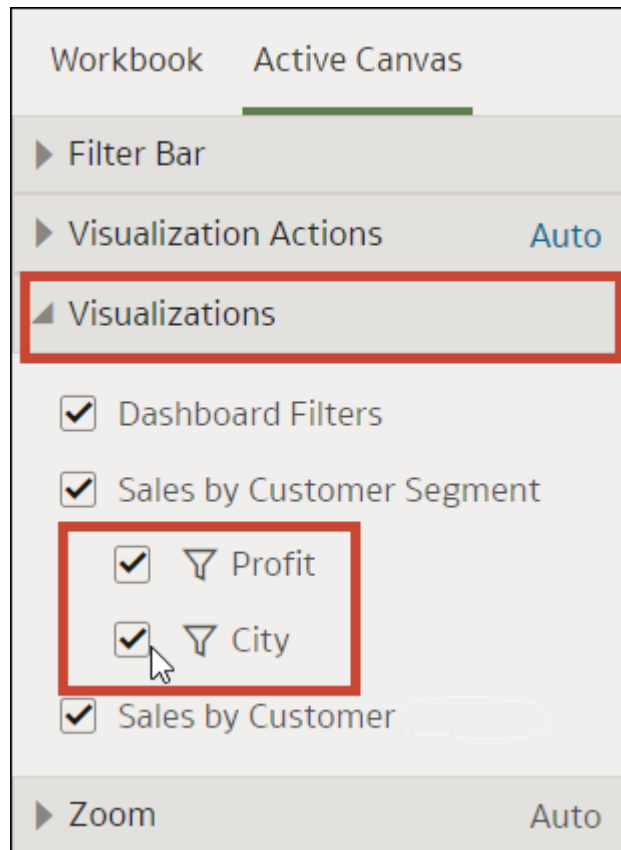
6. Click **Save**.

Show or Hide a Visualization Filter in Present

You can hide or display individual visualization filters for visualizations on a canvas depending on how you want your users to view and interact with the visualization.

When you hide a filter for a specific visualization in Present, the filter still functions however it was set, it's just not visible to end users. Additionally, when you hide a visualization filter in Present, the changes are saved to the presentation flow's canvas and not to Visualize.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas where you want to show or hide visualizations.
4. On the Present page, click the **Active Canvas** tab.
5. Scroll to the Visualizations section and under the applicable visualization, deselect the filters that you want to hide, or select the filters that you want to display on the canvas.



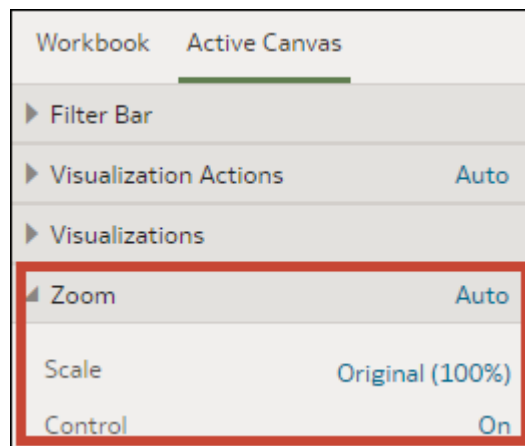
6. Click **Save**.

Specify Canvas Zoom Control Options in Present

When you design a presentation flow, each canvas inherits the zoom control options you set on the **Workbook** tab. You can use the **Active Canvas** tab to customize an individual canvas' zoom control options.

The Zoom/Layout controls button allows consumers to zoom in and out of the whole active canvas to best fit their screen. The zoom control is displayed only for canvases with the **Layout** canvas property set to **Freeform**.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas that you want to update the zoom control for.
4. In the Present page, click the **Active Canvas** tab.



5. Scroll to the Zoom section, click **Scale**, and select the zoom size used to display the canvas when a user opens it.
6. In the Zoom section, click **Control** to set it to **Off** to hide the zoom control in the workbook header bar for the canvas, or click it to set it to **On** to show the zoom control in the workbook header bar for the canvas.
7. Optional: Click **Custom** and then click **Auto** to reset the default settings you specified in the **Workbook** tab.
8. Click **Save**.

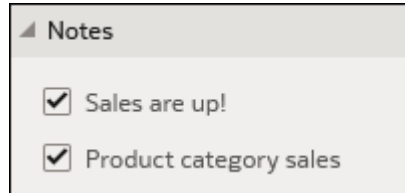
Show or Hide Canvas Notes in Present

When you design a presentation flow, by default all canvas notes are displayed. You can use the **Active Canvas** tab to specify which canvas notes to hide or show.

If you choose to leave some or all notes displayed for a canvas, then when you preview the workbook, you can click the **Hide Notes** workbook header button to turn off or on all notes that aren't hidden. Or when users view the workbook, they can click the **Hide Notes** header button to turn off or on all notes that aren't hidden. See [Show or Hide a Visualization's Notes](#).

Any notes that you hide or show in Present are saved to the presentation flow's canvas and not to the canvas in Visualize.

1. On the Home page, select a workbook, click **Actions**, and then select **Open**.
2. Click **Present**.
3. If the presentation flow contains more than one canvas, then go to the bottom of the Present page and click the canvas where you want to show or hide notes.
4. In the Present page, click the **Active Canvas** tab.
5. Scroll to the Notes section and deselect the notes that you want to hide, or select the notes that you want to display on the canvas.



6. Click **Save**.

Preview a Presentation Flow

As an author using the Present page to design the presentation flow, you can use the preview mode to test how a user views and interacts with the workbook you're designing. Switching to preview mode removes the presentation flow's workbook and canvas options and the canvas panel.

1. On the Home page, select a workbook, click **Actions**, and then select **Open**.
2. Click **Present**.
3. Click **Preview**  to view the workbook as it displays to the user.
4. Click **Edit**  to exit the workbook's preview mode and return to the presentation flow in the **Present** page.

Use Oracle Analytics Predictive Models and Oracle Machine Learning Models

In Oracle Analytics you can consume predictive models or machine learning models that reside in Oracle Database or , Oracle Autonomous Data Warehouse. Apply predictive models to your data to build machine learning Machine Learning (ML) and Artificial Intelligence (AI) into your applications without requiring ML or AI expertise.

Topics:

- [Create and Use Oracle Analytics Predictive Models](#)
- [Use Oracle Machine Learning Models in Oracle Analytics](#)
- [Apply a Predictive or Registered Oracle Machine Learning Model to a Dataset](#)

Create and Use Oracle Analytics Predictive Models

Oracle Analytics predictive models use several embedded Oracle Machine Learning algorithms to mine your datasets, predict a target value, or identify classes of records. Use the data flow editor to create, train, and apply predictive models to your data.

Topics:

- [What Are Oracle Analytics Predictive Models?](#)
- [How Do I Choose a Predictive Model Algorithm?](#)
- [Train a Predictive Model Using AutoML in Oracle Autonomous Data Warehouse](#)
- [Create and Train a Predictive Model](#)
- [Inspect a Predictive Model](#)
- [Add a Predictive Model to a Workbook](#)
- [Evaluate Machine Learning Models Using Lift and Gain Charts](#)

What Are Oracle Analytics Predictive Models?

An Oracle Analytics predictive model applies a specific algorithm to a dataset to predict values, predict classes, or to identify groups in the data.

You can also use Oracle machine learning models to predict data.

Oracle Analytics includes algorithms to help you train predictive models for various purposes. Examples of algorithms are classification and regression trees (CART), logistic regression, and k-means.

You use the data flow editor to first train a model on a training dataset. After the predictive model has been trained, you apply it to the datasets that you want to predict.

You can make a trained model available to other users who can apply it against their data to predict values. In some cases, certain users train models, and other users apply the models.

**Note:**

If you're not sure what to look for in your data, you can start by using Explain, which uses machine learning to identify trends and patterns. Then you can use the data flow editor to create and train predictive models to drill into the trends and patterns that Explain found.

You use the data flow editor to train a model:

- First, you create a data flow and add the dataset that you want to use to train the model. This training dataset contains the data that you want to predict (for example, a value like sales or age, or a variable like credit risk bucket).
- If needed, you can use the data flow editor to edit the dataset by adding columns, selecting columns, joining, and so on.
- After you've confirmed that the data is what you want to train the model on, you add a training step to the data flow and choose a classification (binary or multi), regression, or cluster algorithm to train a model. Then name the resulting model, save the data flow, and run it to train and create the model.
- Examine the properties in the machine learning objects to determine the quality of the model. If needed, you can iterate the training process until the model reaches the quality you want.

Use the finished model to score unknown, or unlabeled, data to generate a dataset within a data flow or to add a prediction visualization to a workbook.

Example

Suppose you want to create and train a multi-classification model to predict which patients have a high risk of developing heart disease.

1. Supply a training dataset containing attributes on individual patients like age, gender, and if they've ever experienced chest pain, and metrics like blood pressure, fasting blood sugar, cholesterol, and maximum heart rate. The training dataset also contains a column named "Likelihood" that is assigned one of the following values: absent, less likely, likely, highly likely, or present.
2. Choose the CART (Decision Tree) algorithm because it ignores redundant columns that don't add value for prediction, and identifies and uses only the columns that are helpful to predict the target. When you add the algorithm to the data flow, you choose the Likelihood column to train the model. The algorithm uses machine learning to choose the driver columns that it needs to perform and output predictions and related datasets.
3. Inspect the results and fine tune the training model, and then apply the model to a larger dataset to predict which patients have a high probability of having or developing heart disease.

How Do I Choose a Predictive Model Algorithm?

Oracle Analytics provides algorithms for any of your machine learning modeling needs: numeric prediction, multi-classifier, binary classifier, and clustering.

Oracle's machine learning functionality is for advanced data analysts who have an idea of what they're looking for in their data, are familiar with the practice of predictive analytics, and understand the differences between algorithms.

**Note:**

If you're using data sourced from Oracle Autonomous Data Warehouse, you can use the AutoML capability to quickly and easily train a predictive model for you, without requiring machine learning skills. See *Train a Predictive Model Using AutoML in Autonomous Data Warehouse*.

Normally users want to create multiple prediction models, compare them, and choose the one that's most likely to give results that satisfy their criteria and requirements. These criteria can vary. For example, sometimes users choose models that have better overall accuracy, sometimes users choose models that have the least type I (false positive) and type II (false negative) errors, and sometimes users choose models that return results faster and with an acceptable level of accuracy even if the results aren't ideal.

Oracle Analytics contains multiple machine learning algorithms for each kind of prediction or classification. With these algorithms, users can create more than one model, or use different fine-tuned parameters, or use different input training datasets and then choose the best model. The user can choose the best model by comparing and weighing models against their own criteria. To determine the best model, users can apply the model and visualize results of the calculations to determine accuracy, or they can open and explore the related datasets that Oracle Analytics used the model to output.

Consult this table to learn about the provided algorithms:

Name	Type	Category	Function	Description
CART	Classification	Binary Classifier	-	Uses decision trees to predict both discrete and continuous values. Use with large datasets.
	Regression	Multi-Classifer		
		Numerical		
Elastic Net Linear Regression	Regression	Numerical	ElasticNet	Advanced regression model. Provides additional information (regularization), performs variable selection, and performs linear combinations. Penalties of Lasso and Ridge regression methods. Use with a large number of attributes to avoid collinearity (where multiple attributes are perfectly correlated) and overfitting.

Name	Type	Category	Function	Description
Hierarchical	Clustering	Clustering	AgglomerativeClustering	Builds a hierarchy of clustering using either bottom-up (each observation is its own cluster and then merged) or top down (all observations start as one cluster) and distance metrics. Use when the dataset isn't large and the number of clusters isn't known beforehand.
K-Means	Clustering	Clustering	k-means	Iteratively partitions records into k clusters where each observation belongs to the cluster with the nearest mean. Use for clustering metric columns and with a set expectation of number of clusters needed. Works well with large datasets. Result are different with each run.
Linear Regression	Regression	Numerical	Ordinary Least Squares Ridge Lasso	Linear approach for a modeling relationship between target variable and other attributes in the dataset. Use to predict numeric values when the attributes aren't perfectly correlated.
Logistic Regression	Regression	Binary Classifier	LogisticRegressionCV	Use to predict the value of a categorically dependent variable. The dependent variable is a binary variable that contains data coded to 1 or 0.
Naive Bayes	Classification	Binary Classifier Multi-Classifer	GaussianNB	Probabilistic classification based on Bayes' theorem that assumes no dependence between features. Use when there are a high number of input dimensions.

Name	Type	Category	Function	Description
Neural Network	Classification	Binary Classifier Multi-Classifer	MLPClassifier	Iterative classification algorithm that learns by comparing its classification result with the actual value and returns it to the network to modify the algorithm for further iterations. Use for text analysis.
Random Forest	Classification	Binary Classifier Multi-Classifer Numerical	-	An ensemble learning method that constructs multiple decision trees and outputs the value that collectively represents all the decision trees. Use to predict numeric and categorical variables.
SVM	Classification	Binary Classifier Multi-Classifer	LinearSVC, SVC	Classifies records by mapping them in space and constructing hyperplanes that can be used for classification. New records (scoring data) are mapped into the space and are predicted to belong to a category, which is based on the side of the hyperplane where they fall.

Train a Predictive Model Using AutoML in Oracle Autonomous Data Warehouse

When you use data from Oracle Autonomous Data Warehouse, you can use its AutoML capability to recommend and train a predictive model. AutoML analyzes your data, calculates the best algorithm to use, and registers a prediction model in Oracle Analytics so that you can make predictions on your data.

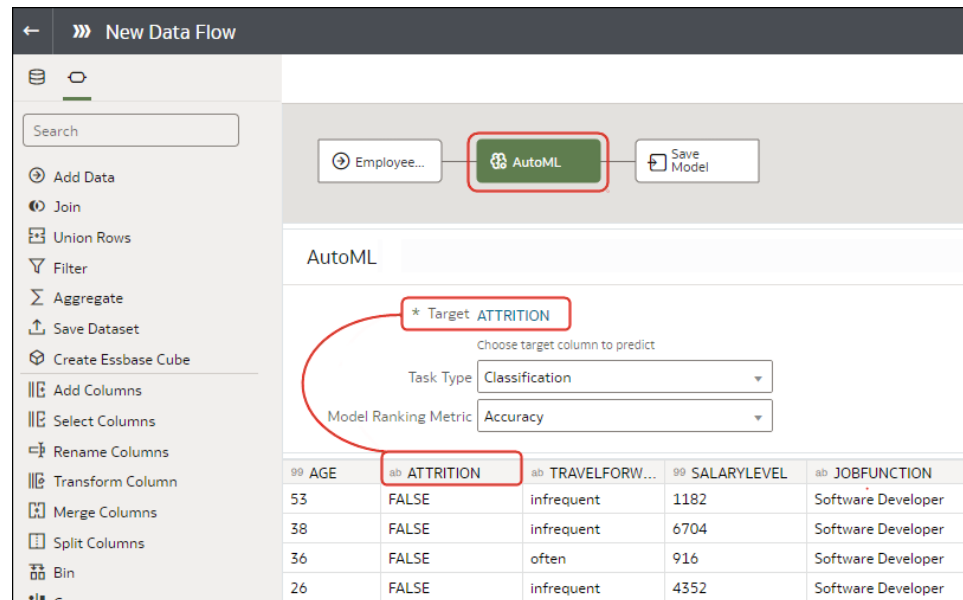
Using AutoML means that Oracle Autonomous Data Warehouse does all of the hard work for you, so that you can deploy a prediction model without machine learning or artificial intelligence skills. The generated prediction model is saved in the Models area of the Machine Learning page. To predict data based on the new model, create a data flow and use the **Apply Model** step.

Before you start:

- Create a dataset based on the data in Oracle Autonomous Data Warehouse that you want to make predictions about. For example, you might have data about employee attrition, including a field named ATTRITION indicating 'Yes' or 'No' for attrition.

- Make sure that the database user specified in the Oracle Analytics connection to Oracle Autonomous Data Warehouse has the role `OML_Developer` and isn't an 'admin' super-user. Otherwise, the data flow fails when you try to save or run it.
1. On the Home page, click **Create**, and then click **Data Flow**.
 2. In Add Dataset, select the dataset based on Oracle Autonomous Data Warehouse containing the data to analyze.
 3. Click **Add a step**, then click **AutoML**.
 4. For the **Target**, click **Select a column**, and select the data column containing the value you're trying to predict.

For example, to predict employee attrition, you might select a field named `ATTRITION` indicating 'TRUE' or 'FALSE' for whether employees have left an organization or not.



5. Accept the suggested **Task Type** and **Model Ranking Metric** that Oracle Analytics recommends, or select a different algorithm.
6. Click **Save Model**, and specify the name of the generated prediction model.
7. Click **Save** and specify a name for the data flow.
8. Click **Run** to analyze the data and generate a predictive model.
9. From the Home page, click **Navigate**, then click **Machine Learning**, then right-click the generated model and select **Inspect**.

You can locate the model that Oracle Analytics generates on the **Machine Learning** page on the **Models** tab. Inspect the model to assess its quality. See [Assess a Predictive Model's Quality](#). You can also refer to related datasets that are generated for models generated by AutoML. See [What Are a Predictive Model's Related Datasets?](#).

Create and Train a Predictive Model

Advanced data analysts create and train predictive models so that they can use them to deploy Oracle Machine Learning algorithms to mine datasets, predict a target value, or identify

classes of records. Use the data flow editor to create and train predictive models and apply them to your data.



Arriving at an accurate model is an iterative process and an advanced data analyst can try different models, compare their results, and fine tune parameters based on trial and error. A data analyst can use the finalized, accurate predictive model to predict trends in other datasets, or add the model to workbooks.

Note:

If you're using data sourced from Oracle Autonomous Data Warehouse, you can use the AutoML capability to quickly and easily train a predictive model for you, without requiring machine learning skills. See *Train a Predictive Model Using AutoML in Autonomous Data Warehouse*.

Oracle Analytics provides algorithms for numeric prediction, multi-classification, binary-classification and clustering.

The algorithms aren't available until you install Oracle machine learning into your local Oracle Analytics Desktop directory. See *How do I install Machine Learning for Desktop?*

1. On the Home page, click **Create**, and then select **Data Flow**.
2. Select the dataset that you want to use to train the model. Click **Add**.
3. In the data flow editor, click **Add a step (+)**.

After adding a dataset, you can either use all columns in the dataset to build the model or select only the relevant columns. Choosing the relevant columns requires an understanding of the dataset. Ignore columns that you know won't influence the outcome behavior or that contain redundant information. You can choose only relevant columns by adding the **Select Columns** step. If you're not sure about the relevant columns, then use all columns.

4. Select one of the train model steps (for example, **Train Numeric Prediction**, or **Train Clustering**).
5. Select an algorithm and click **OK**.
6. If you're working with a supervised model like prediction or classification, then click **Target** and select the column that you're trying to predict. For example, if you're creating a model to predict a person's income, then select the Income column.

If you're working with an unsupervised model like clustering, then no target column is required.

7. Change the default settings for your model to fine tune and improve the accuracy of the predicted outcome. The model you're working with determines these settings.
8. Click the **Save Model** step and provide a name and description.
9. Click **Save**, enter a name and description of the data flow, and click **OK** to save the data flow.
10. Click **Run Data Flow** to create the predictive model based on the input dataset and model settings that you provided.

Inspect a Predictive Model

After you create the predictive model and run the data flow, you can review information about the model to determine its accuracy. Use this information to iteratively adjust the model settings to improve its accuracy and predict better results.

Topics:

- [View a Predictive Model's Details](#)
- [Assess a Predictive Model's Quality](#)
- [What Are a Predictive Model's Related Datasets?](#)
- [Find a Predictive Model's Related Datasets](#)

View a Predictive Model's Details

A predictive model's detail information helps you understand the model and determine if it's suitable for predicting your data. Model details include its model class, algorithm, input columns, and output columns

1. On the Home page, click **Navigator**, and then click **Machine Learning**.
2. Click the **Models** tab.
3. Click the menu icon for a training model and select **Inspect**.
4. Click the **Details** to view the model's information.

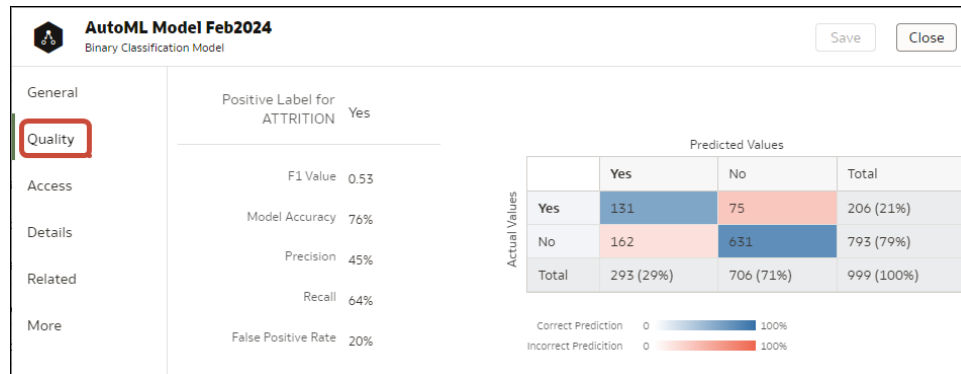
Assess a Predictive Model's Quality

View information that helps you understand the quality of a predictive model. For example, you can review accuracy metrics like model accuracy, precision, recall, F1 value, and false positive rate.

Oracle Analytics provides similar metrics irrespective of the algorithm used to create the model, thereby making comparison between different models easy. During the model creation process, the input dataset is split into two parts to train and test the model based on the Train Partition Percent parameter. The model uses the test portion of the dataset to test the accuracy of the model that is built.

Based on your findings in the **Quality** tab, you may need to adjust the model parameters and retrain it.

1. On the Home page, click **Navigator**, and then click **Machine Learning**.
2. Click the **Models** tab.
3. Click the menu icon for a training model and select **Inspect**.
4. Click the **Quality** tab to review the model's quality metrics and assess the model. For example, review the **Model Accuracy** score.



Tip: Click **More** to review details of the views generated for the model.

What Are a Predictive Model's Related Datasets?

When you run the data flow to create the Oracle Analytics predictive model's training model, Oracle Analytics creates a set of related datasets. You can open and create workbooks on these datasets to learn about the accuracy of the model.



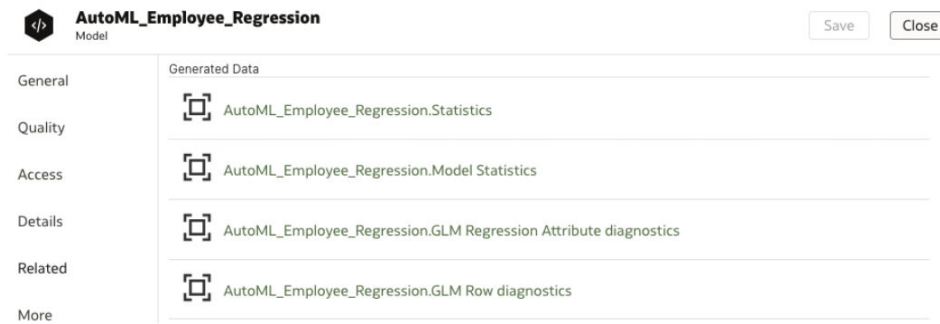
Depending on the algorithm you chose for your model, related datasets contain details about the model such as prediction rules, accuracy metrics, confusion matrix, and key drivers for prediction. You can use this information to fine tune the model to get better results, and you can use related datasets to compare models and decide which model is more accurate.

For example, you can open a Drivers dataset to discover which columns have a strong positive or negative influence on the model. By examining those columns, you find that some columns aren't treated as model variables because they aren't realistic inputs or that they're too granular for the forecast. You use the data flow editor to open the model and based on the information you discovered, you remove the irrelevant or too-granular columns, and regenerate the model. You check the Quality and Results tab and verify if the model accuracy is improved. You continue this process until you're satisfied with the model's accuracy and it's ready to score a new dataset.

Different algorithms generate similar related datasets. Individual parameters and column names may change in the dataset depending on the type of algorithm, but the functionality of the dataset stays the same. For example, the column names in a statistics dataset may change from Linear Regression to Logistic Regression, but the statistics dataset contains accuracy metrics of the model.

Related Datasets for AutoML Models

When you train a predictive model using AutoML, Oracle Analytics creates additional datasets that contain useful information about the model. The number of datasets created depends on the model algorithm. For example, for Naive Bayes models, Oracle Analytics creates a dataset providing information about conditional probabilities. For a decision tree model, the dataset provides information about decision tree statistics. When you inspect an AutoML-generated model using the generalized linear model (GLM) algorithm, you see entries prefixed with GLM* for the model-specific datasets that contain metadata information about the model.



Related Datasets



Note:

Oracle Analytics appends the dataflow's output name to the related dataset type. For example, for a CART model, if the data flow's output is named `cart_model2`, then the dataset is named `cart_model2_CART`.

CART

Oracle Analytics creates a table for the CART (Classification and Regression Tree) related dataset, which contains columns that represent the conditions and the conditions' criteria in the decision tree, a prediction for each group, and prediction confidence. Use the tree diagram visualization to visualize this decision tree.

The CART dataset is created when you select these model and algorithm combinations.

Model	Algorithm
Numeric	CART for Numeric Prediction
Binary Classification	CART
Multi Classification	CART

Classification Report

Oracle Analytics creates a table for the Classification Report related dataset. For example, if the target column can have the two distinct values, Yes or No, this dataset shows accuracy metrics like F1, Precision, Recall, and Support (the number of rows in the training dataset with this value) for every distinct value of the target column.

The Classification dataset is created when you select these model and algorithm combinations.

Model	Algorithms
Binary Classification	Naive Bayes
	Neural Network
	Support Vector Machine
Multi Classification	Naive Bayes
	Neural Network
	Support Vector Machine

Confusion Matrix

Oracle Analytics creates a pivot table for the Confusion Matrix related dataset, which is also called an error matrix. Each row represents an instance of a predicted class, and each column represents an instance in an actual class. This table reports the number of false positives, false negatives, true positives, and true negatives, which are used to compute precision, recall, and F1 accuracy metrics.

The Confusion Matrix dataset is created when you select these model and algorithm combinations.

Model	Algorithms
Binary Classification	Logistics Regression
	CART (Decision Tree)
	Naive Bayes
	Neural Network
	Random Forest
	Support Vector Machine
Multi Classification	CART (Decision Tree)
	Naive Bayes
	Neural Network
	Random Forest
	Support Vector Machine

Drivers

Oracle Analytics creates a table for the Drivers related dataset, which contains information about the columns that determine the target column values. Linear regressions are used to identify these columns. Each column is assigned coefficient and correlation values. The coefficient value describes the column's weight-age used to determine the target column's value. The correlation value indicates the relationship direction between the target column and dependent column. For example, if the target column's value increases or decreases based on the dependent column.

The Drivers dataset is created when you select these model and algorithm combinations.

Model	Algorithms
Numeric	Linear Regression
	Elastic Net Linear Regression
Binary Classification	Logistics Regression
	Support Vector Machine
Multi Classification	Support Vector Machine

Hitmap

Oracle Analytics creates a table for the Hitmap related dataset, which contains information about the decision tree's leaf nodes. Each row in the table represents a leaf node and contains information describing what that leaf node represents, such as segment size, confidence, and expected number of rows. For example, expected number of correct predictions = Segment Size * Confidence.

The Hitmap dataset is created when you select these model and algorithm combinations.

Model	Algorithm
Numeric	CART for Numeric Prediction

Residuals

Oracle Analytics creates a table for the Residuals related dataset, which contains information about the quality of the residual predictions. A residual is the difference between the measured value and the predicted value of a regression model. This dataset contains an aggregated sum value of absolute difference between the actual and predicted values for all columns in the dataset.

The Residuals dataset is created when you select these model and algorithm combinations.

Model	Algorithms
Numerics	Linear Regression
	Elastic Net Linear Regression
	CART for Numeric Prediction
Binary Classification	CART (Decision Tree)
Multi Classification	CART (Decision Tree)

Statistics

Oracle Analytics creates a table for the Statistics related dataset. This dataset's metrics depend upon the algorithm used to generate it. Note this list of metrics based on algorithm:

- Linear Regression, CART for Numeric Prediction, Elastic Net Linear Regression - These algorithms contain R-Square, R-Square Adjusted, Mean Absolute Error(MAE), Mean Squared Error(MSE), Relative Absolute Error(RAE), Related Squared Error(RSE), Root Mean Squared Error(RMSE).
- CART(Classification And Regression Trees), Naive Bayes Classification, Neural Network, Support Vector Machine(SVM), Random Forest, Logistic Regression - These algorithms contain Accuracy, Total F1.

This dataset is created when you select these model and algorithm combinations.

Model	Algorithm
Numeric	Linear Regression
	Elastic Net Linear Regression
	CART for Numeric Prediction
Binary Classification	Logistics Regression
	CART (Decision Tree)
	Naive Bayes
	Neural Network
	Random Forest
Multi Classification	Support Vector Machine
	Naive Bayes
	Neural Network
	Random Forest
	Support Vector Machine

Summary

Oracle Analytics creates a table for the Summary related dataset, which contains information such as Target name and Model name.

The Summary dataset is created when you select these model and algorithm combinations.

Model	Algorithms
Binary Classification	Naive Bayes
	Neural Network
	Support Vector Machine
Multi Classification	Naive Bayes
	Neural Network
	Support Vector Machine

Find a Predictive Model's Related Datasets

Related datasets are generated when you train a predictive model.

Depending on the algorithm, related datasets contain details about the model like: prediction rules, accuracy metrics, confusion matrix, key drivers for prediction, and so on. These parameters help you understand the rules the model used to determine the predictions and classifications.

1. On the Home page, click **Navigator**, and then click **Machine Learning**.
2. Click the **Models** tab.
3. Click the menu icon for a training model and select **Inspect**.
4. Click the **Related** tab to access the model's related datasets.
5. Double-click a related dataset to view it or to use it in a workbook.

Add a Predictive Model to a Workbook

When you create a scenario in a workbook, you apply a predictive model to the workbook's dataset to reveal the trends and patterns that the model was designed to find.



Note:

You can't apply an Oracle machine learning model to a workbook's data.

After you add the model to the workbook and map the model's inputs to the dataset's columns, the Data Panel contains the model's objects, which you can drag and drop onto the canvas. Machine learning generates the model's values based on the visualization's corresponding data columns.

1. On the Home page, click **Create**, and then click **Workbook**.
2. Select the dataset that you want to use to create the workbook and click **Add to Workbook**.
3. In the Data pane, click **Add**, and select **Create Scenario**.
4. In the Create Scenario - Select Model dialog, select a model and click **OK**.

You can only apply a predictive model. You can't apply an Oracle machine learning model.

If each model input can't be matched to a data element, then the Map Your Data to the Model dialog is displayed.

5. If the Map Your Data to the Model dialog is displayed, then in the **Dataset** field, select the dataset to use with the model.
6. Match the model input and data elements as needed. Click **Done**.
The scenario is displayed as a dataset in the Data Elements pane.
7. Drag and drop elements from the dataset and the model onto the Visualize canvas.
8. To adjust the scenario, right-click the scenario in the Data Elements pane and select **Edit Scenario**.
9. Change the dataset and update the model input and data elements mapping as needed.
10. Click **Save** to save the workbook.

Evaluate Machine Learning Models Using Lift and Gain Charts

Lift and gain charts enable you to compare different machine learning models to determine the most accurate model.

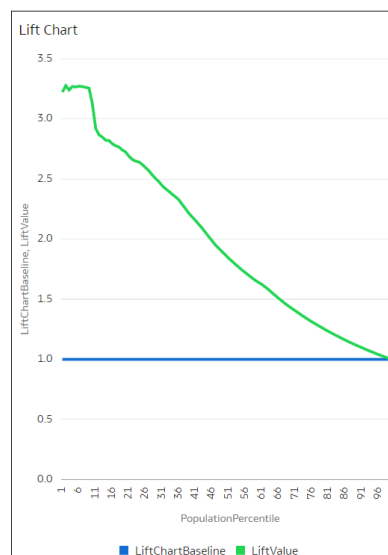
Topics:

- [Overview to Using Lift and Gain Charts](#)
- [Generate Predictive Data for Lift and Gain Charts](#)
- [Evaluate a Machine Learning Model Using a Lift and Gain Chart](#)

Overview to Using Lift and Gain Charts

Lift and gain charts enable you to evaluate predictive machine learning models by charting modeling statistics in a visualization in Oracle Analytics.

When you use a data flow to apply a classification model to a dataset, Oracle Analytics enables you to compute lift and gain values. You can then visualize this data in a chart to help you assess the accuracy of predictive models and determine the best one to use.



Prerequisites

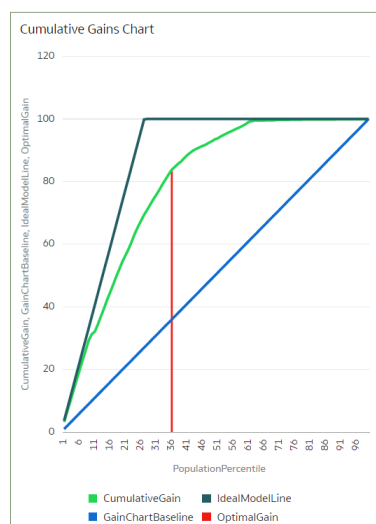
- Oracle Database or Oracle Autonomous Data Warehouse
- A classification model that includes prediction probability (for example, a multi-classifier model created using the Naive Bayes training script).
You access existing predictive models in the Machine Learning area in Oracle Analytics.

Statistics Generated For Lift and Gain Analysis

When you apply a predictive classification model to a dataset and generate lift and gain statistics, you produce a dataset named `<Data flow name>_LIFT` with these columns:

- PopulationPercentile - The dataset population split into 100 equal groups.
- CumulativeGain - The ratio of the cumulative number of positive targets up to that percentile, to the total number of positive targets. The closer the cumulative gains line is to the top-left corner of the chart, the greater the gain; the higher the proportion of the responders that are reached for the lower proportion of customers contacted.
- GainChartBaseline - The overall response rate : the line represents the percentage of positive records we expect to get if we selected records randomly. For example, in a marketing campaign, if we contact X% of the customers randomly, we will receive X% of the total positive response.
- LiftChartBaseline - Value of 1 and used as a baseline for lift comparison.
- LiftValue - The cumulative lift for a percentile. Lift is the ratio of the cumulative positive records density for the selected data, to the positive density over all the test data.
- IdealModelLine - The ratio of the cumulative number of positive targets to the total number of positive targets.
- OptimalGain - This indicates the optimum number of customers to contact. The cumulative gain curve will flatten beyond this point.

You can then visualize the `<Data flow name>_LIFT` dataset in an Oracle Analytics chart. For example, to analyze gains, you might plot PopulationPercentile on the x-axis, and CumulativeGain, GainChartBaseline, IdealModelLine, and OptimalGain on the y-axis.



Generate Predictive Data for Lift and Gain Charts

When you use a data flow to apply a classification model to a dataset, Oracle Analytics enables you to compute statistics that you can visualize in lift and gain charts.

Before you start, create a classification model that includes prediction probability (for example, a multi-classifier model created using the Naive Bayes training script). Oracle Analytics displays available models on the Models tab on the Machine Learning page (from the Home page, click **Machine Learning**).

1. On the Home page, click **Create**, then click **Data Flow**.
2. Select a data source, then click **Add**.
3. Click **Add a Step**, and select **Apply Model**.
4. At Select Model, select a classification model that includes prediction probability, then click **OK**.
5. In Apply Model, in the **Parameters** section:
 - In **Compute lift and gain**, select **Yes**.
 - In **Target column to compute lift**, select the column name of the value being predicted. For example, if your model predicts whether customers will sign up for a membership using a column named SIGNUP, select SIGNUP.
 - In **Positive class to compute**, specify the case-sensitive data value representing the positive class (or the preferred outcome) in the prediction. For example, if your model predicts whether customers will sign-up for a membership using a column named SIGNUP with values YES or NO, specify YES.
6. Add a **Save Data** node to your data flow.
7. Execute this data flow.

The data flow produces a dataset named `<Data flow name>_LIFT` that contains lift and gain statistics, which you can evaluate.

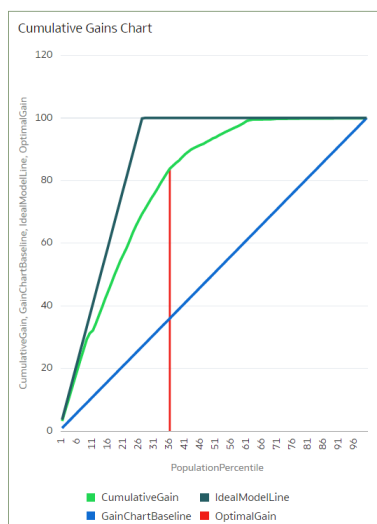
Evaluate a Machine Learning Model Using a Lift and Gain Chart

Use a chart to analyze statistics generated by machine learning classification models to determine the best model to use.

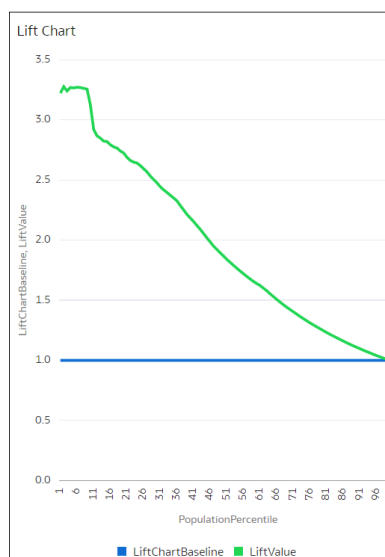
Before you start, apply a predictive model to your data and generate lift and gain statistics in a dataset.

1. On the Home page, click **Create**, then click **Workbook**.
2. In **Add Dataset**, select the `<Data flow name>_LIFT` dataset that you generated in the previous task, then click **Add to Workbook**.
3. In the **Visualize** panel, select the statistics to analyze, then right-click and select **Pick Visualization**, and choose **Line Chart**.

For example, to analyze gains, you might place **PopulationPercentile** on the x-axis, and place **CumulativeGain**, **GainChartBaseline**, **IdealModelLine**, and **OptimalGain** on the y-axis.



To analyze lift, you might place **PopulationPercentile** on the x-axis, and place **LiftChartBaseline**, and **LiftValue** on the y-axis.



Use Oracle Machine Learning Models in Oracle Analytics

You can register and use Oracle machine learning models from Oracle Database or Oracle Autonomous Data Warehouse to score data in Oracle Analytics. Use the data flow editor to apply the machine learning models to your data.

Oracle Analytics enables you to build machine-learning into your applications without data scientist expertise.

Topics:

- [How Can I Use Oracle Machine Learning Models in Oracle Analytics?](#)
- [Register Oracle Machine Learning Models in Oracle Analytics](#)
- [Inspect Registered Oracle Machine Learning Models](#)
- [Visualize a Registered Oracle Machine Learning Model's View](#)

How Can I Use Oracle Machine Learning Models in Oracle Analytics?

Oracle Analytics allows you to register and use Oracle machine learning models from Oracle Database or Oracle Autonomous Data Warehouse.

Using Oracle machine learning models with Oracle Analytics greatly increases the level of predictive analytics that you can perform on datasets because the data and the model reside in the database, the data scoring is performed in the database, and the resulting dataset is stored in the database. This allows you to use the Oracle machine learning execution engine to score large datasets.

You can register and use Oracle machine learning models from these database data sources:

- Oracle Autonomous Data Warehouse
- Oracle Database

In Oracle Analytics you can register any of the database's Oracle machine learning models in the mining classes Classification, Regression, Clustering, Anomaly, or Feature Extraction that were created using the Oracle Machine Learning for SQL API (OML 4SQL). Your database permissions determine the Oracle machine learning models that are available for you to register and use.

You can also create predictive models in Oracle Analytics.

Register Oracle Machine Learning Models in Oracle Analytics

The Oracle machine learning models must be registered in Oracle Analytics before you can use them to predict data. You can register and use models that reside in your Oracle Database or Oracle Autonomous Data Warehouse data sources.

1. On the Home page, click **Page Menu**, then **Register Model/Function**, then **Machine Learning Models**.

2. In the Register an ML Model dialog, select a connection.

In the Select a Model to Register dialog, you see the database's Oracle machine learning models in the mining classes Classification, Regression, Clustering, Anomaly, or Feature Extraction that were created using the Oracle Machine Learning for SQL API (OML 4SQL). If needed, click **Create Connection** to create a connection to the Oracle Database or Oracle Autonomous Data Warehouse data source containing the Oracle machine learning model that you want to use.

3. In the Select a Model to Register dialog, click the model that you want to register and review the model's information. For example, the model class and algorithm used to build the model, the target the model predicts, the columns the model is trained on, model predictions, and parameters.
4. Click **Register**.
5. From the Home page, click **Navigator**, and then click **Machine Learning** to confirm that the model was imported successfully.

Inspect Registered Oracle Machine Learning Models

You can access and review information about the Oracle machine learning models that you registered in Oracle Analytics.

Topics:

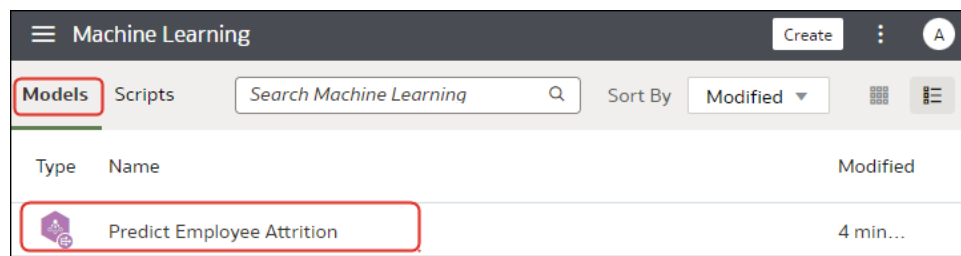
- [View a Registered Model's Details](#)
- [What Are a Registered Model's Views?](#)
- [View a Registered Model's Views List](#)

View a Registered Model's Details

View an Oracle machine learning model's detail information to help you understand the model and determine if it's suitable for predicting your data. Model details include model class, algorithm, input columns, output columns, and parameters.

When you register a model, its detail information is included. This information is obtained from Oracle Database or Oracle Autonomous Data Warehouse.

1. On the Home page, click **Navigator**, and then click **Machine Learning**.
2. Click the **Models** tab.



3. Hover over the model you want to view, click **Actions**, and then select **Inspect**.
4. Click **Details** to view the model's information.

What Are a Registered Model's Views?

When an Oracle machine learning model is created, views containing specific information about the model are generated and stored in the database. Use Oracle Analytics to access a list of a model's views, and then build datasets that you can use to visualize the information contained in the views.

Views contain information about the registered model such as model statistics, target value distribution, and algorithm settings. The number and kind of views created are determined by the model's algorithm. So a model built from the Naive Bayes algorithm has one set of views and a model built from the Decision Tree algorithm has a different set of views. For example, some of the views generated for a Decision Tree model are:

- **Scoring Cost Matrix** - Describes the scoring matrix for classification models. The view contains `actual_target_value`, `predicted_target_value`, and `cost`.
- **Global Name-Value Pairs** - Describes global statistics related to the model like number of rows used in the model build and convergence status.

- **Decision Tree Statistics** - Describes the statistics associated with individual nodes in the decision tree. The statistics include a target histogram for the data in the node. For every node in the tree, this view has information about `predicted_target_value`, `actual_target_value`, and `node support`.

Each view's name is unique, for example `DM$VCDT_TEST`. The format used to generate view names is `DM$VAlphabet_Model Name` where:

- **DM\$V** - Represents a prefix for views generated from a registered model.
- **Alphabet** - Represents a value that indicates the type of output model. For example, `C` indicates that the view type is Scoring Cost Matrix, and `G` indicated that the view type is Global Name-Value Pair.
- **Model Name** - Holds the name of the registered Oracle machine learning model and its view. For example, `DT_TEST`.

For more information about views, see the documentation for your Oracle database version.

Oracle Analytics provides a list of any registered model's views. However, you can only access and visualize views for Oracle Database 12c Release 2 or later. If you're working with an early version of Oracle Database, then you can't use Oracle Analytics to access and visualize views.

View a Registered Model's Views List

A registered model's views are stored in the database, but you can use Oracle Analytics to display a list of the model's views.

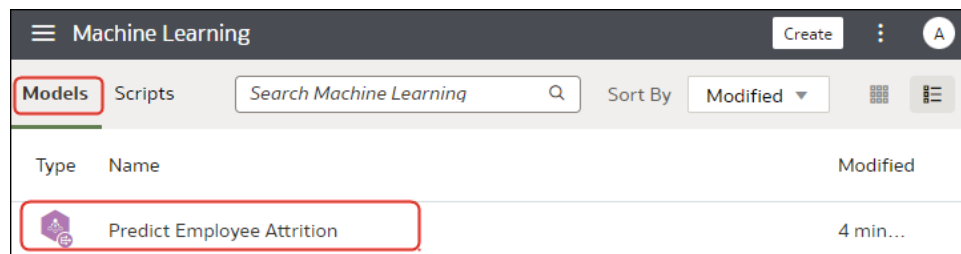
Views contain information such as a model's size, settings, and the attributes used in the model. This information can help you better understand and utilize the model.



Note:

You can access and visualize views for Oracle Database 12c Release 2 or later. If you're working with an earlier version of Oracle Database, then these views don't exist in the database and you can't use Oracle Analytics to access and visualize them.

1. On the Home page, click **Navigator**, and then click **Machine Learning**.
2. Click the **Models** tab.



3. Hover over the model you want to view, click **Actions**, and then select **Inspect**.
4. Click the **Related** tab to view a list of the model's views.

Visualize a Registered Oracle Machine Learning Model's View

Visualize any of a registered model's views to discover information that helps you better understand and utilize the model.



Note:

You can access and visualize views for Oracle Database 12c Release 2 or later. If you're working with an earlier version of Oracle Database, then these views don't exist in the database and you can't use Oracle Analytics to access and visualize them.

When creating the dataset, you need to know the model's view name and the database schema name. Use the following task to find these names, create the dataset, and visualize the view's information.

1. On the Home Page, click **Navigator**, and then click **Machine Learning**.
2. Locate the registered machine learning model, click **Actions**, and click **Inspect**.
3. Click **Details** and confirm that the **Model Info** section is expanded. Go to the **DB Model Owner** field and record the database schema name.
4. Click **Related** and locate and record the name of the view. Click **Close**.
5. On the Home page, click **Create** and click **Dataset**.
6. Select the connection that contains the machine learning model and its views.
7. In the Dataset editor, browse for and click the database schema name that you located on the **Details** tab.
8. Select the view that you located on the **Related** tab, and double-click columns to add them to the dataset. Click **Add**.
9. Click **Create Workbook** to build visualizations.

Apply a Predictive or Registered Oracle Machine Learning Model to a Dataset

Use the data flow editor to score a predictive model on any dataset, or score a registered Oracle machine learning model on a dataset in its corresponding database.

Apply predictive models to your data to build machine learning Machine Learning (ML) and Artificial Intelligence (AI) into your applications without requiring ML or AI expertise.

Running the model outputs a new dataset with columns containing predicted values that you can use for analysis and visualization.

When you run a predictive model, the data is moved into and processed by Oracle Analytics. When you run a registered Oracle machine learning model, data isn't moved from the database into Oracle Analytics. Instead the model resides, is processed, and the output dataset is stored in the database.

In a data flow when using the **Apply Model** step:

- The registered models are displayed and are available for review and analyses. Unregistered models aren't displayed.
 - The available output columns are specific to the model type. For example, for numeric prediction, output columns include PredictedValue and PredictedConfidence, and for clustering, output columns include the clusterId.
 - The available parameters are specific to the model type. For example, if you use a clustering model for scoring, maximum null values is a parameter that you can provide for the scoring process. This parameter is used in the missing value imputation.
 - The model and the mapped input data types must match when you're working with an Oracle machine learning model. See View a Registered Model's Details.
1. On the Home page, click **Create**, and then click **Data Flow**.
 2. Select a dataset and click **Add**.
 3. In the Data Flow editor, click **Add a step (+)**.
 4. From the Data Flow Steps pane, double-click **Apply Model**, and then select the model to use.
 5. In Apply Model, go to the Inputs section, and then select a column as the input.
 6. In Apply Model, go to the Outputs section, and then select the columns that you want created with the dataset, and update the **Column Name** fields as needed.
 7. In the data flow editor, click **Add a step (+)** and select **Save Data**.
 8. Enter a name. In the **Save data to** field, specify the location for saving the output data.
If you're working with an Oracle machine learning model, then the dataset's connection information defaults to the input dataset's connection.
 9. Set data preferences as needed in the **Treat As** and **Default Aggregation** fields.
When you save data, the apply model appends the model's output columns that you selected to the input dataset.
 10. Click **Save**, enter a name and description for the data flow, and click **OK** to save the data flow.
 11. Click **Run Data Flow** to create the dataset.

Import, Export, and Share

This topic describes how to import, export, and share your workbooks, visualizations, and stories with other users.

Topics:

- [Import a Workbook File](#)
- [Export a Workbook or Folder as a File](#)
- [Share a Workbook URL with a Specific Canvas Selected](#)
- [Export a Visualization](#)
- [Export Formatted Data from a Visualization to Excel](#)
- [Export a Visualization's Data to a CSV File](#)
- [Email Workbooks and Folders](#)
- [Email a File of a Visualization, Canvas, or Dashboard](#)
- [Print a Visualization, Canvas, or Dashboard](#)

Import a Workbook File

You can import workbook files (.dva file) that are exported from Oracle Analytics Cloud, Oracle Analytics Desktop, and Oracle Fusion Cloud Applications Suite.

If the workbook file was exported with a password, Oracle Analytics asks for that password when you import the file.

The import includes the data used with the workbook file.



Note:

You can import a workbook file exported from the same version (or earlier version) as your Oracle Analytics environment. For example, if you exported a workbook from an Oracle Analytics environment that includes the May 2022 update, then you can import it into other Oracle Analytics environments that include the May 2022 update or a later update (such as July 2022).

However, you might experience unexpected results if you import a workbook that was exported from a more recent update of Oracle Analytics. For example, if you export a workbook from an Oracle Analytics environment that includes the September 2022 update, then Oracle doesn't recommend that you import this workbook into an Oracle Analytics environment that includes an earlier update, such as June 2022.

1. On the Home page, click the **Page Menu** icon, and then select **Import Workbook/Flow**.
2. In the Import Workbook/Flow dialog, click **Select File**, and then click **Import**.

After the import is successful, open the workbook. See [Edit a Data Source Connection](#).

Export a Workbook or Folder as a File

You can export a workbook or folder as an archive file (.DVA) for backup purposes or to provide to another user for import into their instance of Analytics Cloud or Oracle Analytics Desktop.

Exporting is a way to share workbooks and files with other users or move workbooks and files between Analytics Cloud and Oracle Analytics Desktop. The archive file is for export and import, and you can't open it with an application other than Analytics Cloud or Oracle Analytics Desktop.

The archive file includes items that you specify such as the associated datasets, connection strings, connection credentials, and stored data.

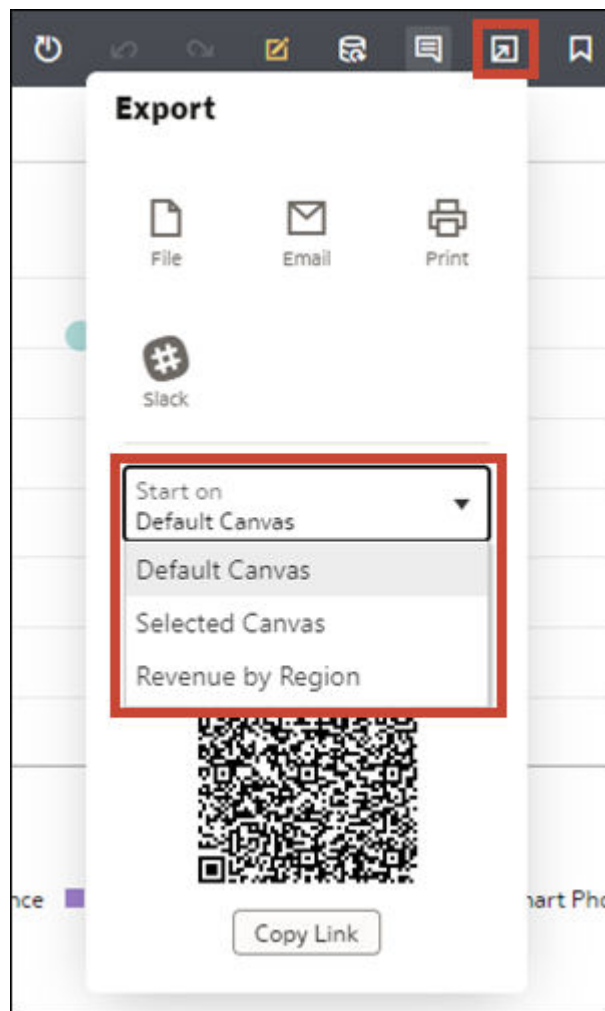
1. On the Home page, click **Navigator**, and then click **Catalog**.
2. In the Catalog page, select the item to share. Click **Actions**, and select **Export** to open the Export dialog.
3. Click **File**.
4. For **Name**, keep the default name or enter a new name for the export file (.DVA file).
5. Disable the **Include Data** option to exclude the data when sharing a workbook or folder.
6. Disable the **Include Connection Credentials** option so that users must sign in to open the workbook. Use the following guidelines to set this field:
 - **Excel, CSV, or TXT data sources** - These data sources don't use a data connection, therefore you can clear the **Include Connection Credentials** option.
 - **Database data sources** - If you enable the **Include Connection Credentials** option, the users must provide a valid user name and password to load data into the imported workbook.
 - - make sure that you also select the **Always use these credentials** option in the **Authentication** field on the Create Connection dialog.

If you clear the **Include Connection Credentials** option or specify the **Require users to enter their own credentials** option in the **Authentication** field, then users must provide a valid user name and password to load data into the imported workbook.
7. If you enable **Include Data** or **Include Connection Credentials**, enter and confirm a password that the user must provide to import the workbook or folder and decrypt its connection credentials and data.
8. Click **Save**. Select a location for the file, and then click **Save**.

Share a Workbook URL with a Specific Canvas Selected

You can create a URL that displays a specific workbook canvas and then share the URL so that other users can display the workbook canvas without having to use the user interface to navigate to the specific workbook canvas.

1. On the Home page, hover over the workbook containing the canvas that you want to share, click **Actions**, and select **Open**
2. On the Visualize or Present canvas, click the **Export** icon in the workbook toolbar.



3. From the **Start On** list, select a canvas.
 - Use **Default Canvas** to select the canvas that the workbook opens to based on how the workbook was saved.
 - Use **Selected Canvas** to select the canvas that you're currently viewing.
4. Click **Copy Link** and share the URL with other users.
5. Optional: Share the QR code to scan and open the workbook URL on a mobile device.

Export a Visualization

You can export visualizations in a variety of formats to view, store, and share with others.

You can specify the following output options when you export a visualization:

- For **Powerpoint (pptx)**, **Acrobat (pdf)**, and **Image (png)** — Specify the file name, paper size, and orientation.
When you share any of these visual formats, the visualization is re-rendered based on the size and orientation you select. So if you're sharing a table, then your output file might not contain all of the table's rows and columns displayed in your visualization.
- For **Data (csv)** — Specify the output file name. This option only includes the data used in the workbook. The output file uses the data delimiter for your computer's locale. For

example, if your locale is set to Brazil, then the delimiter for numeric decimals is a comma instead of a period, which is used when your locale is set to United States.

- For **Excel (xlsx)** — Specify the file name for tables and pivots.
 - For **Package (dva)** — Specify whether to include workbook data and connection credentials. To enable users to open the workbook DVA file without having to enter a password, click **Include Connection Credentials** and specify the password.
1. On the Home page, hover over a workbook containing the visualization that you want to export, click **Actions**, and select **Open**.
 2. Click **Edit** to display the workbook for editing.
 3. Go to the Visualize canvas and click the visualization that you want to export.
 4. In the visualization, click **Menu**, hover over **Export**, and then click **File**.
 5. In the **Format** field, select the output format you want and specify the output options.
 6. Click **Save**.

Export Formatted Data from a Visualization to Excel

You can export formatted data from table and pivot table visualizations to the Microsoft Excel (XLSX) format.

Filters applied to data in your workbook are also applied to data in the exported file. You can export a visualization with 25,000 rows or fewer.

1. On the Home page, select a workbook containing the table or pivot table visualization you want to export, click **Actions**, and select **Open**.
2. In the visualization canvas, right-click the table or pivot table visualization that you want to export data for.
3. Select **Export**, and then select **File**.
4. In the File dialog, go to the **Format** field and select **Excel**.
5. Click **Save**.
6. Select a location in your local file system to save the Excel file.
7. Click **Save**.

Export a Visualization's Data to a CSV File

You can export the data from a visualization to a CSV file. This allows you to open the file and work with the data in an application such as Excel.

1. Open the workbook that contains the visualization that you want to export data for.
2. In the Visualize or Present canvas, click the visualization that you want to export data for to select it.
3. Go to the workbook toolbar, and then click **Export**.
4. In the File dialog, go to the **Format** field and select Data (csv).
5. Click **Save**.

The exported file uses the data delimiter for your computer's locale. For example, if your locale is set to Brazil, then the delimiter for numeric decimals is a comma.

Email Workbooks and Folders

You can email the .DVA file of a workbook or folder to other users.

Selecting the option to email a workbook or folder initiates an export process that produces a .DVA file. The .DVA file includes everything needed to use the workbook or folder (such as associated datasets, the connection string and credentials, and stored data)

1. On the Home page, click **Navigator**, and then click **Catalog**.
2. On the Catalog page select the workbook or folder that you want to share and click **Actions menu**, then select **Export** to open the Export dialog.
3. Click **Email** to open the Email dialog.
4. Enable the **Include Data** option if you're sharing a workbook or folder that uses an Excel data source and you want to include the data with the export.
5. Enable the **Connection Credentials** option if retrieving the data requires connection credentials. Then enter and confirm the password.

If your workbook or folder includes data from Oracle Applications or a database and you've selected the **Include Data** option, then enter a password to send to the database for authentication when the user opens the application to access the data. Disable the **Include Data** option if you want users to enter the password when they open the application to access the data.

6. Click **Email**.

Your email client opens a new partially composed email with the .DVA file attached.

Email a File of a Visualization, Canvas, or Dashboard

You can email visualizations, canvases, or dashboards in formats like Powerpoint (PPTX), Acrobat (PDF), Image (PNG), CSV (data only), or Package (the whole workbook including connection credentials).

1. On the Home page, hover over a workbook containing the visualization, canvas, or dashboard to export, click **Actions**, and select **Open**.
2. On the Visualize or Present canvas, click the **Export** icon on the workbook toolbar, then click **Email**.
3. Use the **Format** option to select the output format you want, and specify output options:
 - For **Powerpoint (pptx)**, **Acrobat (pdf)**, and **Image (png)** - Specify the file name, paper size, and orientation.
When you email any of these visual formats, the visualization or pages are re-rendered based on the size and orientation you select. So if you're emailing a table, then your output file might not contain all of the table's rows and columns included in your visualization, canvas, or dashboard.
 - For **Data (csv)** - Specify the output file name. This option only includes the data used in the workbook. The outputted file uses the data delimiter for your computer's locale. For example, if your locale is set to Brazil, then the delimiter for numeric decimals is a comma instead of a period, which is used when your locale is set to United States.
 - For **Package (dva)** - Specify whether to include workbook data, connection credentials,). To enable users to open the workbook DVA file without having to enter a password, click **Include Connection Credentials** and specify the password.

4. Click **Email**.

Your email client opens a new partially composed email with the .DVA file attached.

Print a Visualization, Canvas, or Dashboard

You can print your workbook's visualizations, canvases, or dashboards.

When you print, the visualization or pages are re-rendered based on the size and orientation you selected. So if you're printing a table, then your printed copy might not contain all of the table's rows and columns included in your visualization, canvas, or dashboard.

1. On the Home page, hover over a workbook containing the visualization, canvas, or dashboard to print, click **Actions**, and select **Open**.
2. On the Visualize or Present canvas, click **Menu**, and **Export**, and then click **Print**.
3. Specify a name, and select an option from the include list.
 - **Name** - You can update the name if needed.
 - **Include** - You can select to print the Active Visual, Active Canvas, or All Canvases. You can also click **Include Filters** (if there are filters), and **Include Title** to include them in the printed output.
 - **Size** - You can use the **Custom** setting (the default size) to print using the height and width displayed on your screen, and optionally select **Scale Proportionally**, or you can select a different size option (for example, US Letter, A4).
 - **Orientation** - You can select whether to print in Landscape or Portrait format.
4. Optional: If filters are in the visualization, workbook, or dashboard, and you want to include them, click **Include Filters**.
5. Optional: If you want to include the title, click **Include Title**.
6. Optional: From the **Size** list, select the paper to use. When using **Custom**, specify the width and height in inches (in), pixels (px), or millimeters (mm).
7. Optional: Select the print format orientation.
8. Click **Print**.

A

Frequently Asked Questions

This reference provides answers to frequently asked questions for Oracle Analytics Desktop.

Topics:

- [Oracle Analytics Desktop Installation FAQs](#)
- [Oracle Analytics Desktop Workbook and Data Source FAQs](#)
- [Oracle Analytics Desktop Printing and Exporting FAQs](#)

Oracle Analytics Desktop Installation FAQs

This topic answers common installation questions.

How do I install Machine Learning and Advanced Analytics?

Machine learning and advanced analytics are optional components that aren't included in the Oracle Analytics Desktop installation. You must install machine learning to use Diagnostics Analytics (Explain), Machine Learning Studio, or advanced analytics.

See [Install Machine Learning and Advanced Analytics on Windows](#) and [Install Machine Learning and Advanced Analytics on Mac](#).

Why can't I install Oracle Analytics Desktop?

To perform the installation, you must have administrator privileges. If you try to install without administrator privileges, the following error message is displayed: `Error in creating registry key. Permission denied.`

To check to see if you've the required administrator privileges, go to Windows Control Panel and check your user accounts. If you don't have administrator privileges, then see your administrator to help you set up the required privileges.

Why can't I successfully upgrade?

If you have issues upgrading, then delete the existing installation and try to the installation again.

How will I know when to upgrade?

You'll see a message when an update is available. The message will guide you to Oracle Technology Network where you can download the latest installer. See [Oracle Analytics Desktop Installation Download](#).

Oracle Analytics Desktop Workbook and Data Source FAQs

This topic answers common questions about workbooks and data sources.

What data sources are supported?

You can use data only from specific types and versions of sources. See [Supported Data Sources](#).

What if I'm using an unsupported version of Teradata?

If you're using an unsupported version of Teradata, then you must update the `extdriver.paths` configuration file before you can successfully build a connection to Teradata. This configuration file is located here: `C:\<your directory>\AppData\Local\OracleAnalyticsDesktop\extdrvier.paths`. For example, `C:\Users\jsmith\AppData\Local\OracleAnalyticsDesktop\extdriver.paths`.

When updating the `extdriver.paths` configuration file, remove the default Teradata version number and replace it with the Teradata version number that you're using. Make sure that you include `\bin` in the path. For example if you're using Teradata 14.10, change `C:\Program Files\Teradata\Client\15.10\bin` to `C:\Program Files\Teradata\Client\14.10\bin`.

What's the maximum number of column values that display when I use a parameter as a filter?

The maximum number of column values that display when you use a parameter as a filter is 10,000. This is because parameters have a limit of 10,000 available values that can be cached. Additionally, parameters are limited to 1,000 initial values.

Oracle Analytics Desktop Printing and Exporting FAQs

This topic answers common questions about printing and exporting.

Why don't I see images in workbooks or from background maps when I print pages or when I export images in formats such as PDF, PPT, and PNG?

You or a visualization builder might have added an image to a workbook or background map by referencing that image with a URL. For the image to print or be exported in various formats, the external website hosting that image must have the `Access-Control-Allow-Origin` header from the host server, to ensure proper security. If a map background includes an image reference that's taken from an external website that doesn't have this header, you won't see the image.

For more information about this header, see https://www.w3.org/wiki/CORS_Enabled.

B

Troubleshoot Visualization Issues

This topic describes common problems that you might encounter when working with visualizations and explains how to solve them.

When I import a workbook, I get an error stating that the workbook, data source, or connection already exists

When you're trying to import a workbook, you might receive the following error message:

"There is already a workbook, data source or connection with the same name as something you're trying to import. Do you want to continue the import and replace the existing content?"

This error message is displayed because one or more of the components exported with the workbook is already on your system. When a workbook is exported, the outputted .DVA file includes the workbook's associated data sources and connection string. To resolve this error, you can either click **OK** to replace the components on your system, or you can click **Cancel** and go into your system and manually delete the components.

This error message is also displayed when the workbook you're trying to import contains no data. When you export a workbook without data, the workbook's and data sources' metadata are included in the .DVA. To resolve this issue, you can click **OK** to replace the components on your system, or you can click **Cancel** and go into your system and manually delete the data source or connection that's causing the error.

When I try to build a connection to Teradata, I get an error and the connection is not saved

When you're trying to create a connection to Teradata, you might receive the following error message:

"Failed to save the connection. Cannot create a connection since there are some errors. Please fix them and try again."

This error message is displayed because the version of Teradata that you're using is different from the version supported by Oracle Analytics Desktop. To resolve this issue, update the `extdriver.paths` configuration file. This configuration file is located here: `C:\<your directory>\AppData\Local\OracleAnalyticsDesktop\extdrvier.paths`. For example,
`C:\Users\jsmith\AppData\Local\OracleAnalyticsDesktop\extdriver.paths`.

To update the `extdriver.paths` configuration file, remove the default Teradata version number and replace it with the Teradata version number that you're using. Make sure that you include `\bin` in the path. For example if you're using Teradata 14.10, then change `C:\Program Files\Teradata\Client\15.10\bin` to `C:\Program Files\Teradata\Client\14.10\bin`. See [What if I'm using a Teradata version different that the one supported by Oracle Analytics Desktop?](#)

I have issues when I try to refresh data for file-based data sources

Keep in mind the following requirements when you refresh data for Microsoft Excel, CSV, or TXT data sources:

- To refresh an Excel file, ensure that the newer spreadsheet file contains a sheet with the same name as the original file you uploaded. If a sheet is missing, then you must fix the file to match the sheets in the original uploaded file.
- If the Excel, CSV, or TXT file that you reload is missing some columns, then you'll get an error stating that your data reload has failed. If this happens, then you must fix the file to match the columns in the original uploaded file.
- If the Excel, CSV, or TXT file you used to create the data source was moved or deleted, then the connection path is crossed out in the Data Source dialog. You can reconnect the data source to its original source file, or connect it to a replacement file, by right-clicking the data source in the Display pane and in the Options menu select **Reload Data**. You can then browse for and select the file to load.
- If you reloaded an Excel, CSV, or TXT file with new columns, then the new columns are marked as hidden and don't display in the Data Panel for existing workbooks using the dataset. To unhide these columns, click the **Hidden** option.

Your Excel spreadsheets must have a specific structure. See [About Files for Datasets](#).

I can't refresh data from a MongoDB data source

The first time you connect to MongoDB, the MongoDB driver creates a cache file. If the MongoDB schema was renamed and you try to reload a MongoDB data source or use the data source in a workbook, then you might get an error or Oracle Analytics doesn't respond.

To correct this error, you need to clear the MongoDB cache. To clear the cache, delete the contents of the following directory: `C:\<your`

`directory>\AppData\Local\Progress\DataDirect\MongoDB_Schema`. For example, `C:\Users\jsmith\AppData\Local\Progress\DataDirect\MongoDB_Schema`

Where can I find files to help me diagnose a technical issue?

You can generate a diagnostic dump file to help resolve a specific issue. This file contains the following information:

- Update information
 - Installer logs
 - Application component logs containing status information for Oracle Business Intelligence Presentation Server, Oracle Business Intelligence Server, and other critical components
 - Jetty logs
 - Data Security Standard (DSS) logs
 - Webcat metadata plugin logs
 - Derby logs
 - Server Administration Workbench (SAW) Server logs
 - Oracle Business Intelligence Presentation Server logs
 - Oracle Business Intelligence Server logs
1. Open the command prompt and change the directory to the Oracle Analytics Desktop installation directory (for example, `C:\Program Files\Oracle Analytics Desktop`).
 2. Type `diagnostic_dump.cmd` and then provide a name for the .zip output file (for example, `output.zip`).
 3. Press Enter to execute the command.
You can find the diagnostic output .zip file in your installation directory.

I need to find more information about a specific issue

The community forum is another great resource that you can use to find out more information about the problem you're having.

You can find the forum here: [Oracle Community Forum](#).

C

Accessibility Features and Tips

This topic describes accessibility features and information for Oracle Analytics Desktop.

Topics:

- [Start Oracle Analytics Desktop with Accessibility Features Enabled](#)
- [Keyboard Shortcuts for Visualizations](#)
- [Keyboard Shortcuts for Data Flow](#)

Start Oracle Analytics Desktop with Accessibility Features Enabled

You can enable features that improve navigation and make the interface accessible.

To enable the accessibility features, you must start Oracle Analytics Desktop from the command line. Open a command window and enter the following:

On Windows:

```
dvdesktop.exe - sdk
```

On Mac:

```
open /Applications/dvdesktop.app --args -sdk
```

When you run the command, Oracle Analytics Desktop opens in a web browser.

Keyboard Shortcuts for Visualizations

You can use keyboard shortcuts to navigate and to perform actions in visualizations.

Use these keyboard shortcuts for working in the Visualize canvas.

Task	Keyboard Shortcut
Display the context menu. From the context menu, you can access the Export File option, and add columns to a workbook.	Shift+F10
Print content.	Ctrl+P (Windows) Command+Shift+P (Mac)
Reverse the last undo.	Ctrl+Y
Save a newly created workbook with a specific name.	Ctrl+Shift+S
Save a workbook with the changes.	Ctrl+S
Undo the last change.	Ctrl+Z

Use these keyboard shortcuts for working in tables and pivot tables in the Visualize canvas.

Information for screen reader users: Table and pivot table visualizations are interactive data grids. These data visualizations are not static table views, and therefore screen readers won't recognize these visualizations as table objects.

Task	Keyboard Shortcut
Display context menu.	SHIFT+F10
Move accessibility focus to the cell to the left.	Left Arrow
Move accessibility focus to the cell to the right.	Right Arrow
Move focus to first row.	HOME
Move focus to last row.	END
Move focus to the column header.	CTRL+Up Arrow
Move focus to the next row.	Down Arrow
Move focus to the previous row. If at the first data row then move to the column header.	Up Arrow
Move the focus in a table. The first Shift+Tab into the Table moves focus to the first column header. The second Shift+Tab moves focus to the previous focusable element outside of the Table data visualization.	SHIFT+TAB
Move the focus in a table or pivot table. The first Tab into the Table or Pivot Table moves focus to the first column header. The second Tab moves focus to the next focusable element outside of the Table data visualization.	TAB
Select and move focus to the next row or data cell.	SHIFT+Down Arrow
Select and move focus to the previous row.	SHIFT+Up Arrow

Use these keyboard shortcuts while working on a visualization in the Visualize canvas.

Task	Keyboard Shortcut
Copy a visualization to paste it to another canvas in the workbook or to a canvas in another workbook.	Ctrl+C
Delete a visualization.	Delete key
Duplicate a visualization.	Ctrl+D
Paste the visualization into a canvas in the workbook or into a canvas in another workbook.	Ctrl+V

Use these keyboard shortcuts while working with a filter in the filter panel on the filter bar.

Task	Keyboard Shortcut
Add the search string to the selection list.	Ctrl+Enter

Use these keyboard shortcuts when you want to open, create, or edit artifacts such as datasets, workbooks, data flows, and sequences in a new tab or window.

Task	Keyboard Shortcut
Open an artifact in a new browser tab.	Ctrl+Click the artifact
Open an artifact in a new browser window.	Shift+Click the artifact

Use these keyboard shortcuts for working in the Grammar Panel.

Task	Keyboard Shortcut
Copy	Ctrl/Cmd+C

Task	Keyboard Shortcut
Cut	Ctrl/Cmd+X
Navigate backwards	Shift+tab
Navigate forwards	Tab
Paste	Ctrl/Cmd+V

Keyboard Shortcuts for Data Flow

Use these keyboard shortcuts to perform actions in the data flow editor.

Task	Keyboard Shortcut
Undo the last change.	Ctrl + Z / Command + Z
Reverse the last undo.	Ctrl + Y / Command + Y

D

Data Sources and Data Types Reference

Find out about supported data sources, databases, and data types.

Topics

- [Supported Data Sources](#)
- [About the Oracle Applications Connector](#)
- [Certification - Supported Data Types](#)

Supported Data Sources

With Oracle Analytics Desktop, you can connect to many different data sources. Data sources are sorted alphabetically by Oracle databases first, then other databases.

Data Source/ Connection Type	Version	Oracle Analytics Desktop for Windows	Oracle Analytics Desktop for Mac	More Information
Oracle Applications	Use the Oracle Applications connection type to connect to Oracle Fusion Cloud Applications Suite and on-premises Oracle BI Enterprise Edition deployments.	Yes	Yes	Connector supports several Oracle SaaS Applications. See About the Oracle Applications Connector . See also Connect to an Application in Oracle Fusion Cloud Applications Suite .

Data Source/ Connection Type	Version	Oracle Analytics Desktop for Windows	Oracle Analytics Desktop for Mac	More Information
Oracle Autonomous Data Warehouse	19c and later.	Yes	Yes	Connection to public IP address only. You can connect to multiple Oracle Autonomous Data Warehouse data sources. Upload a wallet for each connection. Supports saving output from data flows. See Connect to Oracle Autonomous Data Warehouse . As an alternative, you can also connect to Oracle Autonomous Data Warehouse using Delta Sharing. Use the Delta Share connection type. See Connect to a Database Using Delta Sharing.
Oracle Database	12.1+ 12.2+ 18+ 19+	Yes	Yes	Use the Oracle Database connection type to connect to Oracle Database Classic Cloud Service. You can connect to multiple database services. Upload a wallet for each connection. Supports saving output from data flows. Ensure that the appropriate security access rules are in place to allow a network connection to the database service on the database listening port. See Connect to an Oracle Database.
Oracle Essbase	11.1.2.4.0+ 21c	Yes	Yes	See Create a Connection to Oracle Essbase. You can't use Oracle Essbase datasets in Data Flows. You can't blend datasets that use Oracle Essbase data sources.
Oracle Netsuite	Netsuite Release 2019.2 (JDBC Driver 8.10.85.0)	Yes	Yes	-
Oracle Fusion Cloud B2C Service	1.2	Yes	No	-
Oracle Talent Acquisition	15b.9.3+, 17.4+	Yes	Yes	-
Action Ingres	5.0+	Yes	No	-
Action Matrix	5.0+	Yes	No	-
Action Vector	5.0+	Yes	No	-
Amazon Aurora	-	Yes	No	-

Data Source/ Connection Type	Version	Oracle Analytics Desktop for Windows	Oracle Analytics Desktop for Mac	More Information
Amazon EMR	Amazon EMR 4.7.2 running Amazon Hadoop 2.7.2 and Hive 1.0.0 Amazon EMR (MapR) - Amazon Machine Image (AMI) 3.3.2 running MapR Hadoop M3 and Hive 0.13.1	Yes	No	Complex data types not supported.
Amazon Redshift	1.0.1036 +	Yes	No	-
Apache Drill	1.7+	Yes	No	-
Apache Hive	2.3.0+ 3.0+	Yes	No	Supports Kerberos. Supports saving output from data flows.
Cassandra	3.10	Yes	No	-
Centrica	TBD	Yes	Yes	-
CSV File	-	Yes	Yes	-
DB2	11.5+	Yes	No	-
DataBricks	Not applicable	Yes	No	Use the Delta Share connection type. See Connect to a Database Using Delta Sharing .
Delta Share	Not applicable	Yes	No	See Connect to a Database Using Delta Sharing .
DropBox	-	Yes	No	-
Elastic Search	5.6.4+	Yes	-	-
Google Analytics	Universal Analytics, Google Analytics V4	Yes	No	-
Google Universal Analytics (Legacy)	Universal Analytics	Yes	No	-
Google Cloud	-	Yes	No	-
Google Drive	-	Yes	No	-
GreenPlum	4.3.8+	Yes	No	-
Heatwave	8.0.31+	Yes	No	-

Data Source/ Connection Type	Version	Oracle Analytics Desktop for Windows	Oracle Analytics Desktop for Mac	More Information
HortonWorks Hive	1.2+	Yes	No	Supports Kerberos. Supports saving output from data flows.
HP Vertica	9.x, 12.x	Yes	No	-
IBM BigInsights Hive	1.2+	Yes	No	Supports Kerberos.
Impala	2.7+	Yes	No	
Informix	12.10+	Yes	No	-
JDBC	Generic JDBC driver support	Yes	No	See Connect to Data Using JDBC .
MapR Hive	1.2+	-	-	Supports Kerberos. Supports saving output from data flows.
Microsoft Access	2013 2016	Yes	No	-
Microsoft Azure SQL Database	-	Yes*	TBD	* Use the SQL Server connection type on the Create Connection page.
Microsoft Azure Synapse Analytics	-	Yes	Yes	-
Microsoft Excel	-	Yes	Yes	Only XLSX files (and XLS with unpivoted data).
MonetDB	5+	Yes	No	-
MongoDB	3.2.5	Yes	No	-
MySQL	5.6+ 5.7+ 8.0+	Yes	No	Connections to MySQL Community Edition aren't supported.
MySQL Heatwave	8.0.31+Not e: (Cloud offering – current latest cloud version supported)	Yes	Yes	-
Netezza	7	Yes	No	-
OData	4.0+	Yes	No	-
ODBC	Generic ODBC driver support	-	-	-
Pivotal HD Hive	-	Yes	No	Supports Kerberos.
PostgreSQL	9.0+	Yes	No	-
Presto	-	Yes	No	-
Salesforce	-	Yes	No	-
Snowflake Data Warehouse	Current version	Yes	Yes	See Connect to Snowflake Data Warehouse .

Data Source/ Connection Type	Version	Oracle Analytics Desktop for Windows	Oracle Analytics Desktop for Mac	More Information
Spark	1.6+ 3.0	Yes	No	Supports saving output from data flows.
SQL Server	2014, 2016, 2017, 2019	Yes	No	-
Sybase ASE	15.7+	Yes	No	-
Sybase IQ	16+	Yes	No	-
Teradata	16.20, 17.x	Yes	No	-
Teradata Aster	6.10+	Yes	No	-
Vertica	9.x, 12.x	Yes	No	-

About the Oracle Applications Connector

The "Oracle Applications" connection type () enables you to use Oracle Analytics to visualize data from applications in Oracle Fusion Cloud Applications Suite. For example, Oracle Fusion Cloud Financials. You can also use the "Oracle Applications" connection type to connect to your on-premises Oracle BI Enterprise Edition deployments (if patched to an appropriate level) or connect to another Oracle Analytics service.

You can connect to these applications in Fusion Applications Suite:

- Oracle Fusion Cloud Financials
- Oracle Fusion Cloud Human Capital Management
- Oracle Fusion Cloud Loyalty
- Oracle Fusion Cloud Procurement
- Oracle Fusion Cloud Project
- Oracle Fusion Cloud Supply Chain Planning
- Oracle Sales Automation



Note:

When you connect to applications in Fusion Applications Suite, you access the data from an Oracle Transactional Business Intelligence report. These reports are subject to caching in Oracle Transactional Business Intelligence, and the data available in Oracle Analytics is based on the cached data. You can't control the cache behavior in Oracle Transactional Business Intelligence from Oracle Analytics.

Certification - Supported Data Types

Here're the supported data types for Oracle Analytics.

Topics:

- [Supported Base Data Types](#)
- [Supported Data Types by Database](#)

Supported Base Data Types

When reading from a data source, Oracle Analytics attempts to map incoming data types to the supported data types.

For example, a database column that contains only date values is formatted as a DATE, a spreadsheet column that contains a mix of numerical and string values is formatted as a VARCHAR, and a data column that contains numerical data with fractional values uses DOUBLE or FLOAT.

In some cases Oracle Analytics can't convert a source data type. To work around this data type issue, you can manually convert a data column to a supported type by entering SQL commands. In other cases, Oracle Analytics can't represent binary and complex data types such as BLOB, JSON, and XML.

Note that some data types aren't supported. You'll see an error message if the data source contains unsupported data types.

Oracle Analytics supports the following base data types:

- **Number Types** — SMALLINT, SMALLUNIT, TINYINT, TINYUINT, UINT, BIT, FLOAT, INT, NUMERIC, DOUBLE
- **Date Types** — DATE, DATETIME, TIMESTAMP, TIME
- **String Types** — LONGVARCHAR, CHAR, VARCHAR

Supported Data Types by Database

Oracle Analytics supports the following data types.

Database Type	Supported Data Types
Oracle	BINARY DOUBLE, BINARY FLOAT CHAR, NCHAR CLOB, NCLOB DATE FLOAT NUMBER, NUMBER (p,s), NVARCHAR2, VARCHAR2 ROWID TIMESTAMP, TIMESTAMP WITH LOCAL TIMEZONE, TIMESTAMP WITH TIMEZONE

Database Type	Supported Data Types
DB2	BIGINT CHAR, CLOB DATE, DECFLOAT, DECIMAL, DOUBLE FLOAT INTEGER LONGVAR NUMERIC REAL SMALLINT TIME, TIMESTAMP VARCHAR
SQL Server	BIGINT, BIT CHAR DATE, DATETIME, DATETIME2, DATETIMEOFFSET, DECIMAL FLOAT INT MONEY NCHAR, NTEXT, NUMERIC, NVARCHAR, NVARCHAR(MAX) REAL SMALLDATETIME, SMALLINT, SMALLMONEY TEXT, TIME, TINYINT VARCHAR, VARCHAR(MAX) XML
MySQL	BIGINT, BIGINT UNSIGNED CHAR DATE, DATETIME, DECIMAL, DECIMAL UNSIGNED, DOUBLE, DOUBLE UNSIGNED FLOAT, FLOAT UNSIGNED INTEGER, INTEGER UNSIGNED LONGTEXT MEDIUMINT, MEDIUMINT UNSIGNED, MEDIUMTEXT SMALLINT, SMALLINT UNSIGNED TEXT, TIME, TIMESTAMP, TINYINT, TINYINT UNSIGNED, TINYTEXT VARCHAR YEAR
Apache Spark	BIGINT, BOOLEAN DATE, DECIMAL, DOUBLE FLOAT INT SMALLINT, STRING TIMESTAMP, TINYINT VARCHAR

Database Type	Supported Data Types

Teradata	BIGINT, BYTE, BYTEINT CHAR, CLOB DATE, DECIMAL, DOUBLE FLOAT INTEGER NUMERIC REAL SMALLINT TIME, TIMESTAMP VARCHAR

Data Preparation Reference

This topic describes the set and types of recommendation and options you can use to perform data transform changes to a dataset.

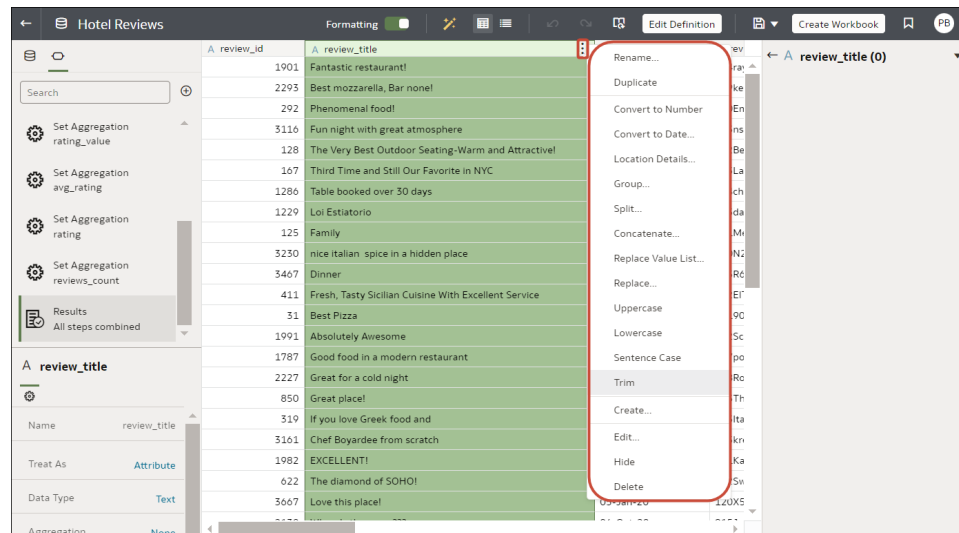
Topics:

- [Transform Reference](#)
- [Column Menu Options for Quick Data Transformations](#)

Transform Reference

Find out about the data transform options that you can access in the transform editor. For example, to categorize racing lap times in a dataset column, you might use the **Bin** option.

To select transform options in the transform editor, open your dataset, then click **Options** (the ellipsis top-right of the data column ) , and select an option (for example, **Bin**, **Rename** or **Convert to Text**).



Option	Description
Bin	Create your own custom groups for number ranges. For example, you can create bins for an Age column with age ranges binned into Pre-Teen, Young Adult, Adult, or Senior based on custom requirements.
Calculate Duration	Calculate the duration between two dates or times. For example, to analyze order delivery times, you might calculate the number of days between ORDER_DATE and DELIVERY_DATE.
Convert to Date	Change the data type of the column to date and deletes any values that aren't dates from the column.

Option	Description
Convert to Number	Change the data type of the column to number, which deletes any values that aren't numbers from the column.
Convert to Text	Change the data type of a column to text.
Create	Create a column based on a function.
Duplicate	Create a column with identical content of the selected column.
Edit	Change the column details. For example, you can change the name, select another column, or update functions.
Extract Date	Extract a range of date and time information from timestamps. For example, you might extract Year as 2024, Day of the Month as 23, or Hour of the Day as 03 PM.
Group, Conditional Group	Select Group to create your own custom groups. For example, you can group States together with custom regions, and you can categorize dollar amounts into groups indicating small, medium, and large.
Hide	Hide the column in the Data Panel and in the visualizations. If you want to see the hidden columns, click Hidden columns (ghost icon) on the page footer. You can then unhide individual columns or unhide all the hidden columns at the same time.
Log	Calculate the natural logarithm of an expression.
Lowercase	Update the contents of a column with the values all in lowercase letters.
Power	Raise the values of a column to the power that you specify. The default power is 2.
Rename	Change the name of a column.
Replace	Change specific text in the selected column to any value that you specify. For example, you can change all instances of <i>Mister</i> to <i>Mr.</i>
Sentence Case	Update the contents of a column to make the first letter of the first word of a sentence uppercase.
Split	Split a column value into parts. For example, you can split a column called, Name, into first name and last name.
Square Root	Create a column populated with the square root of the value in the column selected.
Uppercase	Update the contents of a column with the values in all uppercase letters.

Column Menu Options for Quick Data Transformations

In the transform editor, column options enable you to quickly transform your data. For example, to categorize racing lap times in a dataset column, you might right-click the 'Lap Time' column and select **Bin**.

Options	Description
Bin	Create your custom groups for number ranges.
Convert to Number	Change the data type of the column to number and delete any values that aren't numbers.
Convert to Text	Change the data type of a column to text.
Delete	Select and remove a column from the dataset.
Duplicate	Create a column with data that's identical to the selected column.
Group	Create a custom group to combine related values. For example, you can group states with custom regions and categorize dollar amounts into groups showing small, medium, and large.
Lowercase	Convert all the text in the column to lowercase.
Merge Columns	Combine two or more columns to display as one.
Rename	Change the column name.
Sentence Case	Convert the first letter of the first word to uppercase on each row in a column.

Options	Description
Transform	Modify the column data by using an expression.
Trim	Remove leading and trailing spaces from text data. Oracle Analytics doesn't show leading or trailing spaces in the data preview, but if the original data source contained leading or trailing spaces, this can affect queries.
Uppercase	Convert all the text in the column to uppercase.

F

Expression Editor Reference

This section describes the expression elements that you can use in the Expression Editor.

Topics:

- [SQL Operators](#)
- [Conditional Expressions](#)
- [Functions](#)
- [Constants](#)
- [Types](#)

SQL Operators

You use SQL operators to specify comparisons and arithmetic operations between expressions.

You can use various types of SQL operators.

Operator	Example	Description	Syntax
BETWEEN	"COSTS"."UNIT_COST" BETWEEN 100.0 AND 5000.0	Determines if a value is between two non-inclusive bounds. BETWEEN can be preceded with NOT to negate the condition.	BETWEEN [LowerBound] AND [UpperBound]
IN	"COSTS"."UNIT_COST" IN (200, 600, 'A')	Determines if a value is present in a set of values.	IN ([Comma Separated List])
IS NULL	"PRODUCTS"."PRODUCT_NAME" IS NULL	Determines if a value is null.	IS NULL
LIKE	"PRODUCTS"."PRODUCT_NAME" LIKE 'prod%'	Determines if a value matches all or part of a string. Often used with wildcard characters to indicate any character string match of zero or more characters (%) or any single character match (_).	LIKE
+	(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE	Plus sign for addition.	+
-	(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE	Minus sign for subtraction.	-

Operator	Example	Description	Syntax
* or X	SUPPORT_SERVICE S_EXPENDITURE * 1.5	Multiply sign for multiplication.	* X
/	CAPITAL_OUTLAY_ EXPENDITURE/ 1.05	Divide by sign for division.	/
%		Percentage	%
	STATE CAST(YEAR AS CHAR(4))	Character string concatenation.	
(	(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE	Open parenthesis.	(
)	(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE	Close parenthesis.	)
>	YEAR > 2000 and YEAR < 2016 and YEAR <> 2013	Greater than sign, indicating values higher than the comparison.	>
<	YEAR > 2000 and YEAR < 2016 and YEAR <> 2013	Less than sign, indicating values lower than the comparison.	<
=		Equal sign, indicating the same value.	=
>=		Greater than or equal to sign, indicating values the same or higher than the comparison.	>=
<=		Less than or equal to sign, indicating values the same or lower than the comparison.	<=
<>	YEAR > 2000 and YEAR < 2016 and YEAR <> 2013	Not equal to, indicating values higher or lower, but different.	<>
,	STATE in ('ALABAMA', 'CALIFORNIA')	Comma, used to separate elements in a list.	,

Functions

There are various types of functions that you can use in expressions.

Topics:

- [Aggregate Functions](#)
- [Analytics Functions](#)
- [Conversion Functions](#)
- [Date and Time Functions](#)
- [Date Extraction Functions](#)
- [Display Functions](#)
- [Evaluate Functions](#)
- [Mathematical Functions](#)
- [Running Aggregate Functions](#)
- [String Functions](#)
- [System Functions](#)
- [Time Series Functions](#)

Aggregate Functions

Aggregate functions perform operations on multiple values to create summary results.

The following list describes the aggregation rules that are available for columns and measure columns. The list also includes functions that you can use when creating calculated items for analyses.

- **Default** — Applies the default aggregation rule as in the semantic model or by the original author of the analysis. Not available for calculated items in analyses.
- **Server Determined** — Applies the aggregation rule that's determined by the Oracle Analytics (such as the rule that is defined in the semantic model). The aggregation is performed within Oracle Analytics for simple rules such as Sum, Min, and Max. Not available for measure columns in the Layout pane or for calculated items in analyses.
- **Sum** — Calculates the sum obtained by adding up all values in the result set. Use this for items that have numeric values.
- **Min** — Calculates the minimum value (lowest numeric value) of the rows in the result set. Use this for items that have numeric values.
- **Max** — Calculates the maximum value (highest numeric value) of the rows in the result set. Use this for items that have numeric values.
- **Average** — Calculates the average (mean) value of an item in the result set. Use this for items that have numeric values. Averages on tables and pivot tables are rounded to the nearest whole number.
- **First** — In the result set, selects the first occurrence of the item for measures. For calculated items, selects the first member according to the display in the Selected list. Not available in the Edit Column Formula dialog box.

- **Last** — In the result set, selects the last occurrence of the item. For calculated items, selects the last member according to the display in the Selected list. Not available in the Edit Column Formula dialog box.
- **Count** — Calculates the number of rows in the result set that have a non-null value for the item. The item is typically a column name, in which case the number of rows with non-null values for that column are returned.
- **Count Distinct** — Adds distinct processing to the Count function, which means that each distinct occurrence of the item is counted only once.
- **None** — Applies no aggregation. Not available for calculated items in analyses.
- **Report-Based Total (when applicable)** — If not selected, specifies that the Oracle Analytics should calculate the total based on the entire result set, before applying any filters to the measures. Not available in the Edit Column Formula dialog box or for calculated items in analyses. Only available for attribute columns.

Function	Example	Description	Syntax
AGGREGATE AT	AGGREGATE (sales AT year)	Aggregates columns based on the level or levels in the data model hierarchy you specify. • <i>measure</i> is the name of a measure column. • <i>level</i> is the level at which you want to aggregate. You can optionally specify more than one level. You can't specify a level from a dimension that contains levels that are being used as the measure level for the measure you specified in the first argument. For example, you can't write the function as AGGREGATE (yearly_sales AT month) if <i>month</i> is from the same time dimension used as the measure level for <i>yearly_sales</i>.	AGGREGATE (measure AT level [, level1, levelN])
AGGREGATE BY	AGGREGATE (sales BY month, region)	Aggregates a measure based on one or more dimension columns. • <i>measure</i> is the name of a measure column to aggregate. • <i>column</i> is the dimension column at which you want to aggregate. You can aggregate measures based more than one column.	AGGREGATE (measure BY column [, column1, columnN])
AVG	Avg (Sales)	Calculates the average (mean) of a numeric set of values.	AVG (expr)
AVGDISTINCT		Calculates the average (mean) of all distinct values of an expression.	AVG (DISTINCT expr)

Function	Example	Description	Syntax
BIN	<code>BIN(revenue BY productid, year WHERE productid > 2 INTO 4 BINS RETURNING RANGE_LOW)</code>	Classifies a given numeric expression into a specified number of equal width buckets. The function can return either the bin number or one of the two end points of the bin interval. <i>numeric_expr</i> is the measure or numeric attribute to bin. <i>BY grain_expr1,..., grain_exprN</i> is a list of expressions that define the grain at which the <i>numeric_expr</i> is calculated. <i>BY</i> is required for measure expressions and is optional for attribute expressions. <i>WHERE</i> a filter to apply to the <i>numeric_expr</i> before the numeric values are assigned to bins <i>INTO number_of_bins BINS</i> is the number of bins to return <i>BETWEEN min_value AND max_value</i> is the min and max values used for the end points of the outermost bins <i>RETURNING NUMBER</i> indicates that the return value should be the bin number (1, 2, 3, 4, etc.). This is the default. <i>RETURNING RANGE_LOW</i> indicates the lower value of the bin interval <i>RETURNING RANGE_HIGH</i> indicates the higher value of the bin interval	<code>BIN(numeric_expr [BY grain_expr1, ..., grain_exprN] [WHERE condition] INTO number_of_bins BINS [BETWEEN min_value AND max_value] [RETURNING {NUMBER RANGE_LOW RANGE_HIGH}])</code>
BottomN		Ranks the lowest n values of the expression argument from 1 to n, 1 corresponding to the lowest numerical value. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer. Represents the bottom number of rankings displayed in the result set, 1 being the lowest rank.	<code>BottomN(expr, integer)</code>
COUNT	<code>COUNT(Products)</code>	Determines the number of items with a non-null value.	<code>COUNT(expr)</code>
COUNTDISTINCT		Adds distinct processing to the COUNT function. <i>expr</i> is any expression.	<code>COUNT(DISTINCT expr)</code>
COUNT*	<code>SELECT COUNT(*) FROM Facts</code>	Counts the number of rows.	<code>COUNT(*)</code>
First	<code>First(Sales)</code>	Selects the first non-null returned value of the expression argument. The <i>First</i> function operates at the most detailed level specified in your explicitly defined dimension.	<code>First([NumericExpression])</code>
Last	<code>Last(Sales)</code>	Selects the last non-null returned value of the expression.	<code>Last([NumericExpression])</code>
MAVG		Calculates a moving average (mean) for the last n rows of data in the result set, inclusive of the current row. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer. Represents the average of the last n rows of data.	<code>MAVG(expr, integer)</code>
MAX	<code>MAX(Revenue)</code>	Calculates the maximum value (highest numeric value) of the rows satisfying the numeric expression argument.	<code>MAX(expr)</code>

Function	Example	Description	Syntax
MEDIAN	MEDIAN(Sales)	Calculates the median (middle) value of the rows satisfying the numeric expression argument. When there are an even number of rows, the median is the mean of the two middle rows. This function always returns a double.	MEDIAN(expr)
MIN	MIN(Revenue)	Calculates the minimum value (lowest numeric value) of the rows satisfying the numeric expression argument.	MIN(expr)
NTILE		Determines the rank of a value in terms of a user-specified range. It returns integers to represent any range of ranks. NTILE with numTiles=100 returns what is commonly called the "percentile" (with numbers ranging from 1 to 100, with 100 representing the high end of the sort). <i>expr</i> is any expression that evaluates to a numerical value. numTiles is a positive, nonnull integer that represents the number of tiles.	NTILE(expr, numTiles)
PERCENTILE		Calculates a percentile rank for each value satisfying the numeric expression argument. The percentile rank ranges are between 0 (0th percentile) to 1 (100th percentile). <i>expr</i> is any expression that evaluates to a numerical value.	PERCENTILE(expr)
RANK	RANK(chronological_key, null, year_key_columns)	Calculates the rank for each value satisfying the numeric expression argument. The highest number is assigned a rank of 1, and each successive rank is assigned the next consecutive integer (2, 3, 4,...). If certain values are equal, they're assigned the same rank (for example, 1, 1, 1, 4, 5, 5, 7...). <i>expr</i> is any expression that evaluates to a numerical value.	RANK(expr)
STDDEV	STDDEV(Sales) STDDEV(DISTINCT Sales)	Returns the standard deviation for a set of values. The return type is always a double.	STDDEV(expr)
STDDEV_POP	STDDEV_POP(Sales) STDDEV_POP(DISTINCT Sales)	Returns the standard deviation for a set of values using the computational formula for population variance and standard deviation.	STDDEV_POP([NumericExpression])
SUM	SUM(Revenue)	Calculates the sum obtained by adding up all values satisfying the numeric expression argument.	SUM(expr)
SUMDISTINCT		Calculates the sum obtained by adding all of the distinct values satisfying the numeric expression argument. <i>expr</i> is any expression that evaluates to a numerical value.	SUM(DISTINCT expr)

Function	Example	Description	Syntax
TOPN		Ranks the highest n values of the expression argument from 1 to n, 1 corresponding to the highest numerical value. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer. Represents the top number of rankings displayed in the result set, 1 being the highest rank.	TOPN(<i>expr</i> , <i>integer</i>)

Analytics Functions

Analytics functions allow you to explore data using models such as forecast, trendline, and cluster. Alternatively, you can drag and drop analytics functions into the workbook editor.

Alternatively, you can add forecasts, trendlines, and clusters to a workbook by selecting them on the Analytics tab of the Data Panel in the workbook editor. See [Add Statistical Analytics Functions to Visualizations](#).

Function	Example	Description	Syntax
CLUSTER	CLUSTER((product, company), (billed_quantity, revenue), 'clusterName', 'algorithm=k- means;numClusters=%1;maxIter =%2;useRandomSeed=FALSE;enab lePartitioning=TRUE', 5, 10)	Collects a set of records into groups based on one or more input expressions using K-Means or Hierarchical Clustering.	CLUSTER((dimension_expr1 , . .. dimension_exprN), (expr1, ... exprN), output_column_name, options, [runtime_binded_options])
EVALUATE_SCRIPT IPT	EVALUATE_SCRIPT('filerepo:// obiee.Outliers.xml', 'isOutlier', 'algorithm=kmeans;id=%1;arg1 =%2;arg2=%3;useRandomSeed=Fa lse;', customer_number, expected_revenue, customer_age)	Executes a Python script as specified in the <i>script_file_path</i> , passing in one or more columns or literal expressions as input. The output of the function is determined by the <i>output_column_name</i> .	EVALUATE_SCRIPT(script_file_ path, output_column_name, options, [runtime_binded_options])

Function	Example	Description	Syntax
FORECAST	Revenue Forecast by Day Example This example selects revenue forecast by day. <pre>FORECAST("A - Sample Sales"."Base Facts"."1-Revenue" Target, ("A - Sample Sales"."Time"."T00 Calendar Date"), 'forecast', 'numPeriods=30;predictionInterval=70;') ForecastedRevenue</pre> Revenue Forecast by Year and Quarter Example This example selects revenue forecast by year and quarter. <pre>FORECAST("A - Sample Sales"."Base Facts"."1-Revenue", ("A - Sample Sales"."Time"."T01 Year" timeYear, "A - Sample Sales"."Time"."T02 Quarter" TimeQuarter), 'forecast', 'numPeriods=30;predictionInterval=70;') ForecastedRevenue</pre>	Creates a time-series model of the specified measure over the series using Exponential Smoothing (ETS) or Seasonal ARIMA or ARIMA. This function outputs a forecast for a set of periods as specified by the <i>numPeriods</i> argument. See also additional FORECAST Function Options below.	<pre>FORECAST(<i>measure</i>, ([<i>series</i>]), <i>output_column_name</i>, <i>options</i>, [<i>runtime_binded_options</i>])</pre> Where: <i>measure</i> represents the measure to forecast, for example, revenue data. <i>series</i> represents the time grain used to build the forecast model. The series is a list of one or more time dimension columns. If you omit series, then the time grain is determined from the query. <i>output_column_name</i> represents the valid column names of <i>forecast</i>, <i>low</i>, <i>high</i>, and <i>predictionInterval</i>. <i>options</i> represents a string list of name/value pairs separated by a semi-colon (;). The value can include %1 ... %N specified in <i>runtime_binded_options</i>. <i>runtime_binded_options</i> represents a comma separated list of columns and options. Values for these columns and options are evaluated and resolved during individual query execution time. See also additional FORECAST Function Options below.
OUTLIER	<pre>OUTLIER((product, company), (billed_quantity, revenue), 'isOutlier', 'algorithm=kmeans')</pre>	Classifies a record as Outlier based on one or more input expressions using K-Means or Hierarchical Clustering or Multi-Variate Outlier detection Algorithms.	<pre>OUTLIER((<i>dimension_expr1</i> , . . . <i>dimension_exprN</i>), (<i>expr1</i>, ... <i>exprN</i>), <i>output_column_name</i>, <i>options</i>, [<i>runtime_binded_options</i>])</pre>
REGR	<pre>REGR(revenue, (discount_amount), (product_type, brand), 'fitted', '')</pre>	Fits a linear model and returns the fitted values or model. This function can be used to fit a linear curve on two measures.	<pre>REGR(<i>y_axis_measure_expr</i>, (<i>x_axis_expr</i>), (<i>category_expr1</i>, ..., <i>category_exprN</i>), <i>output_column_name</i>, <i>options</i>, [<i>runtime_binded_options</i>])</pre>

Function	Example	Description	Syntax
TRENDLINE	TRENDLINE (revenue, (calendar_year, calendar_quarter, calendar_month) BY (product), 'LINEAR', 'VALUE')	Oracle recommends that you apply a Trendline using the Add Statistics property when viewing a visualization. See Adjust Visualization Properties. Fits a linear, polynomial, or exponential model, and returns the fitted values or model. The <i>numeric_expr</i> represents the Y value for the trend and the <i>series</i> (time columns) represent the X value.	TRENDLINE (numeric_expr, ([series]) BY ([partitionBy]), model_type, result_type)

FORECAST Function Options The following table lists available options to use with the FORECAST function.

Option Name	Values	Description
numPeriods	Integer	The number of periods to forecast.
predictionInterval	0 to 100, where higher values specify higher confidence	The confidence level for the prediction.
modelType	ETS (Exponential Smoothing) SeasonalArima ARIMA	The model to use for forecasting.
useBoxCox	TRUE FALSE	If <i>TRUE</i> , then use Box-Cox transformation.
lambdaValue	Not applicable	The Box-Cox transformation parameter. Ignore if NULL or when useBoxCox is <i>FALSE</i> . Otherwise the data is transformed before the model is estimated.
trendDamp	TRUE FALSE	This is specific to the Exponential Smoothing model. If <i>TRUE</i> , then use damped trend. If <i>FALSE</i> or NULL, then use non-damped trend.
errorType	Not applicable	This is specific to the Exponential Smoothing model.
trendType	N (none) A (additive) M (multiplicative) Z (automatically selected)	This is specific to the Exponential Smoothing model
seasonType	N (none) A (additive) M (multiplicative) Z (automatically selected)	This is specific to the Exponential Smoothing model

Option Name	Values	Description
modelParamIC	ic_auto ic_aicc ic_bic ic_auto (this is the default)	The information criterion (IC) used in the model selection.

Conversion Functions

Conversion functions convert a value from one form to another.

Function	Example	Description	Syntax
CAST	CAST(hiredate AS CHAR(40)) FROM employee	Changes the data type of an expression or a null literal to another data type. For example, you can cast a <i>customer_name</i> (a data type of CHAR or VARCHAR) or <i>birthdate</i> (a datetime literal).	CAST(expr AS type)
IFNULL	IFNULL(Sales, 0)	Tests if an expression evaluates to a null value, and if it does, assigns the specified value to the expression.	IFNULL(expr, value)
INDEXCOL	SELECT INDEXCOL(VALUEOF(NQ_SESSION.GEOGRAPHY_LEVEL), Country, State, City), Revenue FROM Sales	Uses external information to return the appropriate column for the signed-in user to see.	INDEXCOL([integer literal], [expr1] [, [expr2], ?-])
NULLIF	SELECT e.last_name, NULLIF(e.job_id, j.job_id) "Old Job ID" FROM employees e, job_history j WHERE e.employee_id = j.employee_id ORDER BY last_name, "Old Job ID";	Compares two expressions. If they're equal, then the function returns NULL. If they're not equal, then the function returns the first expression. You can't specify the literal NULL for the first expression.	NULLIF([expression], [expression])
To_DateTime	SELECT To_DateTime('2009-03-03 01:01:00', 'yyyy-mm-dd hh:mi:ss') FROM sales	Converts string literals of <i>DateTime</i> format to a <i>DateTime</i> data type.	To_DateTime([expression] [, [literal]])
VALUEOF	SalesSubjectArea.Custom er.Region = VALUEOF("Region Security"."REGION")	References the value of a semantic model variable in a filter. Use <i>expr</i> variables as arguments of the VALUEOF function. Refer to static semantic model variables by name.	VALUEOF(expr)

Date and Time Functions

Date and time functions manipulate data based on DATE and DATETIME.

Function	Example	Description	Syntax
CURRENT_Date	CURRENT_DATE	Returns the current date. The date is determined by the system in which the Oracle BI is running.	CURRENT_DATE
CURRENT_TIME	CURRENT_TIME (3)	Returns the current time to the specified number of digits of precision, for example: HH:MM:SS.SSS If no argument is specified, the function returns the default precision.	CURRENT_TIME (expr)
CURRENT_TIMESTAMP	CURRENT_TIMESTAMP (3)	Returns the current date/timestamp to the specified number of digits of precision.	CURRENT_TIMESTAMP (expr)
DAYNAME	DAYNAME (Order_Date)	Returns the name of the day of the week for a specified date expression.	DAYNAME (expr)
DAYOFMONTH	DAYOFMONTH (Order_Date)	Returns the number corresponding to the day of the month for a specified date expression.	DAYOFMONTH (expr)
DAYOFWEEK	DAYOFWEEK (Order_Date)	Returns a number between 1 and 7 corresponding to the day of the week for a specified date expression. For example, 1 always corresponds to Sunday, 2 corresponds to Monday, and so on through to Saturday which returns 7.	DAYOFWEEK (expr)
DAYOFYEAR	DAYOFYEAR (Order_Date)	Returns the number (between 1 and 366) corresponding to the day of the year for a specified date expression.	DAYOFYEAR (expr)
DAY_OF_QUARTER	DAY_OF_QUARTER (Order_Date)	Returns a number (between 1 and 92) corresponding to the day of the quarter for the specified date expression.	DAY_OF_QUARTER (expr)
HOUR	HOUR (Order_Time)	Returns a number (between 0 and 23) corresponding to the hour for a specified time expression. For example, 0 corresponds to 12 a.m. and 23 corresponds to 11 p.m.	HOUR (expr)
MINUTE	MINUTE (Order_Time)	Returns a number (between 0 and 59) corresponding to the minute for a specified time expression.	MINUTE (expr)
MONTH	MONTH (Order_Time)	Returns the number (between 1 and 12) corresponding to the month for a specified date expression.	MONTH (expr)
MONTHNAME	MONTHNAME (Order_Time)	Returns the name of the month for a specified date expression.	MONTHNAME (expr)
MONTH_OF_QUARTER	MONTH_OF_QUARTER (Order_Date)	Returns the number (between 1 and 3) corresponding to the month in the quarter for a specified date expression.	MONTH_OF_QUARTER (expr)
NOW	NOW ()	Returns the current timestamp. The NOW function is equivalent to the CURRENT_TIMESTAMP function.	NOW ()
QUARTER_OF_YEAR	QUARTER_OF_YEAR (Order_Date)	Returns the number (between 1 and 4) corresponding to the quarter of the year for a specified date expression.	QUARTER_OF_YEAR (expr)
SECOND	SECOND (Order_Time)	Returns the number (between 0 and 59) corresponding to the seconds for a specified time expression.	SECOND (expr)

Function	Example	Description	Syntax
TIMESTAMPADD	TIMESTAMPADD(SQL_TSI_MONTH, 12, Time."Order Date")	Adds a specified number of intervals to a timestamp, and returns a single timestamp. Interval options are: <i>SQL_TSI_SECOND</i> , <i>SQL_TSI_MINUTE</i> , <i>SQL_TSI_HOUR</i> , <i>SQL_TSI_DAY</i> , <i>SQL_TSI_WEEK</i> , <i>SQL_TSI_MONTH</i> , <i>SQL_TSI_QUARTER</i> , <i>SQL_TSI_YEAR</i>	TIMESTAMPADD(interval, expr, timestamp)
TIMESTAMPDIFF	TIMESTAMPDIFF(SQL_TSI_MONTH, Time."Order Date", CURRENT_DATE)	Returns the total number of specified intervals between two timestamps. Use the same intervals as TIMESTAMPADD.	TIMESTAMPDIFF(interval, expr, timestamp2)
WEEK_OF_QUARTER	WEEK_OF_QUARTER(Order_Date)	Returns a number (between 1 and 13) corresponding to the week of the quarter for the specified date expression.	WEEK_OF_QUARTER(expr)
WEEK_OF_YEAR	WEEK_OF_YEAR(Order_Date)	Returns a number (between 1 and 53) corresponding to the week of the year for the specified date expression.	WEEK_OF_YEAR(expr)
YEAR	YEAR(Order_Date)	Returns the year for the specified date expression.	YEAR(expr)

Date Extraction Functions

These functions calculate or round-down timestamp values to the nearest specified time period, such as hour, day, week, month, and quarter.

You can use the calculated timestamps to aggregate data using a different grain. For example, you might apply the `EXTRACTDAY()` function to sales order dates to calculate a timestamp for midnight on the day that orders occur, so that you can aggregate the data by day.

Function	Example	Description	Syntax
Extract Day	EXTRACTDAY("Order Date") 2/22/1967 3:02:01 AM returns 2/22/1967 12:00:00 AM. 9/2/2022 10:38:21 AM returns 9/2/2022 12:00:00 AM.	Returns a timestamp for midnight (12 AM) on the day in which the input value occurs. For example, if the input timestamp is for 3:02:01 AM on February 22nd, the function returns the timestamp for 12:00:00 AM on February 22nd.	EXTRACTDAY(expr)
Extract Hour	EXTRACTHOUR("Order Date") 2/22/1967 3:02:01 AM returns 2/22/1967 3:00:00 AM. 6/17/1999 11:18:30 PM returns 6/17/1999 11:00:00 PM.	Returns a timestamp for the start of the hour in which the input value occurs. For example, if the input timestamp is for 11:18:30 PM, the function returns the timestamp for 11:00:00 PM.	EXTRACTHOUR (expr)

Function	Example	Description	Syntax
Extract Hour of Day	EXTRACTHOUROFDAY("Order Date") 2014/09/24 10:58:00 returns 2000/01/01 10:00:00. 2014/08/13 11:10:00 returns 2000/01/01 11:00:00	Returns a timestamp where the hour equals the hour of the input value with default values for year, month, day, minutes, and seconds.	EXTRACTHOUROFDAY(expr)
Extract Millisecond	EXTRACTMILLISECOND("Order Date") 1997/01/07 15:32:02.150 returns 1997/01/07 15:32:02.150. 1997/01/07 18:42:01.265 returns 1997/01/07 18:42:01.265.	Returns a timestamp containing milliseconds for the input value. For example, if the input timestamp is for 15:32:02.150, the function returns the timestamp for 15:32:02.150.	EXTRACTMILLISECOND(expr)
Extract Minute	EXTRACTMINUTE("Order Date") 6/17/1999 11:18:00 PM returns 6/17/1999 11:18:00 PM. 9/2/2022 10:38:21 AM returns 9/2/2022 10:38:00 AM.	Returns a timestamp for the start of the minute in which the input value occurs. For example, if the input timestamp is for 11:38:21 AM, the function returns the timestamp for 11:38:00 AM.	EXTRACTMINUTE(expr)
Extract Month	EXTRACTMONTH("Order Date") 2/22/1967 3:02:01 AM returns 2/1/1967 12:00:00 AM. 6/17/1999 11:18:00 PM returns 6/1/1999 12:00:00 AM.	Returns a timestamp for the first day in the month in which the input value occurs. For example, if the input timestamp is for February 22nd, the function returns the timestamp for February 1st.	EXTRACTMONTH(expr)
Extract Quarter	EXTRACTQUARTER("Order Date") 2/22/1967 3:02:01 AM returns 1/1/1967 12:00:00 AM, the first day of the first fiscal quarter. 6/17/1999 11:18:00 PM returns 4/1/1999 12:00:00 AM, the first day of the second fiscal quarter. 9/2/2022 10:38:21 AM returns 7/1/2022 12:00:00 AM, the first day of the third fiscal quarter. Tip: Use QUARTER(expr) to calculate just the ordinal quarter from the returned timestamp.	Returns a timestamp for the first day in the quarter in which the input value occurs. For example, if the input timestamp occurs in the third fiscal quarter, the function returns the timestamp for July 1st.	EXTRACTQUARTER(expr)

Function	Example	Description	Syntax
Extract Second	EXTRACTSECOND("Order Date") 1997/01/07 15:32:02.150 returns 1997/01/07 15:32:02. 1997/01/07 20:44:18.163 returns 1997/01/07 20:44:18.	Returns a timestamp for the input value. For example, if the input timestamp is for 15:32:02.150, the function returns the timestamp for 15:32:02.	EXTRACTSECOND(expr)
Extract Week	EXTRACTWEEK("Order Date") 2014/09/24 10:58:00 returns 2014/09/21. 2014/08/13 11:10:00 returns 2014/08/10.	Returns the date of the first day of the week (Sunday) in which the input value occurs. For example, if the input timestamp is for Wednesday, September 24th, the function returns the timestamp for Sunday, September 21st.	EXTRACTWEEK(expr)
Extract Year	EXTRACTYEAR("Order Date") 1967/02/22 03:02:01 returns 1967/01/01 00:00:00. 1999/06/17 23:18:00 returns 1999/01/01 00:00:00.	Returns a timestamp for January 1st for the year in which the input value occurs. For example, if the input timestamp occurs in 1967, the function returns the timestamp for January 1st, 1967.	EXTRACTYEAR (expr)

Display Functions

Display functions operate on the result set of a query.

Function	Example	Description	Syntax
BottomN	BottomN(Sales, 10)	Returns the <i>n</i> lowest values of expression, ranked from lowest to highest.	BottomN([NumericExpression], [integer])
FILTER	FILTER(Sales USING Product = 'widget')	Computes the expression using the given preaggregate filter.	FILTER(measure USING filter_expr)
MAVG	MAVG(Sales, 10)	Calculates a moving average (mean) for the last <i>n</i> rows of data in the result set, inclusive of the current row.	MAVG([NumericExpression], [integer])
MSUM	SELECT Month, Revenue, MSUM(Revenue, 3) as 3_MO_SUM FROM Sales	Calculates a moving sum for the last <i>n</i> rows of data, inclusive of the current row. The sum for the first row is equal to the numeric expression for the first row. The sum for the second row is calculated by taking the sum of the first two rows of data, and so on. When the <i>n</i> th row is reached, the sum is calculated based on the last <i>n</i> rows of data.	MSUM([NumericExpression], [integer])
NTILE	NTILE(Sales, 100)	Determines the rank of a value in terms of a user-specified range. It returns integers to represent any range of ranks. The example shows a range from 1 to 100, with the lowest sale = 1 and the highest sale = 100.	NTILE([NumericExpression], [integer])

Function	Example	Description	Syntax
PERCENTILE	PERCENTILE(Sales)	Calculates a percent rank for each value satisfying the numeric expression argument. The percentile rank ranges are from 0 (1st percentile) to 1 (100th percentile), inclusive.	PERCENTILE([NumericExpression])
RANK	RANK(Sales)	Calculates the rank for each value satisfying the numeric expression argument. The highest number is assigned a rank of 1, and each successive rank is assigned the next consecutive integer (2, 3, 4,...). If certain values are equal, they're assigned the same rank (for example, 1, 1, 1, 4, 5, 5, 7...).	RANK([NumericExpression])
RCOUNT	SELECT month, profit, RCOUNT(profit) FROM sales WHERE profit > 200	Takes a set of records as input and counts the number of records encountered so far.	RCOUNT([NumericExpression])
RMAX	SELECT month, profit, RMAX(profit) FROM sales	Takes a set of records as input and shows the maximum value based on records encountered so far. The specified data type must be one that can be ordered.	RMAX([NumericExpression])
RMIN	SELECT month, profit, RMIN(profit) FROM sales	Takes a set of records as input and shows the minimum value based on records encountered so far. The specified data type must be one that can be ordered.	RMIN([NumericExpression])
RSUM	SELECT month, revenue, RSUM(revenue) as RUNNING_SUM FROM sales	Calculates a running sum based on records encountered so far. The sum for the first row is equal to the numeric expression for the first row. The sum for the second row is calculated by taking the sum of the first two rows of data, and so on.	RSUM([NumericExpression])
TOPN	TOPN(Sales, 10)	Returns the <i>n</i> highest values of expression, ranked from highest to lowest.	TOPN([NumericExpression], [integer])

Tips on Using Display Functions

- FILTER** - If you're building a report using a subject area, use hierarchies defined in the subject area instead of filtering hierarchy columns directly in a calculation. In other words, if a subject area has a hierarchy for Time\Fiscal Year\Fiscal Quarter, then avoid:


```
filter (<measure> using fiscal_quarter = 'Q4')
```

```
filter (<measure> using fiscal_quarter = 'Q3')
```

```
filter (<measure> using fiscal_year = 'FY24')
```

Evaluate Functions

Evaluate functions are database functions that can be used to pass through expressions to get advanced calculations.

Embedded database functions can require one or more columns. These columns are referenced by %1 ... %N within the function. The actual columns must be listed after the function.

Function	Example	Description	Syntax
EVALUATE	SELECT EVALUATE('instr(%1 , %2)', address, 'Foster City') FROM employees	Passes the specified database function with optional referenced columns as parameters to the database for evaluation.	EVALUATE([string expression], [comma separated expressions])
EVALUATE_AGG R	EVALUATE_AGG('REG R_SLOPE(%1, %2)', sales.quantity, market.marketkey)	Passes the specified database function with optional referenced columns as parameters to the database for evaluation. This function is intended for aggregate functions with a GROUP BY clause.	EVALUATE_AGG('db_agg_f unction(%1...%N)' [AS datatype] [, column1, columnN])

Mathematical Functions

The mathematical functions described in this section perform mathematical operations.

Function	Example	Description	Syntax
ABS	ABS(Profit)	Calculates the absolute value of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	ABS(<i>expr</i>)
ACOS	ACOS(1)	Calculates the arc cosine of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	ACOS(<i>expr</i>)
ASIN	ASIN(1)	Calculates the arc sine of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	ASIN(<i>expr</i>)
ATAN	ATAN(1)	Calculates the arc tangent of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	ATAN(<i>expr</i>)
ATAN2	ATAN2(1, 2)	Calculates the arc tangent of y/x , where y is the first numeric expression and x is the second numeric expression.	ATAN2(<i>expr1</i> , <i>expr2</i>)
CEILING	CEILING(Profit)	Rounds a non-integer numeric expression to the next highest integer. If the numeric expression evaluates to an integer, the CEILING function returns that integer.	CEILING(<i>expr</i>)
COS	COS(1)	Calculates the cosine of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	COS(<i>expr</i>)
COT	COT(1)	Calculates the cotangent of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	COT(<i>expr</i>)
DEGREES	DEGREES(1)	Converts an expression from radians to degrees. <i>expr</i> is any expression that evaluates to a numerical value.	DEGREES(<i>expr</i>)

Function	Example	Description	Syntax
EXP	EXP(4)	Sends the value to the power specified. Calculates <i>e</i> raised to the <i>n</i> -th power, where <i>e</i> is the base of the natural logarithm.	EXP(<i>expr</i>)
ExtractBit	Int ExtractBit(1, 5)	Retrieves a bit at a particular position in an integer. It returns an integer of either 0 or 1 corresponding to the position of the bit.	ExtractBit([Source Number], [Digits])
FLOOR	FLOOR(Profit)	Rounds a non-integer numeric expression to the next lowest integer. If the numeric expression evaluates to an integer, the FLOOR function returns that integer.	FLOOR(<i>expr</i>)
LOG	LOG(1)	Calculates the natural logarithm of an expression. <i>expr</i> is any expression that evaluates to a numerical value.	LOG(<i>expr</i>)
LOG10	LOG10(1)	Calculates the base 10 logarithm of an expression. <i>expr</i> is any expression that evaluates to a numerical value.	LOG10(<i>expr</i>)
MOD	MOD(10, 3)	Divides the first numeric expression by the second numeric expression and returns the remainder portion of the quotient.	MOD(<i>expr1</i> , <i>expr2</i>)
PI	PI()	Returns the constant value of pi.	PI()
POWER	POWER(Profit, 2)	Takes the first numeric expression and raises it to the power specified in the second numeric expression.	POWER(<i>expr1</i> , <i>expr2</i>)
RADIANS	RADIANS(30)	Converts an expression from degrees to radians. <i>expr</i> is any expression that evaluates to a numerical value.	RADIANS(<i>expr</i>)
RAND	RAND()	Returns a pseudo-random number between 0 and 1.	RAND()
RANDFromSeed	RAND(2)	Returns a pseudo-random number based on a seed value. For a given seed value, the same set of random numbers are generated.	RAND(<i>expr</i>)
ROUND	ROUND(2.166000, 2)	Rounds a numeric expression to <i>n</i> digits of precision. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer that represents the number of digits of precision.	ROUND(<i>expr</i> , <i>integer</i>)
SIGN	SIGN(Profit)	Returns the following: • 1 if the numeric expression evaluates to a positive number • -1 if the numeric expression evaluates to a negative number • 0 if the numeric expression evaluates to zero	SIGN(<i>expr</i>)
SIN	SIN(1)	Calculates the sine of a numeric expression.	SIN(<i>expr</i>)

Function	Example	Description	Syntax
SQRT	SQRT (7)	Calculates the square root of the numeric expression argument. The numeric expression must evaluate to a nonnegative number.	SQRT (expr)
TAN	TAN (1)	Calculates the tangent of a numeric expression. <i>expr</i> is any expression that evaluates to a numerical value.	TAN (expr)
TRUNCATE	TRUNCATE (45.12345, 2)	Truncates a decimal number to return a specified number of places from the decimal point. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer that represents the number of characters to the right of the decimal place to return.	TRUNCATE (expr, integer)

Running Aggregate Functions

Running aggregate functions perform operations on multiple values to create summary results.

Function	Example	Description	Syntax
MAVG		Calculates a moving average (mean) for the last <i>n</i> rows of data in the result set, inclusive of the current row. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer. Represents the average of the last <i>n</i> rows of data.	MAVG (expr, integer)
MSUM	select month, revenue, MSUM (revenue, 3) as 3_MO_SUM from sales_subject_area	Calculates a moving sum for the last <i>n</i> rows of data, inclusive of the current row. <i>expr</i> is any expression that evaluates to a numerical value. <i>integer</i> is any positive integer. Represents the sum of the last <i>n</i> rows of data.	MSUM (expr, integer)
RSUM	SELECT month, revenue, RSUM (revenue) as RUNNING_SUM from sales_subject_area	Calculates a running sum based on records encountered so far. <i>expr</i> is any expression that evaluates to a numerical value.	RSUM (expr)
RCOUNT	select month, profit, RCOUNT (profit) from sales_subject_area where profit > 200	Takes a set of records as input and counts the number of records encountered so far. <i>expr</i> is an expression of any datatype.	RCOUNT (expr)
RMAX	SELECT month, profit, RMAX (profit) from sales_subject_area	Takes a set of records as input and shows the maximum value based on records encountered so far. <i>expr</i> is an expression of any datatype.	RMAX (expr)

Function	Example	Description	Syntax
RMIN	select month, profit,RMIN(profit) from sales_subject_area	Takes a set of records as input and shows the minimum value based on records encountered so far. <i>expr</i> is an expression of any datatype.	RMIN(<i>expr</i>)

String Functions

String functions perform various character manipulations. They operate on character strings.

Function	Example	Description	Syntax
ASCII	ASCII('a')	Converts a single character string to its corresponding ASCII code, between 0 and 255. If the character expression evaluates to multiple characters, the ASCII code corresponding to the first character in the expression is returned. <i>expr</i> is any expression that evaluates to a character string.	ASCII(<i>expr</i>)
BIT_LENGTH	BIT_LENGTH('abcdef)	Returns the length, in bits, of a specified string. Each Unicode character is 2 bytes in length (equal to 16 bits). <i>expr</i> is any expression that evaluates to a character string.	BIT_LENGTH(<i>expr</i>)
CHAR	CHAR(35)	Converts a numeric value between 0 and 255 to the character value corresponding to the ASCII code. <i>expr</i> is any expression that evaluates to a numerical value between 0 and 255.	CHAR(<i>expr</i>)
CHAR_LENGTH	CHAR_LENGTH(Custom er_Name)	Returns the length, in number of characters, of a specified string. Leading and trailing blanks aren't counted in the length of the string. <i>expr</i> is any expression that evaluates to a character string.	CHAR_LENGTH(<i>expr</i>)
CONCAT	SELECT DISTINCT CONCAT('abc', 'def') FROM employee	Concatenates two character strings. <i>exprs</i> are expressions that evaluate to character strings, separated by commas. You must use raw data, not formatted data, with CONCAT.	CONCAT(<i>expr1</i> , <i>expr2</i>)

Function	Example	Description	Syntax
INSERT	<pre>SELECT INSERT('123456', 2, 3, 'abcd') FROM table</pre>	Inserts a specified character string into a specified location in another character string. <i>expr1</i> is any expression that evaluates to a character string. Identifies the target character string. <i>integer1</i> is any positive integer that represents the number of characters from the beginning of the target string where the second string is to be inserted. <i>integer2</i> is any positive integer that represents the number of characters in the target string to be replaced by the second string. <i>expr2</i> is any expression that evaluates to a character string. Identifies the character string to be inserted into the target string.	<pre>INSERT(expr1, integer1, integer2, expr2)</pre>
LEFT	<pre>SELECT LEFT('123456', 3) FROM table</pre>	Returns a specified number of characters from the left of a string. <i>expr</i> is any expression that evaluates to a character string <i>integer</i> is any positive integer that represents the number of characters from the left of the string to return.	<pre>LEFT(expr, integer)</pre>
LENGTH	<pre>LENGTH(Customer_Na me)</pre>	Returns the length, in number of characters, of a specified string. The length is returned excluding any trailing blank characters. <i>expr</i> is any expression that evaluates to a character string.	<pre>LENGTH(expr)</pre>
LOCATE	<pre>LOCATE('d' 'abcdef')</pre>	Returns the numeric position of a character string in another character string. If the character string isn't found in the string being searched, the function returns a value of 0. <i>expr1</i> is any expression that evaluates to a character string. Identifies the string for which to search. <i>expr2</i> is any expression that evaluates to a character string. Identifies the string to be searched.	<pre>LOCATE(expr1, expr2)</pre>
LOCATEN	<pre>LOCATEN('d' 'abcdef', 3)</pre>	Like LOCATE, returns the numeric position of a character string in another character string. LOCATEN includes an integer argument that enables you to specify a starting position to begin the search. <i>expr1</i> is any expression that evaluates to a character string. Identifies the string for which to search. <i>expr2</i> is any expression that evaluates to a character string. Identifies the string to be searched. <i>integer</i> is any positive (nonzero) integer that represents the starting position to begin to look for the character string.	<pre>LOCATEN(expr1, expr2, integer)</pre>

Function	Example	Description	Syntax
LOWER	LOWER(Customer_Name)	Converts a character string to lowercase. <i>expr</i> is any expression that evaluates to a character string.	LOWER(<i>expr</i>)
OCTET_LENGTH	OCTET_LENGTH('abcdef')	Returns the number of bytes of a specified string. <i>expr</i> is any expression that evaluates to a character string.	OCTET_LENGTH(<i>expr</i>)
POSITION	POSITION('d', 'abcdef')	Returns the numeric position of <i>strExpr1</i> in a character expression. If <i>strExpr1</i> isn't found, the function returns 0. <i>expr1</i> is any expression that evaluates to a character string. Identifies the string to search for in the target string. For example, "d". <i>expr2</i> is any expression that evaluates to a character string. Identifies the target string to be searched. For example, "abcdef".	POSITION(<i>expr1</i> , <i>expr2</i>)
REPEAT	REPEAT('abc', 4)	Repeats a specified expression <i>n</i> times. <i>expr</i> is any expression that evaluates to a character string <i>integer</i> is any positive integer that represents the number of times to repeat the character string.	REPEAT(<i>expr</i> , <i>integer</i>)
REPLACE	REPLACE('abcd1234', '123', 'zz')	Replaces one or more characters from a specified character expression with one or more other characters. <i>expr1</i> is any expression that evaluates to a character string. This is the string in which characters are to be replaced. <i>expr2</i> is any expression that evaluates to a character string. This second string identifies the characters from the first string that are to be replaced. <i>expr3</i> is any expression that evaluates to a character string. This third string specifies the characters to substitute into the first string.	REPLACE(<i>expr1</i> , <i>expr2</i> , <i>expr3</i>)
RIGHT	SELECT RIGHT('123456', 3) FROM table	Returns a specified number of characters from the right of a string. <i>expr</i> is any expression that evaluates to a character string. <i>integer</i> is any positive integer that represents the number of characters from the right of the string to return.	RIGHT(<i>expr</i> , <i>integer</i>)
SPACE	SPACE(2)	Inserts blank spaces. <i>integer</i> is any positive integer that indicates the number of spaces to insert.	SPACE(<i>expr</i>)
SUBSTRING	SUBSTRING('abcdef' FROM 2)	Creates a new string starting from a fixed number of characters into the original string. <i>expr</i> is any expression that evaluates to a character string. <i>startPos</i> is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.	SUBSTRING([SourceString] FROM [StartPostition])

Function	Example	Description	Syntax
SUBSTRINGN	<code>SUBSTRING('abcdef' FROM 2 FOR 3)</code>	Like SUBSTRING, creates a new string starting from a fixed number of characters into the original string. <i>SUBSTRINGN</i> includes an integer argument that enables you to specify the length of the new string, in number of characters. <i>expr</i> is any expression that evaluates to a character string. <i>startPos</i> is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.	<code>SUBSTRING(expr FROM startPos FOR length)</code>
TrimBoth	<code>Trim(BOTH '_' FROM '_abcdef_')</code>	Strips specified leading and trailing characters from a character string. <i>char</i> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. <i>expr</i> is any expression that evaluates to a character string.	<code>TRIM(BOTH char FROM expr)</code>
TRIMLEADING	<code>TRIM(LEADING '_' FROM '_abcdef')</code>	Strips specified leading characters from a character string. <i>char</i> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. <i>expr</i> is any expression that evaluates to a character string.	<code>TRIM(LEADING char FROM expr)</code>
TRIMTRAILING	<code>TRIM(TRAILING '_' FROM 'abcdef_')</code>	Strips specified trailing characters from a character string. <i>char</i> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. <i>expr</i> is any expression that evaluates to a character string.	<code>TRIM(TRAILING char FROM expr)</code>
UPPER	<code>UPPER(Customer_Nam e)</code>	Converts a character string to uppercase. <i>expr</i> is any expression that evaluates to a character string.	<code>UPPER(expr)</code>

System Functions

The `USER` system function returns values relating to the session. For example, the user name you signed in with.

Function	Example	Description	Syntax
DATABASE		Returns the name of the subject area to which you're logged on.	<code>DATABASE()</code>
USER		Returns the user name for the semantic model to which you're logged on.	<code>USER()</code>

Time Series Functions

Time series functions enable you to aggregate and forecast data based on time dimensions. For example, you might use the AGO function to calculate revenue from one year ago.

Time dimension members must be at or below the level of the function. Because of this, one or more columns that uniquely identify members at or below the given level must be projected in the query.

Function	Example	Description	Syntax
AGO	SELECT Year_ID, AGO(sales, year, 1)	Calculates the aggregated value of a measure in a specified time period in the past. For example, to calculate monthly revenue one year ago, use AGO(Revenue, Year, 1, SHIP_MONTH). To calculate quarterly revenues in the last quarter, use AGO(Revenue, Quarter, 1).	AGO(MEASURE, TIME_LEVEL, OFFSET) Where: • <i>MEASURE</i> represents the measure to calculate, for example, revenue. • <i>TIME_LEVEL</i> represents the time interval, which must be Year, Quarter, Month, Week, or Day. • <i>OFFSET</i> represents the number of time intervals to calculate back to, for example, 1 for one year.
PERIODROLLING	SELECT Month_ID, PERIODROLLING (monthly_sales, -1, 1)	Calculates the aggregate of a measure over the period starting x units of time and ending y units of time from the current time. For example, PERIODROLLING can compute sales for a period that starts at a quarter before and ends at a quarter after the current quarter.	PERIODROLLING(measure, x [, y]) Where: • <i>MEASURE</i> represents the name of a measure column. • <i>X</i> is an integer that represents the offset from the current time. • <i>Y</i> is an integer that represents the number of time units over which the function calculates. • <i>HIERARCHY</i> is an optional argument that represents the name of a hierarchy in a time dimension such as YR, MON, DAY, that you want to use to compute the time window.
TODATE	SELECT Year_ID, Month_ID, TODATE (sales, year)	Calculates the aggregated value of a measure from the start of a time period to the latest time period, for example, year to date calculations. For example, to calculate Year to Date Sales, use TODATE(sales, year).	TODATE(MEASURE, TIME_LEVEL) Where: • <i>MEASURE</i> represents an expression that references at least one measure column, for example, sales. • <i>TIME_LEVEL</i> represents the time interval, which must be Year, Quarter, Month, Week, or Day.

Constants

You can use constants to include specific fixed dates and times in workbooks and reports.

Constant	Example	Description	Syntax
DATE	DATE '2026-04-09'	Creates a specific date in a calculation or expression.	DATE 'yyyy-mm-dd'
TIME	TIME '12:00:00'	Creates a specific time in a calculation or expression.	TIME 'hh:mi:ss'
TIMESTAMP	TIMESTAMP '2026-04-09 12:00:00'	Creates a specific time-stamp in a calculation or expression.	TIMESTAMP 'yyyy-mm-dd hh:mi:ss'

Types

You can use data types, such as `CHAR`, `INT`, and `NUMERIC` in expressions.

For example, you use types when creating `CAST` expressions that change the data type of an expression or a null literal to another data type.

Conditional Expressions

You use conditional expressions to create expressions that convert values.

The conditional expressions described in this section are building blocks for creating expressions that convert a value from one form to another.

Follow these rules:

- In `CASE` statements, `AND` has precedence over `OR`.
- Strings must be in single quotes.

Expression	Example	Description	Syntax
CASE (If)	<pre> CASE WHEN score-par < 0 THEN 'Under Par' WHEN score-par = 0 THEN 'Par' WHEN score-par = 1 THEN 'Bogey' WHEN score-par = 2 THEN 'Double Bogey' ELSE 'Triple Bogey or Worse' END </pre>	Evaluates each <code>WHEN</code> condition and if satisfied, assigns the value in the corresponding <code>THEN</code> expression. If none of the <code>WHEN</code> conditions are satisfied, it assigns the default value specified in the <code>ELSE</code> expression. If no <code>ELSE</code> expression is specified, the system automatically adds an <code>ELSE NULL</code>. Note: See <i>Best Practices for using CASE statements in Analyses and Visualizations</i>.	<pre> CASE WHEN request_condition1 THEN expr1 ELSE expr2 END </pre>

Expression	Example	Description	Syntax
CASE (Switch)	CASE Score-par WHEN -5 THEN 'Birdie on Par 6' WHEN -4 THEN 'Must be Tiger' WHEN -3 THEN 'Three under par' WHEN -2 THEN 'Two under par' WHEN -1 THEN 'Birdie' WHEN 0 THEN 'Par' WHEN 1 THEN 'Bogey' WHEN 2 THEN 'Double Bogey' ELSE 'Triple Bogey or Worse' END	Also referred to as CASE (Lookup). The value of the first expression is examined, then the WHEN expressions. If the first expression matches any WHEN expression, it assigns the value in the corresponding THEN expression. If none of the WHEN expressions match, it assigns the default value specified in the ELSE expression. If no ELSE expression is specified, the system automatically adds an ELSE NULL. If the first expression matches an expression in multiple WHEN clauses, only the expression following the first match is assigned. Note See <i>Best Practices for using CASE statements in Analyses and Visualizations</i>.	CASE expr1 WHEN expr2 THEN expr3 ELSE expr4 END
IfCase > ELSE	-	-	ELSE [expr]
IfCase > IFNULL	-	-	IFNULL([expr], [value])
IfCase > NULLIF	-	-	NULLIF([expr], [expr])
IfCase > WHEN	-	-	WHEN [Condition] THEN [expr]
IfCase > CASE	-	-	CASE WHEN [Condition] THEN [expr] END
SwitchCase > ELSE	-	-	ELSE [expr]
SwitchCase >IFNULL	-	-	IFNULL([expr], [value])
SwitchCase > NULLIF	-	-	NULLIF([expr], [expr])
SwitchCase > WHEN	-	-	WHEN [Condition] THEN [expr]

Best Practices For Using CASE statements in Analyses and Visualizations

When using CASE statements in reports and workbooks, consider the report columns and the order of aggregation because these affect how expressions and sub-totals are calculated.

- In general, when using CASE expressions, make sure that any columns used in the expression are included in the report.
- If the order of aggregation is important, then change the report aggregation rule from Default to Sum.
- If a condition has to be evaluated before the aggregation is computed (for example, if the column filtered isn't displayed in the report), then use the FILTER function.

Example

This example use data for Brand, Product Type, and Revenue.

Brand	Product_Type	Revenue
BizTech	Accessories	2698715.06
BizTech	Audio	7415868.56
BizTech	Cell Phones	5917902.82
BizTech	Smart Phones	4967513.56
FunPod	Camera	7735104.57
FunPod	Fixed	4530169.23
FunPod	Portable	5234726.2
HomeView	Install	487556.74
HomeView	LCD	5324361.46
HomeView	Maintenance	518288.16
HomeView	Plasma	5169793.64

To apply a condition to set Camera revenue to 0, create the following conditional expression:

```
CASE WHEN Product_Type = 'Camera' THEN 0 ELSE Revenue END.
```

When Product_Type is excluded from the report, data isn't available to evaluate the expression because it contains Product_Type, and the results are:

P4 Brand	Revenue Excluding Camera (CASE)
BizTech	21,000,000.00
FunPod	0.00
HomeView	11,500,000.00

By adding PRODUCT_TYPE to the report and setting report aggregation to SUM, the result aggregates after the base level values are calculated:

P4 Brand	P2 Product Type	Revenue Excluding Camera (CASE)
BizTech	Accessories	2,698,715.06
	Audio	7,415,868.56
	Cell Phones	5,917,902.82
	Smart Phones	4,967,513.56
BizTech Total		21,000,000.00
FunPod	Camera	0.00
	Fixed	4,530,169.23
	Portable	5,234,726.20
FunPod Total		9,764,895.43
HomeView	Install	487,556.74
	LCD	5,324,361.46
	Maintenance	518,288.16
	Plasma	5,169,793.64
HomeView Total		11,500,000.00

An alternative to using CASE is to use a filter expression: `FILTER(Revenue using Product_Type != 'Camera')`. The expression is calculated independently of report columns, and aggregations are applied after calculation:

P4 Brand	Revenue Excluding Cameras (FILTER)
BizTech	21,000,000.00
FunPod	9,764,895.43
HomeView	11,500,000.00