Oracle® Analytics

Visualizing Data in Oracle Analytics Server

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Primary Author: Nick Fry

Contributing Authors: Stefanie Rhone, Peter Brownbridge, Suzanne Gill, Rosie Harvey, Hemala Vivek

Contributors: Oracle Analytics Server development, product management, and quality assurance teams

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Preface

Learn how to use Oracle Analytics Server to explore and analyze data by building and sharing workbooks and reports.

Topics:

- Audience
- Documentation Accessibility
- Conventions

Audience

This guide is intended for data consumers and analysts who use Oracle Analytics Server.

- Data consumers customize dashboard pages and work with their favorite reports. Dashboards allow consumers to quickly analyze and manage activity across their system.
- Data analysts load and model data and create reports for consumers. Data integration options range from self-service import to operational ETL updates. Analysts can select interactive visualizations and create advanced calculations to reveal insights in the data.

Documentation Accessibility

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

Access to Oracle Support

Oracle customer access to and use of Oracle support services will be pursuant to the terms and conditions specified in their Oracle order for the applicable services.

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.

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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.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Videos and Images

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.

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Part I

Introduction to Visualizing and Reporting in Oracle Analytics Server

This part introduces you to visualizing data and building reports.

Topics:

- Get Started with Visualizing Data and Building Reports

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1

Get Started with Visualizing Data and Building Reports

This topic describes how to get started with visualizing data and building reports.

Video

Topics:

- About Oracle Analytics Server
- About Visualizations and Analyses
- Find and Explore Your Content
- About Watchlists
- Providing Custom Groups of Content on the Home page
- Explore Data on Mobile Devices Using A Built-in Browser

About Oracle Analytics Server

Oracle Analytics Server is a powerful tool that empowers business analysts and consumers to uncover new insights and make faster, more informed business decisions.

Oracle Analytics Server brings the modern, industry-leading capabilities of Oracle Analytics Cloud to organizations that require on-premises deployments. With Oracle Analytics Server, your organization can take advantage of augmented analytics and world-class data discovery capabilities, and manage your specific configuration needs.

Oracle Analytics Server enables organizations in highly regulated industries or with multi-cloud architectures to experience the latest analytics capabilities on their own terms and preferred deployment architecture. With Oracle Analytics Server, your heritage systems can be maintained while a clear, easy, and seamless path to Oracle Cloud is ready when you are.

Oracle Analytics Server includes modern, AI-powered, self-service analytics capabilities for data preparation, visualization, enterprise reporting, augmented analysis, and natural language processing/generation. You can use these features to:

- Collect up-to-date data from your organization.
- Present the data in easy-to-understand formats, such as tables and graphs.
- Deliver data in a timely fashion to the employees in your organization.

These capabilities enable your organization to make better decisions, take informed actions, and implement more-efficient business processes.

How to Access Oracle Analytics Server?

After the administrator installs and configures Oracle Analytics Server, you can navigate to the appropriate page to use the capabilities of Oracle Analytics Server.

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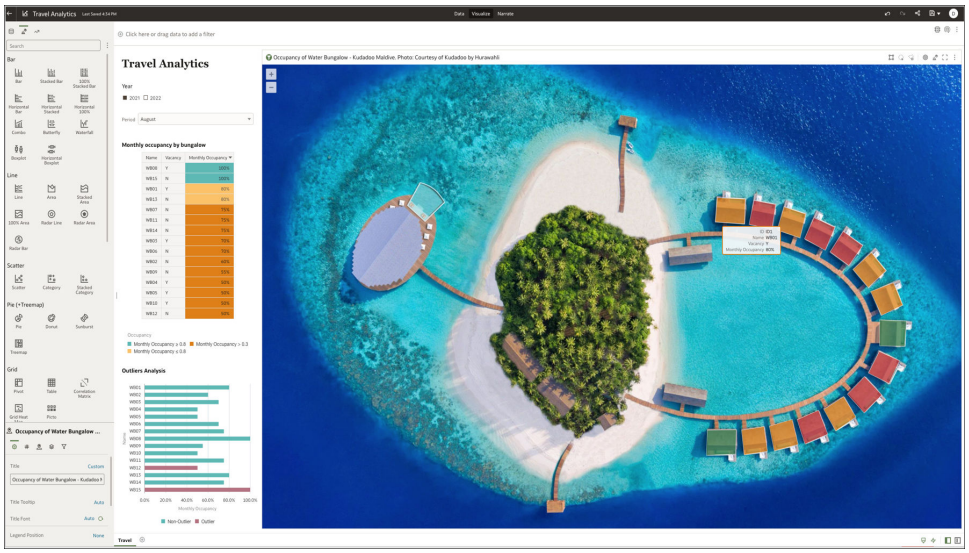
Navigate to...	Access URL format
Home page	`https://host:port/dv`
Classic Administration page	`https://host:port/analytics/saw.dll?bieehome`
Console page	`https://host:port/dv/?pageid=console`
Publisher Home page	`https://host:port/xmlpserver`

About Visualizations and Analyses

You use visualizations and analyses to find the answers that you need from key business and analytic data displayed in graphical formats.

Visualizations

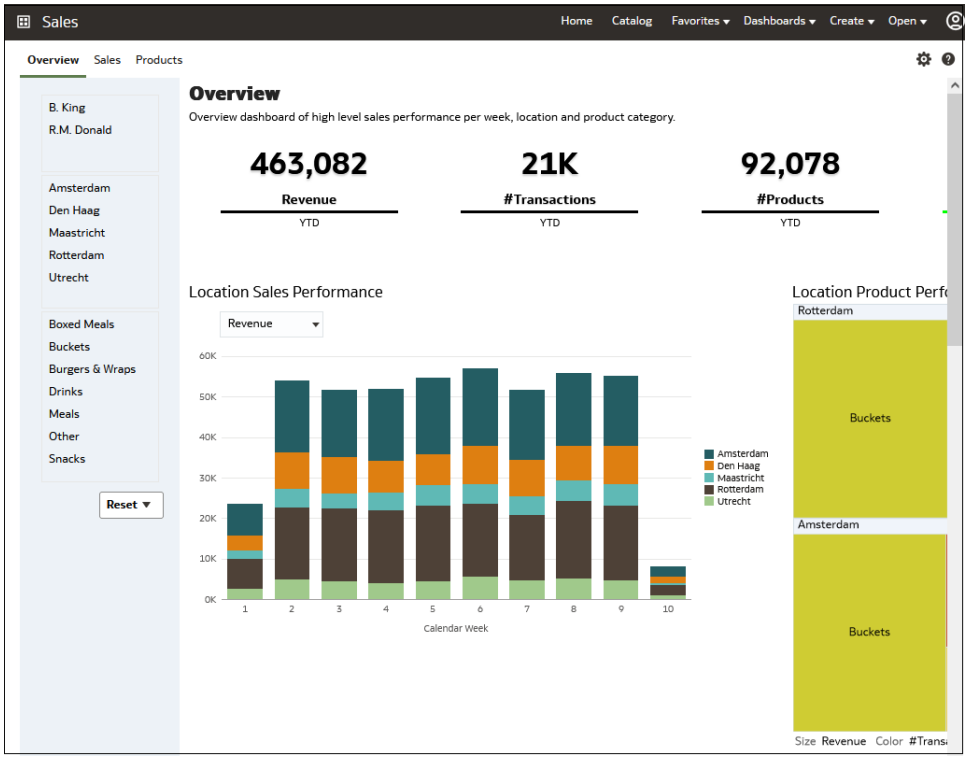
Visualizations enable you to dynamically explore multiple datasets in a graphical way, all within a single interface. You can visualize data from many commonly used data sources. Workbooks enable you to organize and share your visualizations.



Analyses

Analyses are queries against your organization's data that provides you with answers to your analytical questions. Analyses enable you to explore and interact with information visually in tables, graphs, pivot tables, and other data views. You can also save, organize, and share the results of analyses with others.

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Dashboards can include multiple analyses to give you a complete and consistent view of your company's information across all departments and operational data sources. Dashboards provide you with personalized views of information in the form of one or more pages, with each page identified with a tab at the top. Dashboard pages display anything that you have access to or that you can open with a web browser including analyses results, images, text, links to websites and documents, and embedded content such as web pages or documents.

When you embed an analysis in a dashboard, the analysis automatically displays the most current data every time you access the dashboard. For example, if you need to see weekly sales performance over a range of products and locations you can run the dashboard to view the most up to date information.

Find and Explore Your Content

From the Home page you can find your analytics content, such as workbooks, datasets, connections, and data flows.

Find Your Content

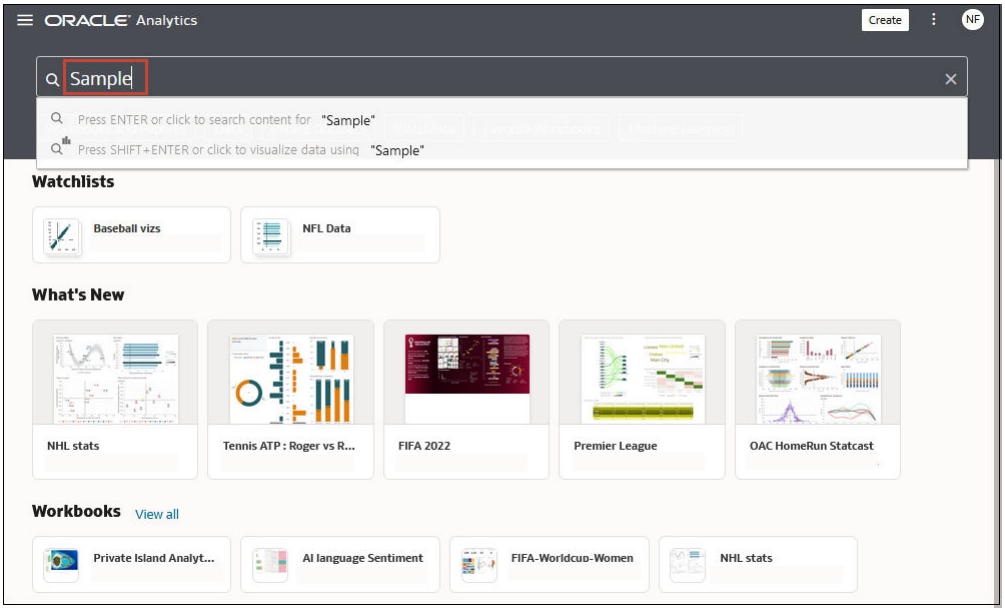
From the Home page you can use the search bar to search for the content you're interested in.

Use the search bar to search for content using search terms, content types, and search tags.

> **Note**
>
> You can use advanced search commands in combination with search terms to refine your search results for exact matches, multi-term matches, and field-level matches. See Search Options

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1. On the Home page, in the search bar, type in a search term and either press **Enter** to search for content or **Shift + Enter** to visualize data.
   a. Specify the full or partial name of what you're looking for. The search is case-insensitive.



   b. (Browser dependent) Click **Dictate** (if displayed) and speak your search term.
2. Click in the search bar for a drop-down list of all content types, such as workbook, dashboard, report, watchlist connection, or model. Click a content type to add it to the search bar. For example:
   - Click **Workbook** to display visualization content
   - Click **Dashboard** or **Analysis** to display reporting content
   - Click **Report** to display pixel-perfect reporting content
   - Click **Watchlist** to display visualization cards grouped in watchlists
   - Click an option in the **Data** category to display connections, datasets, data flows, machine learning models, and other data-related content.
   - To narrow your search, add a free text search term to the search bar. For example, if you've searched on Workbooks, enter `'My Web Analysis'` to display a workbook named My Web Analysis.
3. Add or remove search tags to your search term.
   - Enter `'type:'` or `'filter:'` to display a list of search tags that you can select from.
   - Paste in `'type:'` or `'filter:'` followed by one search term (not case-sensitive). For example:
     – Paste `type:connection` to find your connections. Or, paste `type:workbook` to find your workbooks.
     – Paste `filter:recent` to display your recently accessed content. Paste `filter:favorites` to find content that you've marked as a favorite.
     You can combine the `filter` command with the `type` command. For example, paste in `type:workbook filter:recent`.

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4. To clear your search terms, in the search bar click X or select search tags and press delete.

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

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Search Command	Description	Example
`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.

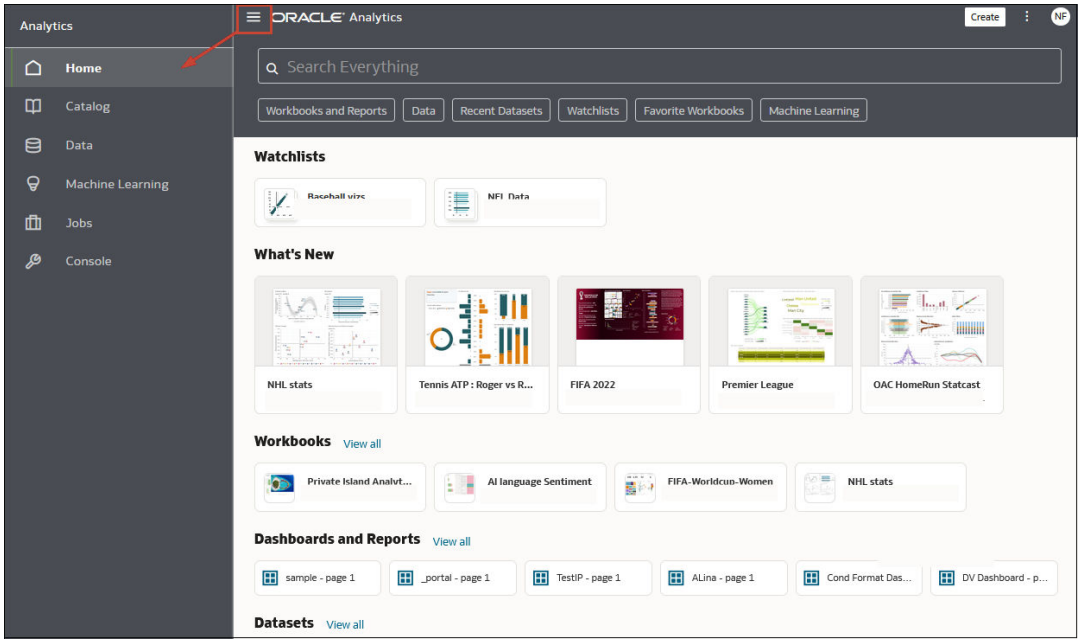
- **Searching in Non-English Locales** - When you enter criteria in the search field, what displays in the drop-down list of suggestions can differ depending upon your locale setting. For example, if you're using an English locale and enter *sales*, then the drop-down list of suggestions contains items 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.

Explore Your Content

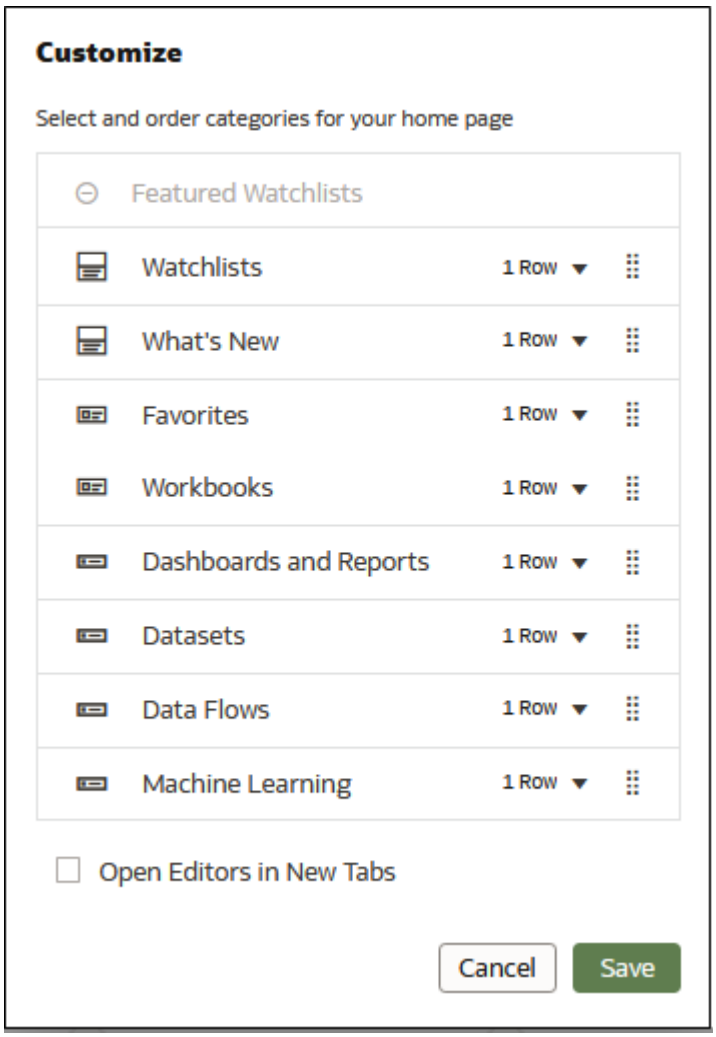
You can quickly access your analytics content using the Navigator bar.

1. On the Home page click the **Navigator** menu.

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2. Click **Page Menu**, then click **Customize Home Page**.

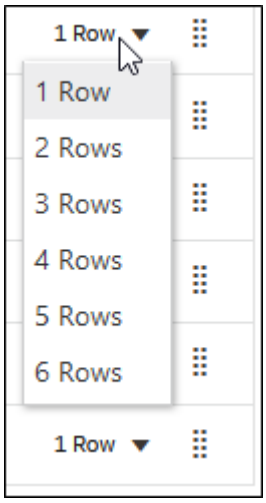


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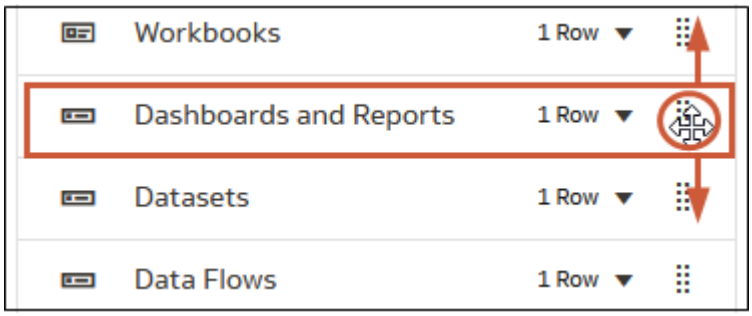
3. Click the icon representing the content size (small, medium, large, or list), or click **Hidden** to hide the content.



4. Click the down arrow and select the number of rows to display.



5. Click and hold the handle , and then drag the content category row to reorder its display sequence on the home page.



6. Click **Open Editors in New Tabs**.
7. Click **Save**.

About Watchlists

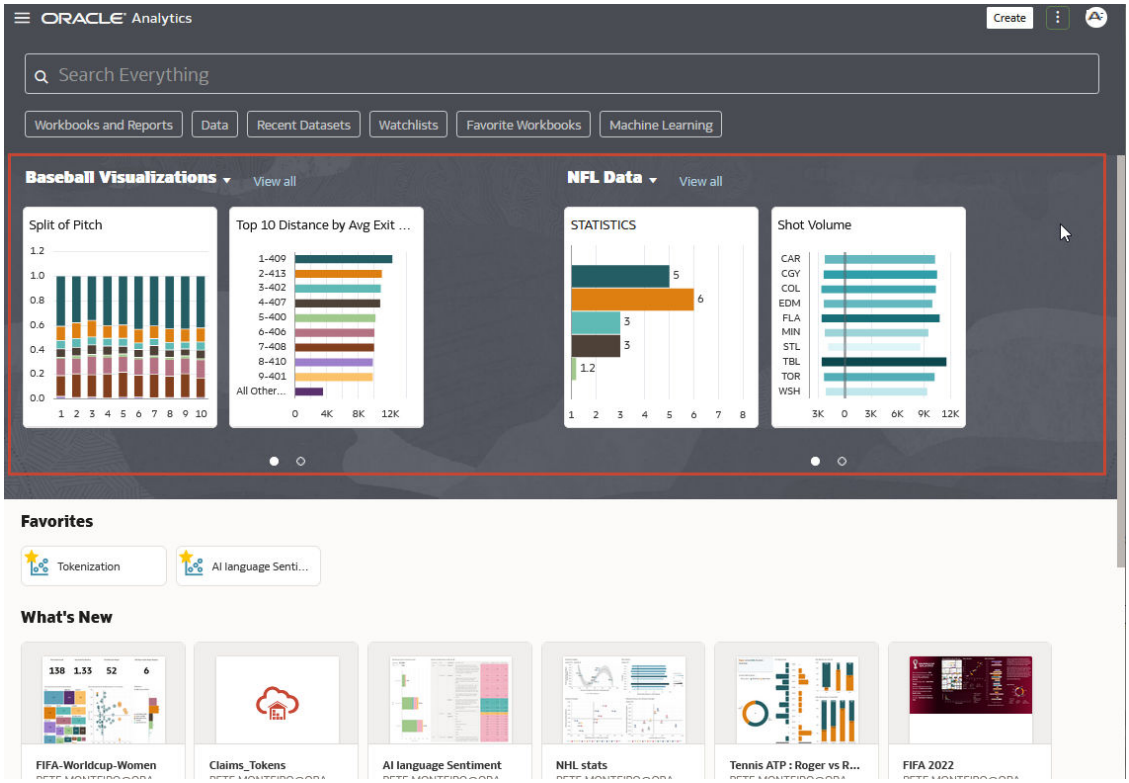
Watchlists provide quick access to visualizations that you access most frequently. When you create watchlists, they're displayed in the Featured Watchlists area on your Home page.

A watchlist enables you to quickly view the visualizations that matter, without having to search through multiple workbooks to locate those visualizations. Each watchlist displays visualization cards that represent data in a workbook visualization, and you can open a visualization directly from the watchlist.

If you don't have any watchlists on your Home page you can create one. See Create a Watchlist.

You can share any watchlist you've created with other users and roles. See Share a Watchlist.

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Create a Watchlist

You can create a watchlist by adding visualizations from one or more workbooks.

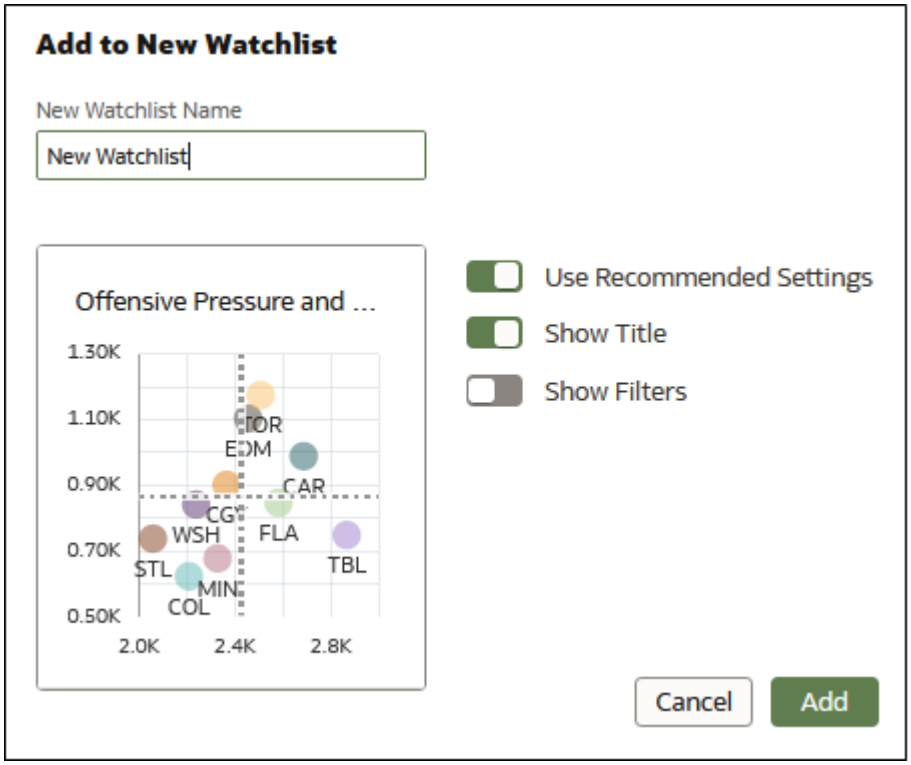
You create watchlists to group together the most popular visualizations and display them as visualization cards. The visualization cards enable users to view and access the data that matters without having to search each time in multiple workbooks.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit** to enter author mode.
3. Hover over a visualization and click **Add to Watchlist**.



4. Click **New Watchlist**, enter a new watchlist name, and click **Add**.

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Add a Visualization to a Watchlist

You can add visualizations to a watchlist from one or more workbooks.

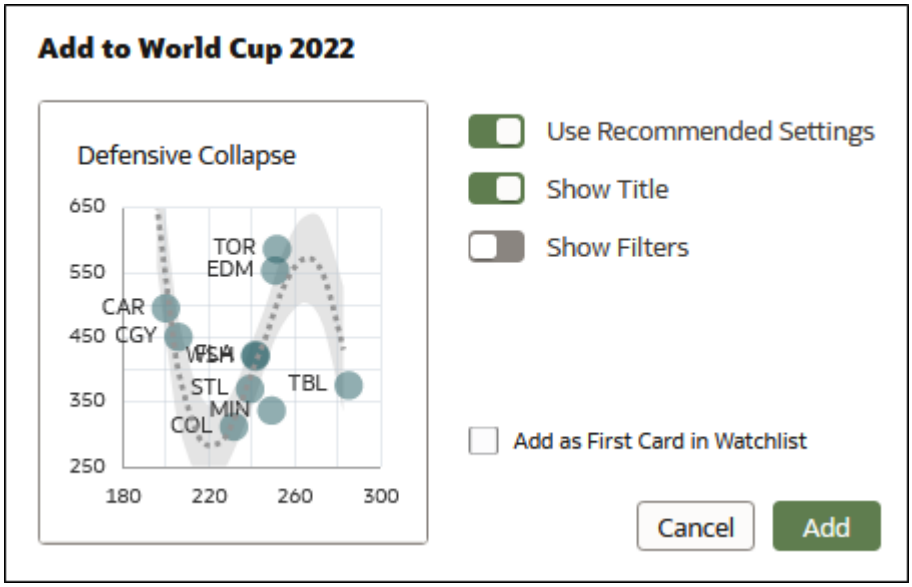
You might want to add useful or favorite visualizations to an existing watchlist. When you add a visualization to a watchlist, it's displayed in the watchlist as a visualization card.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Edit**.
3. Hover over the visualization that you want to add to a watchlist, and click **Add to Watchlist**.



4. Click an existing watchlist from the list.
5. Click **Add**.

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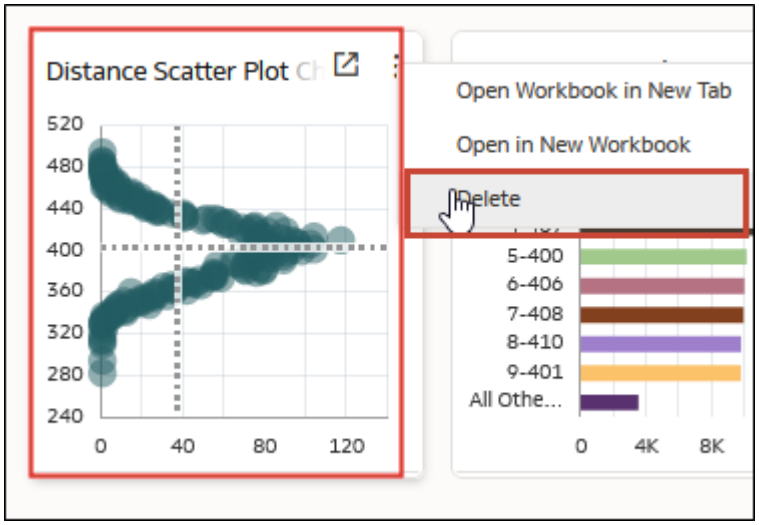
Delete a Visualization Card from a Watchlist

You can remove visualization cards from a watchlist.

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



2. Click **Actions** for the visualization card that you want to remove from the watchlist and select **Delete**.



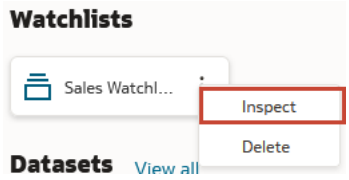
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3. Click **Yes** to remove the selected visualization card from the watchlist.

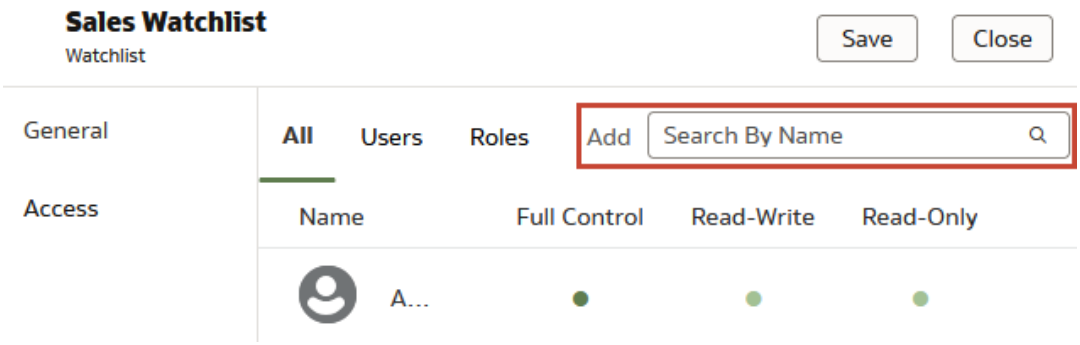
Share a Watchlist

As the owner of a watchlist, you can share the list with others.

1. On the Home page, select your watchlist and click **Actions** then **Inspect**.



2. Click **Access**.
3. In **Add**, enter a user name or role and click Search. Click a name or role from the results to share your watchlist.



4. Click the access control level for the user or role. Click **Save**.
5. Review the listed artifacts you're required to share for a user to view the watchlist. Select whether or not to share these artifacts, then click **Apply**.
6. Click **Close**.

Providing Custom Groups of Content on the Home page

Custom Groups on the Home page enable you to provide quick access to content that you can share with other users.

Topics:

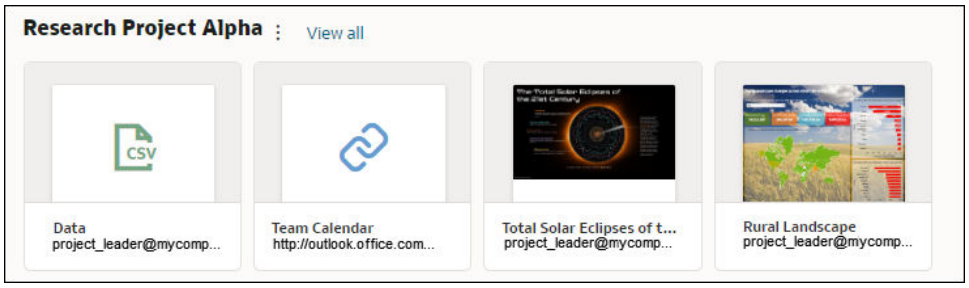
- What Are Custom Groups?
- Create and Share Custom Groups of Content on the Home page

What Are Custom Groups?

Custom groups enable you to display your own choice of items grouped together under a custom heading on the Home page.

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For example, you might display a custom group named Research Project Alpha on the Home page, containing links to data files, workbooks, and a team web calendar.



See Create and Share Custom Groups of Content on the Home page.

After you've created a custom group, click the Page Menu (⋮) next to the custom group name to access these options:

- **Add Items** - Add links to analytics content such as workbooks, reports, and datasets. You can add multiple items at the same time.
- **Add URL Item** - Add links to useful web pages. For example, you might share a team calendar by specifying `http://example.com/myteamcalendar`.
- **Inspect** - Rename the group and review the group owner using the **General** panel, and share it with other users using the **Access** panel.
- **Delete Custom Group** - Remove the custom group from the Home page.

You can also click **View All** to drill into the group. Here, you can edit the group name and add content links.

Create and Share Custom Groups of Content on the Home page

You create custom groups on the Home page to provide quick access to content that you can share with other users. For example, if you're collaborating with co-workers you can create and share a custom group containing specific workbooks, watchlists, dashboards, or web pages that you're all interested in.

You can configure how custom groups display on the Home page. See Explore Your Content.

1. On the Home page, hover over a workbook, dataset, dashboard, or visualization, click **Actions**, select **Add to Custom Group** and select **Add to New Custom Group**.
2. Enter a name, and click **Add** to create a custom group on the Home page.
3. Add an item to your group by hovering over the item on the Home page, click **Actions**, select **Add to Custom Group**, and select the name of the group to which you want to add the new item, then click **Add**.

   Repeat this step for each item that you want to add to the custom group.
4. To configure access for users and roles to view, use, or share the group with others, click **Page Menu** (⋮) next to the group name , select **Inspect**, then **Access**, select who has access, then click **Save**.

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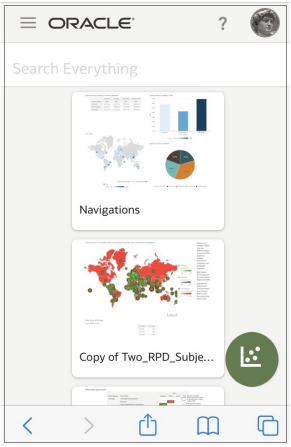
Explore Data on Mobile Devices Using A Built-in Browser

Explore your data at your desk and on the move using the browser in mobile devices on Android, Windows, or Apple operating systems.

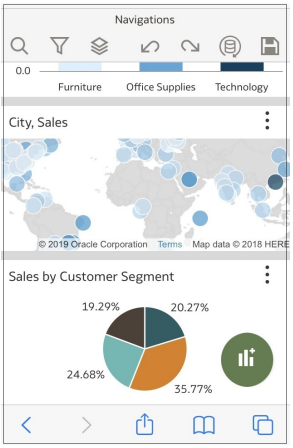
> **Note**
>
> Using a mobile device's browser provides limited Oracle Analytics capabilities. For more comprehensive analytics capabilities, use one of the mobile apps available for Oracle Analytics.

Using the browser in mobile devices, you can view analytics content (dashboards and analyses, workbooks and visualizations). You can also create workbooks and visualizations using a simplified editor.

- Log into Oracle Analytics to get to the Home page.

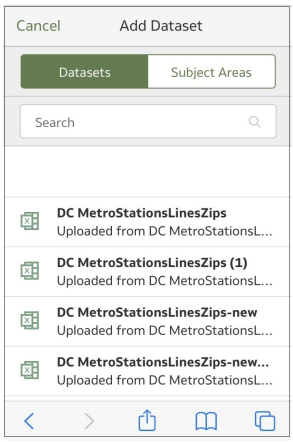


- Tap a workbook or visualization to display the content.



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- Tap the add icon  to create a visualization. You see the simplified visualization designer.



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Part II
Visualize Data

This part explains how to visualize data.

Topics

- Connect to Data Sources
- Connect to Your Data Using Datasets
- Enrich and Transform Your Data
- Create Datasets Using Data Flows
- Manage Datasets
- Visualize and Analyze Data
- Filter Data
- Create and Use Parameters
- Understand Your Data Using Insights
- Apply Map Backgrounds and Map Layers to Enhance Visualizations
- Use Data Actions
- Use Other Functions to Visualize Data
- Build a Presentation Flow
- Use Oracle Analytics Predictive Models and Oracle Machine Learning Models
- Import, Export, and Share

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2

Connect to Data Sources

Connect to databases and upload spreadsheets to get the data you need to create datasets.

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 Analytic Views in Oracle Autonomous Data Warehouse
- Connect to Oracle Fusion Cloud Applications Suite
- Connect to Oracle Fusion Cloud Enterprise Performance Management (EPM)
- Connect to Essbase Data Sources
- Connect to NetSuite
- Connect to Oracle Talent Acquisition Cloud
- Connect to a Database Using Delta Sharing
- Connect to Dropbox
- Connect to Google BigQuery
- Connect to Google Drive or Google Analytics
- Connect to Snowflake Data Warehouse
- Connect to OCI Data Flow SQL Endpoints
- Connect to Data from REST Endpoints
- Connect to Data Using JDBC
- Create Generic ODBC Connections
- Connecting to Data Sources Using Kerberos Authentication
- Connect to Oracle Service Cloud
- Model Data in a Snowflake Data Warehouse
- Data Sources 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.

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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.

> **Note**
>
> Your use of third-party data sources is governed by the data source vendor's terms and agreements, and you're responsible for complying with these terms and agreements.

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.

When you save a workbook, the permissions are synchronized between the workbook and the external sources that it uses. If you share the workbook with other users, then the external sources are also shared with those same users.

Data Sources and Subject Areas

You can combine data sources with subject areas to explore and analyze the data.

A subject area either extends a dimension by adding attributes or extends facts by adding measures and optional attributes. You can't define hierarchies in data sources.

A subject area organizes attributes into dimensions, often with hierarchies, and a set of measures, often with complex calculations, that can be analyzed against the dimension attributes, for example, the measure net revenue by customer segment for the current quarter, and the same quarter a year ago.

When you use data from a source such as an Excel file, the file adds information that is new to the subject area. For example, suppose you purchased demographic information for postal areas or credit risk information for customers and want to use this data in an analysis before adding the data to the data warehouse or an existing subject area.

Using a source as standalone means that the data from the source is used independently of a subject area. It’s either a single file or several files used together, and in both cases doesn't involved a subject area.

You can extend a dimension by adding attributes from a data source to a subject area:

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- You can only make matches to a single dimension.
- The set of values in matched columns are unique in the data source. For example, if the data source matches on ZIP code, then ZIP codes in the source are unique.
- You make matches between one or composite columns. An example of a one column match is that product key matches product key. For composite columns, an example is that company matches company and business unit matches business unit.
- All other columns must be attributes.

You can add measures from a data source to a subject area:

- You make matches to one or more dimensions.
- The set of values in matched columns aren't necessarily unique in the data source. For example, if the data source is a set of sales matched to date, customer, and product, then you can have multiple sales of a product to a customer on the same day.
- You make matches between one or composite columns. An example of a one column match is that product key matches product key. For composite columns, an example is that city and state from separate columns creates the composite City_State in a customers address.

A data source that adds measures can include attributes. You can use these attributes alongside external measures and not alongside curated measures in visualizations. For example, when you add a source with the sales figures for a new business, you can match these new business sales to an existing time dimension and nothing else. The data might include information about the products sold by this new business. You can show the sales for the existing business with those of the new business by time, but you can’t show the old business revenue by new business products, nor can you show new business revenue by old business products. You can show new business revenue by time and new business products.

Data Sources and Measure Columns

You can work with data sources that either include or don't include a measure column.

- You can match tables with measures to other tables with a measure, a dimension, or both.
- When you match tables to other tables with measures, the tables don’t need to be at the same grain. For example, you can match a table of daily sales table to a sales by quarter table.

A table with no measures is treated as a dimension.

- Matches can be between single or composite columns. A single column match might be the product key in one table matching the product key in another. A composite column match might be where company and business unit in one table matches company and business unit in the other table.
- All other columns must be attributes.

Dimension tables can be matched to other dimensions or they can be matched to tables with measures. For example, a table with Customer attributes can be matched to a table with demographic attributes provided both dimensions have unique Customer key columns and Demographic key columns.

Manage Connections to Data Sources

You can create, update, remove, and share connections to data sources. As an Oracle Analytics user with DV Content Author access, you can perform these actions.

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Topics:

- Create a Connection to a Data Source
- Edit a Data Source Connection
- Delete a Data Source Connection
- Share 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. If you're connecting to a remote database, click **Use Remote Data Connectivity**.

   If the Remote Data Connectivity option is available for the dataset, this option appears as a checkbox in the connection dialog. Check with your administrator if you're not sure.
6. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.
7. 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**.

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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**.

Share a Data Source Connection

You can assign access permissions to the data source connections that you create or administer.

1. On the Home page click the **Navigator**. Click **Data**, and then click **Connections**.
2. Hover over the connection that you want to share, click **Actions**, then select **Inspect**.
3. Click **Access**, and use the tabs to grant access:
   - **All** - Share the connection with individual users or roles.
   - **Users** - Share the connection with individual users.
   - **Roles** - Share the connection with application roles (for example, BI Consumer), so that all users with those roles can use the connection.
4. Use the **Add** box to search for and select a user or role.

   The user or role is displayed in the list below with the default privileges **Read-Only**.
5. To change the default privileges, select one of the following:
   - **Full Control** - The user or role can use the connection to create datasets, and modify, rename, or delete the connection. They can also change the privileges for the connection.
   - **Read-Write** - The user or role can use the connection to create datasets, and modify or rename the connection (but not delete it).
   - **Read-Only** - The user or role can use the connection to create datasets, but not change the connection details.
6. Click **Save**.

When users next log in, they can use connections that you've shared to visualize data from this database.

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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= 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.

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.

System connection

Select **System connection** if you want to use these connection details in Semantic Modeler or Model Administration Tool.

- If you're modeling data using Semantic Modeler, choosing this option enables Semantic Modeler to connect to the data source. To find out which databases Semantic Modeler supports, look for a Yes in the 'Data Models - Semantic Modeler' column in the supported data sources list. See Certification - Supported Data Sources.
- If you're modeling data using Model Administration Tool, you can connect to some data sources by copying connection details from Oracle Analytics Cloud into Model Administration Tool. To find out which data sources support this, look for System Connection in the Connectivity Options in the Use in Model Administration Tool in Certification - Supported Data Sources. Click **Copy**, to copy the connection's **Object ID**. Business modelers can paste in the **Object ID** to identify and use a data connection in the Model Administration Tool (Connection Pool dialog).

Click **Copy**, to copy the connection's **Object ID**. Business modelers can paste in the **Object ID** to identify and use a data connection in the Model Administration Tool (Connection Pool dialog).

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Note: If you don't click **System connection** when you initially create the connection, if you later want data modelers to use the connection details, then you have to create a new connection and select **System connection**. In other words, you can't edit the connection later and select this option.

Database Connection Limits

Understand your database connection requirements before your create the database connection.

The maximum number of database tables displayed in Oracle Analytics is 10,000. If you need additional tables, Oracle recommends that you ask your database administrator to create a database user with access to the specific objects you want to analyze and specify that user's credentials when you create the database connection.

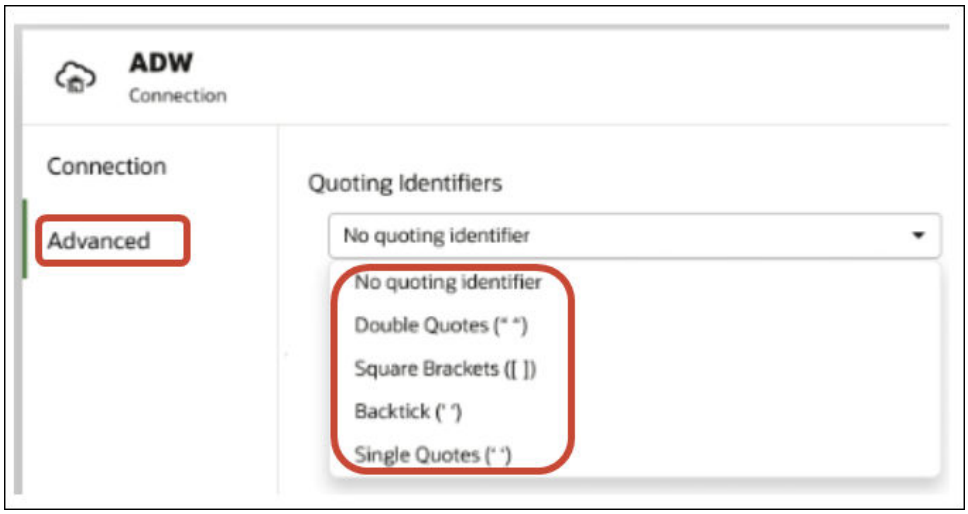
Connect to Data With Upper, Lower, or Mixed-case Characters

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.



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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**.

Manage Connections Using REST APIs

You can use Oracle Analytics Cloud REST APIs to programmatically manage connections to a range of data sources. For example, you might want to create a script that creates (or modifies) the same set of connections in both your test and production Oracle Analytics Cloud environments.

- About Connection REST APIs
- Typical Workflow for Managing Connections Using REST APIs
- How to Use REST APIs to Manage Data Source Connections
- Sample JSON Payloads for Data Sources

About Connection REST APIs

You can create, update, and delete connections for a range of data sources using REST APIs. This topic lists the types of data source connections you can manage with REST APIs.

> **Note**
>
> *REST API for Oracle Analytics Server* provides detailed information about each REST API. See Connection REST Endpoints.

Supported Data Sources

- Oracle Database
- Oracle Autonomous Data Warehouse
- Oracle Essbase
- MySQL
- PostgreSQL
- Snowflake
- SQL Server
- Vertica

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Connection Parameters

The connection parameters required for each data source are different. If you want to use the REST API to create or update a connection, you must know the JSON payload format required for your data source. See Sample JSON Payloads for Data Sources.

Typical Workflow for Managing Connections Using REST APIs

Here are the common tasks to start using Oracle Analytics Server REST APIs to programmatically manage connections. If you're using the REST APIs for the first time, follow these tasks as a guide.

Task	Description	REST API Documentation
Understand prerequisites	Understand and complete several prerequisite tasks. You must have permissions to create workbooks and connect to data in Oracle Analytics Server to manage data connections using REST APIs (**DV Content Author**).	Quick Start tasks
Understand the authentication mechanism allowed by your configuration.	Authentication in Oracle Analytics Server is managed using the same authentication mechanism as your Oracle Analytics Server environment.	Authenticate
Understand supported data sources	Read the topic that describes the types of data connections you can manage with REST APIs.	Supported Data Sources
Determine JSON payload formats	Read the topic that describes the JSON payload format for your data source and obtain the required connection parameters.	Sample JSON Payloads for Data Sources
Create a connection	Create a data connection for use in workbooks, reports, and dashboards.	Create a connection
Update a connection	Update one or more properties of an existing data connection.	Update a connection
Delete a connection	Delete a data connection.	Delete a connection

How to Use REST APIs to Manage Data Source Connections

Use these samples and examples to help you manage data source connections with REST API requests using cURL.

- Sample cURL Format
- Examples

Sample cURL Format

Use the following cURL command format to create or update data source connections using REST APIs:

- **Simple JSON**

```
curl
--header "Authorization: Bearer <token>"
--header "Content-Type: application/json"
```


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```
--request POST|PUT https://<hostname>/api/20210901/catalog/connections
--data "<data source connection payload>"
```

- **Multi-part/Form data**

```
curl
--header "Authorization: Bearer <token>"
--request POST|PUT https://<hostname>/api/20210901/catalog/connections
--form "cert=<security wallet file>"
--form "connectionParams=<data source connection payload>"
```

Where:

- **<token>** - Authenticate bearer token required to authenticate calls to Oracle Analytics Server REST APIs. See Authenticate .
- **<hostname>** - Host where Oracle Analytics Server is running.
- **<data source connection payload>** - Data source-specific connection information. See Sample JSON Payloads for Data Sources.
- **<security wallet file>** - Stores SSL-related information such as authentication and signing credentials, private keys, certificates, and trusted certificate. Required for some connection types, such as Oracle Database with SSL and Oracle Autonomous Data Warehouse (Mutual TLS).

Examples

The following examples show you how to create a connection to Oracle Autonomous Data Warehouse (ADW).

- Example 1 - Create a wallet-less (TLS) connection to Oracle ADW
- Example 2 - Create a connection to Oracle ADW that uses a credentials wallet file `cwallet.sso` (Mutual TLS)

> **Note**
>
> The JSON payloads in these examples are specific to Oracle ADW. The JSON payload format is different for other data sources. See Sample JSON Payloads for Data Sources.

Example 1 Create a wallet-less (TLS) connection to Oracle ADW

In this example, you create a connection named `oracle_adw_walletless`. The request body includes simple JSON `application/json`.

```
curl
  --header "Authorization: Bearer <token>"
  --header "Content-Type: application/json"
  --request POST https://example.com/api/20210901/catalog/connections
  --data "{
     "version": "2.0.0",
     "type": "connection",
     "name": "oracle_adw_walletless",
     "description": "Sample Oracle ADW connection without a wallet created using
Connections API",
     "content": {
       "connectionParams": {
```


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```
          "connectionType": "oracle-autonomous-data-warehouse",
          "connectionString": "(description= (retry_count=20)(retry_delay=3)
(address=(protocol=tcps)(port=1521)(host=adb.us-ashburn-1.oraclecloud.com))
(connect_data=(service_name=abcdefg1hijkl2m_adwwalletless_high.adb.oraclecloud.com))
(security=(ssl_server_dn_match=yes)))",
          "username": "ADMIN",
          "password": "<<password>>",
          "systemConnection": false,
          "remoteData": false,
          "sslType": "ServerSideSSL"
        }
      }
   }"
```

Response Body

```
{"connectionID":"J0FkbWluJy4nb3JhY2xlX2Fkd193YWxsZXRsZXNzJw=="}
```

Make a note of the Base64 encoded `connectionId` in the response body. Later on, you can use this value to update or delete the connection.

Example 2 Create a connection to Oracle ADW that uses a wallet file (Mutual TLS)

In this example, you create a connection named `oracle_adw_with_wallet`. The request body includes `multipart/form-data`, that is, requires both a wallet file from Oracle ADW (`cwallet.sso`) and Oracle ADW connection parameters.

```
curl
 --header "Authorization: Bearer <token>"
 --request POST https://<hostname>/api/20210901/catalog/connections
 --form "cert=@"/Users/scott/Downloads/Wallet_adw/cwallet.sso""
 --form "connectionParams= "{
    "version": "2.0.0",
    "type": "connection",
    "name": "oracle_adw_with_wallet",
    "description": "Sample Oracle ADW connection with a wallet created using Connections
API",
    "content": {
      "connectionParams": {
        "connectionType": "oracle-autonomous-data-warehouse",
        "connectionString": "(description= (retry_count=20)(retry_delay=3)
(address=(protocol=tcps) (port=1522)(host=adb.us-ashburn-1.oraclecloud.com))
(connect_data=(service_name=abcdefg1hijkl2m_walletadw_high.adwc.oraclecloud.com/))
(security=(ssl_server_dn_match=yes)))",
        "username": "ADMIN",
        "password": "<<password>>",
        "remoteData": "false",
        "systemConnection": false,
        "sslType": "ClientSideSSL"
       }
      }
    }"
```

Response Body

```
{"connectionID":"J2FkbWluJy4nb3JhY2xlX2Fkd193aXRoX3dhbGxldCc="}
```

Make a note of the Base64 encoded `connectionId` in the response body. Later on, you can use this value to update or delete the connection.

Additional examples are available in *REST API for Oracle Analytics Server*. See Create a connection, Update a connection and Delete a connection.

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Sample JSON Payloads for Data Sources

To connect to data source you provide connection parameters. When you use the Connections REST API, you specify connection parameters in a JSON payload format. Use this table to determine the JSON payload for the data source you want to connect to.

Data Source	Request Type	Input Payload
Oracle Database (Non-SSL)	**application/ json**	**Basic Connection Type** `{ "version": "2.0.0", "type": "connection", "name": "oracle_db_non_ssl_basic", "description": "Sample non-SSL Oracle Database connection created using Connections API", "content": { "connectionParams": { "connectionType": "oracle-database", "host": "example.com", "port": "1521", "serviceName": "orcl", "username": "admin", "password": "<password>", "remoteData": false, "systemConnection": false } } }`  **Advanced Connection Type**  `{ "version": "2.0.0", "type": "connection", "name": "oracle_db_non_ssl_advanced ", "description": " Sample non-SSL Oracle Database connection created with the advanced connection string format using Connections API", "content": { "connectionParams": { "connectionString": "(DESCRIPTION= (ADDRESS_LIST= (LOAD_BALANCE=on)(FAILOVER=ON) (ADDRESS=(PROTOCOL=tcp)(HOST=example.com) (PORT=1521))) (CONNECT_DATA=(SERVICE_NAME=ORCLPDB1)))", "username": "admin", "password": "<password>", "connectionType": "oracle-database", "remoteData": false, "systemConnection": false } }`

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Data Source	Request Type	Input Payload
		} }

Oracle Database with SSL	**multi-part/ form-data**	cwallet.sso (client credentials file)
		
		Basic Connection Type
		
		cert: <cwallet.sso file location>
		connectionParams: {
		"version": "2.0.0",
		"type": "connection",
		"name": "oracle_db_ssl",
		"description": "Sample Oracle Database connection with SSL created using Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "oracle-database",
		"host": "example.com",
		"port": "2484",
		"serviceName": "ORCLPDB1",
		"username": "admin",
		"password": "<password>",
		"systemConnection": false,
		"remoteData": false
		}
		}
		}

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Data Source	Request Type	Input Payload

Oracle Autonomous Data Warehouse - Wallet-less (TLS)	**application/ json**	**Basic Connection Type**
		
		{
		"version": "2.0.0",
		"type": "connection",
		"name": "oracle_adw_walletless_basic",
		"description": "Sample Oracle ADW connection without a wallet created using Connections API",
		"content": {
		"connectionParams": { "connectionType": "oracle-autonomous-data-warehouse",
		"connectionString": "(description=(retry_count=20)(retry_delay=3)(address=(protocol=tcps)(port=1521)(host=example.com))(connect_data=(service_name=example.com))(security=(ssl_server_dn_match=yes)))",
		"username": "admin",
		"password": "<password>",
		"systemConnection": false,
		"remoteData": false,
		"sslType": "ServerSideSSL"
		}
		}
		}

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Data Source	Request Type	Input Payload

Oracle Autonomous Data Warehouse - Wallet (Mutual TLS)	**multipart/ form-data**	`cwallet.sso (client credentials file)`
		
		Basic Connection Type
		
		`cert: <cwallet.sso file location>`
		
		`connectionParams: {`
		` "version": "2.0.0",`
		` "type": "connection",`
		` "name": "oracle_adw_with_wallet",`
		` "description": "Sample Oracle ADW connection with wallet created using Connections API",`
		` "content": {`
		`  "connectionParams": {`
		`  "connectionType": "oracle-autonomous-data-warehouse",`
		`  "connectionString": "(description= (retry_count=20)(retry_delay=3) (address=(protocol=tcps) (port=1522) (host=example.com))`
		
		`(connect_data=(service_name=example.com))`
		
		`(security=(ssl_server_dn_match=yes)))",`
		`  "username": "admin",`
		`  "password": "<password>",`
		`  "remoteData": "false",`
		`  "systemConnection": false,`
		`  "sslType": "ClientSideSSL"`
		`  }`
		` }`
		`}`

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Data Source	Request Type	Input Payload

PostgreSQL (Non-SSL)	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "postgres_non_SSL",
		"description": "Sample PostgreSQL connection created using Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "postgresql-database",
		"host": "example.com",
		"port": "5432",
		"serviceName": "postgres",
		"username": "admin",
		"password": "<password>",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

PostgreSQL with SSL	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "postgres_SSL_Conn",
		"description": "Sample PostgreSQL connection with SSL created using Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "postgresql-database",
		"host": "example.com",
		"port": "5432",
		"serviceName": "postgres",
		"username": "admin",
		"password": "<password>",
		"sslType":"ServerSideSSL",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

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Data Source	Request Type	Input Payload

SQL Server (Non-SSL)	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "SqlServer_non_ssl",
		"description": "Sample non-SSL SQL Server connection created using Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "sqlserver-database",
		"host": "example.com",
		"port": "1400",
		"serviceName": "sqlserver1",
		"username": "admin",
		"password": "<password>",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

SQL Server with SSL	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "SqlServer_ssl",
		"description": "Sample SQL Server connection with SSL created using the Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "sqlserver-database",
		"host": "example.com",
		"port": "60190",
		"serviceName": "sqlserver1",
		"username": "admin",
		"password": "<password>",
		"sslType":"ServerSideSSL",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

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Data Source	Request Type	Input Payload

MySQL (Non-SSL)	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "MySql_no_SSL",
		"description": "Sample MySQL connection created using the Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "mysql-database",
		"host": "example.com",
		"port": "3307",
		"serviceName": "mysql1",
		"username": "admin",
		"password": "<password>",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

MySQL with SSL	**application/ json**	**Basic Connection Type**
		
		{
		"version":"2.0.0",
		"type": "connection",
		"name": "MySql_ssl",
		"description": "Sample MySQL connection with SSL created using Connections API",
		"content": {
		"connectionParams": {
		"connectionType": "mysql-database",
		"host": "example.com",
		"port": "3306",
		"serviceName": "mysql1",
		"username": "admin",
		"password": "<password>",
		"sslType":"ServerSideSSL",
		"remoteData": false,
		"systemConnection": false
		}
		}
		}

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Data Source	Request Type	Input Payload
Oracle Essbase	**application/ json**	**Basic Connection Type** `{ "version":"2.0.0", "type": "connection", "name": "Oracle_Essbase", "description": "Sample Oracle Essbase connection created using Connections API", "content": { "connectionParams": { "connectionType": "oracle-essbase", "dsn":"example.com", "username":"admin", "password":"<password>", "remoteData": false, "systemConnection": false, "authentication":"current"/"private"/"sso" } } }`

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.

Video

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))`

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```
(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. If you're connecting to an on-premises database, click **Use Remote Data Connectivity**.

   Check with your administrator that you can access the on-premises database.

6. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.

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 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:

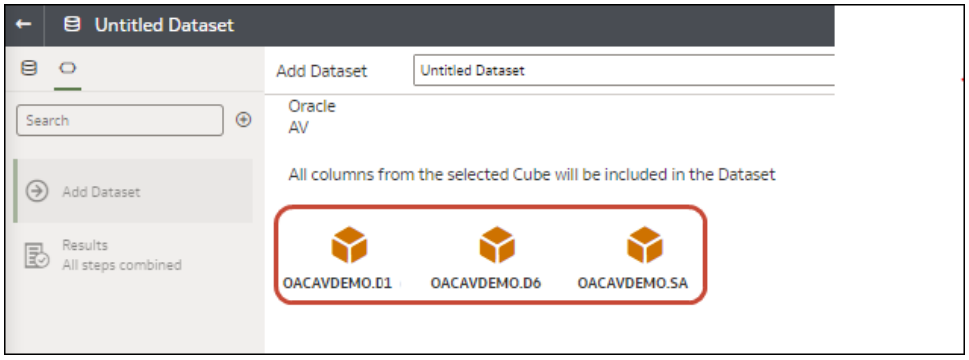
   - **Always use these credentials** - Oracle Analytics always uses the login name and password you provide for the connection. Users aren't prompted to log in.
   - **Require users to enter their own credentials** - Oracle Analytics prompts users to enter their own user name and password for the data 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.

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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.

1. To connect using a credentials wallet file, (known as **Mutual TLS** connection), download the SSL certificates from 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 connect without using a credentials wallet file (known as **TLS** connection), skip Step 1 and go straight to the Step 2.
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.

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6. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.
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**.

You can now create datasets from the connection.

Selecting an Oracle Autonomous Data Warehouse Database Service Name

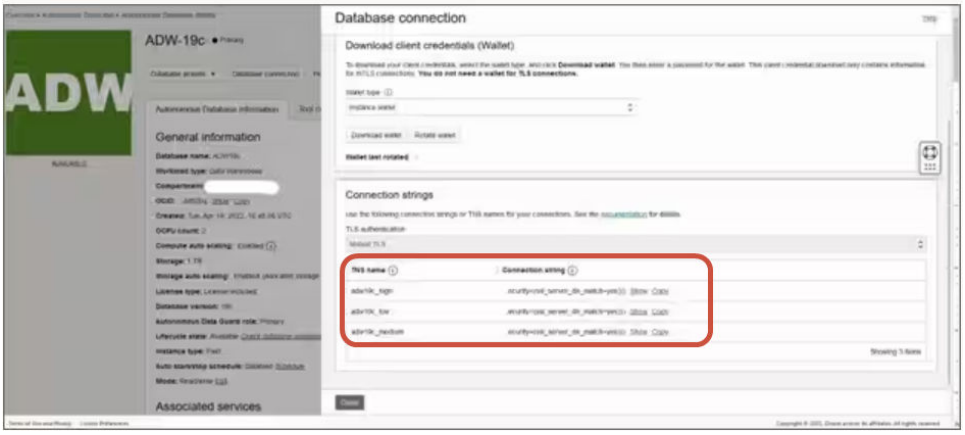
Selecting the correct prebuilt database service name is key to connecting to Oracle Autonomous Data Warehouse. Learn about the different prebuilt database service names and which one you should choose.

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.

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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 × number of ECPUs)	60 (1.89 × number of ECPUs)
low	Up to 4800 (150 x number of ECPUs)	Up to 4800 (150 x 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.

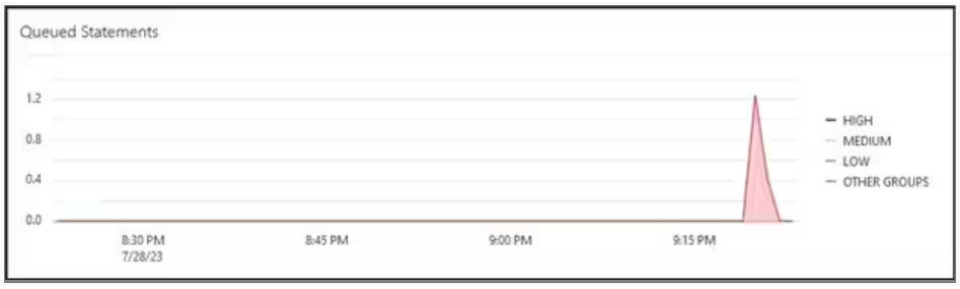
The low service name works well for most Oracle Autonomous Data Warehouse workloads with Oracle Analytics, but to utilize parallel queries, select the medium service name. The parallel degree limit for the low service name is one, meaning no parallelism. If you're connected to the low service name, even 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.



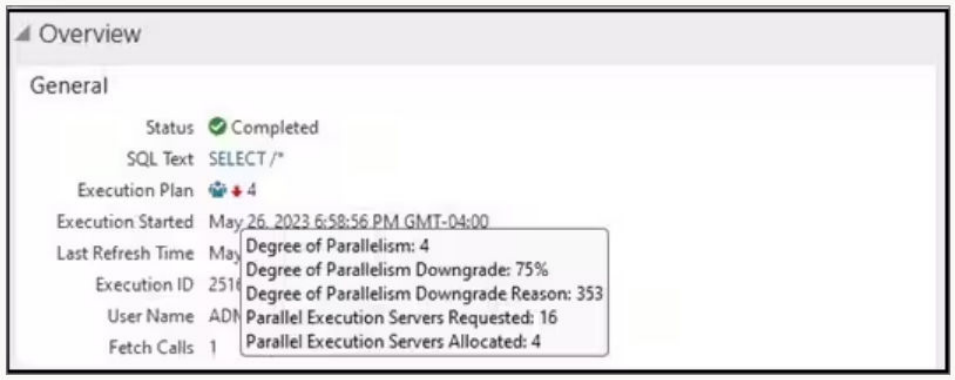
Select **Performance Hub,** and select **SQL Monitor Tab** to see the queued statement status, which is displayed as a grey clock. In this example, three queries are running with the high service name, one is queued, and one query is running with the medium service name. The queued statement executes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

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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

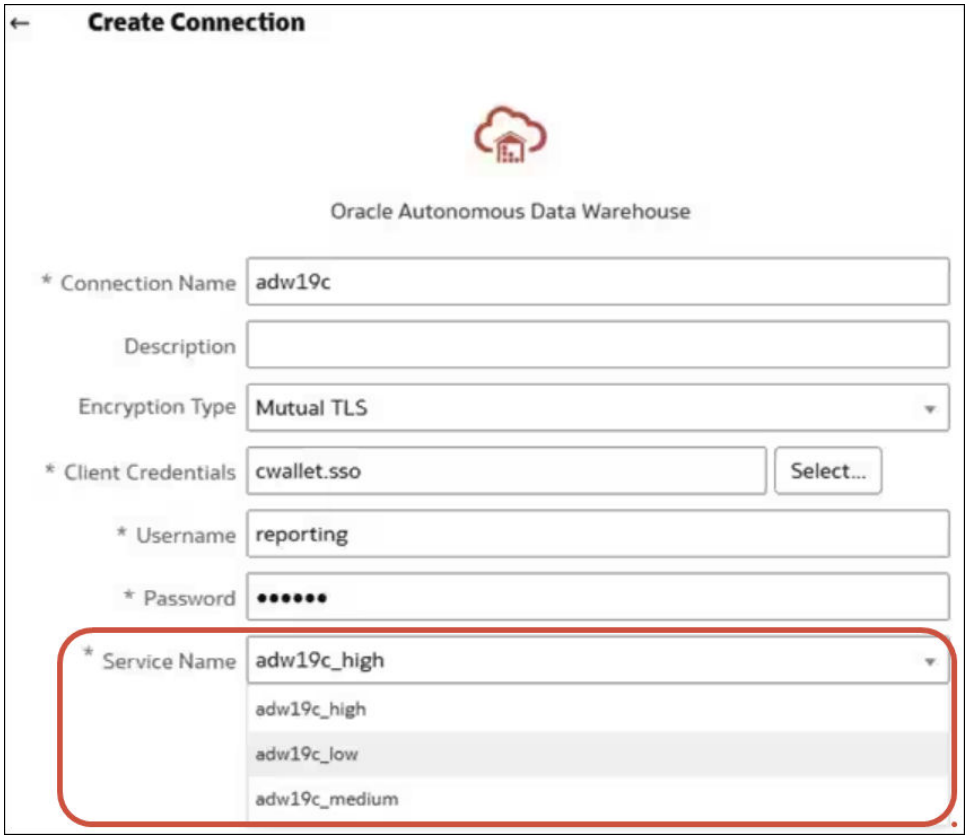
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disappeared once the customer switched to the medium service, and the periodic slowness of their dashboard was resolved.



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.



Connect to Oracle Autonomous Transaction Processing

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

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1. To connect using a credentials wallet file, (known as **Mutual TLS** connection), download the SSL certificates from Oracle Autonomous Data Warehouse.

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

   To connect without using a credentials wallet file (known as **TLS** connection), skip Step 1 and go straight to the Step 2.

   A 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.
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. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.
8. 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.
9. Click **Save**.
10. 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 Analytic Views in Oracle Autonomous Data Warehouse

Connect to analytic views to visualize data in Oracle Autonomous Data Warehouse.

Before you start, ask your Oracle Analytics Cloud administrator to make analytic views available through a local subject area (semantic model).

1. In Oracle Analytics Cloud, on the Home page, click **Create** and then click **Dataset**.
2. Click **Local Subject Area**.
3. Select a subject area that's based on an analytic view.
4. Select the facts and measures that you want to analyze and add to the dataset.

   You can now visualize data in this dataset.

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Connect to Oracle Fusion Cloud Applications Suite

You can connect to Oracle Fusion Cloud Applications Suite and create datasets that help you visualize, explore, and understand your applications data.

Topics:

- About the Oracle Applications Connector
- Connect to an Application in Oracle Fusion Cloud Applications Suite
- Configure Impersonate User for the Use Active User's Credentials Option

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.

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**. 

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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 Analytics Server.

     > **Note**
     >
     > Don't enter the URL of the Oracle Analytics application you're currently logged in to. If you want to visualize the data used in a local analysis, create a dataset based on the analysis (local subject area). See Create a Dataset from a Subject Area in Your Instance.

   - 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.

Configure Impersonate User for the Use Active User's Credentials Option

You can configure "impersonate user" to enable the active user's credentials option when you use the Oracle Applications connection type.

You can implement "impersonate user" for connections to Oracle Fusion Cloud Applications Suite with Oracle Transactional Business Intelligence, and Oracle BI EE. When you use "impersonate user", users can access data allowed for the active user's permissions, privileges, and role assignments. Users aren't prompted to enter their user name and password.

Tips on setting up impersonation

- Provision one administrator user in the Oracle Fusion Cloud Enterprise Performance Management (EPM) identity domain with the necessary roles and permissions to impersonate other users.
- Specify the credentials for this EPM administrator user when you import the metadata using the Model Administration Tool. The credentials are stored in the connection pool of the RPD data model created by the Model Administration Tool.
- In addition, the SSO checkbox must be checked on the Planning server connection pool in the RPD.

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- With this setup, only one native user needs to be provisioned in the EPM identity domain. Other end users log into Oracle Analytics using their SSO credentials, and Oracle Analytics passes the SSO username to Planning and Budgeting Cloud Service when connecting, along with the credentials of the native EPM administrator user that has impersonation permissions.
- **Note**: Logging into EPM using SSO credentials isn't supported by the REST API or the Planning ADM driver.

Provision Impersonate User for Connection to Oracle Fusion Cloud Applications Suite

You can provision the impersonate user functionality in Oracle Fusion Cloud Applications Suite when your connection target is an application in Oracle Fusion Cloud Applications Suite with Oracle Transactional Business Intelligence.

1. Log in to Oracle Fusion Applications as an administrator with privileges to create or modify a role.
2. Display the Security Console dialog, and display the **Users** tab.
3. Click **Add User Account** to create a user. For example, create a user called DV Admin.
4. Display the **Roles** tab, and click **Create Role**.
5. Enter a role name in the **Role Name** field. For example, enter `DV Access`.
6. Enter a code for the role name in the **Role Code** field. For example, enter `DV_ACCESS`.
7. Select `BI - Abstract Roles` in the **Role Category** field.
8. Skip the steps Function Security Policies and Data Security Policies.
9. In the Role Hierarchy step, click (+) **Add Role** and select the existing `BIImpersonator` role in the Add Role Membership dialog.
10. Select the user that you created (for example, DV Admin).
11. Click **Add User to Role** in the Add User dialog.
12. Click **Save and Close**.

    The DV Admin user is added to the BI Impersonator role, and you can use the DV Admin user in Oracle Analytics in conjunction with the **Use Active User's Credentials** option in the Create Oracle Application Connection dialog.

    You can now test the impersonate functionality.

Provision Impersonate User for Connections to Oracle BI EE On-Premises

You can provision the impersonate user functionality in Oracle Fusion Middleware when your Oracle Application connection target is an on-premises installation of Oracle BI EE.

1. Log in to Oracle Fusion Middleware Control for your Oracle BI EE instance using an administrator account.
2. Click the **Weblogic Domain** option, and select **Security** and **Application Policies**.
3. Click **Create** to display the Create Application Grant dialog.
4. Click (+) **Add** in the Permissions area.
5. Select **Resource Types**.
6. Select **oracle.bi.user** from the drop-down list.
7. Click **Continue**.

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8. Enter an asterisk (*) in the **Resource Name** field.
9. Select "`impersonate`" in **Permission Actions**.
10. Click **Select**.
11. Click (+) **Add** in the Grantee section.
12. Select **User** from the **Type** drop-down list.

    You grant the newly created permission to either an application role or user.
13. Select **Includes** from the **Principal Name** drop-down list and enter an asterisk (*) into the field.
14. Click the **>** arrow to display a list of users.
15. Select the user that you want to give the permission to and click **OK**.

    You can now test the impersonate functionality.

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.

Don't create or use an Oracle Applications connection to connect to your local Oracle Analytics instance. Using a connection to your instance to create datasets from local subject areas or analyses results in data caching issues and errors in visualizations. Instead, use the Local Subject Area connection type to create a dataset from a subject areas stored in your Oracle Analytics instance. See Create a Dataset from a Local Subject Area.

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.

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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.

Don't create or use an Oracle Applications connection to connect to your local Oracle Analytics instance. Using a connection to your instance to create datasets from local subject areas or analyses results in data caching issues and errors in visualizations. Instead, use the Local Subject Area connection type to create a dataset from a analyses stored in your Oracle Analytics instance. See Create a Dataset from a Local Analysis.

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.

Edit an Oracle Applications Connection

You can edit an Oracle Applications connection. For example, you must edit a connection if your system administrator changed the Oracle Applications login credentials.

1. In the Data page, click **Connections**.
2. In the Edit Connection dialog, edit the connection details. Note that you can’t see or edit the password that you entered when you created the connection. If you need to change the connection’s password, then you must create a new connection.
3. Click **Save**.

Delete an Oracle Applications Connection

You can delete an Oracle Applications connection.

1. Delete any datasets that use the connection you need to delete.
2. In the Data page, click **Connections**.
3. Click **Yes**.

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Connect to Oracle Fusion Cloud Enterprise Performance Management (EPM)

You can create a connection to Oracle Fusion Cloud Enterprise Performance Management (EPM) and use the connection to access data.

Before you start, make sure that your product is supported. See Which Oracle EPM Business Processes Does Oracle Analytics Support?.

1. On the Home page, click **Create** and then click **Connection**.
2. Click **Oracle EPM Cloud** and enter the connection details.
3. For **URL**, enter the URL for the Oracle Fusion Cloud Enterprise Performance Management (EPM) data source.

   For EPM deployments on OCI Classic, enter the full URL in the format:

   ```
   https://epm-mySecurityDomain.epm.domain.mycloud.oracle.com/mySecurityDomain
   ```

   For example:

   ```
   https://example-idDomain.pbcs.dom1.oraclecloud.com/idDomain
   ```

   For EPM deployments on OCI Gen 2, enter the EPM URL, excluding the application context (epmcloud or Hyperion):

   ```
   https://epm-99999-plan.hap.fra.demoservices999.oraclepdemos.com/epmcloud
   ```

   For example:

   ```
   https://epm-99999-plan.hap.fra.demoservices999.oraclepdemos.com
   ```
4. Under **Authentication**, click **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 Fusion Cloud Enterprise Performance Management (EPM).
5. Click **Save**.

   You can now create datasets from the connection and visualize the data.

Which Oracle EPM Business Processes Does Oracle Analytics Support?

When you integrate Oracle Analytics with Oracle Enterprise Performance Management, make sure that you're connecting to one of the supported business processes:

Oracle Analytics supports:

- Financial Consolidation and Close
- FreeForm
- Planning and Planning Modules
- Profitability and Cost Management
- Tax Reporting

Oracle Analytics doesn't support:

- Account Reconciliation

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- Enterprise Data Management Cloud
- Narrative Reporting

Connect to Essbase Data Sources

You can create, edit, and delete Essbase connections and use the connections to create data sets from Essbase cubes.

Topics:

- Create a Connection to Oracle Essbase
- Create a Dataset from an Essbase Connection

Create a Connection to Oracle Essbase

You can create a connection to 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.

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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.

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.

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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

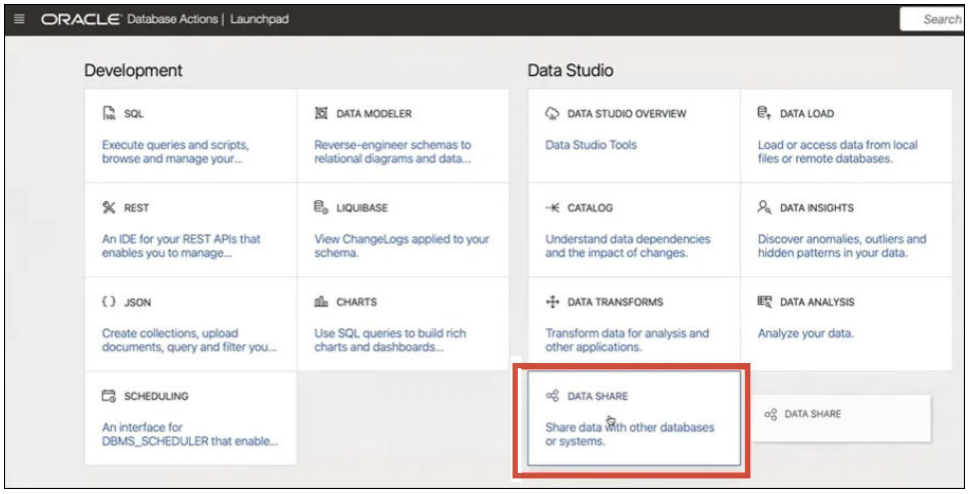
You can connect to some databases using the Delta Sharing protocol, for example, Oracle Autonomous Database, and visualize the data.

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

For a list of databases that support Delta Sharing, see Certification - Supported Databases.

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.

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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.

LiveLabs Sprint

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

1. Ask your Oracle Analytics administrator to allow connections to Dropbox.

   Your Oracle Analytics administrator must register the following domains as safe:

   `api.dropboxapi.com`

   `*.dropbox.com`

   See Register Safe Domains.
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**.

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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 BigQuery

You can create a connection to a Google BigQuery database and use the connection to visualize data in a BigQuery project.

Before you start, note the following:

- Creating a connection to Google BigQuery is resource-intensive. It's best to create one connection and share it with other users, rather than having multiple users create their own connection.
- Oracle Analytics builds a cache of tables and schemas for each project in Google BigQuery. You should limit the projects, tables, and schemas to only those required for the analysis.
- Depending on the amount of Google BigQuery data, creating a connection can take up to several hours, so allow time for this process to complete.
- After the connection is created, allow time before you use the connection to start analyzing your data.
- A connection to Goole BigQuery is defined explicitly to a single project. If you require data from multiple projects, then the connection must be created by a service user that has access to the projects and datasets. Dataset outputs can be blended.

1. In Google BigQuery, create a Service Account.
   a. Add a role (for example, BigQuery User) with the permission `bigquery.jobs.create` to the Service Account.
   b. Add Users to the role.
   c. Add a JSON key.
2. On the Oracle Analytics Home page, click **Create**, and then click **Connection**.
3. Click **BigQuery**.
4. Enter the connection details.
   - In **Connection Name**, specify a user-friendly name to identify the connection details in Oracle Analytics.
   - In **Project**, specify the BigQuery project you want to analyze using the name exactly as defined in Google BigQuery (case-sensitive).
   - In **Service Account Email**, specify the email address used to log into Google BigQuery.
   - In **Service Account Private Key**, upload the Service Account Private Key (JSON format).
5. Click **Save**.

   You can now create analytics dataset workbooks based on your Google BigQuery data. When you create a dataset, you navigate to BigQuery tables and select the data facts and measures to analyze. Alternatively, you can use a SQL Query to get the data directly.

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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. Ask your Oracle Analytics administrator to allow connections to Google.

   Your Oracle Analytics administrator must register the following domains as safe:

   `api.google.com`

   `*.google.com`

   See Register Safe Domains.
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 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**.

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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. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.
9. Click **Save**.
10. 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 OCI Data Flow SQL Endpoints

OCI Data Flow SQL Endpoints enables business analysts and data scientists to analyze both structured and unstructured data in object storage with high performance and scalability.

OCI Data Flow SQL Endpoints enable you to analyze large volumes of event and time-series data in-place on the data lake without having to move and summarize it for performance.

Topics:

- Overview to Analyzing OCI Data Flow SQL Endpoints
- Download JDBC Connection Details for Data Flow SQL Endpoints to a JSON File
- Create a Connection to OCI Data Flow SQL Endpoints

For general information about OCI Data Flow SQL Endpoints, see SQL Endpoints in the Oracle Cloud Infrastructure documentation.

Overview to Analyzing OCI Data Flow SQL Endpoints

You use Oracle Analytics Cloud to analyze data from OCI Data Flow SQL Endpoints in object storage, data lakes, and applications.

Data Flow SQL Endpoints are designed for developers, data scientists, and advanced analysts to interactively query data directly where it lives in a data lake.

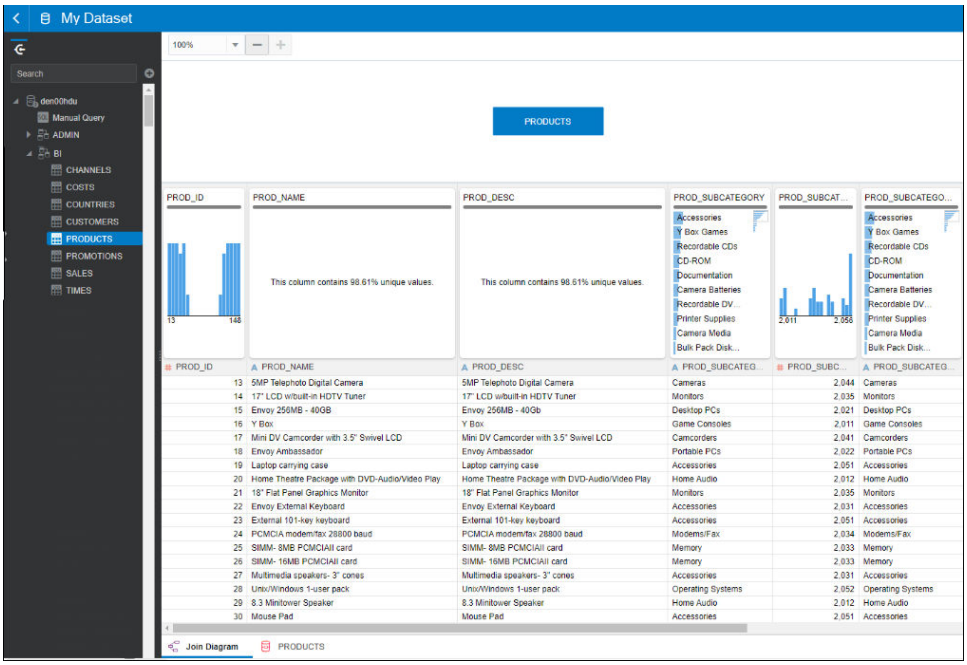
Benefits of Using OCI Data Flow SQL Endpoints

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- You can analyze large volumes of event and time-series data in-place on the data lake without having to move and summarize it for performance.
- You can consolidate data from multiple applications and data stores (for example, in Enterprise Resource Planning) into object storage and perform ad hoc queries regardless of where the data originates.
- You can dispense with extracts and pre-aggregation and work on live data at any level of granularity. So not only can you save the time and effort when preparing the data, you have more powerful analysis capabilities.

Best Practices for Performance

-



  To take advantage of the indexing and caching at the Spark Cluster tier, create a dataset based on a single table or view. Datasets based on multi-table joins are supported, but not recommended.

- When you configure the OCI Data Flow SQL Entpoints cluster, set `incrementalCollect` to true, for example:
  `spark.sql.thriftServer.incrementalCollect=true;`

Visualizing Data From OCI Data Flow SQL Endpoints

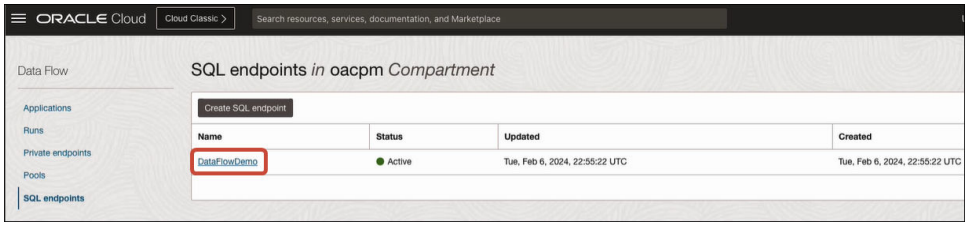
In the Oracle Analytics Cloud workbook editor, add multiple OCI Data Flow SQL Endpoints tables or cubes. When you select a table or cube, you can add dimension columns and measure columns to your datasets for analysis.

Download JDBC Connection Details for Data Flow SQL Endpoints to a JSON File

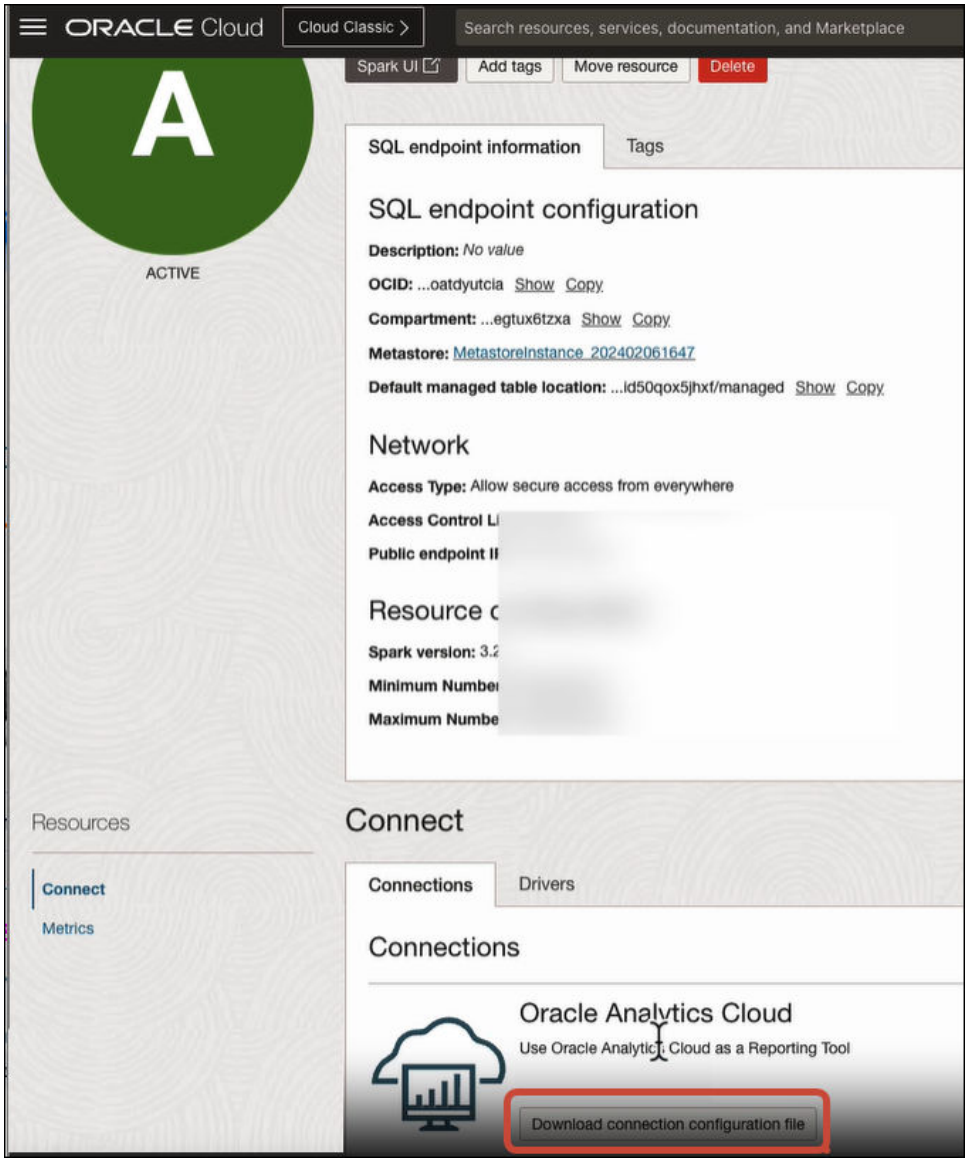
Download and configure JDBC connection details in a JSON file to use when you connect to OCI Data Flow SQL Endpoints from Oracle Analytics.

1. In OCI, navigate to Data Flow, SQL endpoints, and click the name of your data flow SQL endpoint.

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2. Scroll down to the Connect area, and under Connections - Oracle Analytics Cloud, click **Download connection configuration file**.



The connection configuration file is downloaded and saved to your local area.

You're now ready to connect to your OCI Data Flow SQL Endpoints data source in Oracle Analytics. See Create a Connection to OCI Data Flow SQL Endpoints.

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Create a Connection to OCI Data Flow SQL Endpoints

You can create a connection to a OCI Data Flow SQL Endpoints and use the connection to visualize data.

Before you start, in OCI Console download a JSON file containing connection details for the OCI tenancy where the OCI data flow is located. See Download JDBC Connection Details for Data Flow SQL Endpoints to a JSON File. In addition, copy an API Key from the User Tenancy area (in a Privacy Enhanced Mail (PEM) file).

1. On the Oracle Analytics Home page, click **Create**, and then click **Connection**.
2. Click **OCI Data Flow**.
3. In **Connection Name**, specify a user-friendly name to identify the connection in Oracle Analytics.
4. In **Connection Details**, click **Select**, navigate to your JDBC connection JSON file that you downloaded, then click **Open**.

   Oracle Analytics uses the JSON file to populate the **Host**, **Database**, **User OCID**, **Tenancy OCID**, and **Region** fields.
5. In **Private API Key**, click **Select**, navigate to your PEM file containing the API Key, then click **Open**.

   Oracle Analytics uses the PEM file to populate the **API Key Fingerprint** field.
6. 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 Data from REST Endpoints

You can connect to data sources with REST endpoints and analyze the data. For example, connect to SaaS or PaaS applications or government data such as weather, spatial, or census data.

Connecting to data via REST endpoints enables you to analyze data from many transactional SaaS or PaaS applications without having to understand the internal format or structure of the data.

1. Store the data source's REST endpoint connection details in a JSON file. See Specifying REST Endpoint Connection Details in a JSON File.

   You can download example JSON files from the Oracle Analytics Public Library. See JSON Examples for Common Data Sources with REST Endpoints.
2. Create a connection in OAC by uploading the zipped JSON file. See Create a Connection to a Data Source with REST Endpoints.
3. Use the connection. For example, from the Home page, click **Create**, then **Dataset**, then select the connection that you created in Step 2.

See Troubleshooting Connection to Data Sources with REST Endpoints.

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Specifying REST Endpoint Connection Details in a JSON File

Before you create a connection from Oracle Analytics Cloud to a data source's REST endpoints, create a zipped JSON file containing the connection details.

You can download a JSON template from the Oracle Analytics Public Library. Store the connection details in a JSON file based on the template, then compress the JSON file in ZIP format. You can also download example JSON files for a range of SaaS and PaaS applications.

JSON Template Format for Connection to REST Endpoints

```
{
    "name": "Connection name",
    "description": "Brief description",
    "baseURL": "URL, e.g. https://api.surveymonkey.com/v3",
    "endpoints": {
        "Endpoint 1": "Endpoint 1 URL, e.g. https://api.surveymonkey.com/v3/
users/endpoint1",
        "Endpoint 2": "Endpoint 2 URL, e.g. https://api.surveymonkey.com/v3/
question_bank/endpoint2",
        "Endpoint n": "Endpoint n URL, e.g. https://api.surveymonkey.com/v3/
users/endpointn"
    },
    "authentication": {
        "type": "Authentication type"
    }
}
```

JSON Example for Connection to Survey Monkey REST Endpoints

```
{
    "name": "Survey Monkey Connection",
    "description": "Survey Monkey connection",
    "baseURL": "https://api.surveymonkey.com/v3",
    "endpoints": {
        "Users": "https://api.surveymonkey.com/v3/users/me",
        "Questions": "https://api.surveymonkey.com/v3/question_bank/questions"
    },
    "authentication": {
        "type": "HttpHeader"
    }
}
```

About OAuth2 Authentication

Before you start, make sure that your target data source supports OAuth2 authentication; not all data sources do support OAuth2.

When you create the JSON file using one of the downloaded templates, specify the appropriate authentication type in the `authentication-type` field.

OAuth2 Types	Valid Values for the authentication-type field.

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OAuth2 Code	OAuth2Code
OAuth2 Password Credentials	OAUTH2PasswordGrant
OAuth2 Implicit	OAUTH2ImplicitGrant
OAuth2 Client Credentials	OAUTH2ClientCredentials

In this example, the OAuth2 Password Credentials authentication method is specified using "OAUTH2PasswordGrant" as the `authentication-type` value.

```
{
    "name": "Name of the datasource",
    "description": "Description about datasource",
    "baseURL": "https://companyname.com",
    "endpoints": {
        "endpointExample1":"/example1",
        "endpointExample2":"/example2"
   },
    "authentication": {
        "//OAuth type": "OAuth2Code or OAUTH2ClientCredentials or OAUTH2ImplicitGrant or OAUTH2PasswordGrant",
        "//Others": "noauth or HttpHeader or BasicAuth",
        "type": "OAUTH2PasswordGrant"
    }
}
```

Other tips on creating the JSON file

- Remove unnecessary parameters and values from the file.
- Make sure that the Authentication type value is set to noauth, BasicAuth, HttpHeader, or one of the OAuth2 settings in the table above.

Create a Connection to a Data Source with REST Endpoints

You can connect to data sources with REST endpoints and analyze the data. For example, connect to SaaS or PaaS applications or government data such as weather, spatial, or census data.

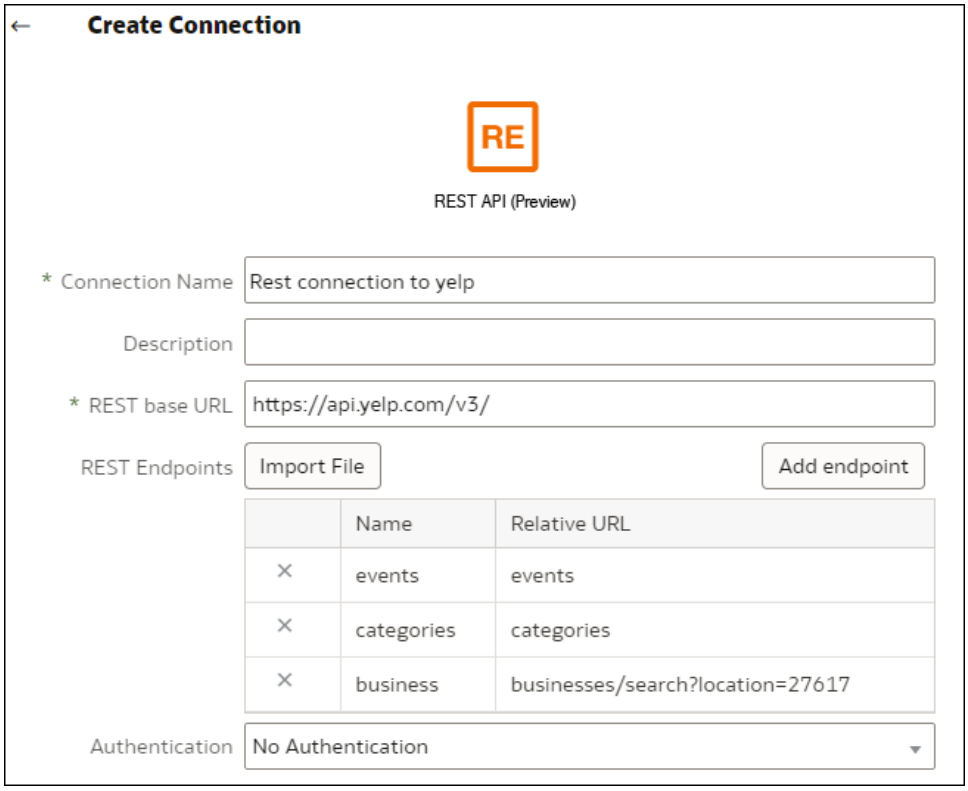
Connecting to data using REST endpoints enables you to analyze data from many transactional SaaS or PaaS applications without having to understand the internal format or structure of the data.

Before you start, create a JSON file for the data source you're connecting to. See Specifying REST Endpoint Connection Details in a JSON File.

1. On the Oracle Analytics Home page, click **Create**, then click **Connection**, then click **REST API (Preview)**.
2. In **Connection Name**, specify a user-friendly name to identify this connection in Oracle Analytics.
3. Click **Import File** and select the REST connector ZIP file that you created as a prerequisite.

   The **Description** and **REST base URL** fields are populated from the imported file, and the endoint table displays the **Name** and **Relative URL** for each available endpoint.

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4. Optional: Edit the endpoints to match your business requirements. For example, you might delete endpoints that you don't need.
   - To edit an endpoint, double-click the **Name** or **Relative URL** value in the table and edit the text.
   - To add an endpoint, click **Add endpoint** to add a row to the table, and edit the default name and relative URL.
   - To remove an endpoint, click **Delete Row** next to the endpoint (that is, **X**).
5. In **Authentication**, select how you want to protect the connection.

   Tip: Make sure that the authentication type you select matches the authentication-type specified in the uploaded JSON file. See Specifying REST Endpoint Connection Details in a JSON File.
   - **No Authentication** - Allow connection without authentication. Use this option to connect to public endpoints.
   - **Basic** - authenticate the connection with a username and password.
   - **HttpHeader** - Authenticate the connection with a a security token.
   - **OAuth2 Code** - Connect to a client using an authorization code generated in your target application (known as the Authorization Code grant type). This is the most secure OAuth2 connection type.
   - **OAuth2 Password Credentials** - Connect to a trusted client using a password, (known as the Password Credentials or Resource Owner Password grant type). Use this connection type if you're using a trusted client.
   - **OAuth2 Implicit** - Connect to a client using a public code generated in your target application (known as the Authorization Code grant type). This is less secure than the OAuth2 Code connection type, but is easier to implement.

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- **OAuth2 Client Credentials** - Connect to a client using a token, (known as the Client Credentials grant type).

For guidance on specifying OAuth2 connection details, see OAuth2 Authentication Values for REST Enabled Data Sources.

6. Click **Save**.

OAuth2 Authentication Values for REST Enabled Data Sources

When you connect to a REST enabled data source using one of the OAuth2 authentication types (that is, **OAuth2 Code**, **OAuth2 Password Credentials**, **OAuth2 Implicit**, or **OAuth2 Client Credentials**), you're prompted to specify connection details appropriate for authentication type that you use.

Connection dialog field or option	Description
Authorize	Click **Authorize** to test the connection and request necessary codes and tokens.
Auth URL	Enter the URL for the authentication page in the target application. For example, `https://example.com/login/oauth/authorize`.
Client ID	Enter the Client ID that you copy from your target application, such as Chimp, which is typically a string of integers and letters.
Client Secret	Enter the Client Secret that you copy from your target application, such as Chimp, which is typically a string of integers and letters.
Password	Enter the password used to log into your target application.
Scope	Enter `read:` or `write:` followed by the name of the target. For example, `read:org`.
Token URL	Enter the authorization URL provided by the target application. For example, `https://example.com/login/oauth/access_token`.
Username	Enter the username used to log into your target application.

Troubleshooting Connection to Data Sources with REST Endpoints

Here're some tips on addressing issues you might encounter when you connect to REST endpoints.

Creating OAC Connections to data sources with REST endpoints

- **Failed to Import the file - Invalid JSON file provided**
  1. Extract the connection.json file from the uploaded ZIP file.
  2. Validate the JSON using any JSON validator, and fix any syntax errors.
  3. Re-create the connection ZIP file and retry the uploading using the **Import file** option on the Create Connection dialog.
- **Invalid REST Base URL** - Check the base URL using HTTP or CURL by appending each endpoint one at a time.
- **Failed to Import the file - Invalid Authentication Types** - In the JSON file, make sure that the `Authentication type` value is set to `noauth`, `BasicAuth`, or `HttpHeader`.
- **One Endpoint Table is Invalid** - Validate each endpoint URL using HTTP or CURL, and correct any errors.

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- **Forbidden Access to some of the end points** - Using CURL or HTTP, validate each endpoint by appending a BASE URL to it using same user credentials. Provide access to any endpoints that don't have access or remove the endpoints from the JSON file.
- **Endpoint URL is invalid** - Using CURL or HTTP, validate each endpoint by appending a BASE URL to it. Correct any invalid endpoints or remove the endpoints from the JSON file.
- **Invalid Username/Password** - Using CURL or HTTP, validate the credentials for each endpoint.
- **Invalid JSON Response from REST data source** - Using HTTP or CURL, connect to the REST data source, extract the response received, and validate the response using a JSON validator. If necessary, contact the administrator of the data source to correct data issues.
- **URI too long** - Make sure that the URIs are no more than 8000 characters in length.

JSON Examples for Common Data Sources with REST Endpoints

Download example JSON files for commonly used data sources such as Mailchimp and Yelp from the Oracle Analytics Public Library to enable you to connect to data sources with REST endpoints.

See REST Connectors at Oracle Analytics Public Library.

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.

> **Note**
>
> - Oracle doesn't manage the license or usage compliance for any JDBC drivers that you deploy in your environment.
> - Although the **JDBC** connection type is certified, Oracle can't guarantee to resolve issues with uncertified data sources that you connect to using the **JDBC** connection type. Make sure that you fully test data sources and database features before deployment to production.
> - Oracle Analytics might be unable to list database objects with some JDBC drivers.

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.

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- For the **Host** value, enter the connection string provided by your administrator for the JDBC driver that you're using, for example, `jdbc:oracle:thin:@host:port/database`.
- For the **Driver Class Name** value, enter the text provided by your administrator for the JDBC driver that you're using, for example, `oracle.jdbc.driver.OracleDriver`.

1. Ask your administrator to set up the required JDBC driver.

   (The administrator copies the required JDBC driver's JAR file to the `[DOMAIN_HOME]/lib` folder on the Oracle Analytics Server machine.)
2. On the Data or Home page, click **Create**, then click **Connection**.
3. In the Create Connection dialog, locate and click the **JDBC** icon.
4. Enter the connection criteria.
5. 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.

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. 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.
2. 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.

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Connecting to Data Sources Using Kerberos Authentication

You can connect from Oracle Analytics to Spark, Hive, and Impala using Kerberos.

Topics:

- Create the Archive File Needed for a Database Connection with Kerberos Authentication
- Connect to a Spark or Hive Database Using Kerberos Authentication

Create the Archive File Needed for a Database Connection with Kerberos Authentication

To connect to a data source using Kerberos authentication, you can supply connection details to Oracle Analytics using connection details stored in an archive file (for example, a compressed file with a *.zip file extension).

Storing connection details in an archive file (that is, a compressed file with a *.zip file extension) makes it easy to connect to a Spark or Hive data source without having to manually enter connection details.

The archive file requires a directory named kerberos that contains the following files :

- `kerberos/krb5conf`
- `kerberos/oac.keytab`
- `kerberos/service_details.json`

The `service_details.json` file contain values for Host, Port, and ServicePrincipalName with parameter values in quotation marks (`"value"`). For example:

```
{
 "Host" : "myHost.com",
 "Port" : "10000",
 "ServicePrincipalName" : "hive/myHostDB.com@BDA.COM"
}
```

1. Obtain the Kerberos configuration files from your database administrator, for example, to connect to Apache Hive.
2. Create a folder named `kerberos` to contain the Kerberos configuration files.
3. Copy the `krb5conf` file into the `kerberos` folder that you created.
4. Ensure the `.keytab` file is named `oac.keytab` (rename it if required), and copy the file into the folder you created.
5. Get or create the `service_details.json` file and save it in the folder you created.
6. Create an archive file containing the three files that you added to your folder, and provide an appropriate name, for example `SSLKerberos.zip`.

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Connect to a Spark or Hive Database Using Kerberos Authentication

You can connect to a Spark or Hive database using Kerberos network authentication protocol.

Before you start, store the Kerberos connection details in an archive file (that is, a compressed file with a *.zip file extension).

To find out which database types support Kerberos authentication, look for databases with 'Supports Kerberos' in the **More Information** column in the Supported Data Sources list. See Certification - Data Sources.

1. On the Home page, click **Create**, and then click **Connection**.
2. Select a Hive connection type (such as **Apache Hive** or **Hortonworks Hive**) or a Spark connection type .
3. Click **Authentication Type** and select **Kerberos**.
4. In the **Client Credentials** field, either drag and drop or click **Select** to browse for a prepared archive or CONF file.

   Do one of the following to get the appropriate configuration files for a SSL or a Non-SSL connection:

   - Ask your administrator to provide the appropriate archive or CONF files.
   - Prepare your own archive file.
5. If you added an archive file, enter the archive file password in the **ZIP Password** field.
6. If you added a `krb5conf` file, either drag and drop or click **Select** to browse for the `oac.keytab` file in the **Keytab** field.

   The **Host**, **Port**, and **Service Principal** fields automatically display values taken from the `service_details.json` file.
7. If you're connecting to your data using SSL, click **Enable SSL**.
8. If you want data modelers to be able to use these connection details. click **System connection**. See Database Connection Options.
9. Click **Save**.

Connect to Oracle Service Cloud

Connect to an Oracle Service Cloud data source to visualize CRM data.

1. On the Home page, click **Create** and then click **Connection**.
2. Click **Oracle Service Cloud** and enter the connection details.
3. Click **Save**.
4. 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.

Model Data in a Snowflake Data Warehouse

You can model data in a Snowflake Data Warehouse before you visualize the data.

1. Configure your environment to enable data modeling. See Configure Your Environment for Modeling Snowflake Data.

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2. Create a modeling connection to your Snowflake Data Warehouse and model your data. See Create a Connection to a Snowflake Database.

Configure Your Environment for Modeling Snowflake Data

Configure your environment so that you can model data in a Snowflake database.

In your data modeling environment, you need to install Data Gateway to provide the correct java libraries for interacting with the Snowflake driver. In Model Administration Tool, you can then import and model your Snowflake tables. You configure your Data Gateway agent with a suitable driver to connect to Snowflake.

Note: When you've modeled your Snowflake tables and uploaded the semantic model to Oracle Analytics, you can disable or remove Data Gateway (it isn't used when Oracle Analytics runs queries).

Before you start:

- Install Data Gateway and Model Administration Tool on the same Windows computer in your on-premises environment. See Download page for Oracle Data Gateway.
- Make sure that both your Model Administration Tool node where Data Gateway is installed, and your Oracle Analytics Server nodes have network access to the Snowflake endpoints.

1. Configure the Oracle Analytics Server domain by downloading and installing the Snowflake JDBC driver so that BI users can run queries:
   a. Download the latest Snowflake JDBC driver (for example, in file snowflake-jdbc-3.9.0.jar).
   b. Copy the downloaded JAR file to the Oracle Analytics Server domain /lib folder:

      ```
      OracleHome/user_projects/domains/bi/lib
      ```

   c. Re-start Oracle Analytics Server.
2. Configure a local Data Gateway agent to so that you can use Model Administration Tool to import metadata and view data for modeling:
   a. Copy the downloaded Snowflake JDBC driver JAR file to the Data Gateway installation folder.

      In a personal deployment on Windows, copy the JAR file into: `<Data Gateway_extract_path>\thirdpartyDrivers`.

   b. Re-start Data Gateway.

Create a Connection to a Snowflake Database

Connect to a Snowflake database so that you can model data.

Before you start, see Configure Your Environment for Modeling Snowflake Data.

1. In Model Administration Tool, enable the JDBC connection pool functionality by loading Java data sources.
   a. From the **File** menu, click **Open**, then **In the Cloud**, and use the Open in the Cloud dialog to specify the details of your Cloud data model.
   b. From the **File** menu, click **Load Java Data Sources**.
   c. At the Connect to Java Datasource Server dialog:

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- In the **Hostname** field, enter the machine name that you noted in Step 1. Fully qualify the hostname. For example, if you noted `machine` in Step 1, you might specify `machine.us.example.com`.
- In the **Port** field, enter the port that you noted in Step 1. For example, `51811`.
- In the **Username** and **Password** fields, enter `dummy` or any string (these credentials aren't validated because this is a public call to discover the capabilities advertised by the Data Gateway).

2. In Model Administration Tool, create a new database and set the type to Snowflake.
3. Add a Connection Pools and specify these details on the General tab:
   - **Call Interface**: JDBC(Direct Driver).
   - **Require fully qualified table names**: Yes.
   - **Data source name**: Enter the connection string, for example: jdbc:snowflake://xxxx.snowflakecomputing.com?db=xxxx&warehouse=xxxxxx&schema=xxxxxx
   - **RDC Version**: Leave this field blank.
4. On the Miscellaneous tab, specify these details:
   - **JDS Server URL**: Leave this field blank (remove any entry in this field).
   - **Driver Class**: `net.snowflake.client.jdbc.SnowflakeDriver`.
   - `Use SQL over HTTP`: false.
5. Model your data using this connection.
6. When you have completed your model, upload or save your semantic model back to Oracle Analytics.

Data Sources that Support Incremental Reload for Datasets

You can reload a dataset's data incrementally if it uses one of these data sources.

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

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3

Connect to Your Data Using Datasets

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

Topics

- Overview to Using Datasets
- Design Datasets
- Use Joins to Build Datasets
- Create Datasets from Data Sources

Overview to Using Datasets

Learn how to use datasets to power your data visualization and analysis projects.

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

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.

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When you create and build a dataset, you can:

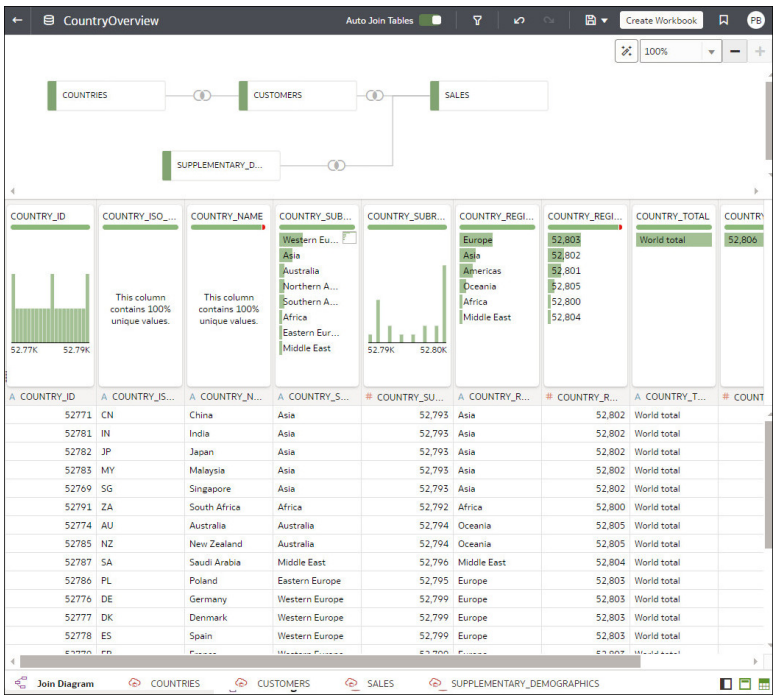
- Choose between many types of connections or spreadsheets.
- Create datasets based on data from multiple tables in a database connection, Oracle data source, or a local subject area. And create datasets based on data from tables in different connections and subject areas. For example, you can build 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 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 local subject area or 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 on the Data Panel 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.

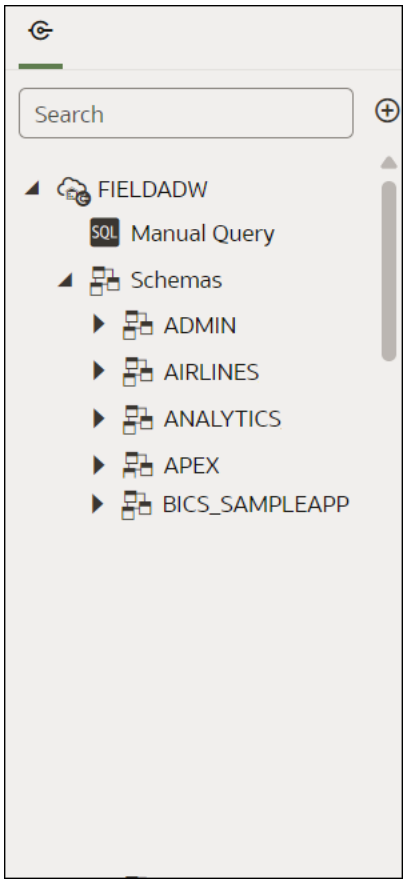
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Click **Add** to open the Add Connection or Add File dialog where you can select or create another connection or select a file to add to the dataset.

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

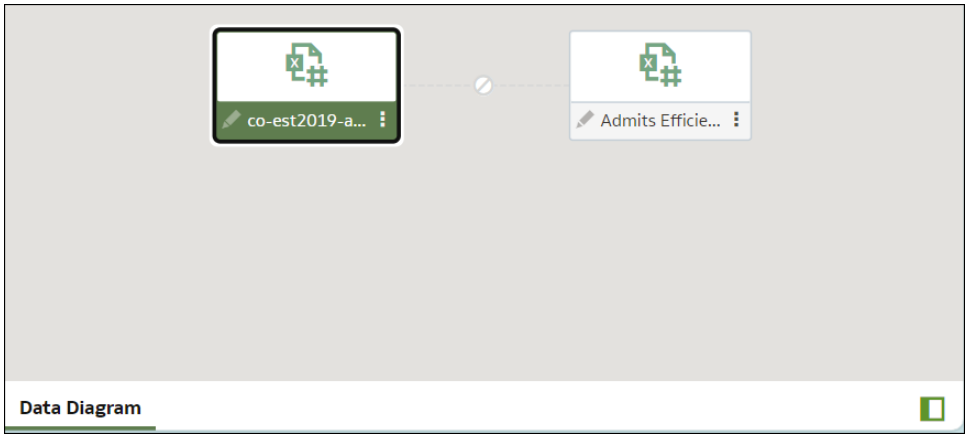
To write a SQL statement to create a table, drag and drop the Manual Query item to the diagram. Then go to the diagram and double-click the Manual Query table to access the SQL editor.

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



- **Data Diagram**
  The Data Diagram displays data files in a workbook.

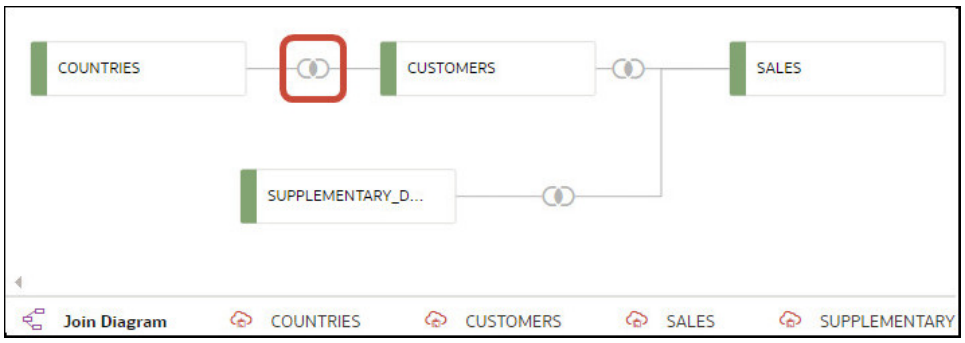
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- **Join Diagram**

  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 enbles you to configure it.

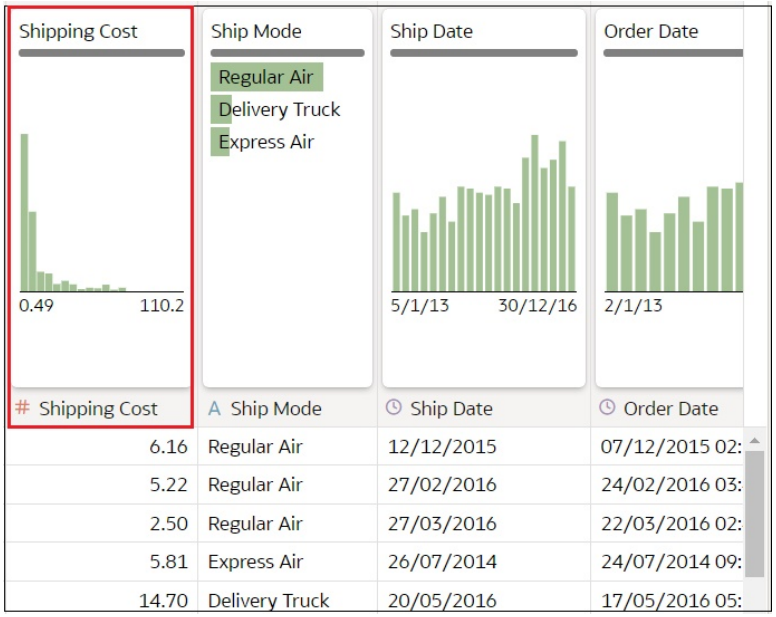


- **Data Preview**

  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.

  A quality insight tile is displayed for each column, which enables you to view the data distribution as a pictogram and assess the quality of the data using a representative sample. See What are Quality Insights?

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- **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 Data Panel:



  This button hides or displays the Quality Tiles:



  This button hides or displays the Preview Data area:



Join Diagram Reference

Use the Join Diagram in the dataset editor to define relationships in your data.

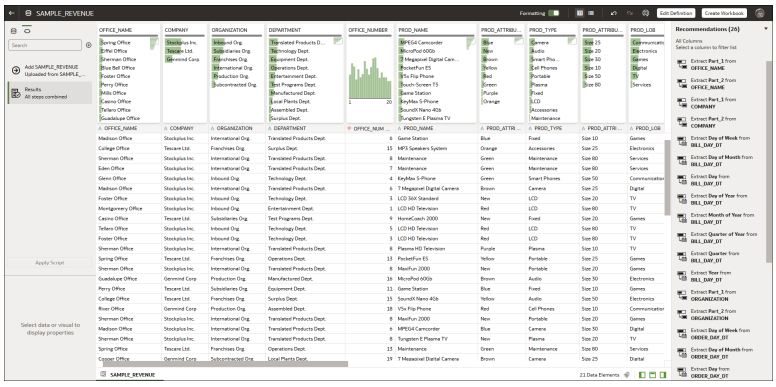
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Option or icon	Use to
 Add	Add a table to the dataset. Select **Add Data** to add file-based data or database tables to the Data Panel. From the Data Panel, drag tables onto the Join Diagram to add data to the dataset. See Add a File to a Dataset Created From a Connection.
 Always Include in Query	Determine whether a table is configured to always be included in queries. See Include a Dataset Table in Data Source Queries.
 Auto Join Tables	Determine whether Oracle Analytics automatically creates relationships between tables when you drag and drop tables onto the Join Diagram. By default Oracle Analytics creates joins where common keys are detected in tables, but in some cases you might want to turn off automatic join creation and manually create table joins.
 Auto Layout Join Diagram	Undo changes you've made to the arrangement of tables and go back to the default diagram layout.
 Drag to join tables	Hover over a table and drag the circle over another table to join them. See Add Joins Between Dataset Tables.
 Hide or display the role-based filter bar	Hide or display the role-based filter bar, which enables you to filter the dataset. See Filter a Dataset Based on an Application Role.
 Preserve Grain	Determine whether a table is configured to include the preserve grain option. See Specify Which Table Determines Grain.

About Opening Datasets

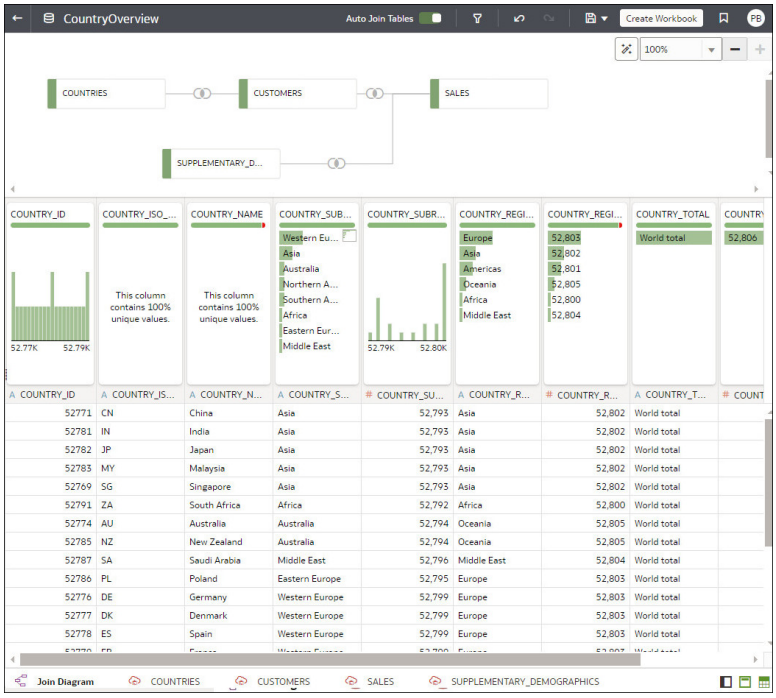
The type of data source a dataset uses determines how you navigate the user interface when you create a new dataset, and when you open an existing dataset by itself or from a workbook.

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.

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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 browser tab.
- If the dataset contains multiple tables, then the Dataset editor is opened in a new browser tab.



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 and the connections that you have permission to access and use. 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.

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

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 of more of these Oracle data source connections to create a dataset containing multiple tables.

- Oracle Analytics Local Subject Areas
- 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

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- 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

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

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

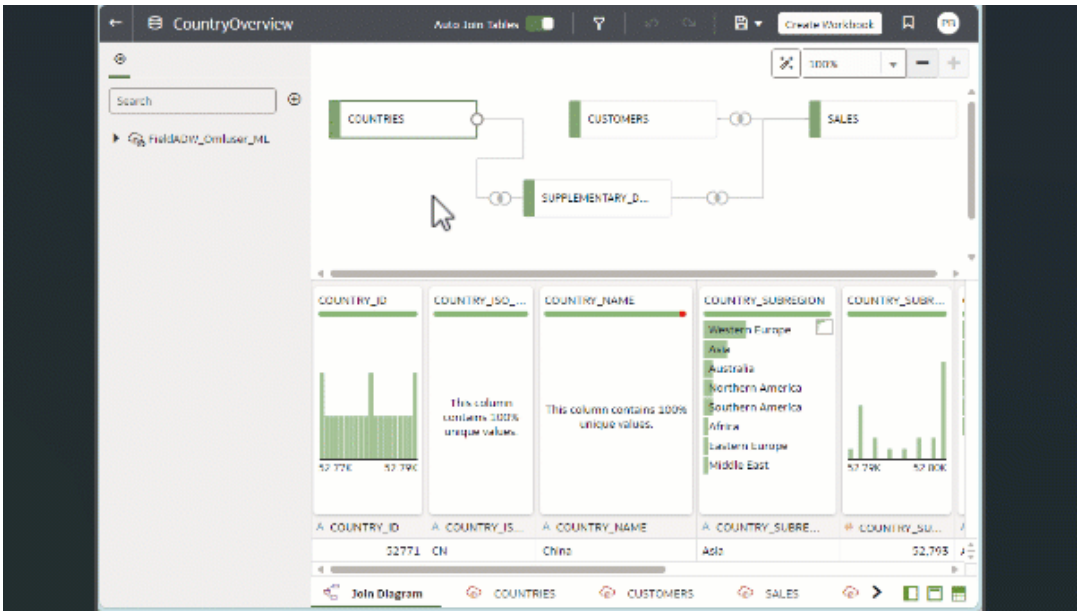
> **Note**
>
> You can create datasets with multiple tables from most data sources. Exceptions include Oracle EPM Cloud, Oracle Essbase, or Google Analytics.

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.

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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 local subject areas or 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**.

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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:

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- 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**.

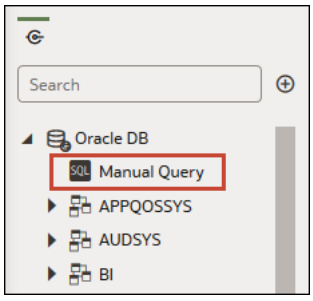
Add a Table to a Dataset Using a SQL Statement

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. Make sure you're in the Join Diagram before you proceed by selecting the **Join Diagram** tab.
5. In the Data panel, Connections pane, locate and expand the connection that you want to query, and locate the **Manual Query** option.



6. Drag and drop **Manual Query** to the Join Diagram to create a table shell.
7. Double-click the Manual Query table.
8. Confirm that **Enter SQL** is selected.

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9. In the **Statement** field, enter the SQL statement.

   In the SQL query, specify the alias for the columns when you use aggregate functions such as MAX and MIN to avoid query errors. For example, specify `SELECT MAX(SYS_BOOKING_DATE) <Alias_Name> FROM <table_name>;` instead of using `SELECT MAX(SYS_BOOKING_DATE) FROM <table_name>;`.

10. Optional: Click **Get Preview Data** to verify that you're querying the correct data.
11. Click **OK**.
12. 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.

Design Datasets

Learn how to design datasets to power your data visualization and analysis projects.

Topics:

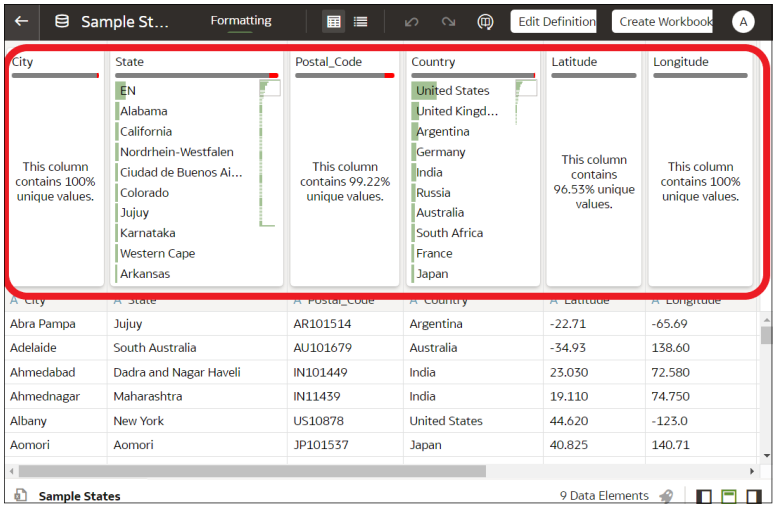
- What are Quality Insights?
- Enhance Your Data Using Quality Tiles
- About Removing or Restoring Dataset Columns
- Remove or Restore a Dataset Table's Columns
- Filter a Dataset Table
- Use Role-Based Filters in a Dataset
- View a Dataset Table's Original Formatting
- Specify Whether a Dataset Table Is Cached or Live

What are Quality Insights?

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

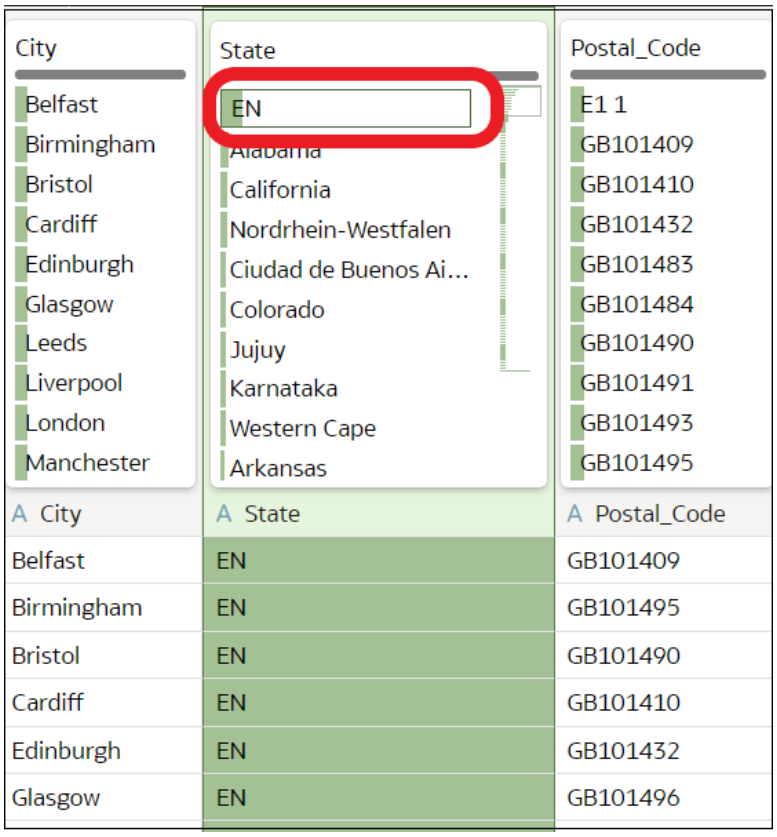
When you edit a table in the join diagram or transform editor, Oracle Analytics analyzes the quality of the data and provides a visual summary known as a quality insight in a tile above each column. Quality insights enable you to explore your data, and use a visual overview of the content to assess and 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.

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Quality tiles enable you to:

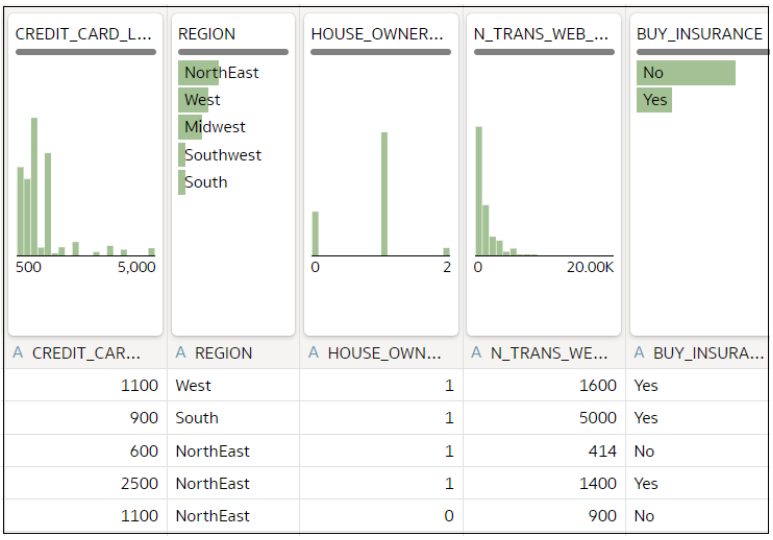
- **Explore** - Explore your data in real time using instant filtering, which enables you to temporarily filter data across all column in the table. You can filter on multiple values at the same time.



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.

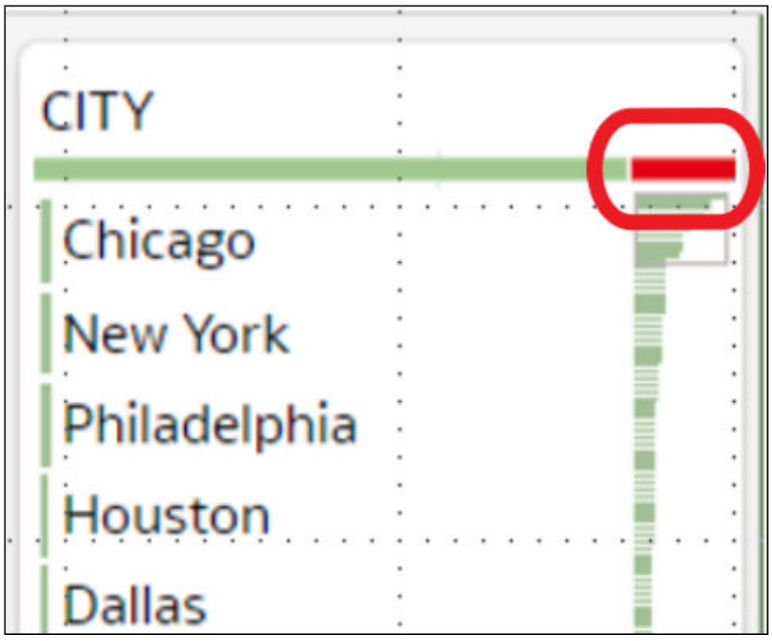
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A CREDIT_CAR...	A REGION	A HOUSE_OWN...	A N_TRANS_WE...	A BUY_INSURA...
1100	West	1	1600	Yes
900	South	1	5000	Yes
600	NorthEast	1	414	No
2500	NorthEast	1	1400	Yes
1100	NorthEast	0	900	No

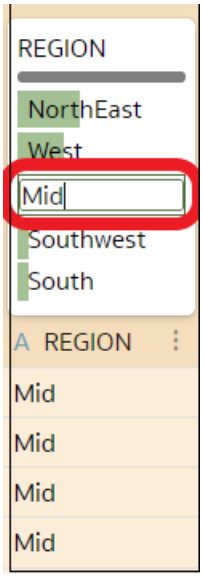
The quality tiles at the top of each column provide an instant assessment of the quality of content in that column based on a deep semantic understanding of the data.

- **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.

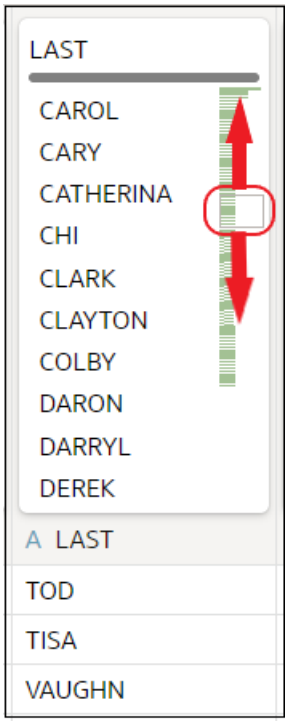


- **Replace or correct** - When you've identified anomalies and outliers, use inline replace to correct values. You get immediate feedback on the improvements to the data quality on the quality bar.

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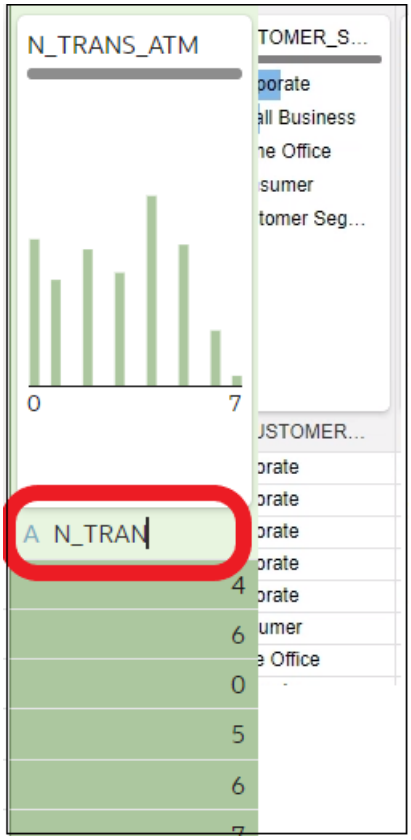


- **Scroll** - Navigate large datasets using the scrollable mini-map.

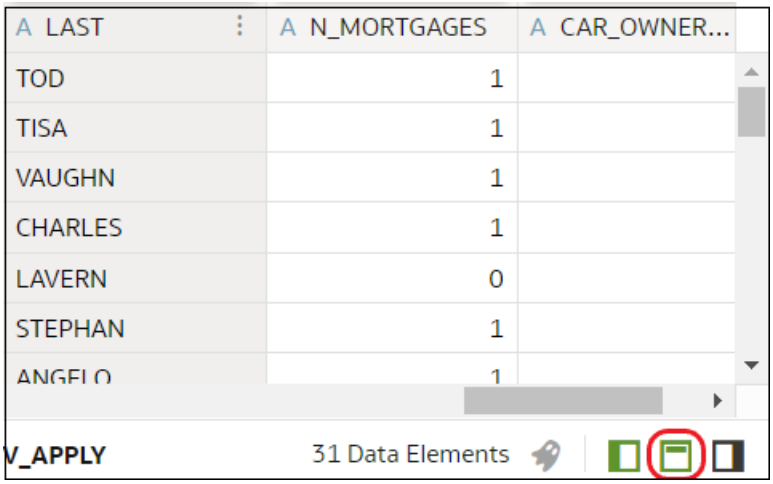


- **Rename columns** - Create more readable column names easily.

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



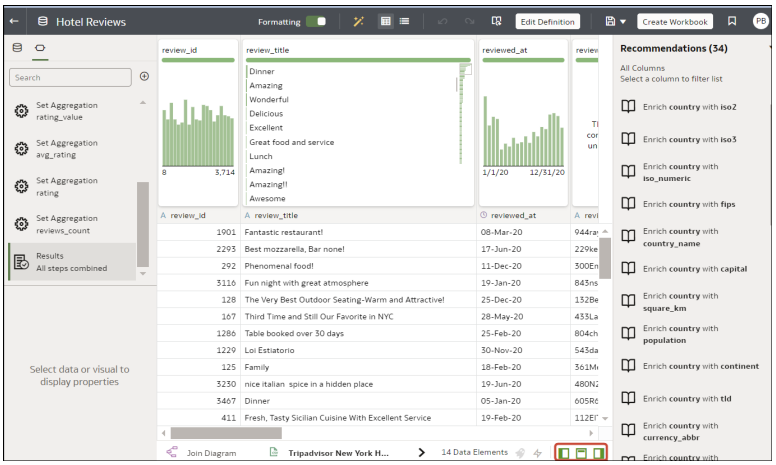
Enhance Your Data Using Quality Tiles

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.

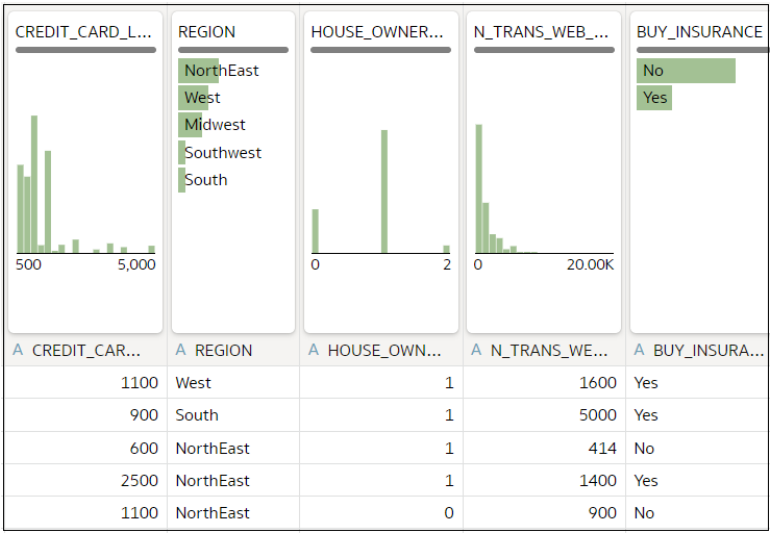
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

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If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.

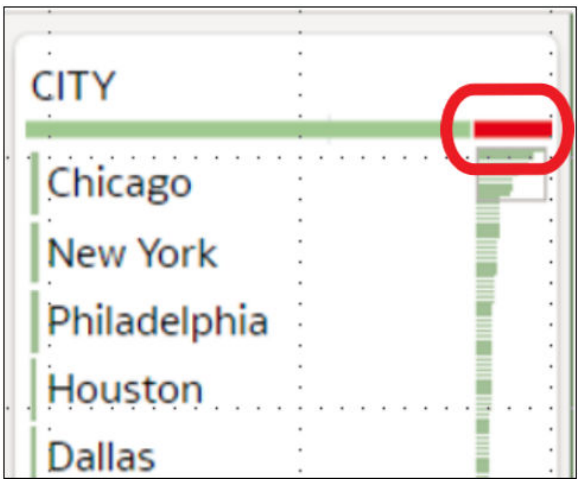


2. Use the quality insights to get an instant assessment of the quality of content in that column based on a deep semantic understanding of the data.



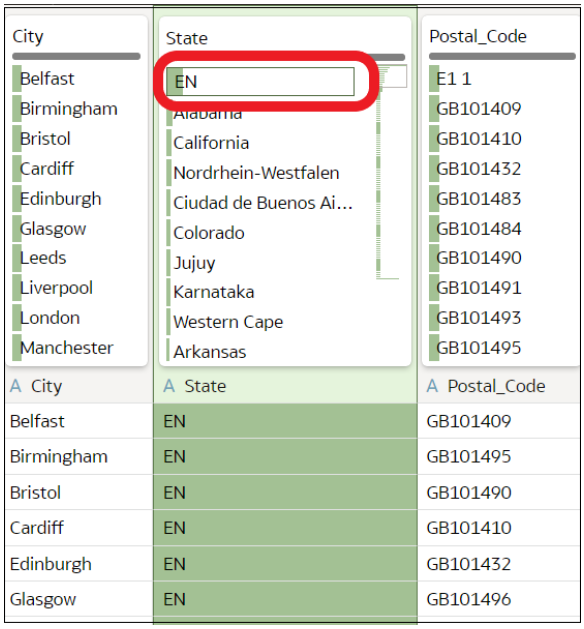
For example, hover over a quality bar to see how many valid and invalid values are in the column. Click on areas marked in red to filter on invalid values.

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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.

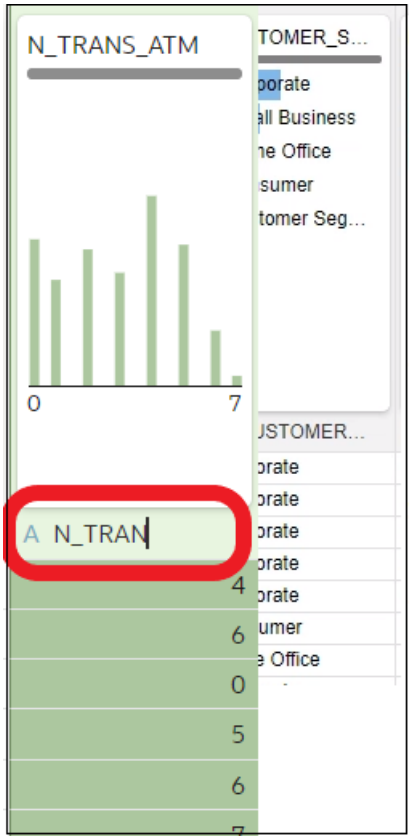


   When you filter on values, Oracle Analytics updates all data columns to instantly display only the rows relating to the filter values you selected. If you filter a value nearer the bottom of a long list, you might have to scroll down the list to locate it so that you can deselect the value.

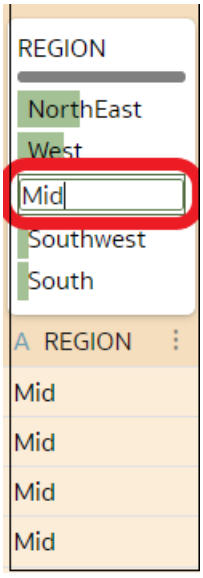
   Note: Temporary filters that you apply in quality tiles aren't saved with your data (that is, aren't added to the data preparation script).

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

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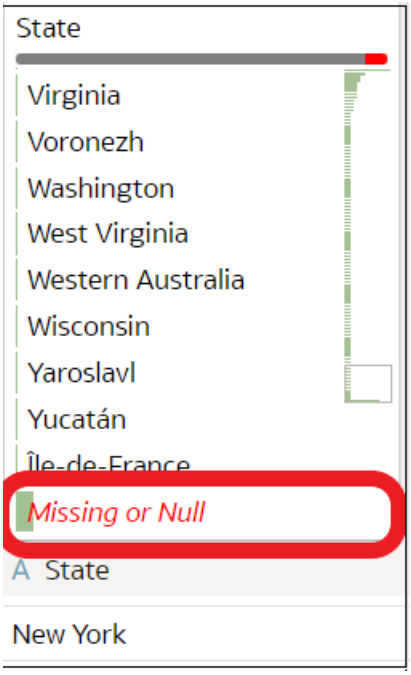
5. To edit values.
   a. In the quality tile, double-click the value you want to change.



   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.

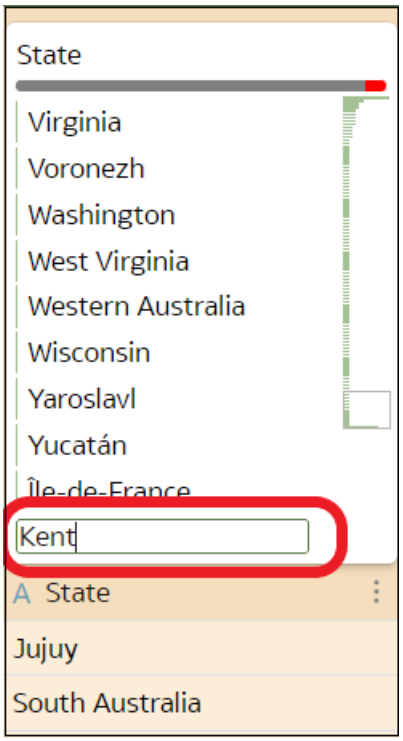
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If your data has missing values, you see **Missing or Null** highlighted in red.



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).

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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

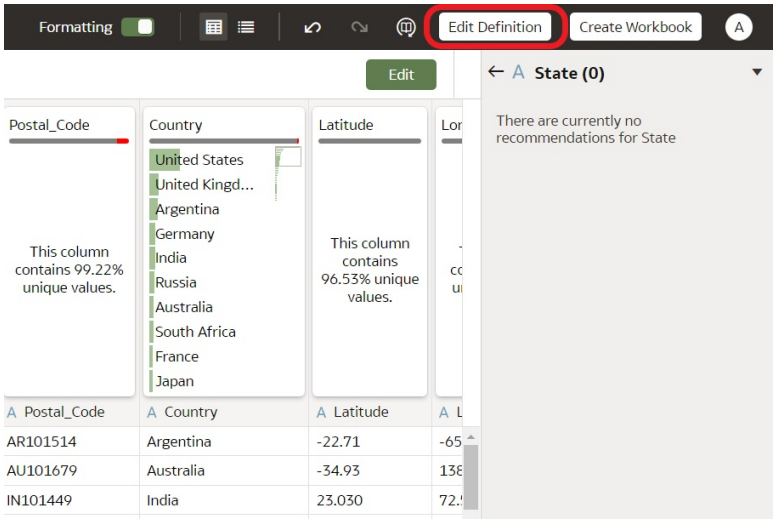
You can remove columns from a dataset table when the dataset doesn't need the columns, and you can restore any removed columns.

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**.

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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.

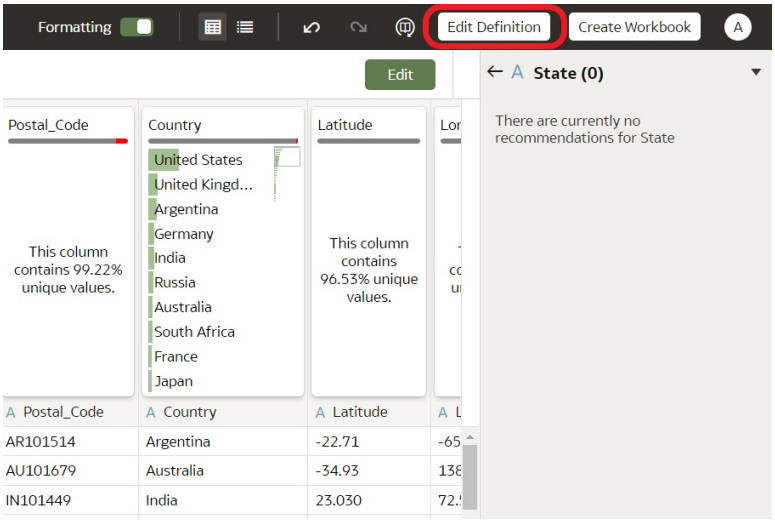
Any filters that you apply limit what is displayed in the table's quality tiles, the Transform editor, and the table's data preview.

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

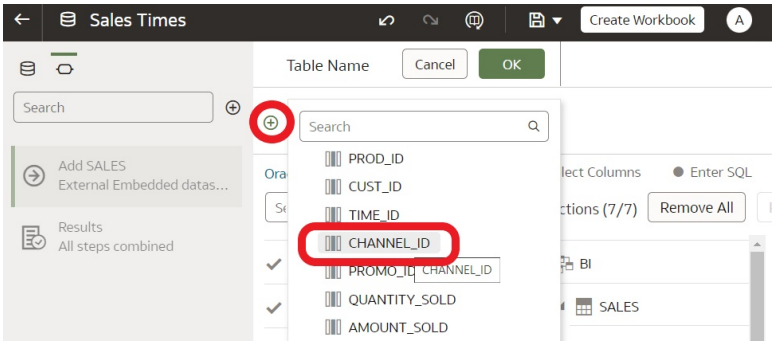
In some cases you might want to use the table's filter to query other visualizations in a workbook. See Include a Dataset Table in Data Source Queries.

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.

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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.

Use Role-Based Filters in a Dataset

This topic describes what you need to know to apply role-based filters to workbooks and visualizations. Filters based on application roles, known as role-based filters, enable business analysts and users to access just the data they need.

Topics:

- About Role-Based Filters
- Filter a Dataset Based on an Application Role
- Example One - Apply a Simple Role-Based Filter in a Workbook
- Example Two - Apply Multiple Role-Based Filters in a Workbook

About Role-Based Filters

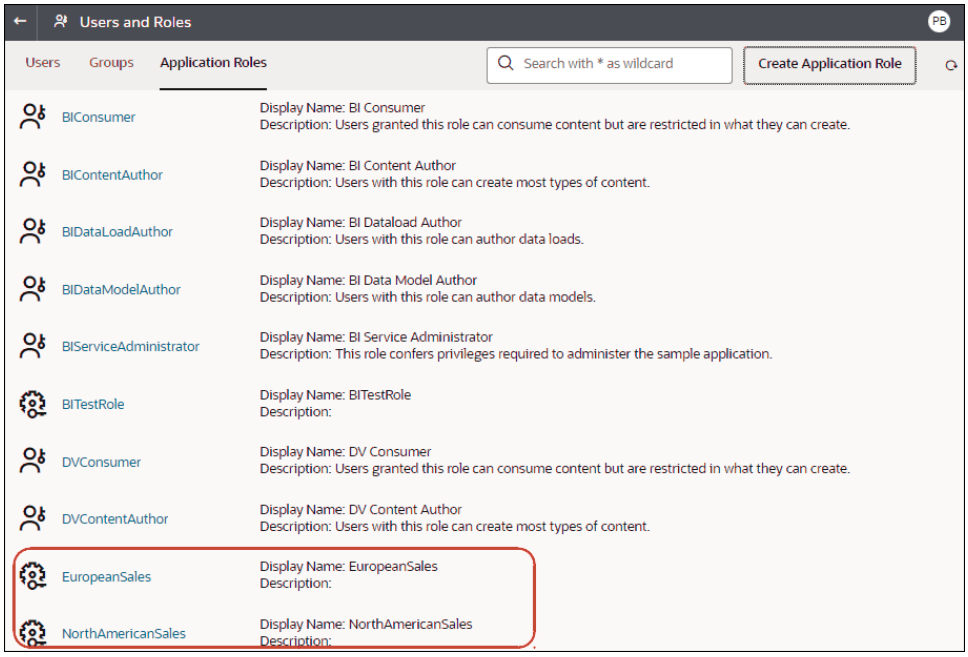
Filters based on application roles, known as role-based filters, enable Oracle Analytics business analysts and users to access just the data they need. For example, suppose you

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want some users to see North American sales data when they open a shared global sales workbook. To accomplish this, you create a custom application role called North American Analyst and then use it to filter the workbook data.

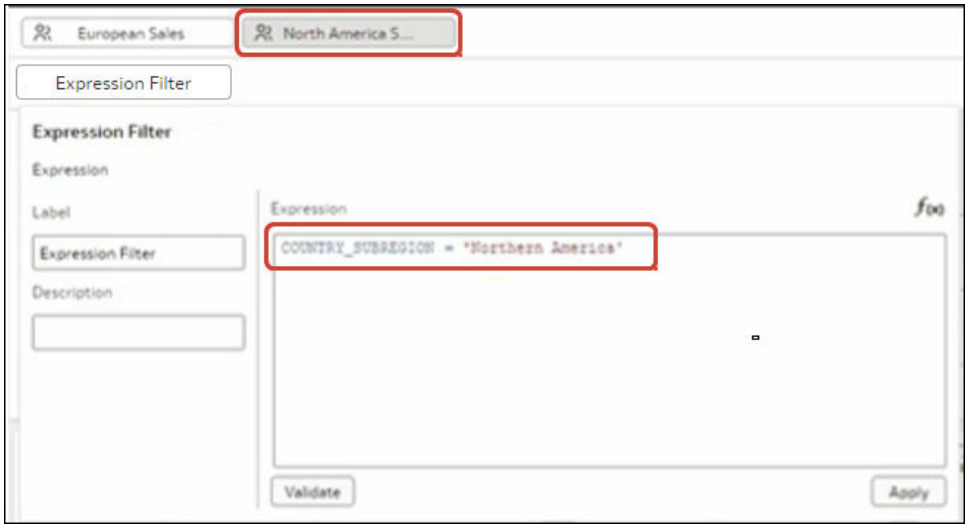
Role-based filters overview

- Dataset owners apply filters based on Oracle Analytics application roles that allow users to see data that's applicable to their application roles.
- You apply role-based filters to datasets.
- You can apply multiple role-based filters to a dataset at the same time.
- When you add role-based filters in the Dataset editor, the preview data shown isn't filtered, but the dataset is filtered when workbook consumers access the dataset.
- You can use existing application roles or create your own application roles. For example, to filter a global sales dataset for analysts in Europe and North America you might create application roles *EuropeanSales* and *NorthAmericaSales*.

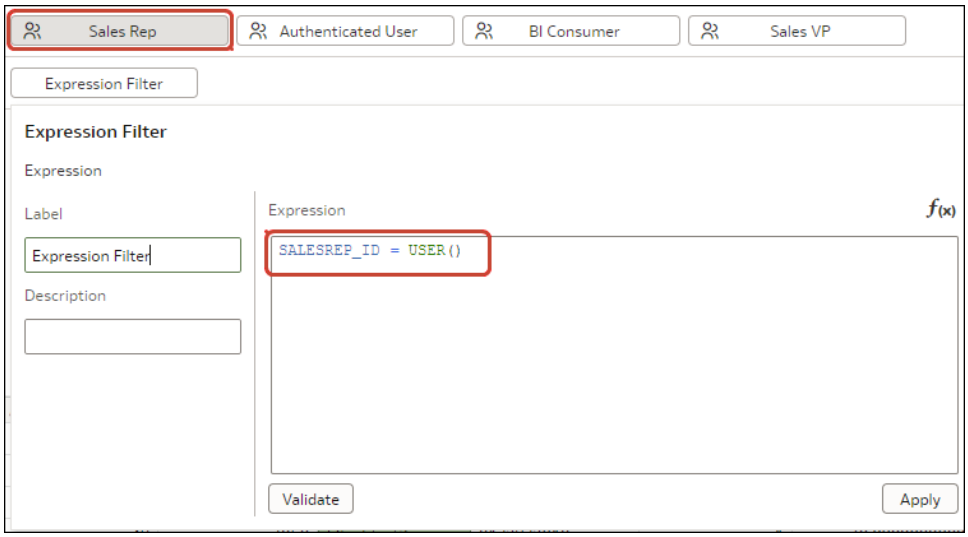


- You use expressions to specify role-based filters. For example, on a *North America Sales* application role you might filter on the COUNTRY_SUBREGION column of a COUNTRIES table using the expression `COUNTRY_SUBREGION = "Northern America"`.

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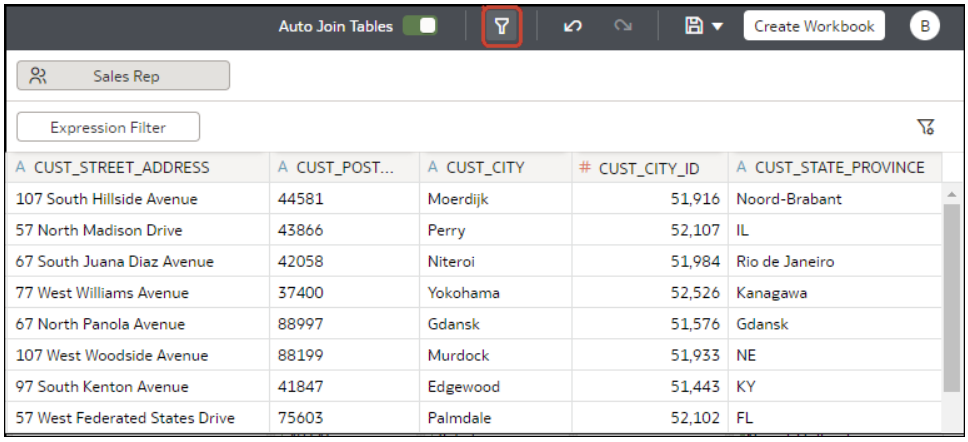


- Filter expressions can reference Oracle Analytics system variables. For example, on a *Sales Rep* application role you might filter on the SALESREP_ID column using the expression `SALESREP_ID = USER()`, where USER () is a system variable that provides the ID of the logged-in user.



- In the Dataset editor, you display the role-based filter panel using the **Hide or display the role-based filter bar** option on the toolbar.

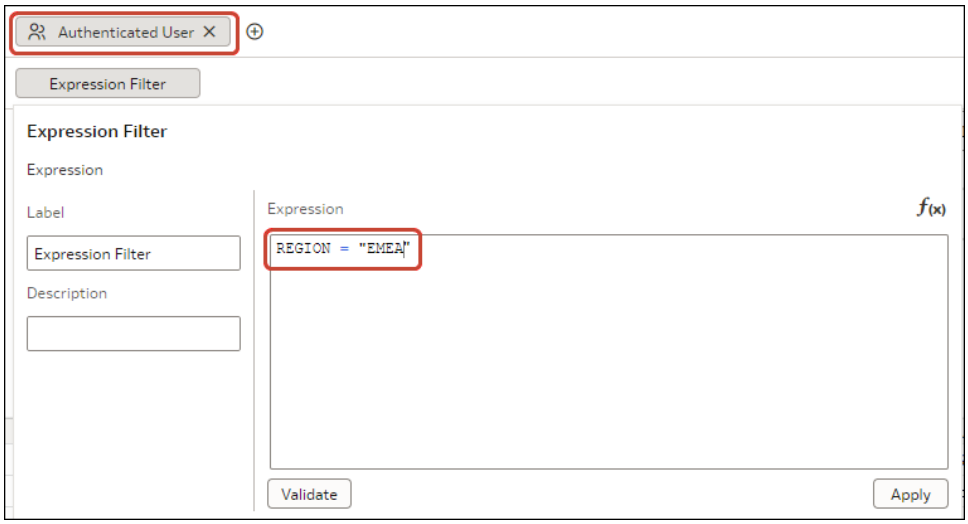
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CUST_STREET_ADDRESS	CUST_POST...	CUST_CITY	CUST_CITY_ID	CUST_STATE_PROVINCE
107 South Hillside Avenue	44581	Moerdijk	51,916	Noord-Brabant
57 North Madison Drive	43866	Perry	52,107	IL
67 South Juana Diaz Avenue	42058	Niteroi	51,984	Rio de Janeiro
77 West Williams Avenue	37400	Yokohama	52,526	Kanagawa
67 North Panola Avenue	88997	Gdansk	51,576	Gdansk
107 West Woodside Avenue	88199	Murdock	51,933	NE
97 South Kenton Avenue	41847	Edgewood	51,443	KY
57 West Federated States Drive	75603	Palmdale	52,102	FL

Tips on Using Role-based Filters

- To filter a dataset for all users and roles, add a role-based filter to the *Authenticated User* role. For example, if you want users to only access data for the EMEA region, add the filter expression REGION = "EMEA" to the *Authenticated User* role.



- When you place a role-based filter on a dataset, any user who doesn't have the role(s) specified won't be able to see any data, including the dataset owner. If a dataset owner needs to see the data, add the dataset owner to one of the specified roles. In addition, if users with a super role such as an Admin or the OrgVP need to see all data, create a dummy filter. For example, if you would like the OrgVP to see all data in a region, create an additional filter for the application role of OrgVP and create a filter with the expression 1=1. When a user with OrgVP logs in and creates a workbook, they will be able to see all of the data.

Filter a Dataset Based on an Application Role

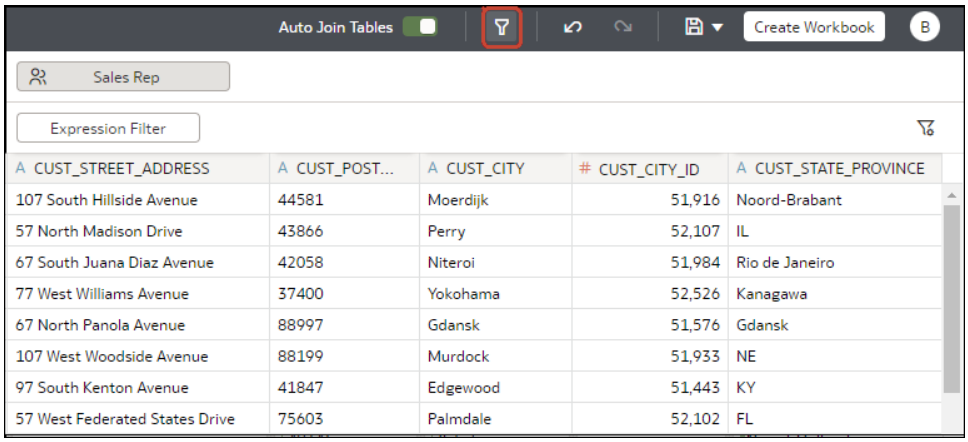
You use filters based on application roles to enable business analysts and users to access just the data they need. For example, you might want North American business users to only see North American data when they open a shared workbook.

When you've applied role-based filters to a dataset, add it to a workbook and share the workbook with other business analysts and users. When other users log in to Oracle Analytics

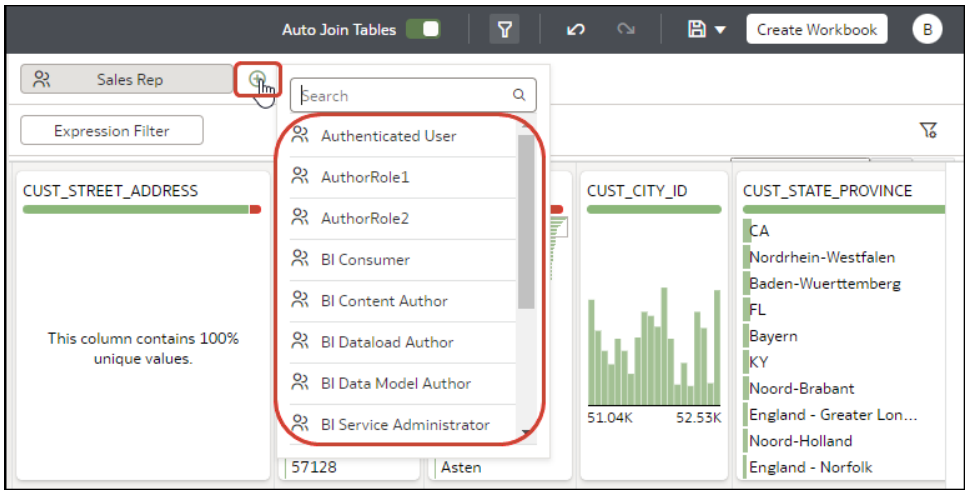
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and open the workbook, they'll only see data that you've shared with them using role-based filters.

1. From the Home page, select a dataset, click **Actions**, and then select **Open**.
2. In the dataset editor, click **Join Diagram**.
3. Click the **Hide or display the role-based filter bar** option on the toolbar.



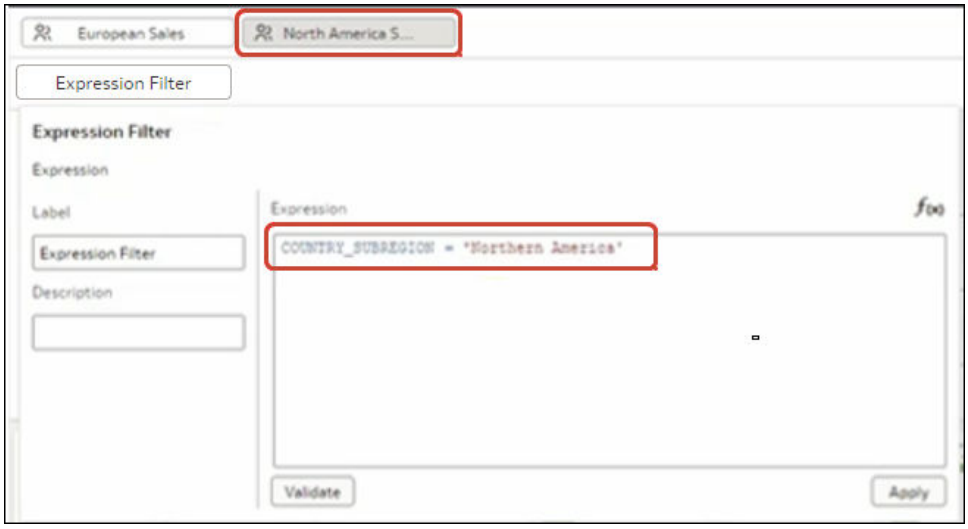
4. Hover over the role-based filter bar, and click **Add Role** (⊕) to display a list of application roles.



5. In the drop down list, select the application role that you'd like to use to filter the dataset.
6. Right-click the application role and select **Create Filter** to display the Expression Filter editor.
7. Optional: If required, use the **Label** field to change the filter name to something more meaningful.
8. In the **Expression** box, enter the logical expression that filters the data. using single quotes around data values.

   For example, if your dataset has a column COUNTRY_SUBREGION that identifies geographical region, you might enter `COUNTRY_SUBREGION = 'Northern America'`.

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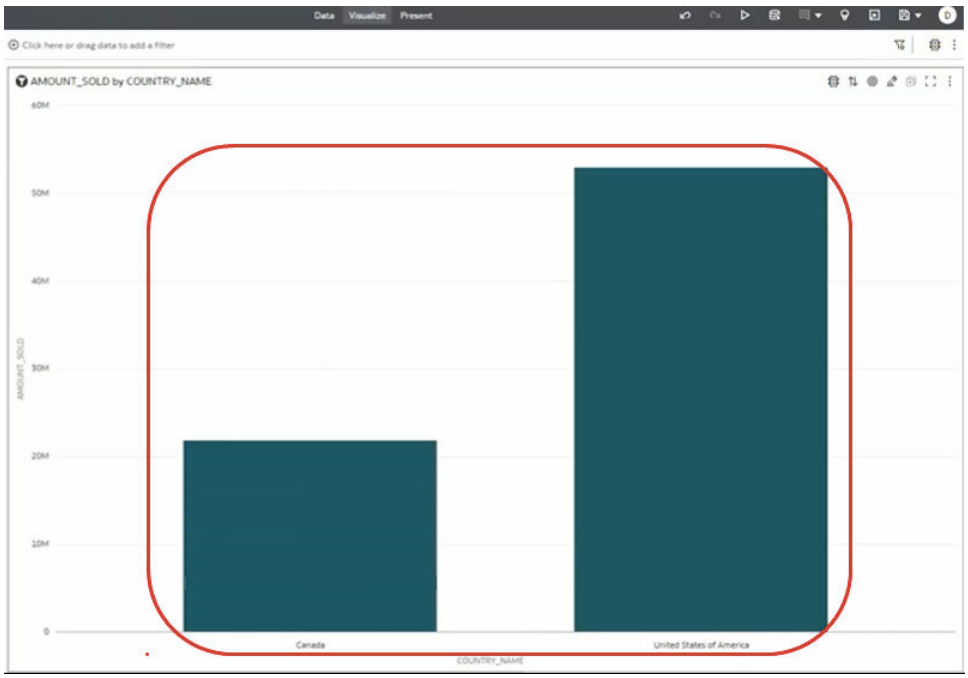
9. Click **Validate**, then click **Apply**.

Example One - Apply a Simple Role-Based Filter in a Workbook

This example shows how to filter a dataset so that North American sales representatives can access only North American sales data when opening a shared workbook.

Example report

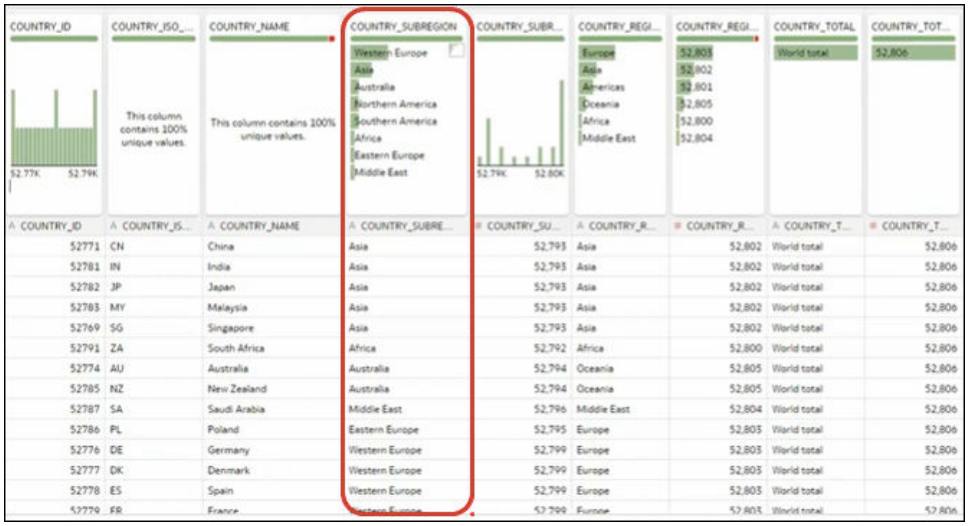
When North American sales representatives log into Oracle Analytics and open the shared global sales workbook, they only want to see sales data for North America. In this example, sales representative *dvauthoruser* can see sales for North American countries Canada and United States of America.



Example data

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The example dataset contains sales data, with the geographical location stored in the `COUNTRY_SUBREGION` column in the COUNTRIES table.

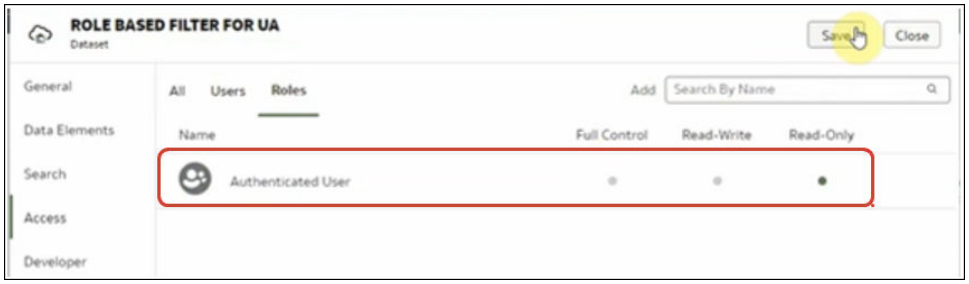


Example users and application roles

- User *dvauthoruser* is assigned the application role *North America Sales*.

Example dataset access configuration

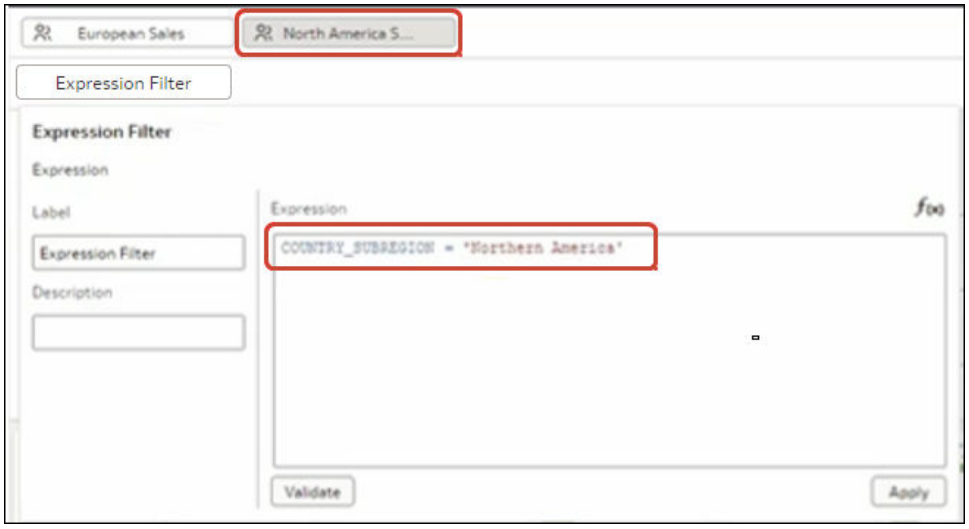
In the Inspect dialog for the dataset, under Access, then Roles, authenticated users are given Read-Only access.



Example role-based filter

In the dataset editor, the workbook author applies a role-based filter to the *North America Sales* application role with the expression `COUNTRY_SUBREGION = "Northern America"`.

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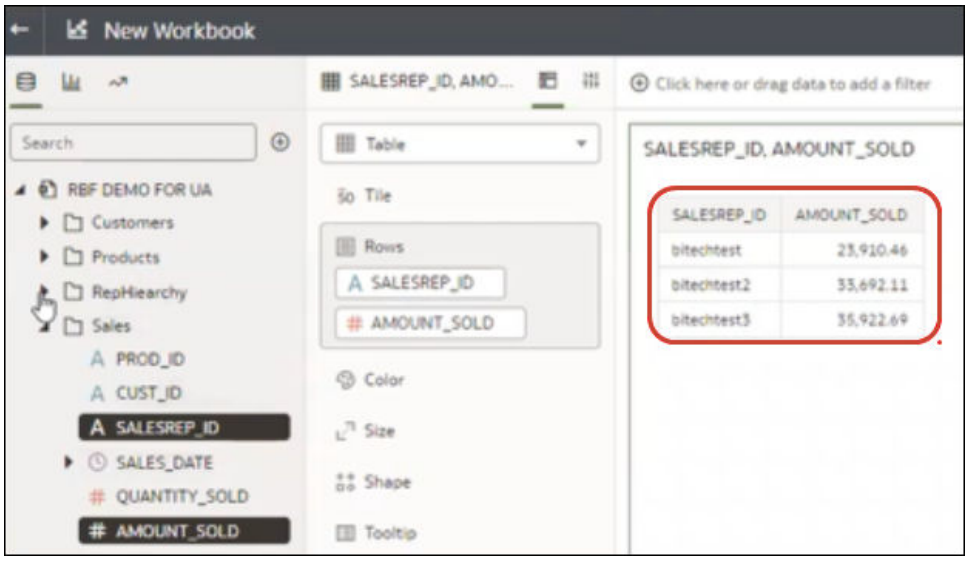
Example Two - Apply Multiple Role-Based Filters in a Workbook

This example shows how sales vice presidents and sales representatives use the same shared workbook to analyze sales data. Vice presidents can see the sales data for every sales representative in their team. Sales representatives can only see their own sales data.

Example report

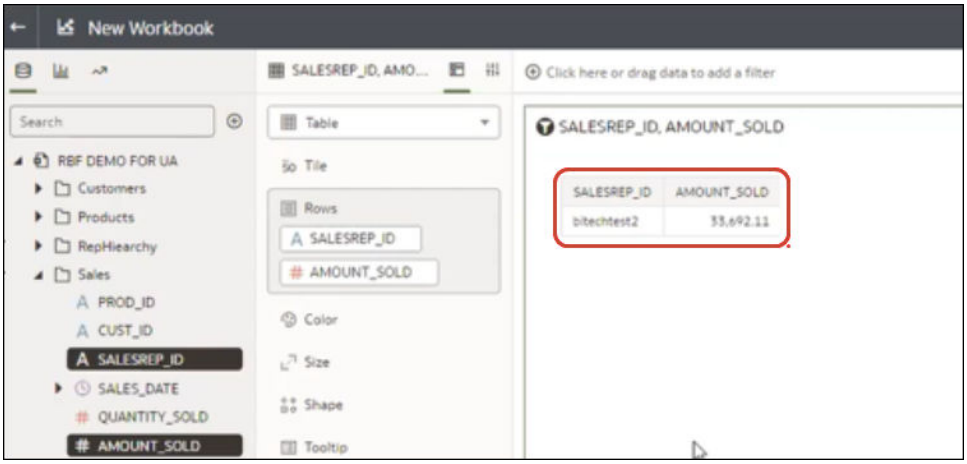
Sales vice presidents or sales representatives can open the same shared workbook and see data appropriate to their application role and user ID.

- When a sales vice president logs into Oracle Analytics and opens the shared sales workbook, they see the sales data for each sales representative in their team. In this example, sales vice president *dvauthoruser* can see a sales summary for sales representatives in their team (*bitechtest*, *bitechtest2*, and *bitechtest3*).



- When a sales representative logs into Oracle Analytics and opens the shared sales workbook, they only see their own sales data. In this example, sales representative *bitechtest2* can see his or her sales `$33,692.11`.

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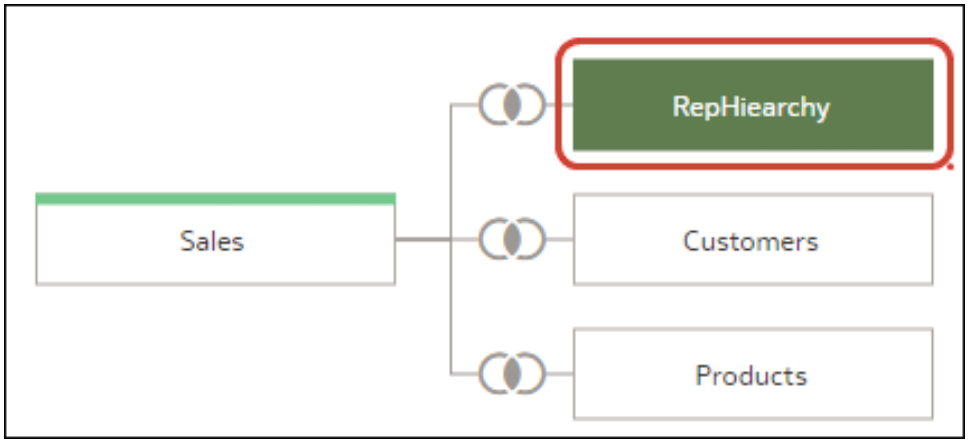
Example data

The example dataset contains sales data, with the sales representative ID in the `SALESREP_ID` column.

PROD_ID	CUST_ID	SALESREP_ID	SALES_DATE	QUANTITY_...	AMOUNT_SOLD
139	2943	bitechtest2	08/26/2019	1	17.770000000000
34	1025	bitechtest	06/19/2018	1	44.790000000000
118	2365	bitechtest4	09/30/2019	1	8.130000000000
47	3059	bitechtest2	01/27/2019	1	30.080000000000
48	4678	bitechtest5	03/28/2022	1	12.000000000000
134	3829	bitechtest7	08/09/2020	1	23.600000000000
46	680	bitechtest5	06/10/2021	1	24.610000000000
38	33742	bitechtest4	11/23/2019	1	27.780000000000
139	1619	bitechtest6	07/07/2020	1	22.250000000000
45	3633	bitechtest2	07/03/2020	1	48.100000000000
16	2985	bitechtest3	07/07/2021	1	303.330000000000
28	4047	bitechtest3	07/17/2018	1	214.740000000000
31	5576	bitechtest2	12/16/2020	1	8.320000000000
130	8203	bitechtest2	08/30/2018	1	94.490000000000
140	43443	bitechtest5	03/31/2020	1	37.790000000000
132	4435	bitechtest	10/02/2021	1	27.590000000000
132	12005	bitechtest6	05/21/2021	1	23.730000000000
123	9084	bitechtest3	12/26/2019	1	50.790000000000
26	11445	bitechtest3	12/21/2021	1	154.650000000000
126	3927	bitechtest	04/08/2020	1	29.520000000000
24	4960	bitechtest7	06/29/2021	1	64.300000000000

The sales vice president to sales representative hierarchy is implemented using a RepHierarchy table.

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The RepHierarchy table relates sales vice presidents to sales representatives in their team:

VP_ID	SALESREP_ID
dvauthoruser	bitechtest
dvauthoruser	bitechtest2
dvauthoruser	bitechtest3
dvauthoruser2	bitechtest4
dvauthoruser2	bitechtest5
dvauthoruser2	bitechtest6
dvauthoruser2	bitechtest7

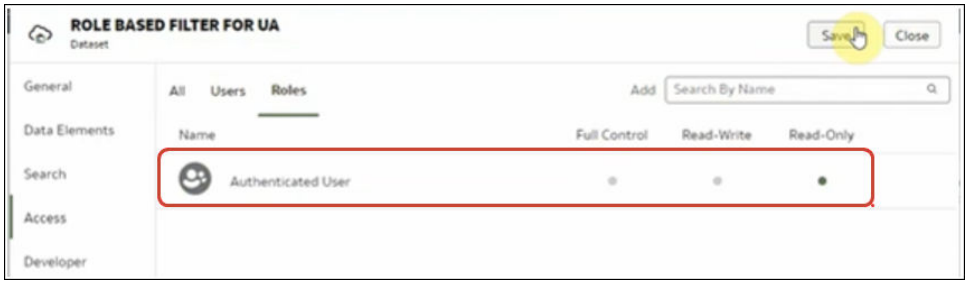
Example users and application roles

- Users *dvauthoruser* and *dvauthoruser2* are assigned the application role *Sales VP*.
- Users *bitechtest* to *bitechtest7* are assigned the application role *Sales Rep*.

Example dataset access configuration

In the Inspect dialog for the dataset, under Access, then Roles, authenticated users are given Read-Only access.

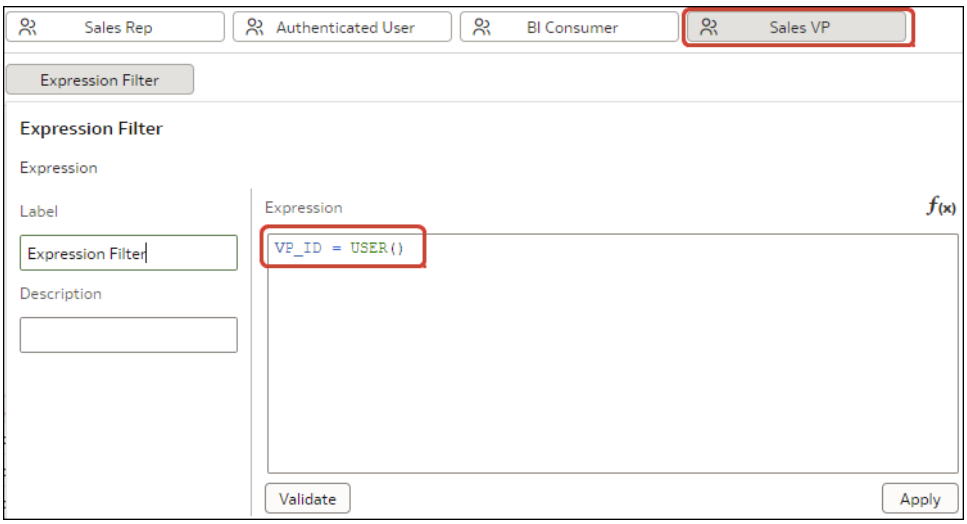
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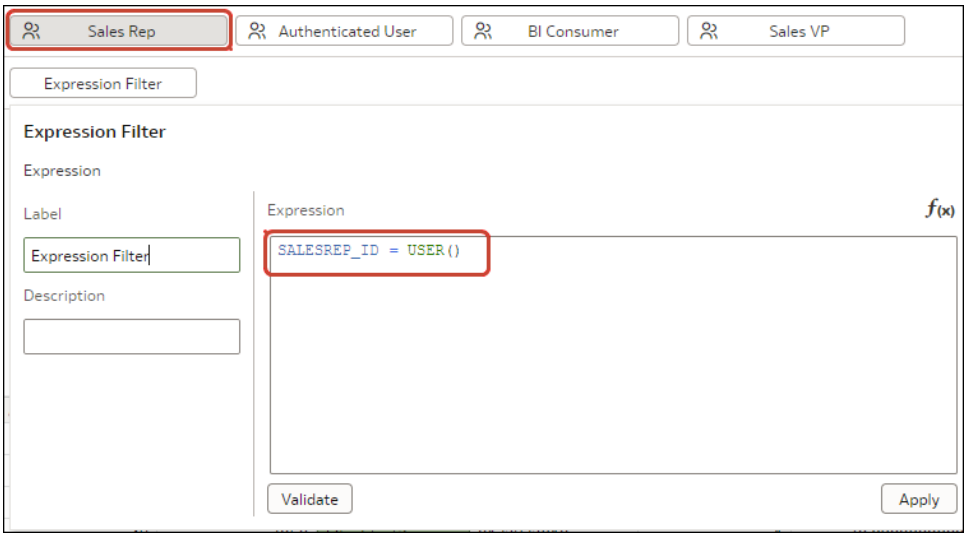
Example role-based filters

The workbook author applies two role-based filters to the dataset used by the workbook, one for sales vice presidents and one for sales representatives.

- The workbook author applies a role-based filter to the sales vice president 'Sales VP' application role with the expression `SALESVP_ID = USER()`. The argument USER() is a system variable in Oracle Analytics that provides the ID of the logged-in user.



- The workbook author also applies a role-based filter to the 'Sales Rep' application role with the expression `SALESREP_ID = USER()`.



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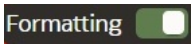
View a Dataset Table's Original Formatting

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.



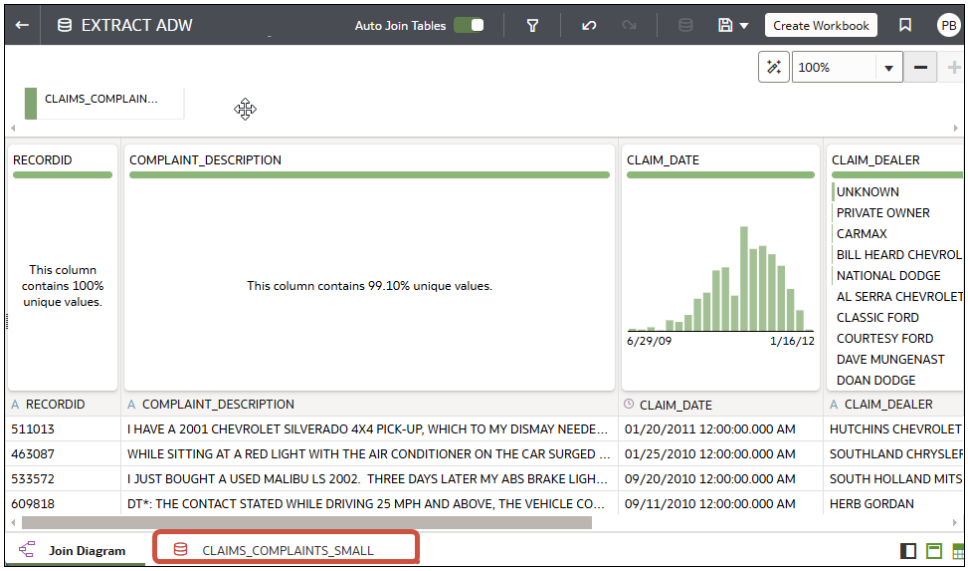
Specify Whether a Dataset Table Is Cached or Live

Configure a dataset table's **Data Access** setting to determine whether data is cached or loaded directly from the data source.

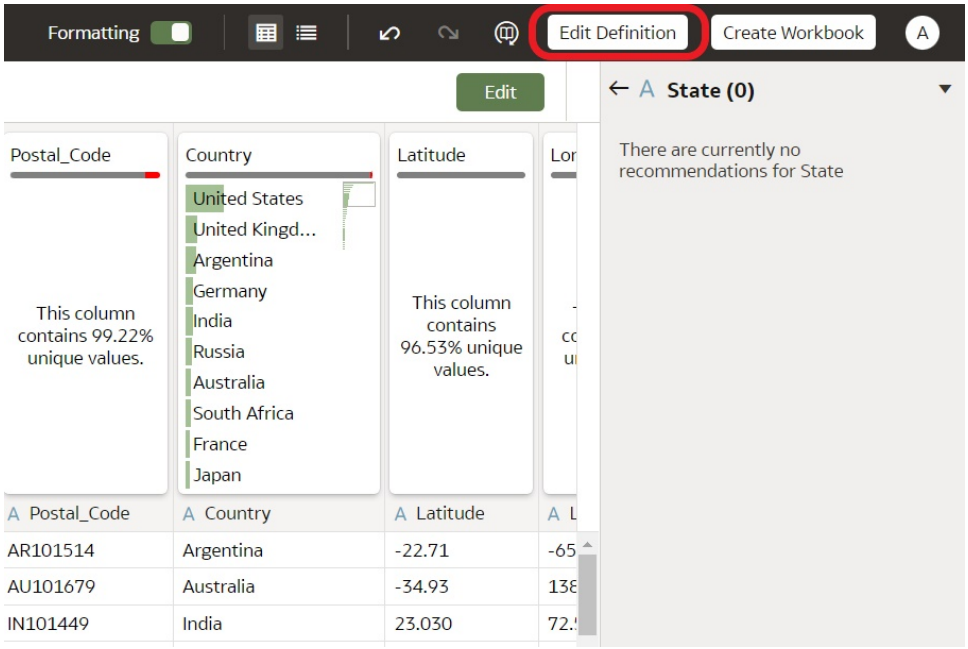
See Choosing a Data Access Type for Dataset Tables.

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. In the **Join Diagram** go to the table page tabs and click the table that you want to configure.

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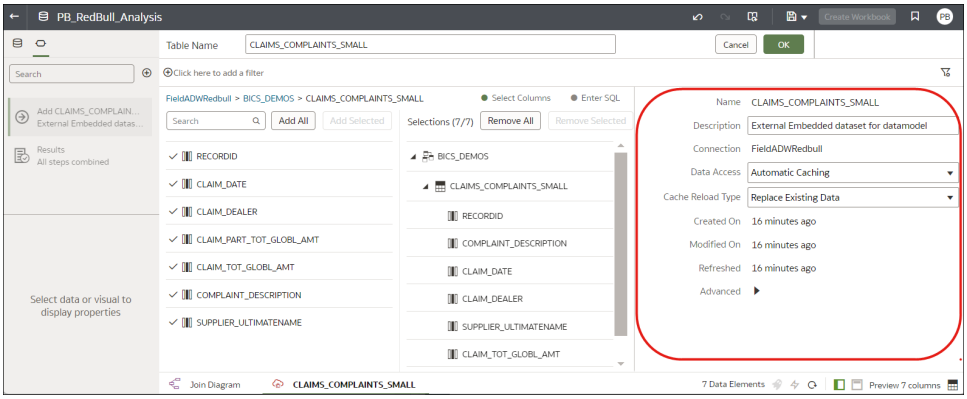


5. In the table editor, click **Edit Definition**.

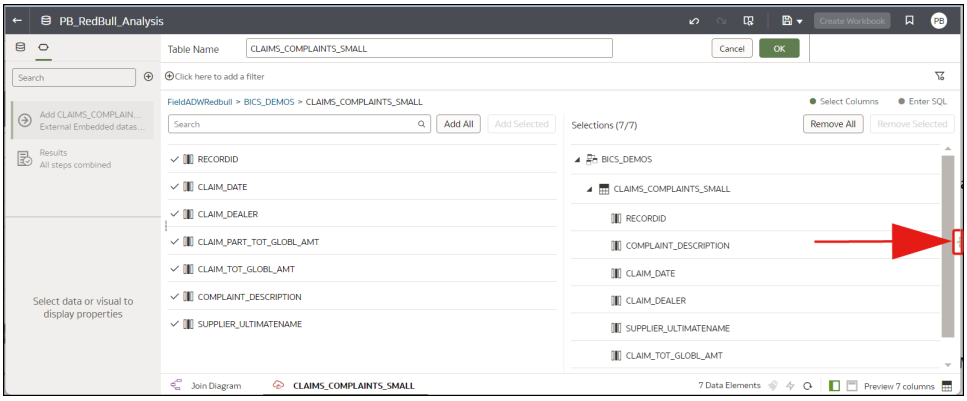


6. Make sure that the data access options are displayed at the right-hand side.

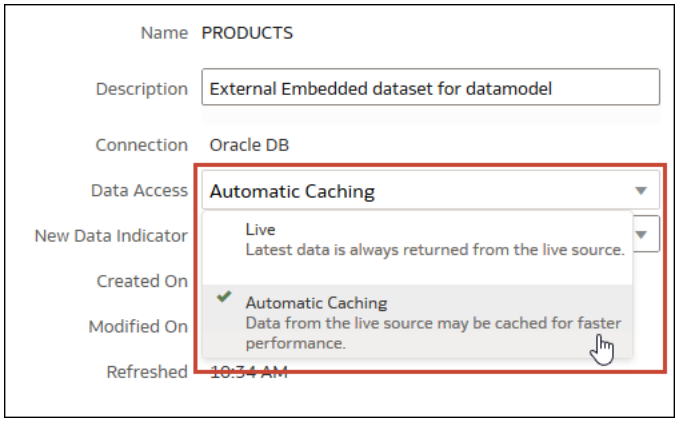
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If the data access options aren't displayed, hover over the center of the right edge of the window to display the **Expand** option, then click **Expand**.



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



8. Click **OK**.

Choosing a Data Access Type for Dataset Tables

You specify the use of cached data or data loaded directly from a data source using Oracle Analytics data access settings.

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Tip: For best performance, if you have a dataset with multiple tables, set all tables to access data in the same way. Although you can can configure some tables to use caching and some to use live data, this can affect performance. For example, if the reloading of one table fails, then any tables set to use automatic caching are switched to use live data.

Data Access settings:

Option	When to use	What it does	Other information
Live	You're using a high-performance database such as Oracle Autonomous Data Warehouse, and you always want to use the latest and freshest data.	A table loads its data directly from the data source.	The source system manages the table's data source queries.
Automatic Caching	You want faster performance when you refresh a table's data from the transform editor or from a workbook. If a dataset load fails, you understand that the data access type switches to **Live** mode.	A table loads its data from the cache where possible. If a dataset load fails or columns are added, data access temporarily switches to Live mode until a new reload is successful.	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 2 GB or if the data takes too long to load, the data is accessed using a live query (if the connection type supports it). If you want to use automatic caching and the data is larger than 2 GB, then add column filters to the table, for example limit a date range to reduce the size of the data.
Extracted	You want to ensure that in-memory caching of datasets is completed before allowing queries, which provides resilience and consistent performance for workbooks. If a dataset load fails, you understand that workbooks use the last data loaded.	A table always loads its data from the cache (most recent load or previous successful load).	Extracted mode forces the Reload Data operation (on the Inspect dialog) to complete before letting other users use the dataset, which ensures that it's fully cached. In addition, a dataset author can make modifications such as adding a column, and the changes are only visible to users when all of the data is available in the cache. If a dataset reload fails or new columns are added, workbooks use the last data loaded.

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Use Joins to Build Datasets

Learn how to define relationships between your data tables using joins.

Topics:

- Understand Dataset Table Joins
- What is Preserve Grain?
- Add Joins Between Dataset Tables
- Disable Auto Joins in Datasets
- Modify or Fix Joins in a Dataset
- Delete Joins from a Dataset
- Add Joins When Table Columns Don't Match
- Specify Which Table Determines Grain
- Include a Dataset Table in Data Source Queries

Understand Dataset Table Joins

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

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.

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> **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.
	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.

What is Preserve Grain?

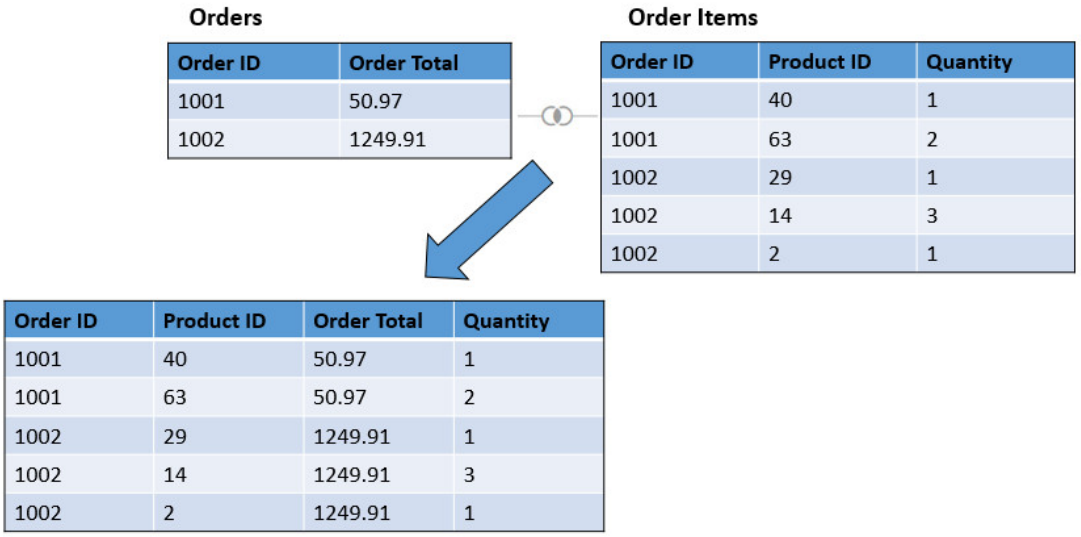
By default a dataset's grain is determined by the table with the lowest grain, but you can use the preserve grain setting to specify which table determines the dataset's grain.

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.

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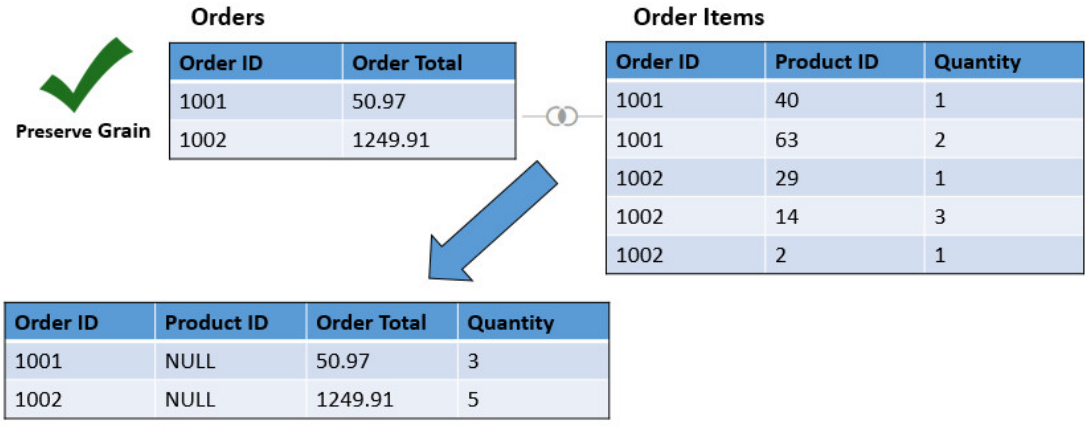


Orders		Order Items		
Order ID	Order Total	Order ID	Product ID	Quantity
1001	50.97	1001	40	1
1002	1249.91	1001	63	2
		1002	29	1
		1002	14	3
		1002	2	1

Order ID	Product ID	Order Total	Quantity
1001	40	50.97	1
1001	63	50.97	2
1002	29	1249.91	1
1002	14	1249.91	3
1002	2	1249.91	1

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.



Orders		Order Items		
Order ID	Order Total	Order ID	Product ID	Quantity
1001	50.97	1001	40	1
1002	1249.91	1001	63	2
		1002	29	1
		1002	14	3
		1002	2	1

Order ID	Product ID	Order Total	Quantity
1001	NULL	50.97	3
1002	NULL	1249.91	5

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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.

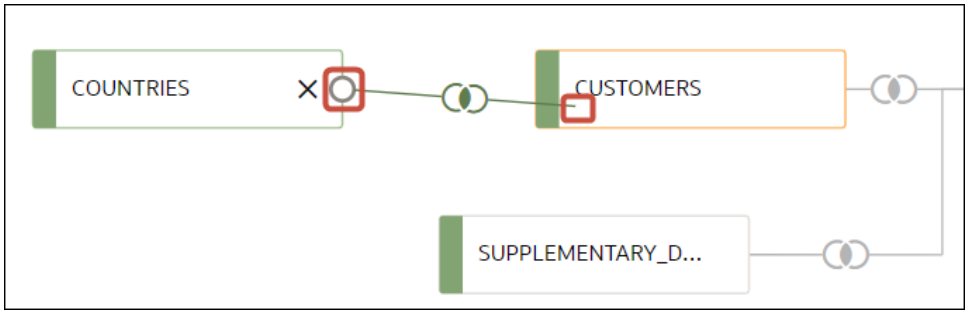
Tutorial

When add tables to a dataset, Oracle Analytics automatically creates joins for related dataset tables 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.

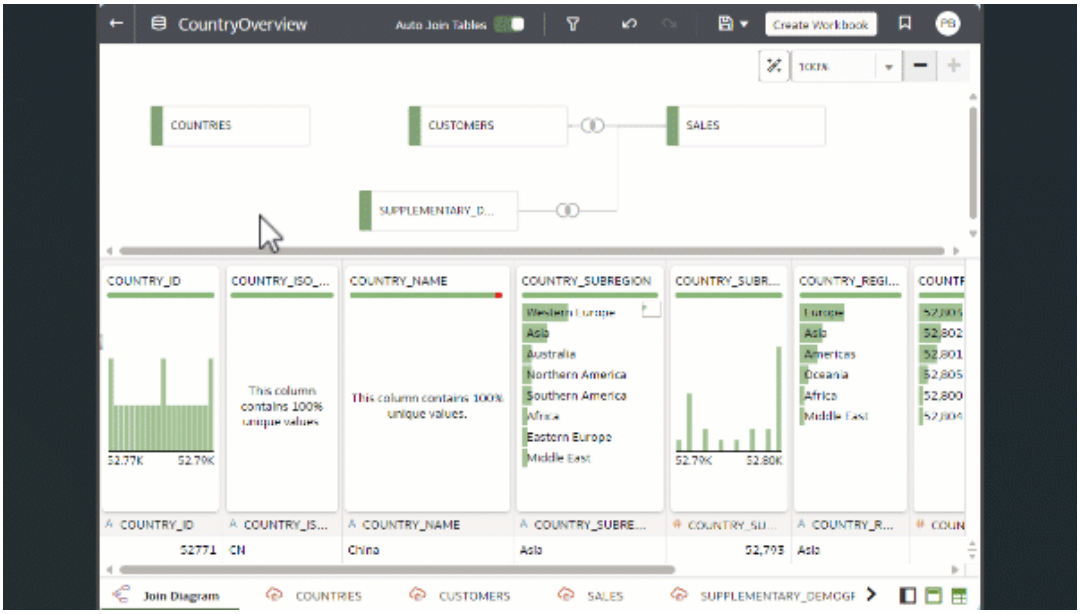
1. On the Home page, click **Navigator** and then click **Data**.
2. Click **Datasets** and locate the dataset that you want to open, click **Actions**, and then click **Open**.
3. In the **Join Diagram** , hover over the first table, click the circle node that's displayed at the right-hand edge, and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

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

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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.

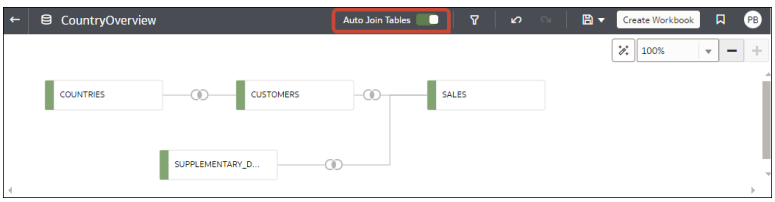
By default, when you drag and drop tables to a dataset, any joins defined in the data source are automatically created between the dataset's tables. Oracle Analytics also automatically creates joins based on the column name matches it finds between the tables.

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.



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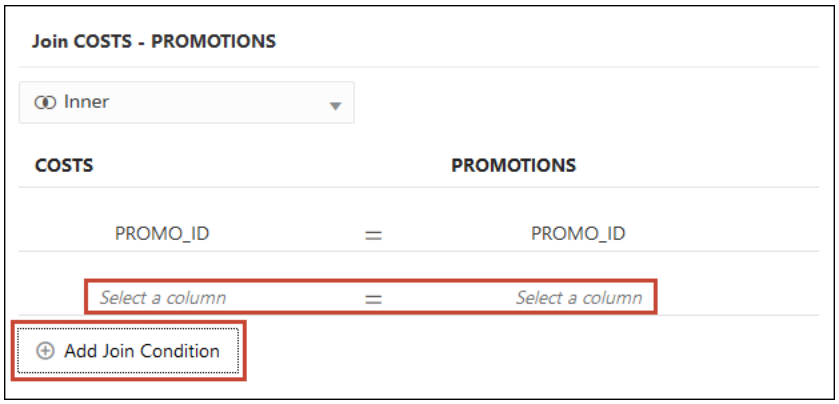
Add Joins When Table Columns Don't Match

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.

Video

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.



13. Click **Save**.

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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.

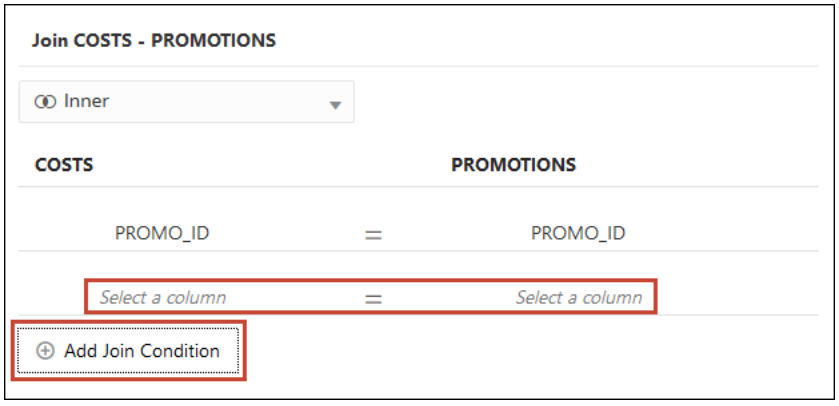
This icon indicates an incomplete join:



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.



8. Click **Save**.

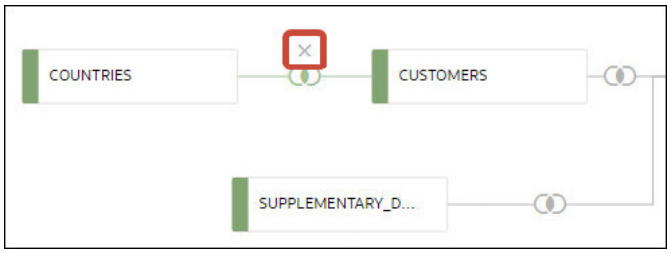
Delete Joins from a Dataset

You can delete any table join from a dataset.

1. On the Home page, click **Navigator** and then click **Data**.

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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**.

Specify Which Table Determines Grain

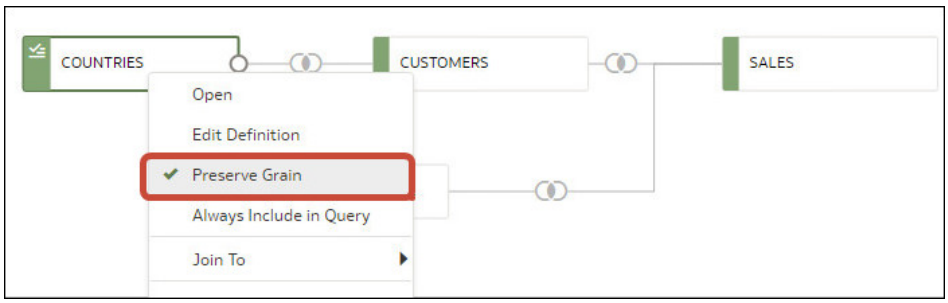
By default the table with the lowest grain determines a dataset's grain, but you can change which dataset table determines grain.

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**.

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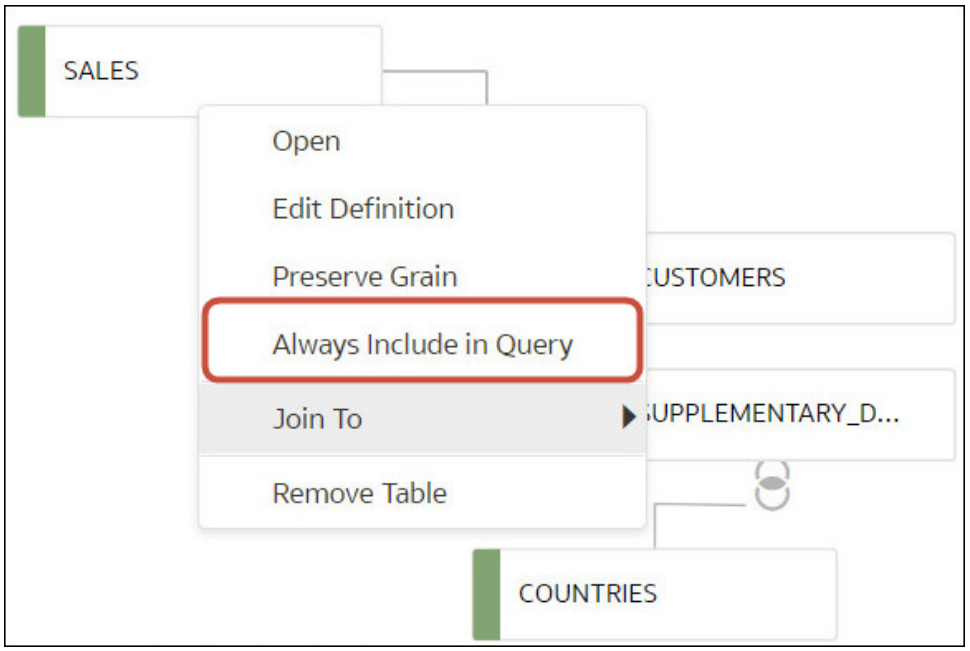
Include a Dataset Table in Data Source Queries

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**.

Create Datasets from Data Sources

Learn how to create datasets from various data sources, such as files, local subject areas, and database connections.

Topics:

- Create Datasets from Files

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- 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 a Local Subject Area
- Create a Dataset from a Local Analysis
- Create a Dataset from an Essbase Connection
- Create a Dataset from a Data Source with REST Endpoints
- Create a Dataset from OCI Object Storage
- Create a Dataset from Oracle Enterprise Performance Management (Oracle EPM)

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.

Don't create or use an Oracle Applications connection to connect to your local Oracle Analytics instance. Using a connection to your instance to create datasets from local subject areas or analyses results in data caching issues and errors in visualizations. Instead, use the Local Subject Area connection type to create a dataset from a subject areas stored in your Oracle Analytics instance. See Create a Dataset from a Local Subject Area.

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.

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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.

Don't create or use an Oracle Applications connection to connect to your local Oracle Analytics instance. Using a connection to your instance to create datasets from local subject areas or analyses results in data caching issues and errors in visualizations. Instead, use the Local Subject Area connection type to create a dataset from a analyses stored in your Oracle Analytics instance. See Create a Dataset from a Local Analysis.

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.

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Create a Dataset from a Local Analysis

You can create datasets from analyses stored in your Oracle Analytics instance.

Use the Local Subject Area connection option to create datasets from local analyses. Don't create or use an "Oracle Applications" connection to connect to your local Oracle Analytics instance. Using a connection to your local instance results in data caching issues and errors in visualizations.

1. On the Oracle Analytics Home page, click **Page Menu**, then click **Open Classic Home**.
2. In Classic Home, click **Catalog** and locate and open the analysis to use to create the dataset. In the Analysis editor, click the **Advanced** tab.
3. In the **SQL Issued** field, select and copy the SQL code.
4. In the Oracle Analytics Home page, click **Create** and then click **Dataset**.
5. In the Create Dataset dialog, select Local Subject Area.
6. In the Connections pane, locate and expand the subject area and locate the **Manual Query** option.
7. Drag and drop **Manual Query** to the Join Diagram to create a table shell.
8. Double-click the Manual Query table.
9. In the Add Dataset page, rename the table and confirm that **Enter Logical SQL** is selected.
10. In the **Statement** field, paste the SQL statement.
11. Click **OK**.
12. Optional: To modify the SQL statement, go to the **Table Page Tabs** and confirm that the tab for the table you created is selected. Click **Edit Definition** to access the Add Dataset page and modify the SQL statement.

Create a Dataset from a Local Subject Area

You can create a dataset from local subject areas stored in your Oracle Analytics instance.

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 Local Subject Area.
3. In the Dataset editor, go to the **Connections** pane and browse or search for a local 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.

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7. Click **Save**.
8. Enter a name and click **OK**.

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, comma-separated value (CSV) files, and text (TXT) files.

Size Limits

- The maximum file size you can upload is 250 MB.
- The maximum number of columns for a single sheet is 250.

Uploading Files

- You can upload data from multiple sheets in a spreadsheet file at the same time.
- 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).

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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 contains 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 Table dialog, use the **Name** field to change the default dataset name if required.
4. If you're uploading a spreadsheet with multiple sheets, click the **Select** list to select a single sheet, or click **All Sheets** to load every sheet.
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.

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 contains 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.

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4. In the Create Dataset Table dialog, use the **Name** field to change the default dataset name if required.
5. If you're uploading a spreadsheet with multiple sheets, click the **Select** list to select a single sheet, or click **All Sheets** to load every sheet.
6. 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.
7. 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.

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.

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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**.

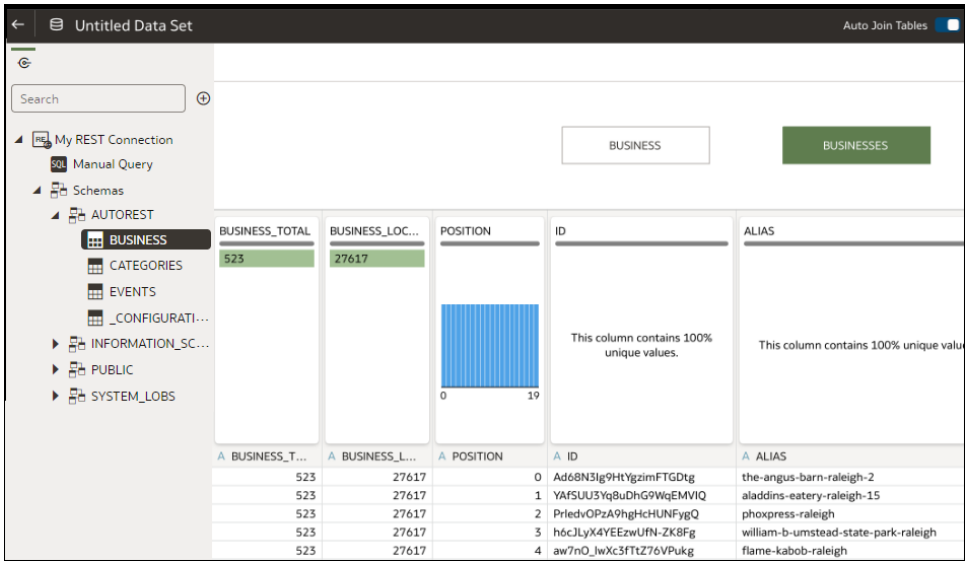
Create a Dataset from a Data Source with REST Endpoints

You can create a dataset with data accessed via the REST endpoint of a SaaS or PaaS application such as Workday, eBay, or MailChimp.

Connecting to data via REST endpoints enables you to analyze data from many transactional SaaS or PaaS applications without having to understand the internal format or structure of the data.

1. If you already have a connection to the REST data source you want to analyze, skip to Step 2 .

   If you don't have a connection, create a connection to the REST data source. See Connect to Data from REST Endpoints.
2. On the Home page, click **Create** and then click **Dataset**.
3. In the Create Dataset dialog, click a connection to the REST data source.
4. In the Dataset editor, go to the **Connections** pane and navigate to **Schemas**, then **AUTOREST**.



5. Drag and drop one or more tables from the **AUTOREST** schema to the **Join Diagram**.
6. Click **Save Dataset**.
7. Enter a name and click **OK**.

See Troubleshooting Connection to Data Sources with REST Endpoints.

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Create a Dataset from OCI Object Storage

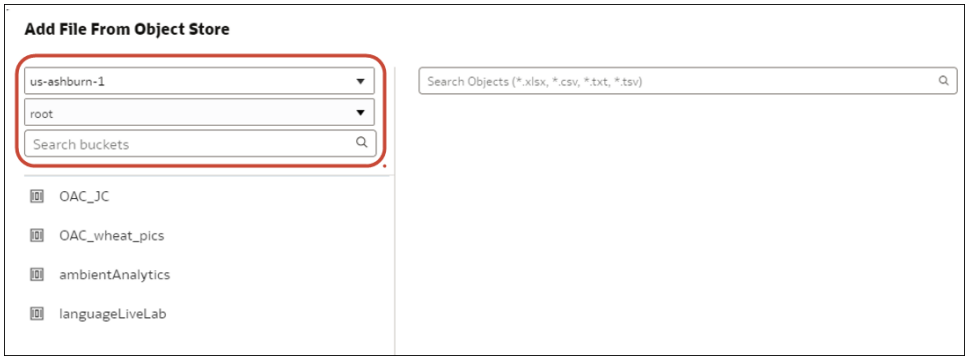
You can create a dataset from data files stored in OCI Object Storage. For example, you might use spreadsheet files (XLSX), comma-separated values (CSV) files or text files (TXT). You can add data from multiple files and use the dataset designer to associate them using joins.

When you've created your dataset, you can configure it to load incrementally. See Configure a Dataset to Load Incrementally.

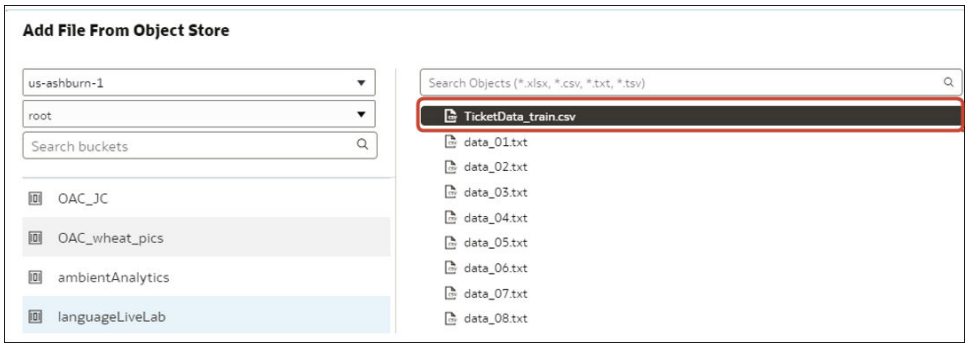
Prerequisites:

- Make sure that your data files are stored in a suitable bucket in OCI Object Storage.
- Connect Oracle Analytics to the OCI tenancy where you files are stored. See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

1. On the Home page, click **Create** and then click **Dataset**.
2. In the Create Dataset dialog, click the connection to your OCI tenancy.
3. Use the drop-down lists to select the region where your OCI tenancy is located, then select the folder and bucket where your data files are stored.



4. Select a data file from the bucket, then click **Add**.



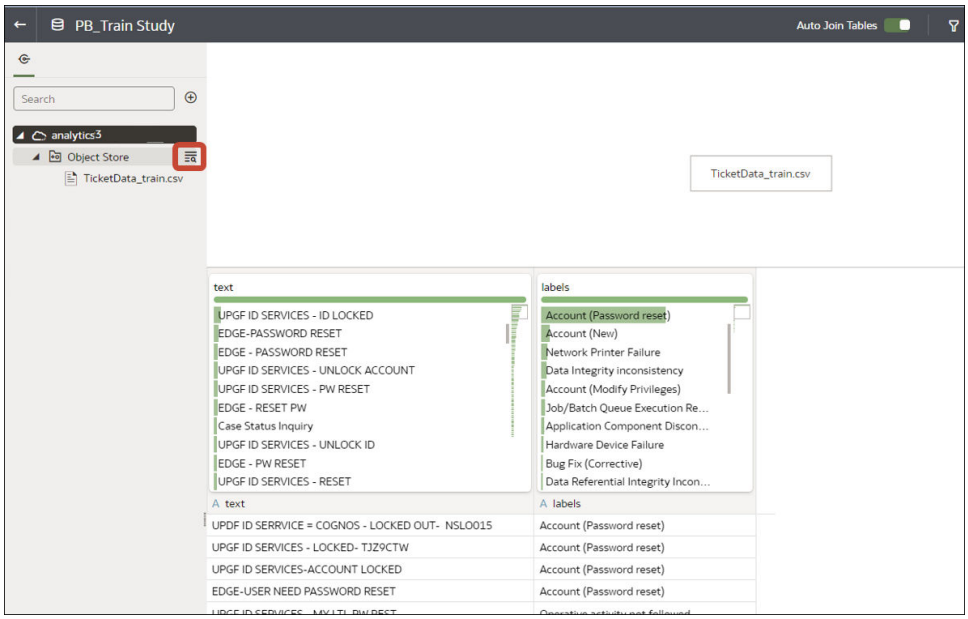
5. At the Create Dataset table from <file name> dialog, click **OK**.

   If required, change the default **Description** or **Separated by** option first.

   The dataset editor shows all of the fields from the data file.
6. Optional: Use the dataset editor to configure your data.

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7. Optional: If you want to add data from additional files to the dataset, in the Join Diagram, click the connection name in the Data Panel, then hover over **Object Store** and click **Search and add file from Object Store** to locate and select additional data files.



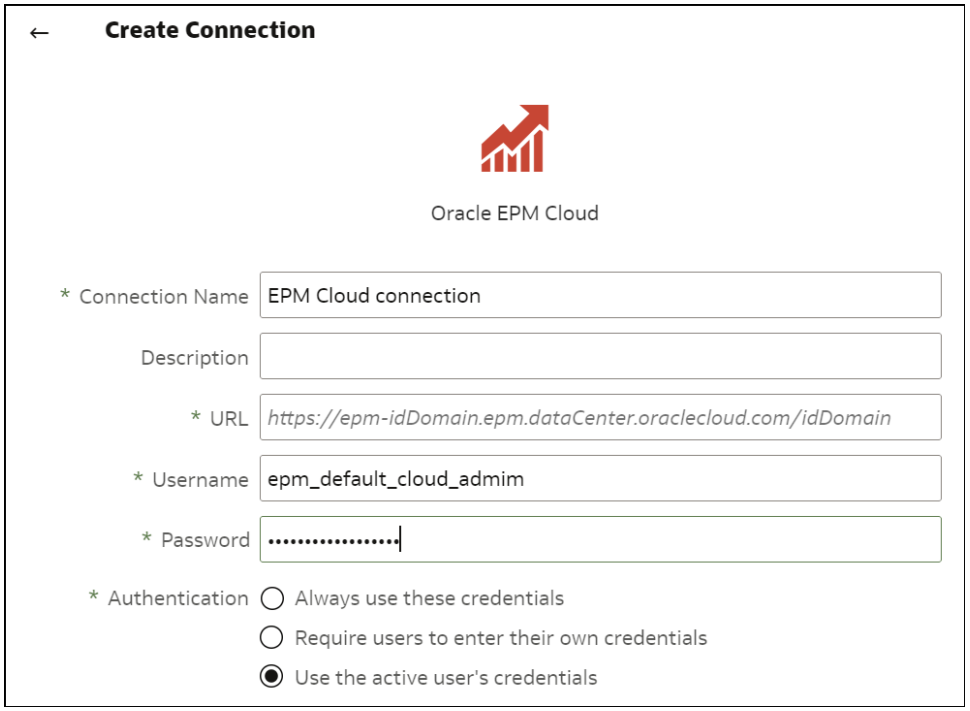
8. Click **Save** and specify a name for the dataset.

Create a Dataset from Oracle Enterprise Performance Management (Oracle EPM)

Connect to an Oracle Enterprise Performance Management (Oracle EPM) application and visualize the data in a workbook. Data is accessed as a live query.

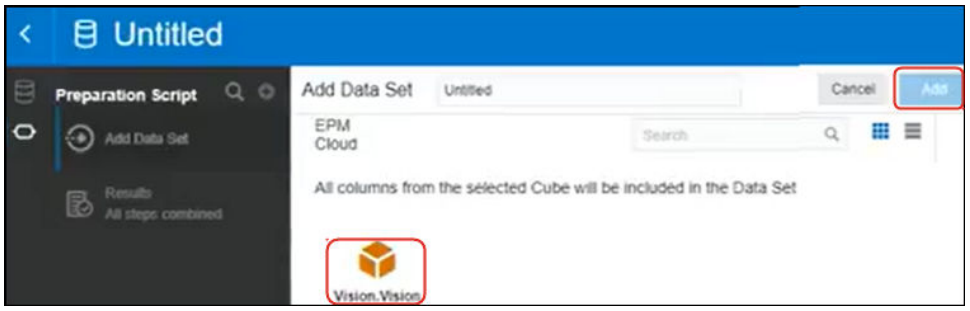
1. In the homepage, click **Create**, then **Connection**, and select **Oracle EPM Cloud**.
2. In the Create Connection dialog, enter connection details for your Cloud EPM Platform application.
   - In **Authentication**, select **Use the active user's credentials**.

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See Connect to Oracle Enterprise Performance Management Cloud.

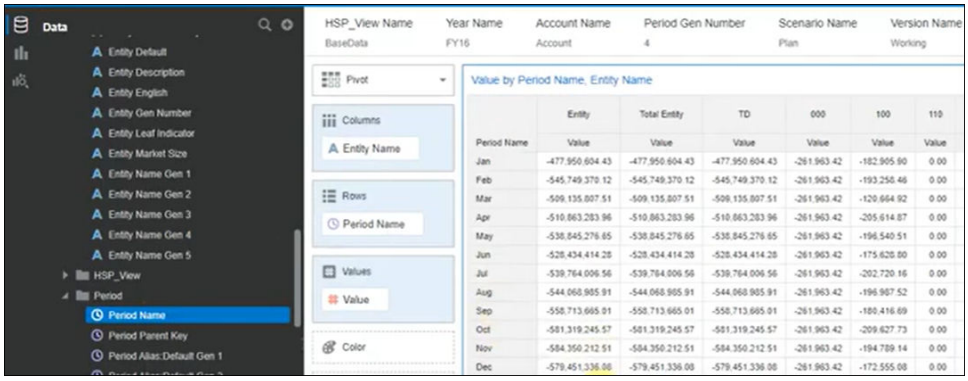
3. From the home page, click Create, then Dataset.
4. At the Create Dataset dialog, select the Oracle EPM connection that you created in Step 2.
5. In the Add Dataset dialog, select the cube to visualize, then click Add.



6. Click Create Workbook, then add the data elements to the design canvas.

   Tip: Use filters to precisely locate the data in your cubes.

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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

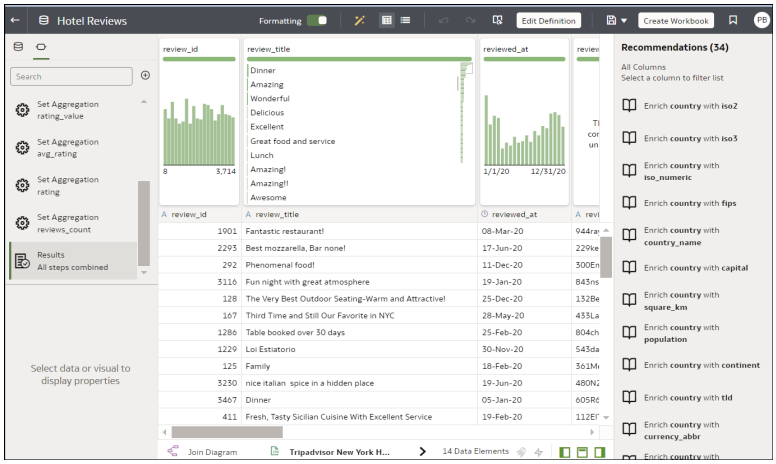
Oracle Analytics makes it easy to enrich and transform your data before you make it available for analysis.

Navigate to the transform editor

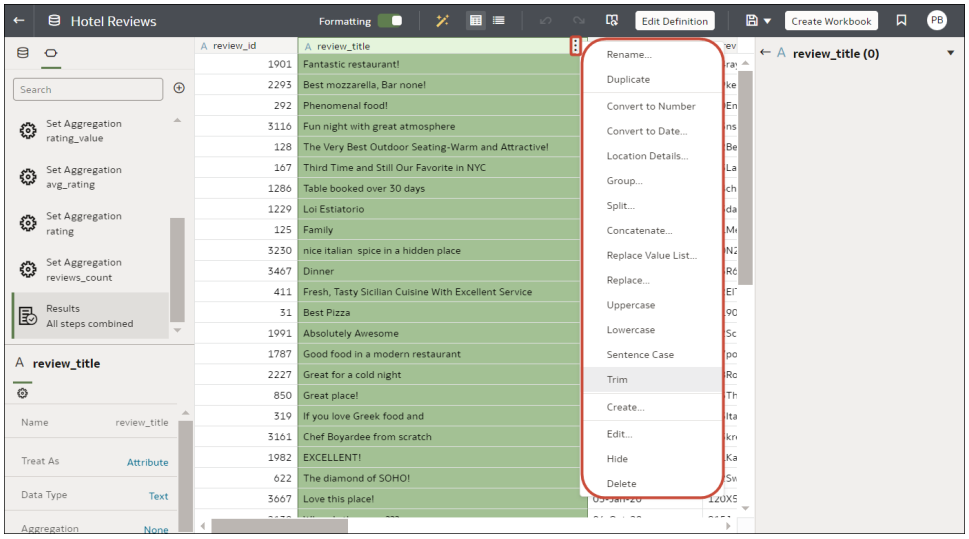
On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.

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

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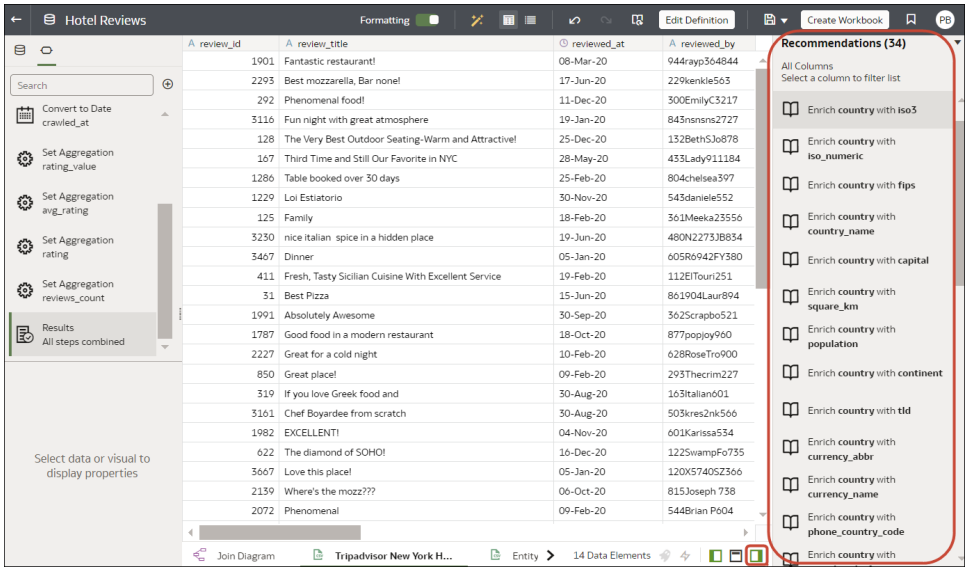
To transform your data, click **Options** (the ellipsis top-right of the data column ⋮), and select a transformation option (for example, **Bin**, **Rename** or **Convert to Text**).



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.

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You can enhance or transform a dataset with:

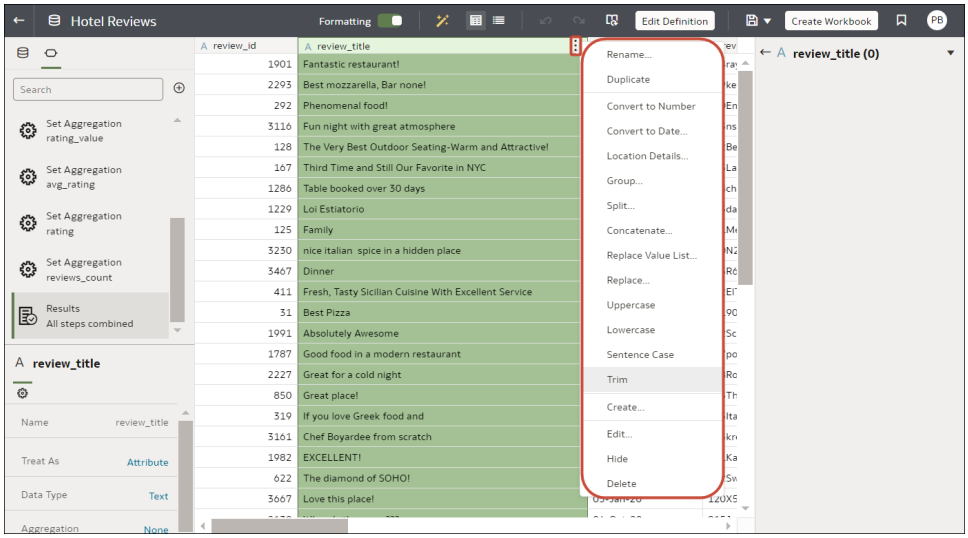
- Column concatenations, for example, adding a column with the person's first and last name.
- Custom Knowledge enrichments that your administrator has added to Oracle Analytics.
- Date part extractions, for example, extract the day of the week from a column that uses month, day, year as its format.
- 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.

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- 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.

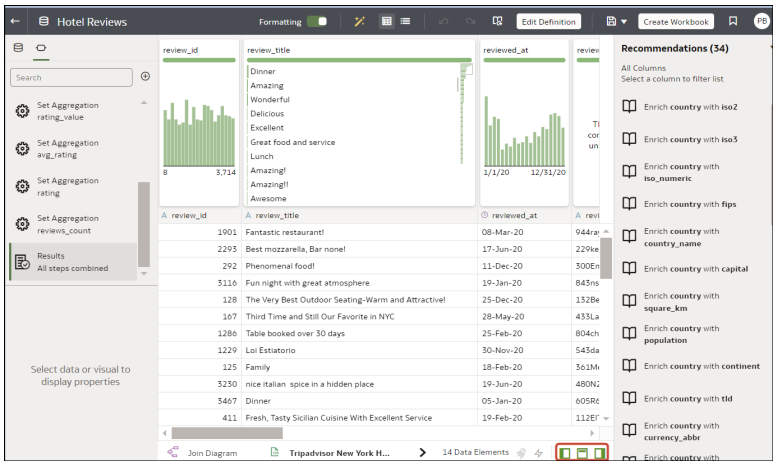
Enrich and Transform Your Data

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.

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1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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.

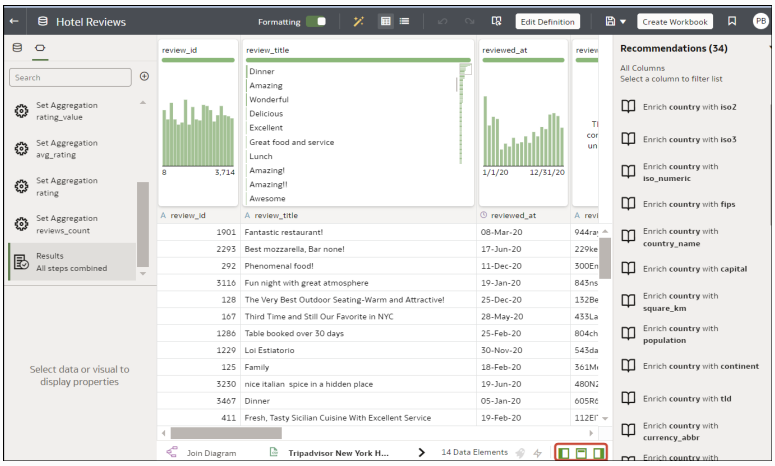
   - Use the **Recommendations** panel to apply suggested enrichments and transformations.
   - Use the **Options** menu at the top of each column to apply common transformations such as Rename, Uppercase, and Trim.
   - From the **Options** menu at the top of a column, click **Edit** to enhance columns 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.

   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.

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> **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.

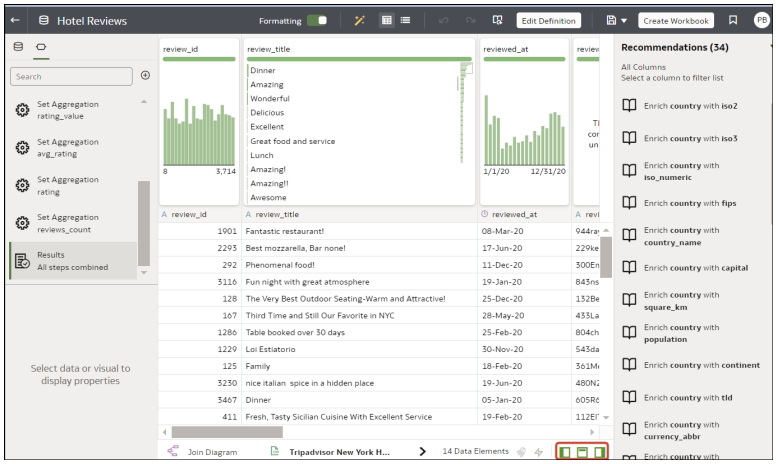
If an enrichment recommendation adds information to data such as enhancing a zip code attribute column with the state name, a new column is added to the dataset containing the name of the states associated with the zip codes. When you select a recommendation, the change is added to the Preparation Script 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.

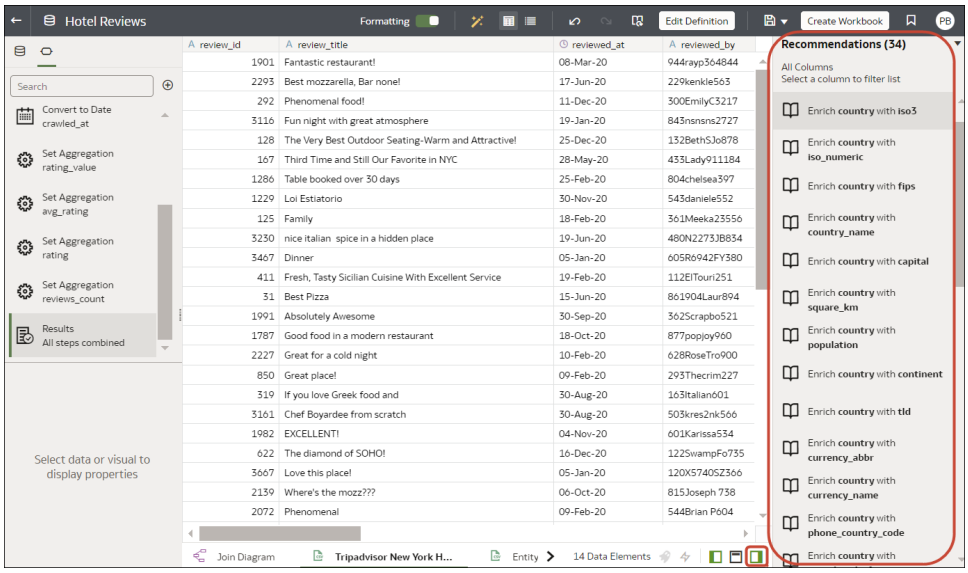
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.

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2. Select a column, then click a recommendation to apply to the dataset.



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

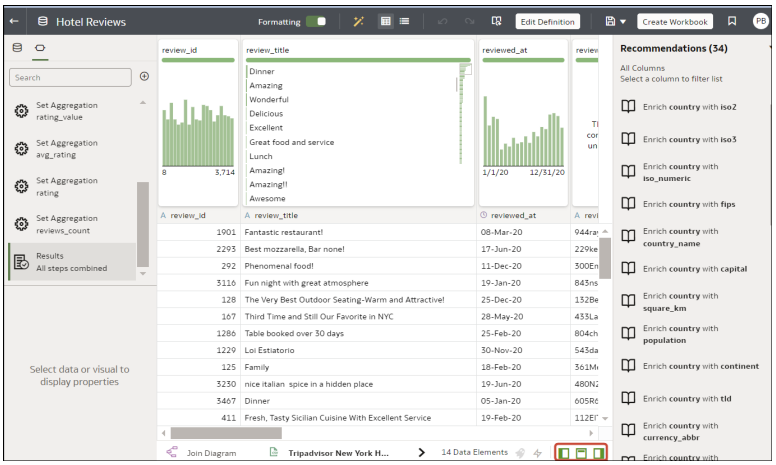
You can use the transform editor to enhance your data. For example, you might convert text to uppercase or trim leading and trailing spaces from data. Transform your data to make it more useful and powerful for content consumers.

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.

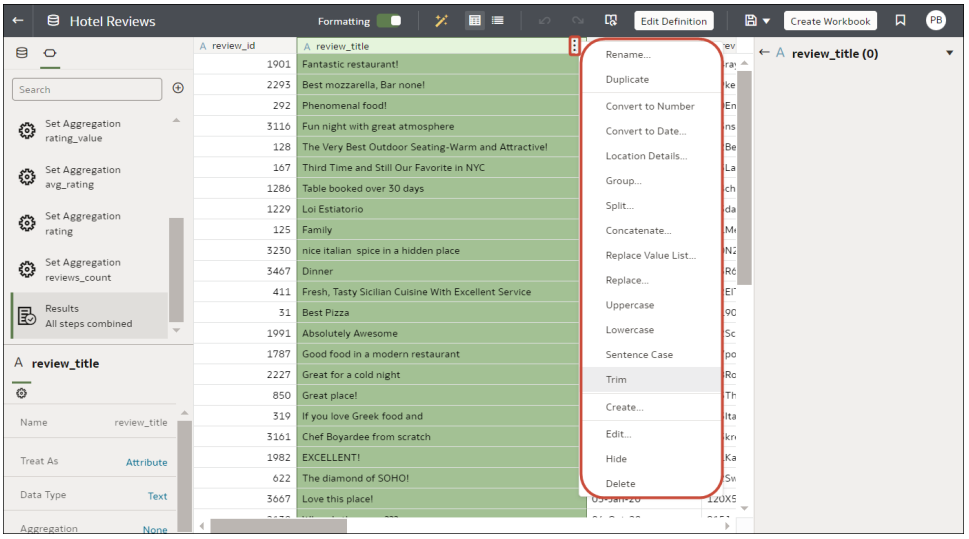
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

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If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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**.

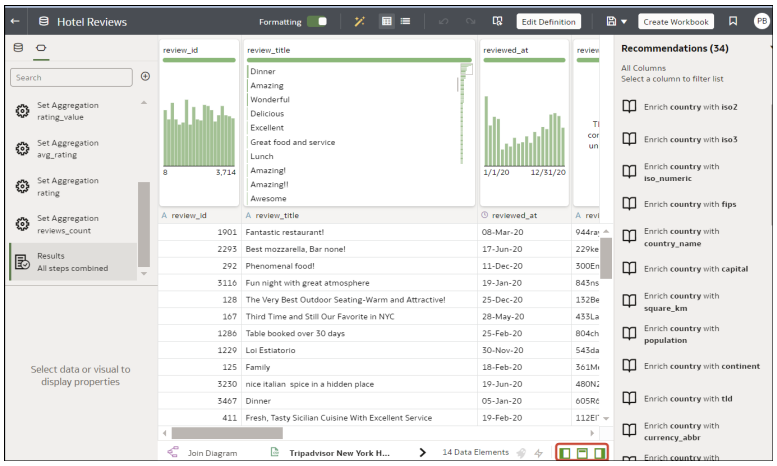
Change the Column Type of Measures and Attributes

When you edit a dataset in the transform editor, you can use recommendations provided by Oracle Analytics to change the column type of measures and attributes. 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.

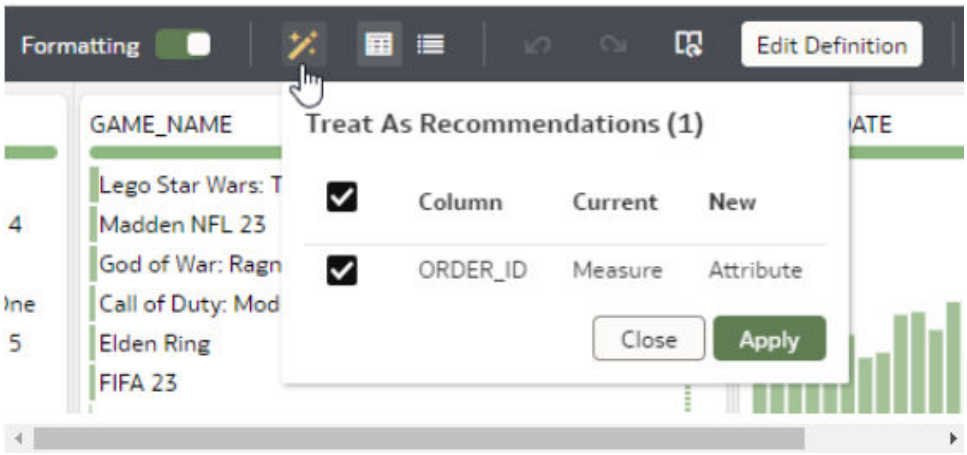
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1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.



2. Click **Review auto Treat-as recommendations** ().
3. Select columns to change from the type specified under **Current** to the type specified under **New**.



4. Click **Apply**.

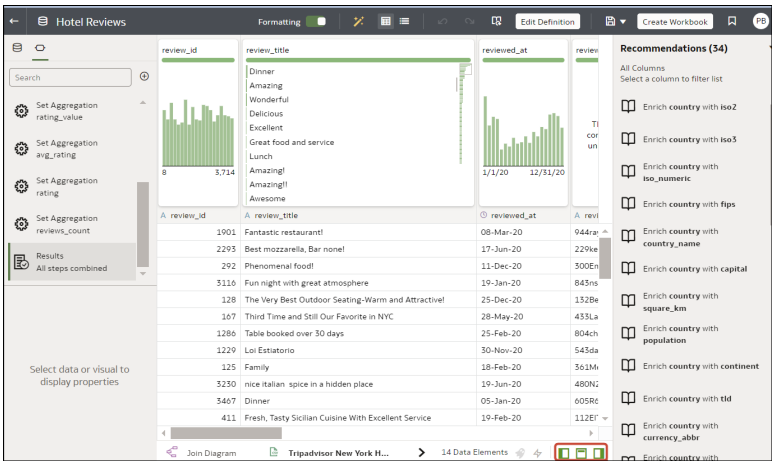
Replace Missing or Null Values in a Dataset

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.

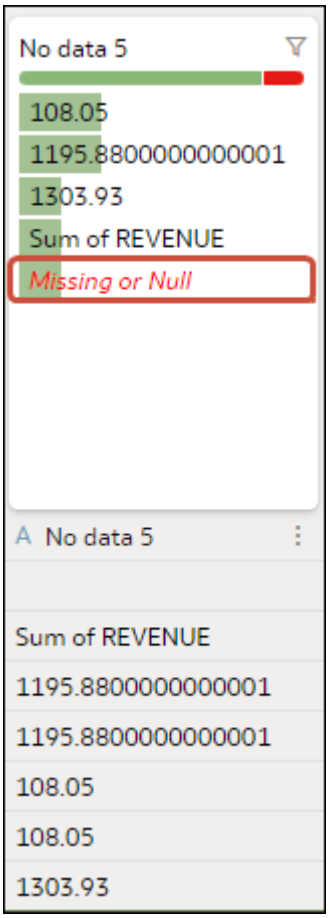
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

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If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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**.



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".

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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**.

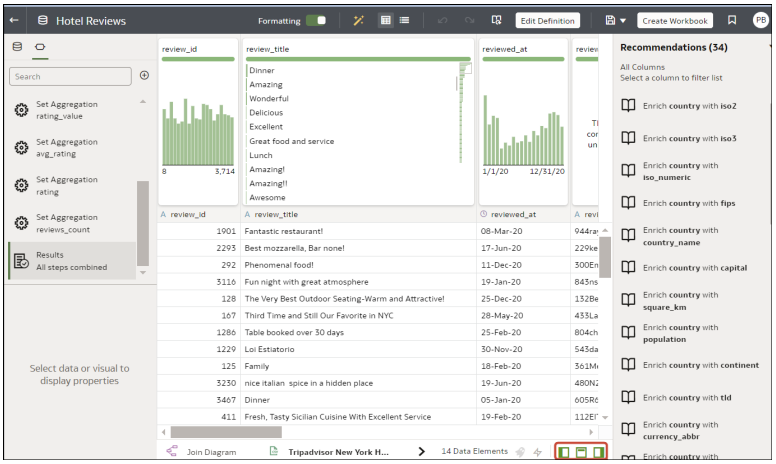
Transform Data Using Replace

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.

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.

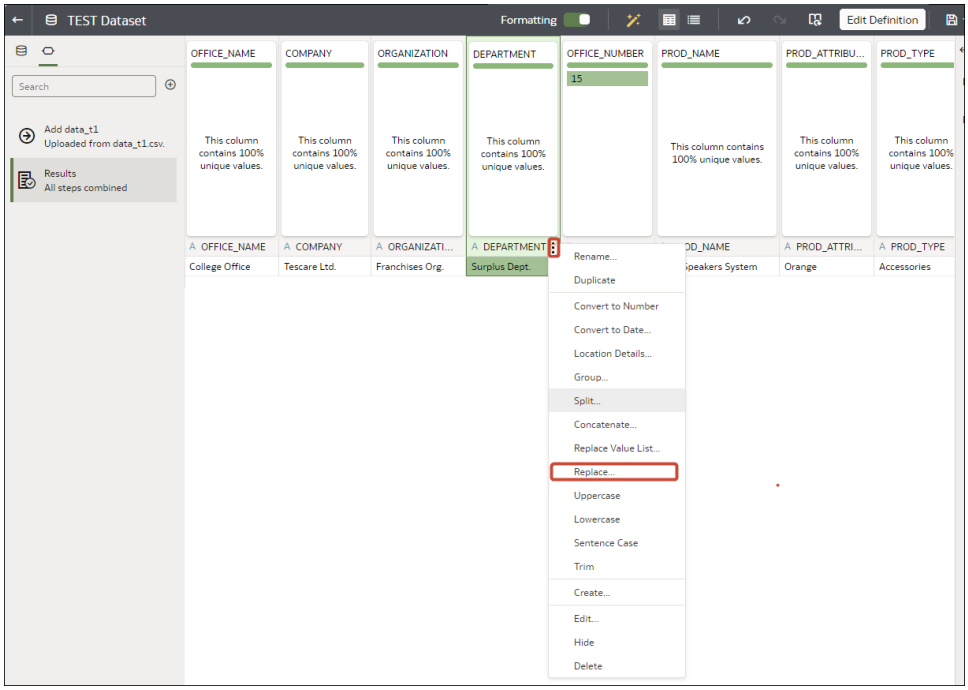
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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**.

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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.

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Table 4-1 Example replace transforms

Search Expression	Replace Value	Original Text	Replaced Text	Notes
`@([a-z]+)(?=\.[a-z]{3})`	@example	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

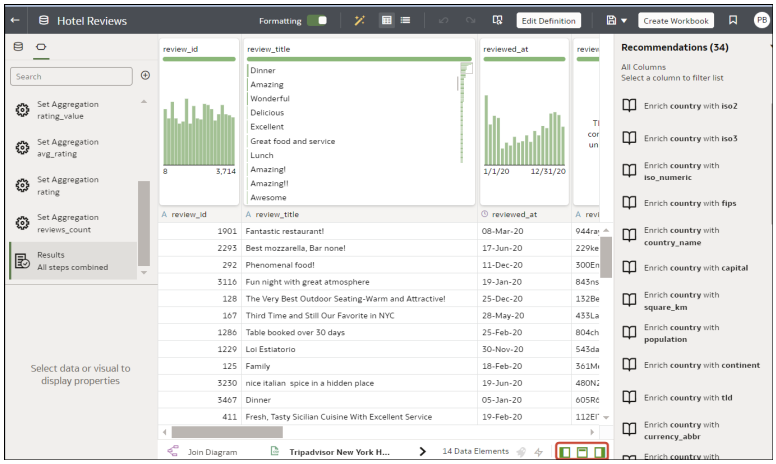
You can convert any text column to a date, time, or timestamp column.

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

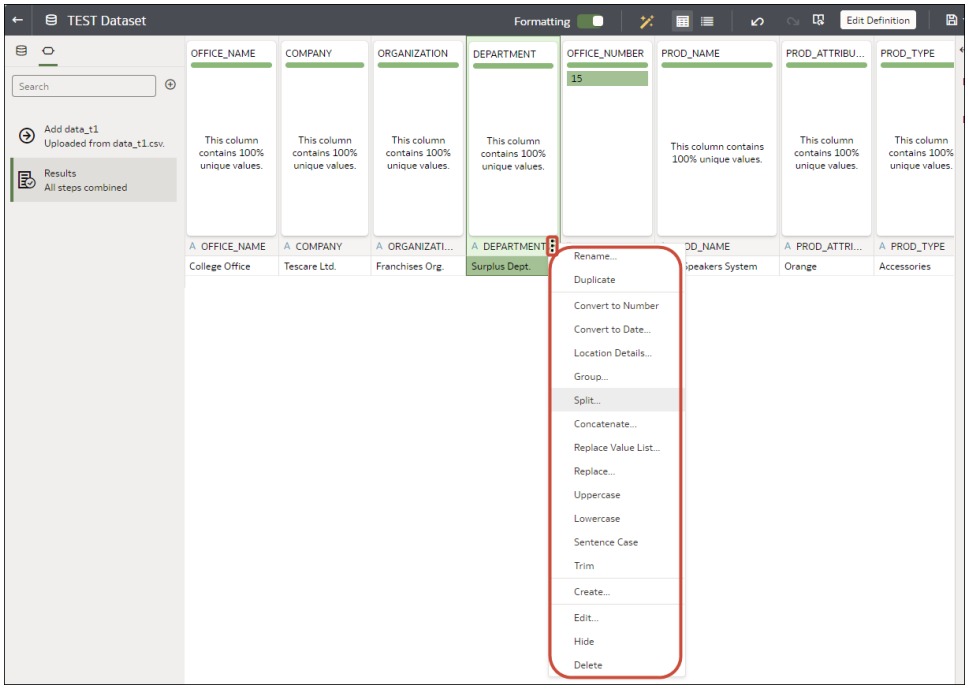
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.

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2. Hover over the column that you want to convert.
3. 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.

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Adjust the Display Format of a Date or Number Column

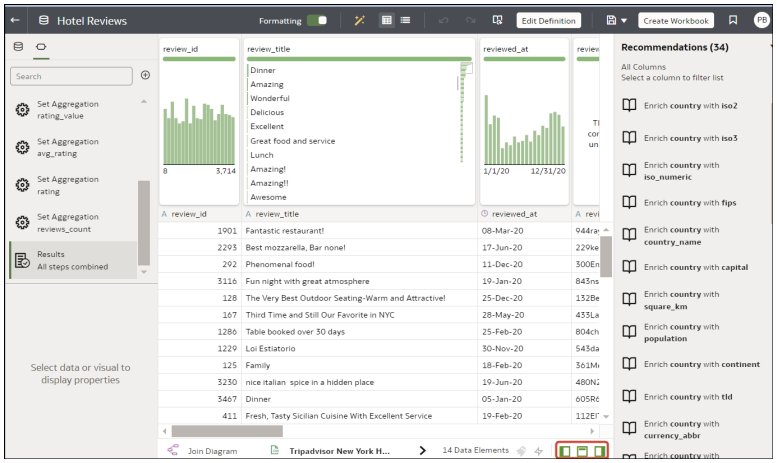
You can adjust the display format and granularity level of a date column or number column.

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, hover over a dataset that you own, click **Actions**, and then select **Open**.

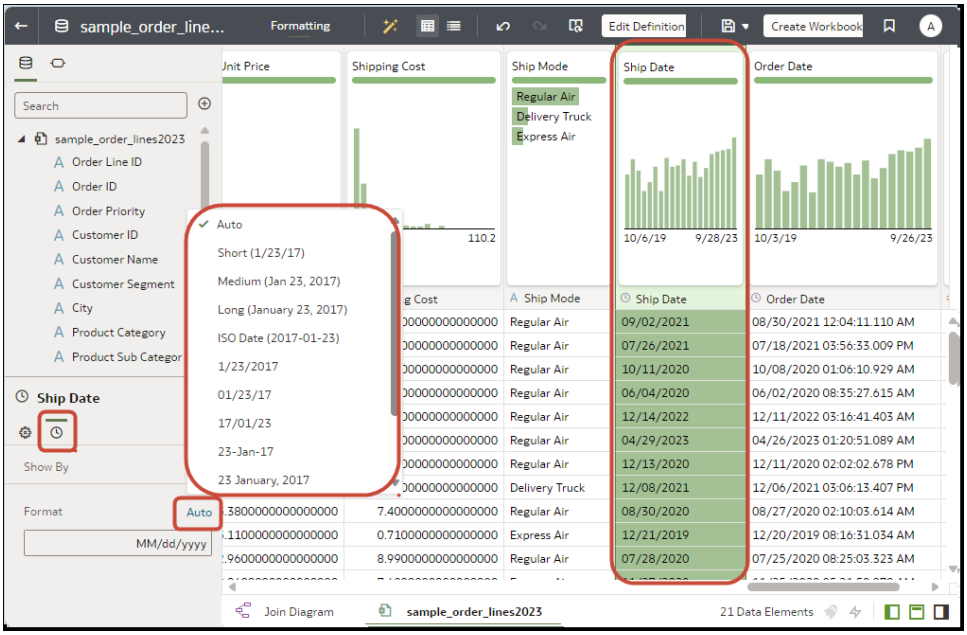
   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.



2. Click the numer 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.

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

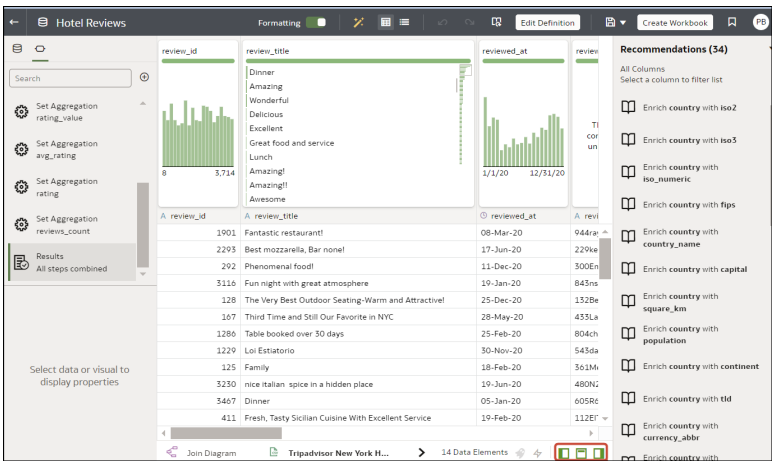
Create a Bin Column When You Prepare Data

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.

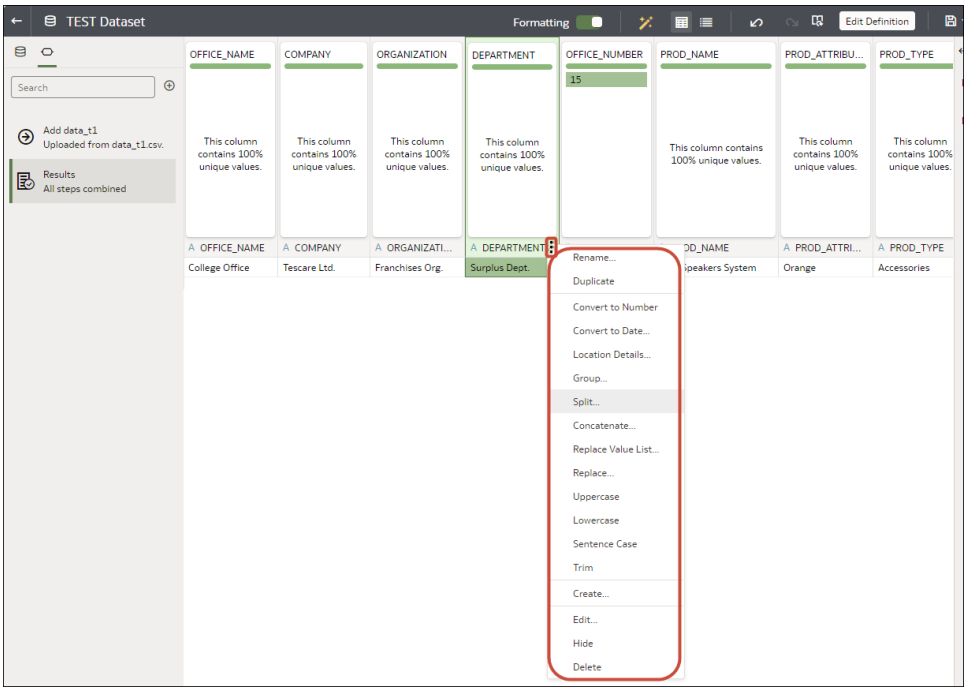
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.



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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**.

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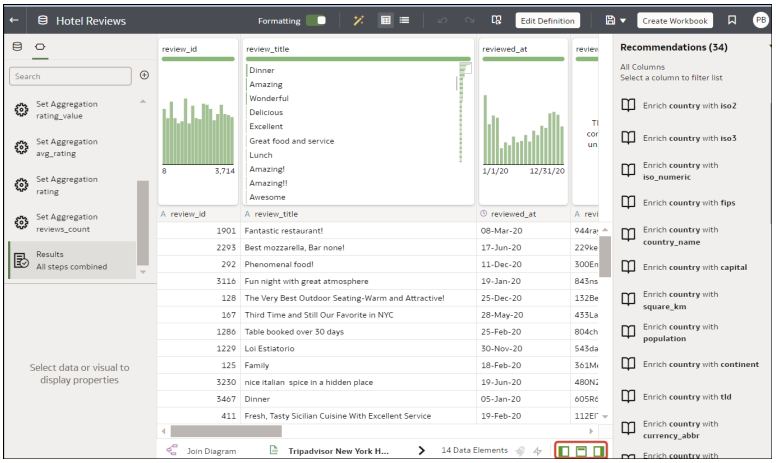
Configure Columns Properties in a Dataset

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, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.

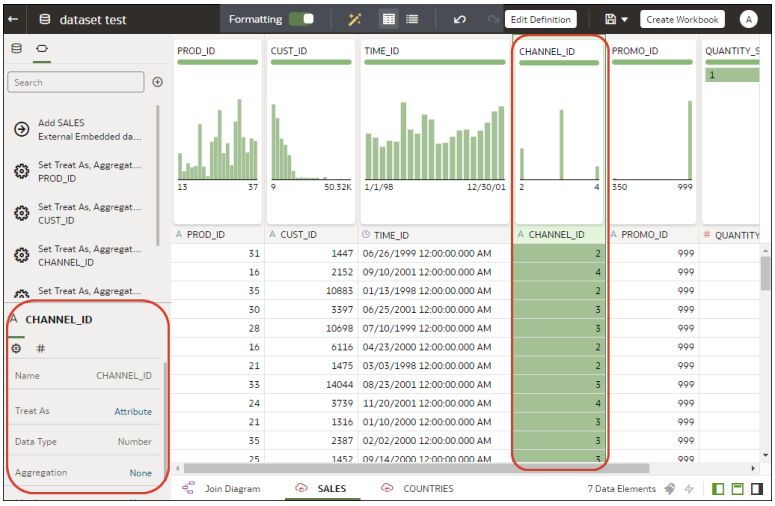


2. To configure the properties of one column:

   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.

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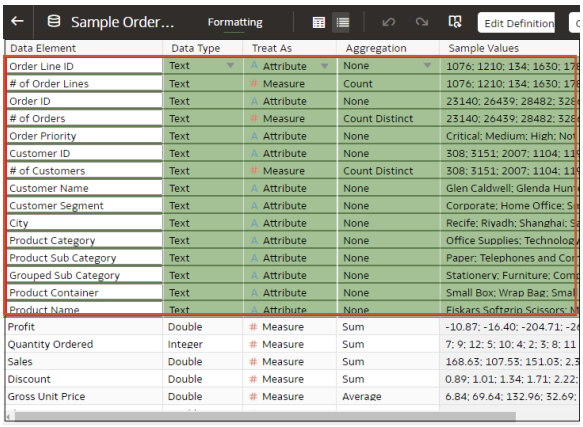
3. To update the **Data Type**, **Treat As**, **Aggregation** or **Hidden** properties of multiple columns at the same time:

   a. From the toolbar, click **Metadata** ( ).

      Dataset columns are listed as **Data Elements**.

   b. Select multiple data elements to configure.

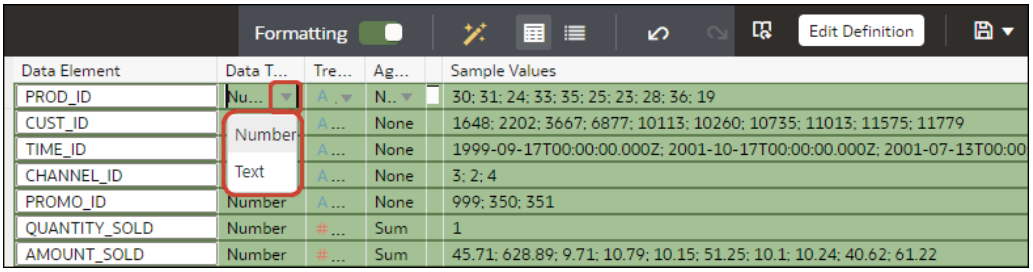
      Oracle Analytics highlights selected data elements and displays an arrow in the first data element that you selected.



   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.

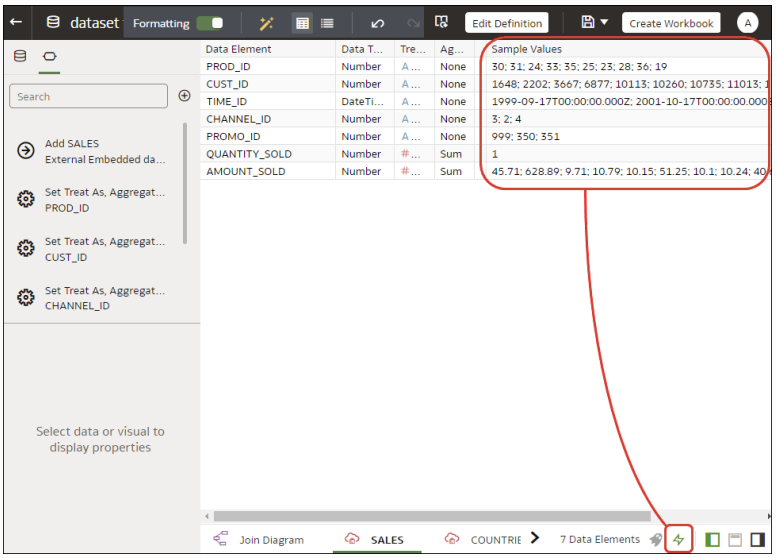
      You can also change properties by clicking the arrow in the first data element selected and selecting a configuration value from the drop-down list.

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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.

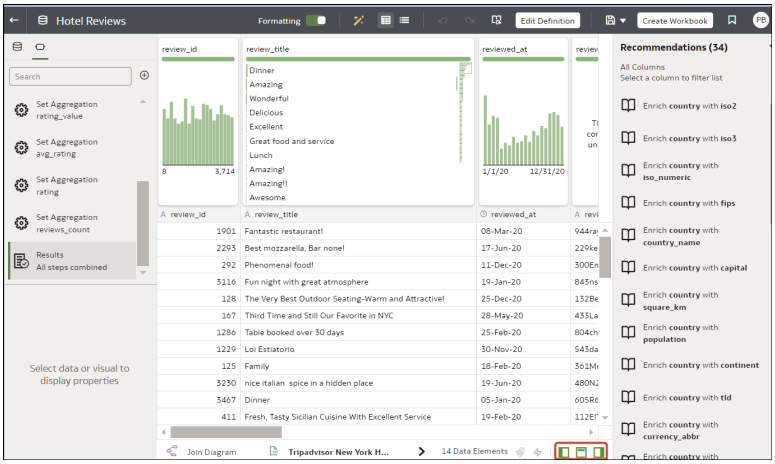
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Hidden columns are available for table joins. Deleted columns aren't available for table joins.

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.

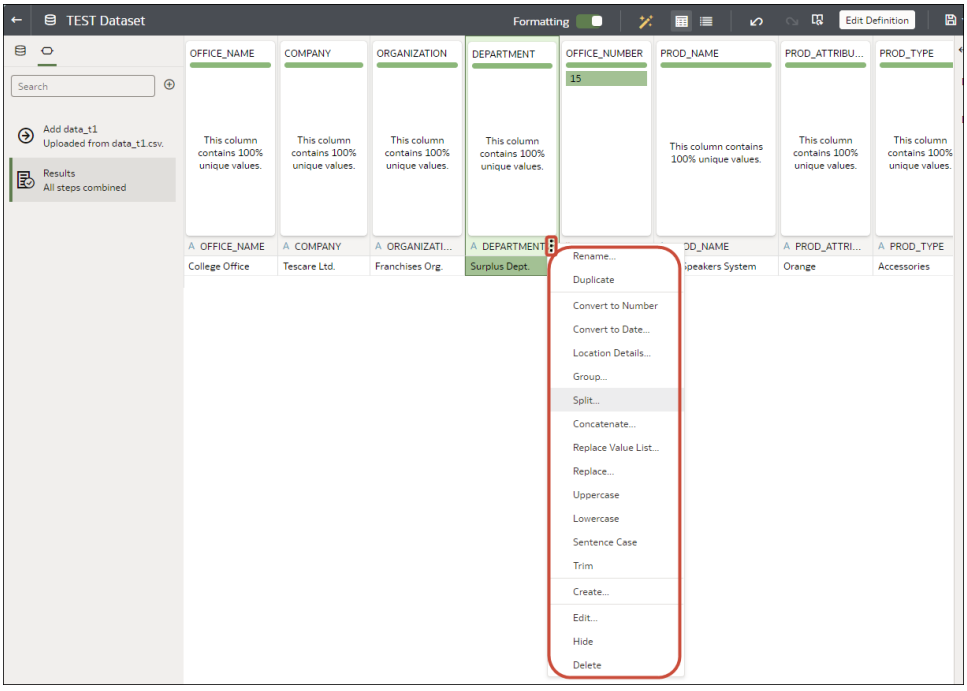
1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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**.

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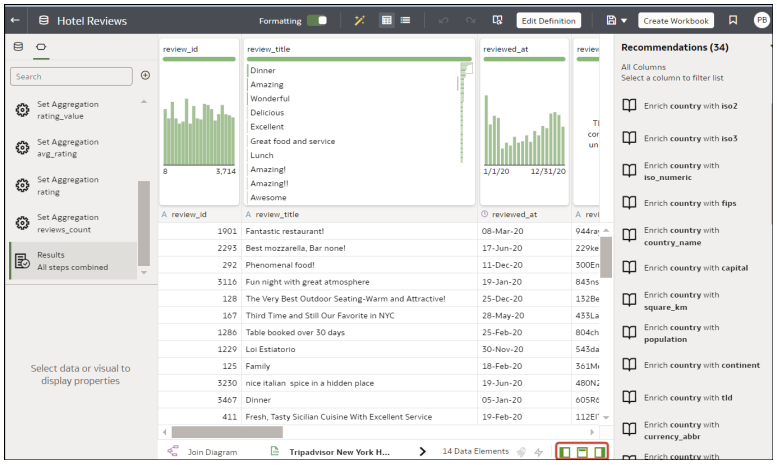
Restore a Hidden or Deleted Column

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

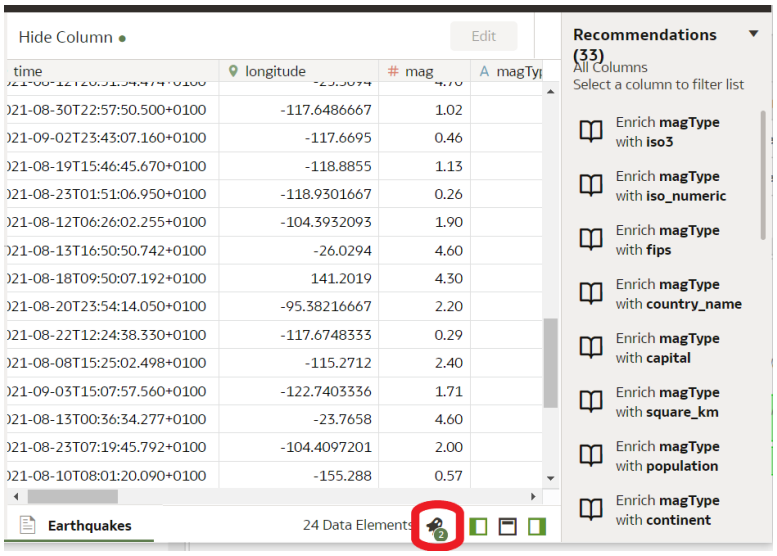
If you don't see a column's **Delete Step** in the Preparation Script Panel, then the column might have been removed from the dataset. Use Edit Definition to confirm if the column has been removed instead of deleted. See Remove or Restore a Dataset Table's Columns.

1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the 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**.

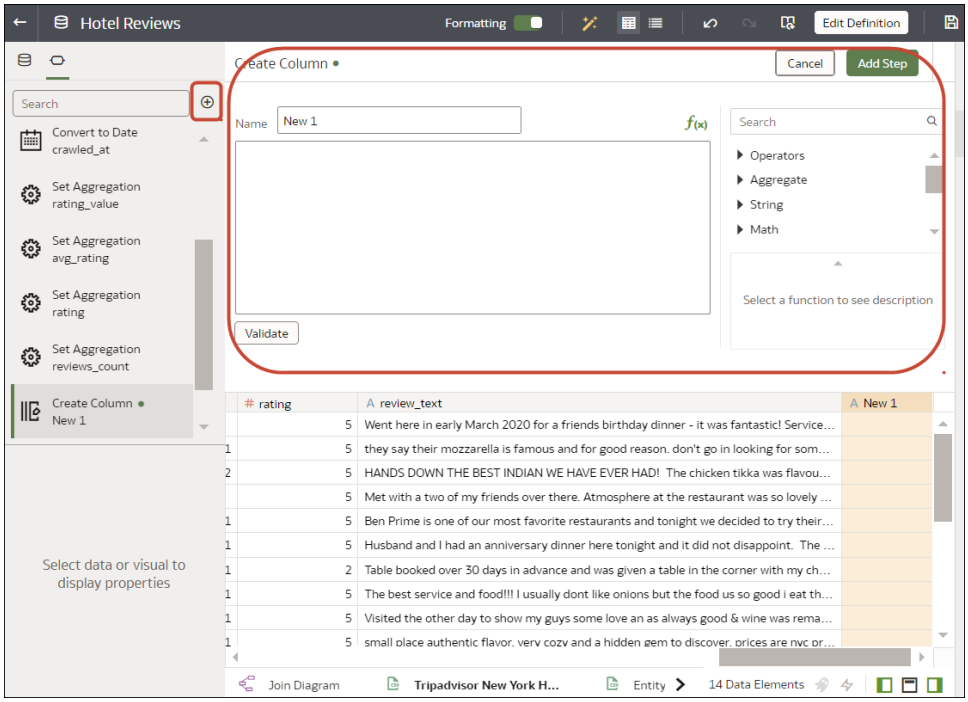


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Add Columns to a Dataset

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**.

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Edit the Data Preparation Script

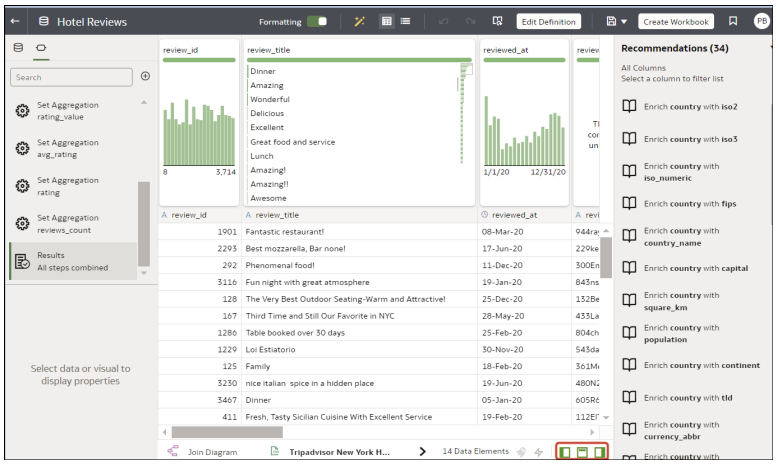
You can edit the data transformation changes added to the Preparation Script. For example, you can edit, preview, or delete transformation steps before you apply them.

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**.

1. On the Home page, hover over a dataset that you own, click **Actions**, and then select **Open**.

   If the dataset contains a single table, you'll see the transform editor. If the dataset contains multiple tables, you'll see the Join Diagram. In the Join Diagram, right-click a data source and click **Open** to display the transform editor.



2. Select a step in the Preparation Script pane and click **Edit Step**.
3. 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.
4. In the step editor, update the fields to edit the data transform changes that are applied to the columns.
5. Click **OK** to update the column and close the step editor.
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:

- Transform Reference

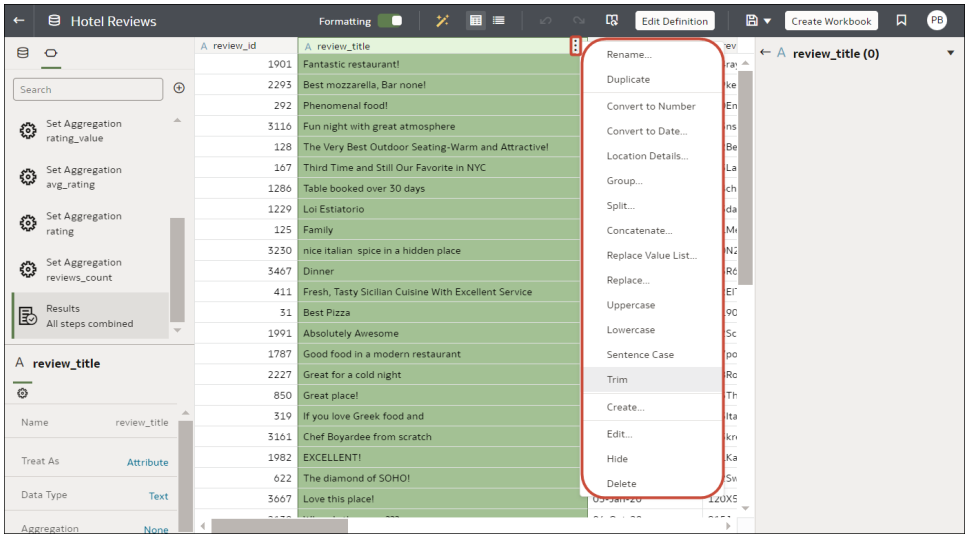
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- Data Profiles and Semantic Recommendations
- General Custom Format Strings

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.
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.

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Option	Description
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 *Mister* to *Mr.*.
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.

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.

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- 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

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- 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.

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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.

You can use existing semantic files such as Unsupervised Semantic Parsing (USP) files, or you can create your own semantic files. Ask your administrator to upload custom knowledge files to Oracle Analytics. When you enrich datasets, Oracle Analytics presents enrichment recommendations based on this semantic data. When you create workbooks, you can also include knowledge enrichments in your visualizations by adding them from the Data Panel.

Creating Your Own Custom Knowledge Files

When you create your own semantic files, follow these guidelines:

- Create a data file in CSV or Microsoft Excel (XLSX) format. The maximum file size you can upload is 250 MB.
- Populate the first column with the key, which Oracle Analytics uses to profile the data.
- Populate the other columns with the enrichment values.

Ask your administrator to upload your custom knowledge file to Oracle Analytics.

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.

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General Format String	Result
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.
DDDDD or ddddd	Displays the first letter of the name of the day of the week in the user's locale, for example, T 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 s.# or s.00 (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 ss.# or ss.00 (where # means an optional digit, and 0 means a required digit).
S	Displays the millisecond, for example, 2.

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General Format String	Result
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, pm.
gg	Displays the era in the user's locale.

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5

Create Datasets Using Data Flows

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

Video

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
- Transform Data Using OCI Functions
- Generate or Update a Dataset at a Specific Time
- Change When a Data Flow Processes Data
- Process Data Using a Sequence of Data Flows
- Manage Your Data Flows
- About Sharing Data Flows and Sequences
- Share a Data Flow
- Share a Sequence

About Data Flows

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

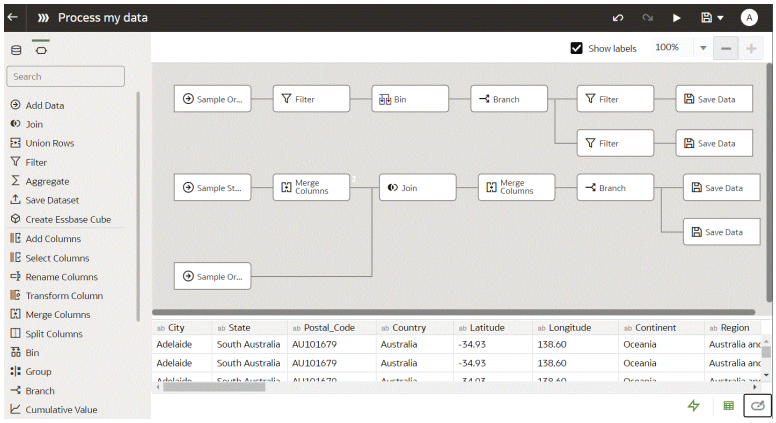
Use data flows to manipulate your data visually without requiring manual coding skills.

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.

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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.

You can execute data flows individually or in a sequence. You can include multiple data sources in a data flow and specify how to join them.

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).

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Working in the Data Flow Editor

You prepare your data for analysis by building data flows in the data flow editor. For example, you might transform columns, merge columns, or categorize data into bins. Find out how to use the data flow editor to quickly get started preparing your data.

Working in the data flow editor:

Name	Icon	What it does
Data		Display the data pane, where you can drag and drop data columns onto the data flow editor.
Data Flow Steps		Display the steps pane, where you can drag and drop steps onto the data flow editor.
Data Preview		Hide or display the Preview data columns pane by clicking **Toggle Data Preview** at the bottom right-hand corner of the data flow editor. This pane updates automatically when you make changes to the data flow. You can specify whether to automatically refresh step changes in the Preview data pane by clicking **Auto apply**.
Run data flow		Execute (known as 'run') the data flow.
Show available functions /hide functions		Display or hide the expression pick list. This icon is only displayed for steps that enable you to build your own expressions, for example, the "Add Columns" step or "Transform Column" step.
Step Editor		Hide or display the Step editor pane by clicking the **Toggle Step Editor** icon at the bottom right-hand corner of the data flow editor.
Toggle auto-refresh		Turn on to refresh the data preview as soon as you make changes in your data flow. For example, if you have a transform column step that changes text from low case to high case, you see the high case text in the data preview. If you turn off, the data preview is only refreshed if you click **Refresh Data Preview**.

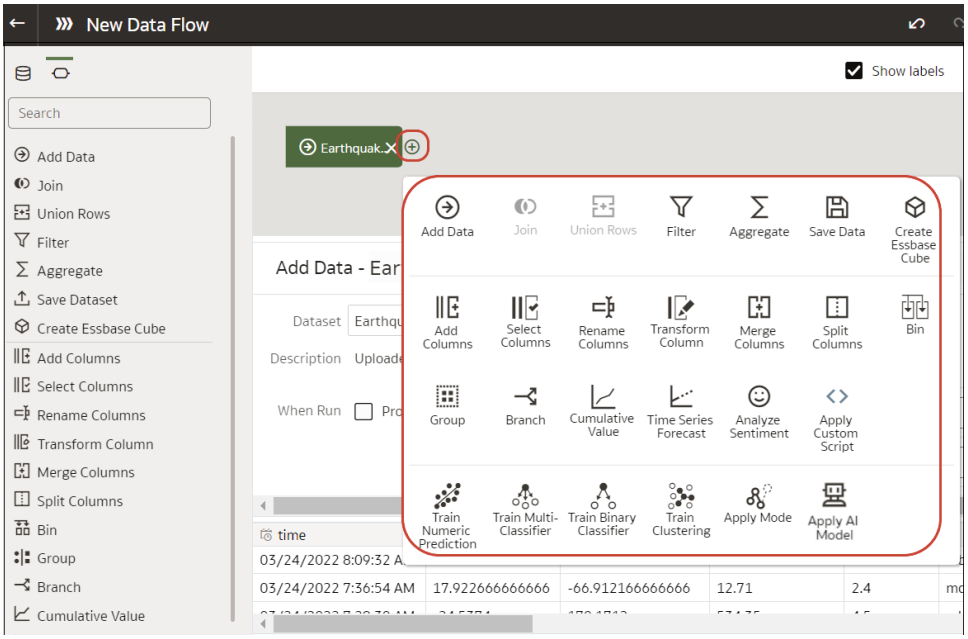
What Steps Can I Use to Organize and Integrate My Data?

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.

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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 AI Model

Analyze data using an artificial intelligence model. For example, you might perform object detection, image classification, or text detection using a model created in the OCI Vision service. See Use Oracle Cloud Infrastructure Vision Models in Oracle Analytics. You can also perform language analysis such as sentiment analysis and language detection using models created in OCI Language Service.

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.

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Apply Custom Script

Transform your data using a function, such as one defined in Oracle Cloud Infrastructure (OCI). For example, you might use a function to convert English text into Spanish or German. Your Oracle Analytics administrator registers these functions to make them available to you.

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`.

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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.

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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.

 LiveLabs Sprint

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.

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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 DR$*IndexName*$I, which contains the token text and the token count related details. Use the DR$*IndexName*$I 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 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 `grant EXECUTE on CTXSYS.CTX_DDL 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.

Note: To use analytic functions, make sure that the administrator has enabled analytics functions (see Console, Advanced System Settings, Performance and Compatibility, Enable Database Analytics Node in Data Flows).

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.

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

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**.

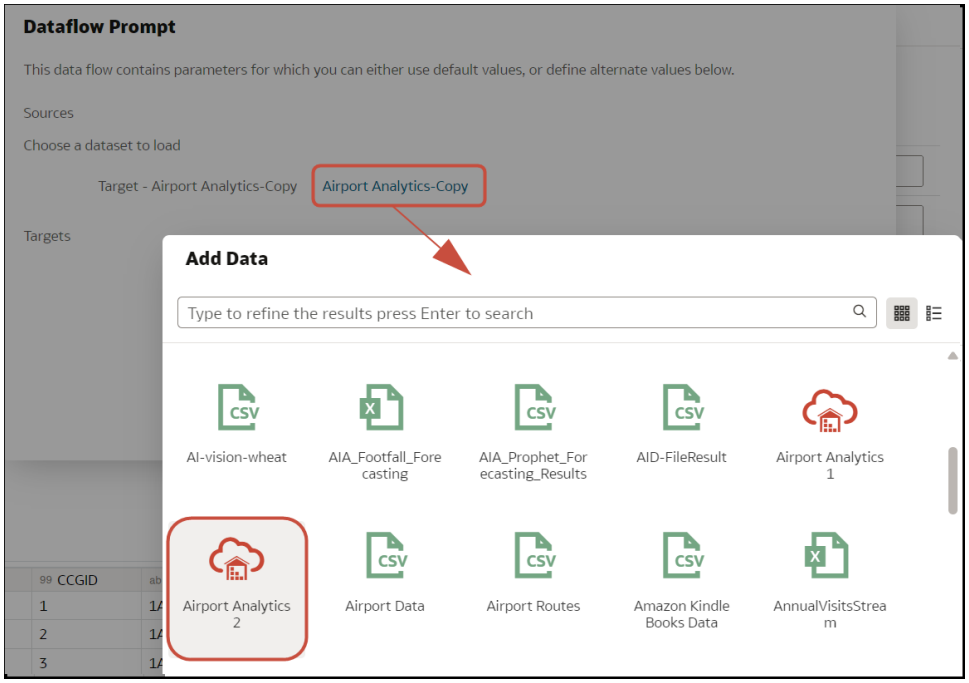
To view the dataset, from the Home page, click **Navigator**, then **Data** and navigate to the **Datasets** page.

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Reuse a Data Flow

You can configure a data flow to prompt users at runtime to specify a data source or data target, which enables you to reuse the dataflow with different data sources and targets.

In this example, a data flow is configured to prompt the user to specify an input dataset at runtime. At the Dataflow Prompt dialog, the user clicks the prompt *Airport Analytics* to display the Add Data dialog, where they can select a dataset to process.



1. On the Home page, click **Navigator**, then **Data**, then **Data Flows**.
2. Open your data flow.
3. To prompt the user to specify an input dataset at runtime:
   - Select the Add Data - <*Name*> step (usually the first node in the data flow), and in the step editor pane select the **When Run Prompt to specify Dataset** option. Then specify a **Prompt** to explain to the user what to do.
4. To prompt the user to specify an output dataset or cube at runtime:
   - For datasets, select the Add Data - <*Name*> step (usually the first node in the data flow), and in the step editor pane select the **When Run Prompt to specify Dataset** option. Then specify a **Prompt** to explain to the user what to do at runtime.
   - For Essbase cubes, select the Create Essbase Cube step, and in the step editor pane select the **When Run Prompt to specify Dataset** option. Then provide the **Cube**, **Application**, and **Prompt** values to use at runtime.

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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. Configure a data flow for incremental processing. See Configure a Data Flow for Incremental Processing.

You can now schedule your data flow to load new data regularly.

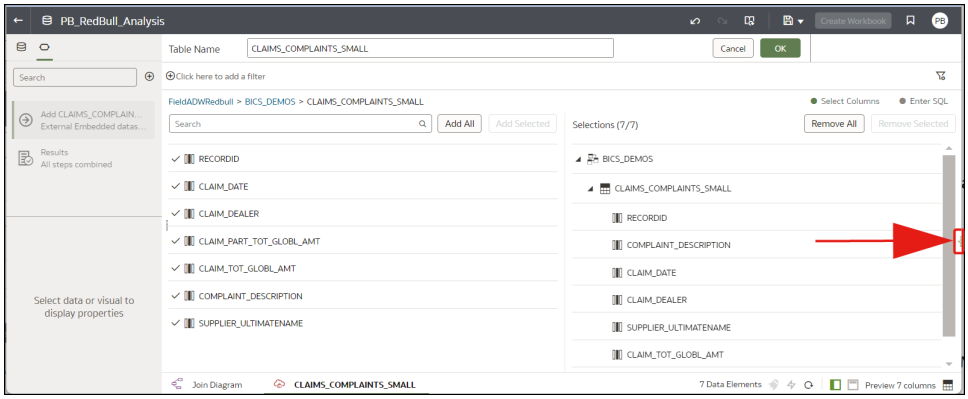
Specify a New Data Indicator for a Data Source

Select the data column to use as the 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.

Specifying a New Data Indicator enables you to perform incremental processing when you load data. In other words, each time you load data using a data flow, you only process new data that's been added since the last run.

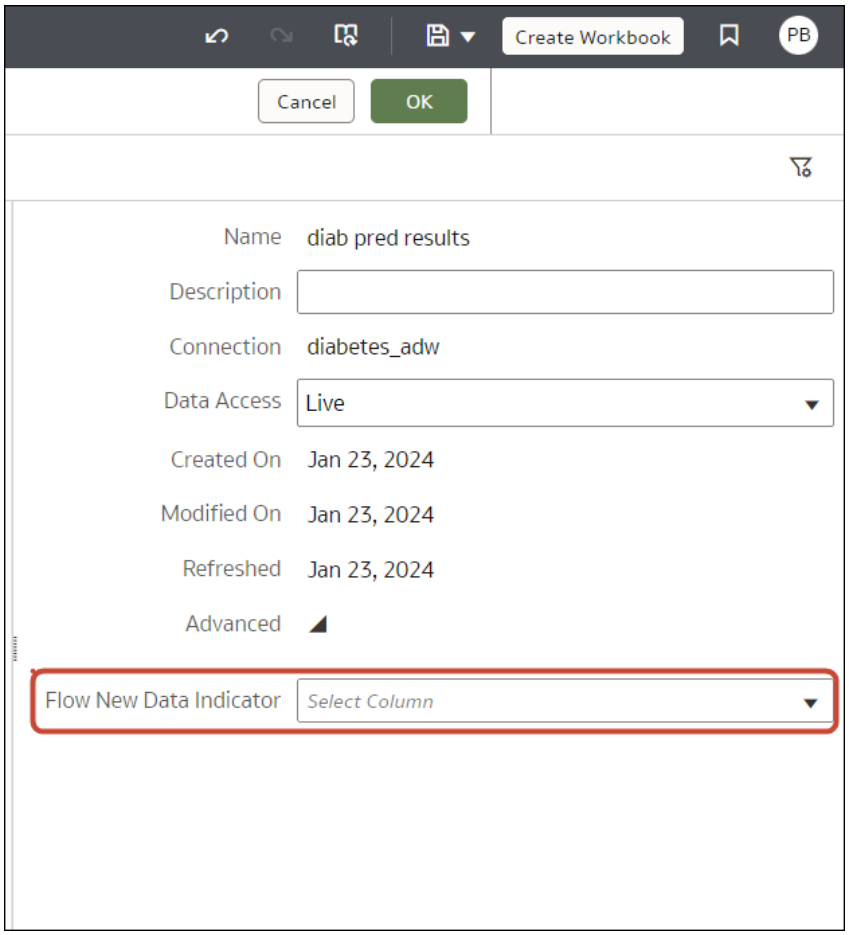
Before you start, create a connection to one of the supported databases, for example Oracle, Oracle Autonomous Data Warehouse, Apache Hive, Hortonworks Hive, or Map R Hive.

1. On the home page, click **Navigator**, 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**.



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



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

Configure a Data Flow for Incremental Processing

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

Applying incremental processing in a data flow enables you to load only new data rather than performing a full load each time, which is inefficient and costly. In other words, each time you load data using a data flow, you only process new data that's been added since the last run.

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. Then, configure a new data indicator for that database. See Specify a New Data Indicator for a Data Source.

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 specified in the **Add Data** step.
4. At the **Save data to** option select **Database Connection**.

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5. Click **Select Connection** and select a connection to one of the supported target databases.
6. In the **Table** 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**.

Transform Data Using OCI Functions

Use an OCI function in a data flow to transform data in Oracle Analytics. For example, you might use a function to convert English text into Spanish or German.

Use OCI functions to leverage the power of your OCI resources in Oracle Analytics.

Before you start, ask your administrator to make the OCI functions available in Oracle Analytics. See Integrate Oracle Analytics with Oracle Cloud Infrastructure Functions.

1. On the Home page, click **Create** then click **Data Flow**.
2. In the Add Dataset dialog, select a dataset to transform, then click **Add**.
3. Optional: In the Add Data pane, configure your data. For example, include or exclude columns, or rename columns.
4. Click **Add a step (+)**, then click **Apply Custom Script** to display the Select Custom Script dialog.
5. Select a function then click **OK** to display the Apply Custom Script dialog.
6. Use the **Outputs** and **Parameters** options and the inline guidance to configure your function.

   For example, if the function counts words in a text column, you might use **Output** to specify the name of the generated column that will contain the word count, and **Parameters** to select the name of the text column that you want to analyze.
7. Add a **Save Data** step to the end of your data flow and specify the name of the output dataset or database table.
8. Save your data flow.

   You can start processing your data immediately by clicking **Run Data Flow**, or later using the **Data Flows** panel on the Data page (on 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 at a Specific Time

You can schedule data flows to generate or update datasets regularly at a specific time.

Schedule data updates to keep your data up-to-date, providing better quality insights.

1. On the Home page, click **Navigator** then click **Data**, then click **Data Flows**.
2. Hover over a data flow, click **Actions**, then click **New schedule**.
3. In the Schedule dialog, specify the name, start date, start time, and repeat.
   - In the Repeat field, select the frequency of the scheduled task such as Hourly, Daily, Weekly, Monthly, and Yearly. For each frequency type, you have to define particular properties such as the end date, specific days of the week, or dates in the month.
4. If you've added parameters to the data flow, in the Parameters section, specify other values.

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- In the Source field, click the source dataset. In the Add Dataset dialog, select a new dataset and click **Add**.
- In the Targets field, change the dataset name. For a data flow with **Create Essbase Cube** step, change the Application and Cube names.

5. Click **OK**.

Change When a Data Flow Processes Data

You can change when your scheduled data flows process your data.

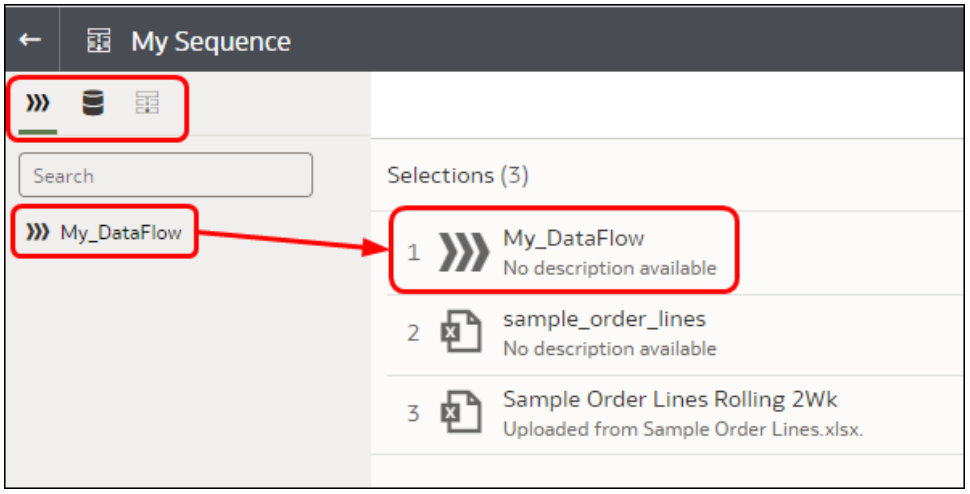
1. On the Home page, click **Navigator** then click **Data**, then click **Data Flows**.
2. Hover over the data flow for which you've added a scheduled task.
3. Click **Actions**, then select **Inspect**.
4. In the data flow inspector dialog, click the **Schedules** tab, then select a scheduled task.
5. Check and modify the properties such as name, start date, start time, and frequency.
6. Click **Save**, then click **Close**.

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.

Video

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.

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- 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.

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- 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).

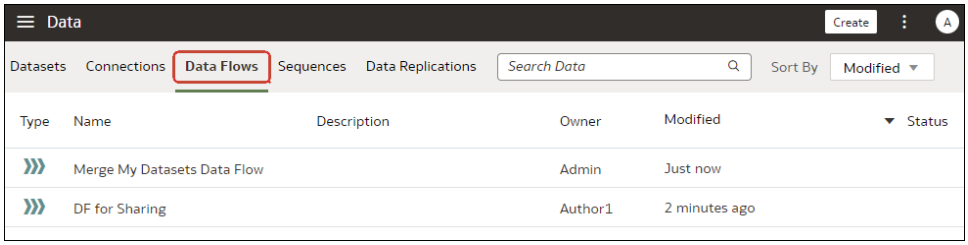
About Sharing Data Flows and Sequences

Users can share data flows and sequences with other Oracle Analytics users, who can then use them to prepare data.

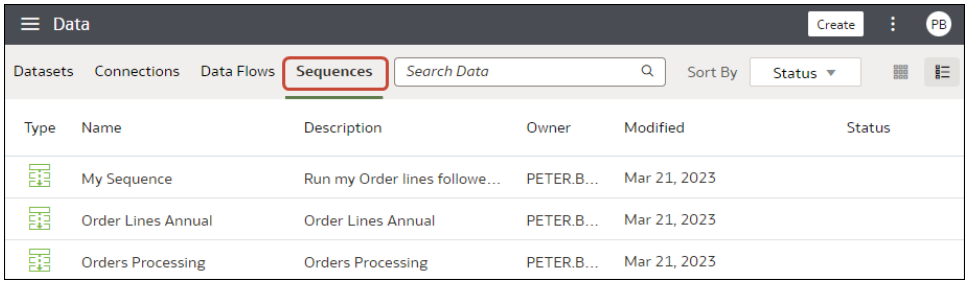
Sharing data flows and sequences enables you to collaborate on data preparation projects and reuse Oracle Analytics assets and resources.

About Sharing Data Flows and Sequences

- If you own a data flow, users that you share the data flow with can see it on the Data Flow tab of their Data page.



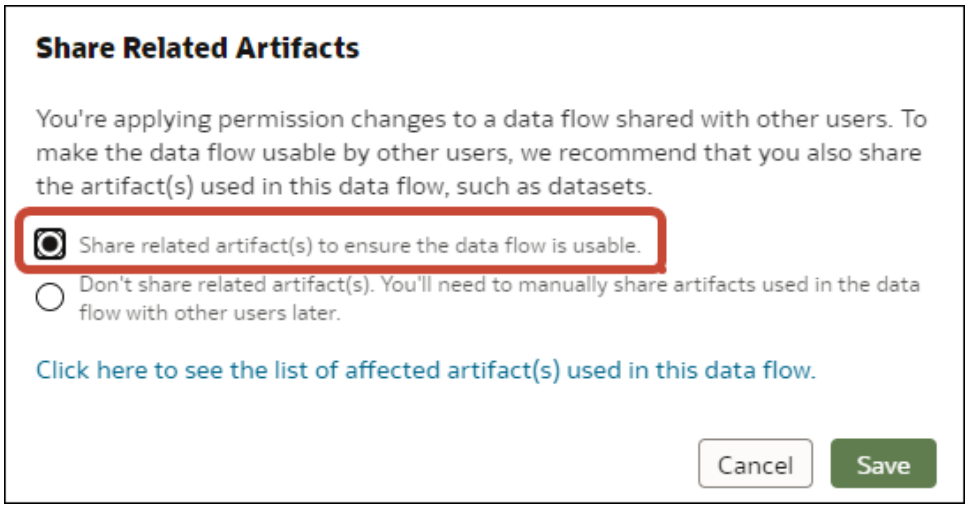
- If you own a sequence, users that you share the sequence with can see it on the Sequences tab of their Data page.



- When you share data flows or sequences, you're given the option to also share datasets and connections (known as artifacts) used in them. If you select **Share related artifact(s)**

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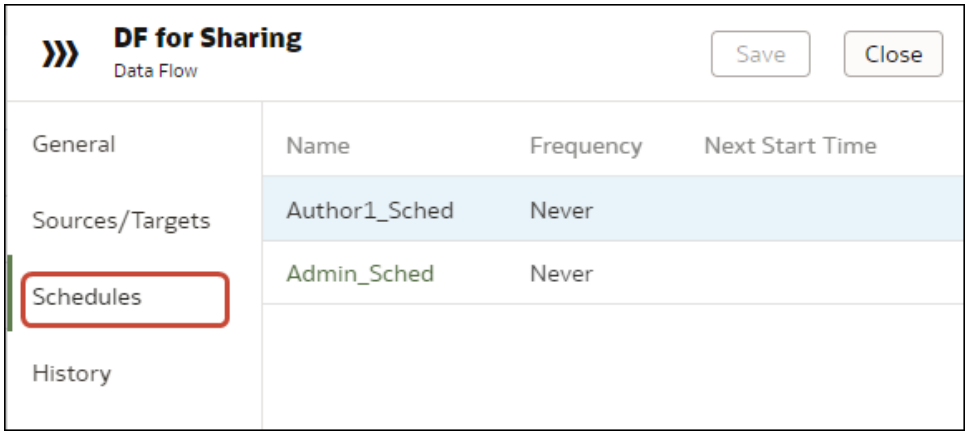
to ensure the data flow is usable, users that you share with get read-only access to input datasets and full-control access to output artifacts, as well as access to other data flow components. If you select **Don't share related artifact(s)**, you have to manually give users or roles read and write access to the data flow components.



- Users who you share data flows or sequences with can't subsequently re-share them with other users, because they don't have the full-control privileges required to share artifacts. In this scenario, you have to manually give users or roles read and write access to input datasets using the Access tab on the Inspect dialog for a dataset.

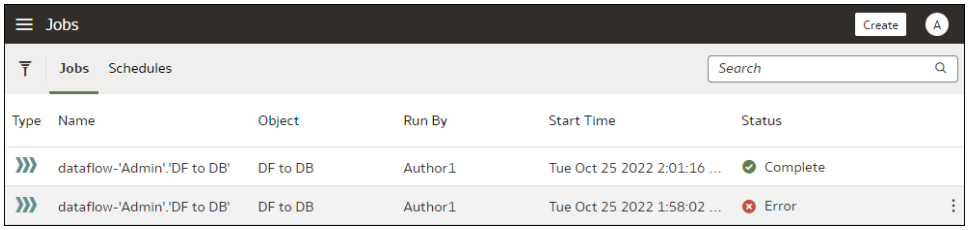
About Scheduling Data Flows and Sequences

- Only the user who creates a schedule can see that schedule in the Inspect dialog. Users with administration permissions can see all schedules in the Jobs page.



- On the Jobs and Schedules tabs in the Jobs page, administrators can see all jobs and schedules. Content authors can only see jobs and schedules if they were the last user to edit that schedule. Scheduled jobs will run as the user who added or last edited the schedule.

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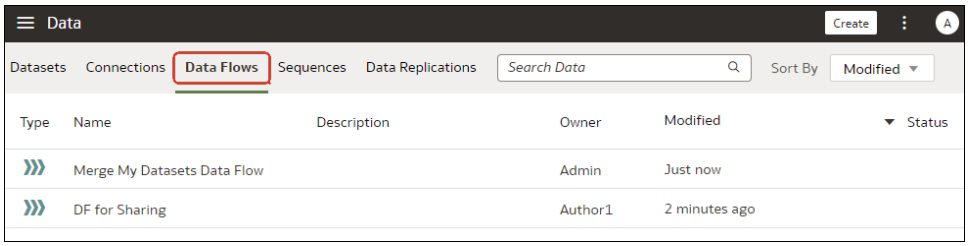


Share a Data Flow

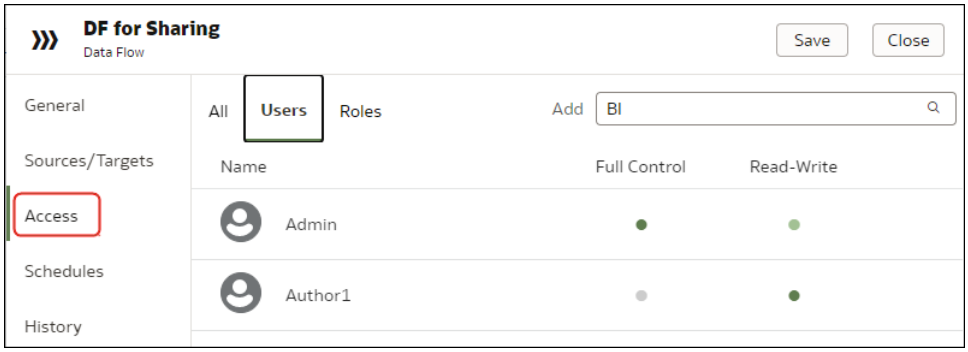
Share a data flow with other Oracle Analytics users so that they can use it to prepare data.

Share data flows to enable other users to collaborate on data preparation projects and reuse Oracle Analytics assets and resources.

1. On the Home page, click **Navigator**, then **Data**, then **Data Flows**.

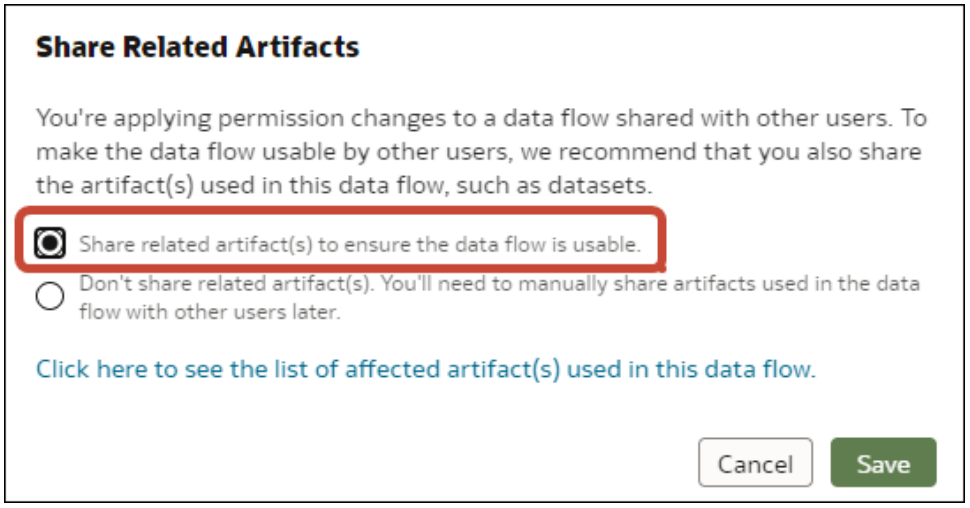


2. Right-click the data flow that you want to share, and click **Inspect**.



3. Click **Access**.
4. To share with another user, click **User**, search for and select the user name, then select either **Full Control** or **Read-Write**.
5. To share with all users with a particular role (BI Content Author), click **Role**, search for and select the role name, then select either **Full Control** or **Read-Write**.
6. Click **Save**.
7. Click **Share related artifact(s) to ensure the data flow is usable**.

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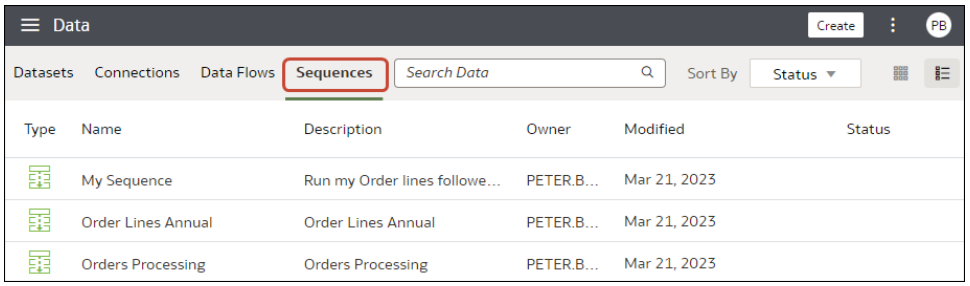
Users with whom you've shared a data flow can access it from the Data Flows page when they next log in. Make sure that users also have access to connections and datasets used by shared data flows.

Share a Sequence

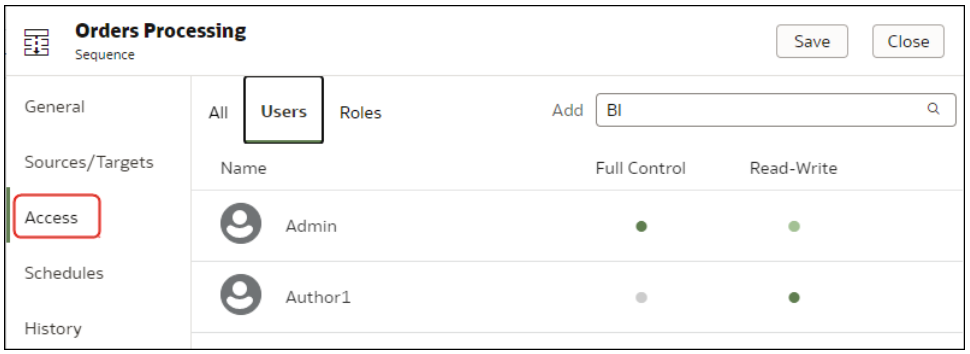
Share a sequence with other Oracle Analytics users so that they can use it to prepare data.

Share sequences to enable other users to collaborate with colleagues and reuse Oracle Analytics assets and resources.

1. On the Home page, click **Navigator**, then **Data**, then **Sequences**.



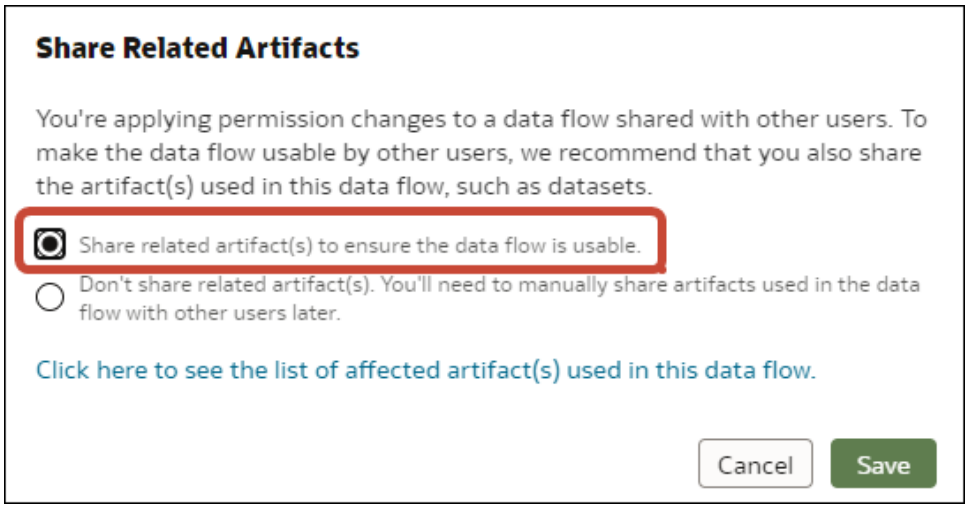
2. Right-click the sequence you want to share, and click **Inspect**.



3. Click **Access**.

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4. To share with another user, click **User**, search for and select the user name, then select either **Full Control** or **Read-Write**.
5. To share with all users with a particular role (BI Content Author), click **Role**, search for and select the role name, then select either **Full Control** or **Read-Write**.
6. Click **Save**.
7. Click **Share related artefact(s) to ensure the sequence is usable**.



Users with whom you've shared a sequence can access it from the Sequences page when they next log in. Make sure that users also have access to data flows, connections, and datasets used by shared sequences.

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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
- Work with Dataset Reload Schedules
- Inspect a Dataset's Properties
- View the Dataset Storage Limit
- Rename a Dataset and Change Its Description
- Copy a Dataset's Object ID
- Certify a Dataset
- View a Dataset's Data Elements
- Make a Dataset's Data Available for Search
- Add or Update a Dataset's Permissions
- Download a Dataset's Source File
- Duplicate a Dataset
- Delete a Dataset
- Enable Knowledge Enrichments in the Workbook Editor

Dataset Type Icons

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

Dataset type icons are displayed in the list of datasets that you created or have been given permission to use. 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 XLXS or XLS file.
	Dataset uses a CSV or TXT file.
	A local subject area that you can use like a dataset to create a workbook. Local subject areas are located in your instance's Classic Home.

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Dataset Icon	Description
	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.

Your permissions determine which datasets are displayed in the list and the actions that you can perform on a dataset (Open, Reload Data, or Download File).

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

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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.

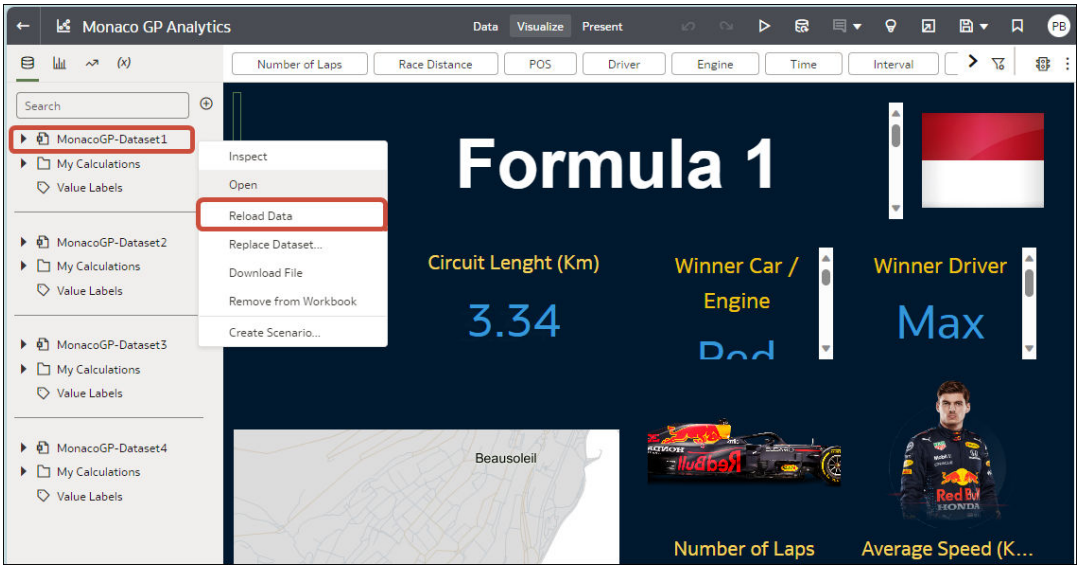
Dataset Source Type	How You Reload Data
Data from databases that support incremental loading	You can reload dataset data incrementally if the dataset uses a data source that supports this. Incremental loading only loads new or updated data. See Reload a Dataset's Data Incrementally.
Data from external 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. You can also set up a schedule to reload your dataset's tables as often as once per hour. See Schedule a Dataset Reload.
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**.

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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.

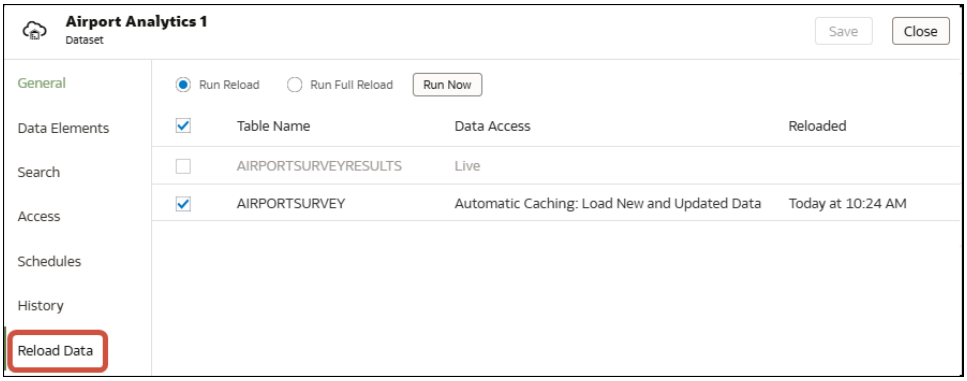
If you want to reload a table that uses a file as its source, then see Reload a Dataset's Files.

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**.



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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.

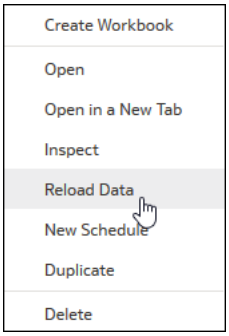
The **Reload Data** option is available for any dataset when the **Data Access** field is set to **Automatic Caching** for one or more table, and when the data source connection includes credentials for one or more table .

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

The user who created or owns the dataset or a user with Read-Write privileges on the dataset and Read-Only privileges on the data source connection can reload the dataset's tables.

You can create and use schedules to run a dataset reload. See Schedule a Dataset Reload.

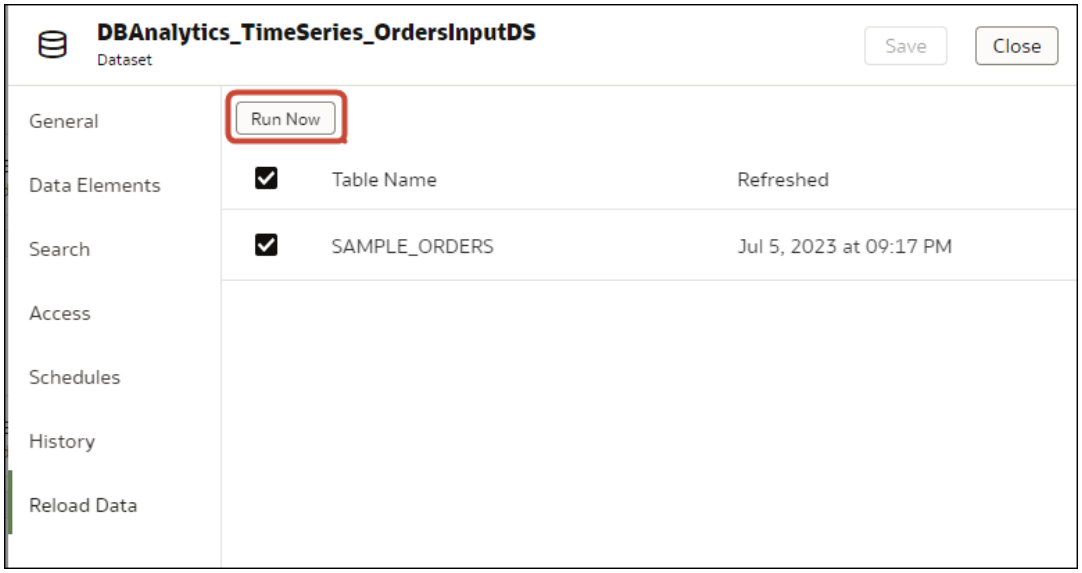
1. On the Home page, click **Navigator** and then click **Data**.
2. Hover over the dataset that you want to reload, click **Actions**, and then click **Reload Data**



.

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

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Reload a Dataset's Files

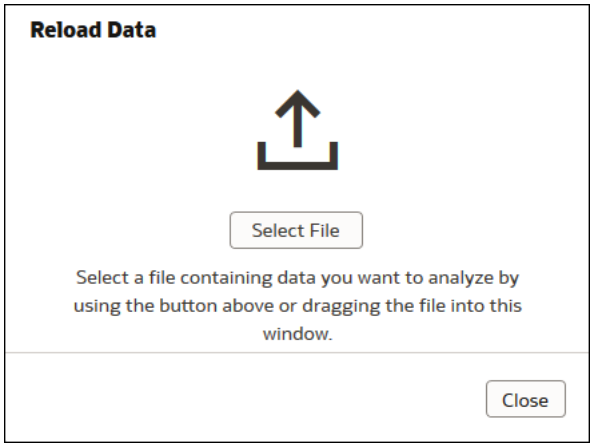
Reload data in a dataset based on a XLSX, XLS, CSV, or TXT file to make sure that you have the most up-to-date workbook content.

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

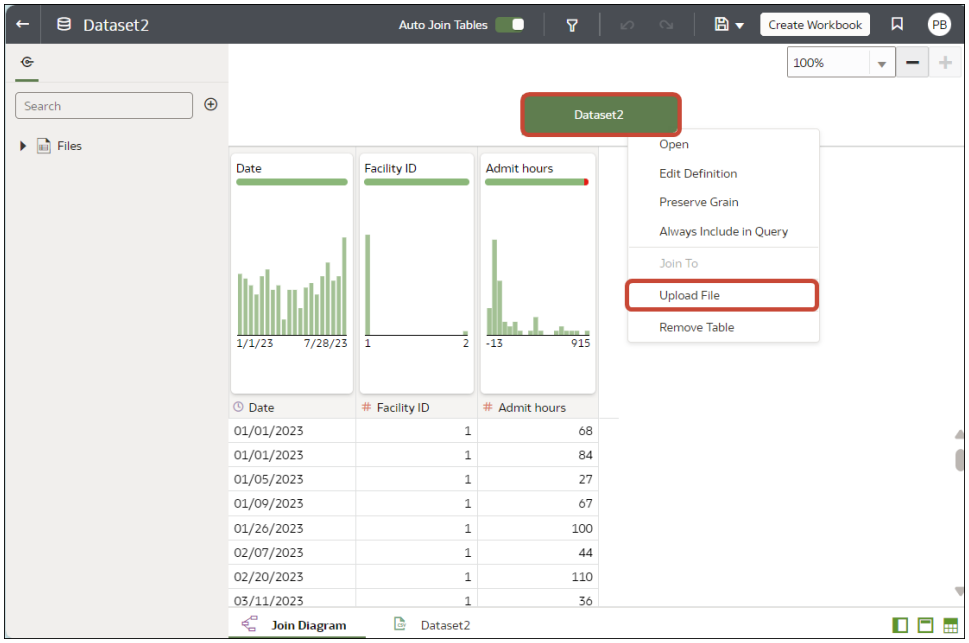
1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Hover over the dataset that you want to reload, click **Actions**, and then click **Reload Data**.
4. In the Upload File dialog, drag and drop the file onto the dialog or click **Select File** to browse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



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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

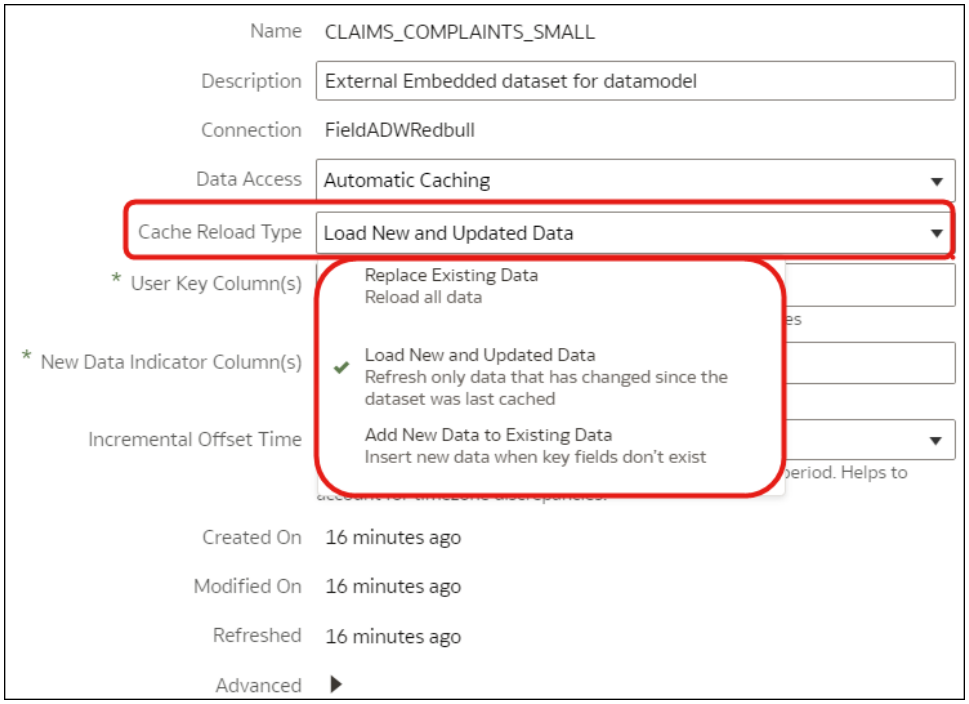
You can keep your workbooks up-to-date by implementing incremental dataset loads.

Reloading data incrementally refreshes data and can minimize processing time.

Where Do I Configure Incremental Loading?

In Oracle Analytics you configure incremental loading for datasets using the **Cache Reload Type** in the data access options.

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What Incremental Load Types Are Supported?

In Oracle Analytics you can:

- Load new records and updates to existing records, known as upsert, using the **Load New and Updated Data** option.
- Load new records only, known as insert, using the **Add New Data to Existing Data** option.

If incremental loading isn't appropriate for you data, then you might choose to reload all data by selecting the **Replace Existing Data** option. For example, if a significant proportion of your data changes regularly, then a full 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 Cloud Infrastructure Object Storage
- Oracle Talent Management Cloud/Oracle Talent Acquisition Cloud (Taleo)
- DB2
- Informix
- MySQL
- SQL Server
- Sybase ASE and Sybase IQ

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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 Standard Time (PST), which is eight hours behind UTC, set the incremental offset time to 8 hours. See Configure a Dataset to Load Incrementally.

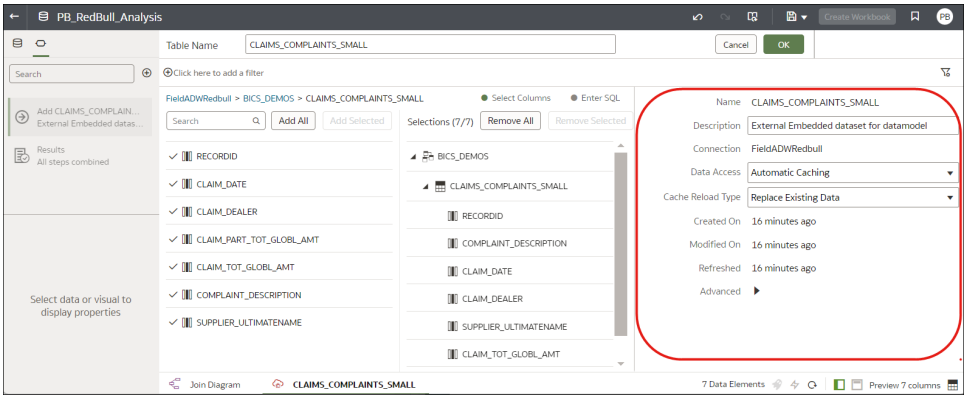
Configure a Dataset to Load Incrementally

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.

After completing this configuring, you can reload the dataset incrementally.

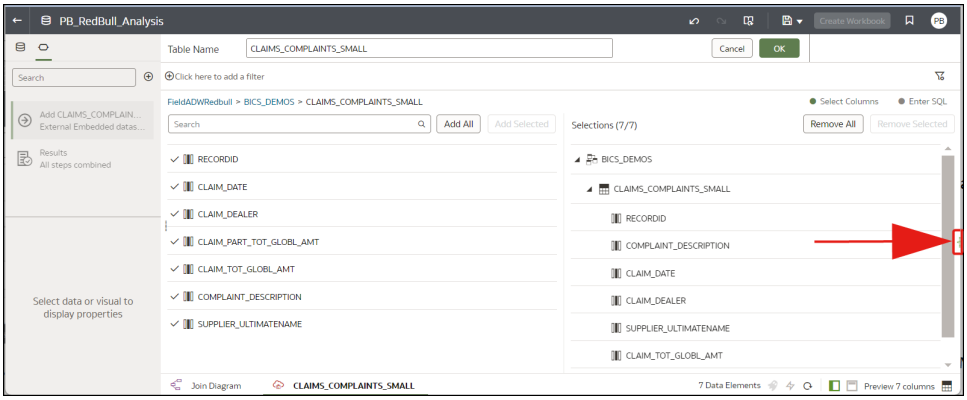
Before you start, make sure that you have a dataset based on a database type that supports incremental loading. See Data Sources that Support Incremental Reload for Datasets.

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

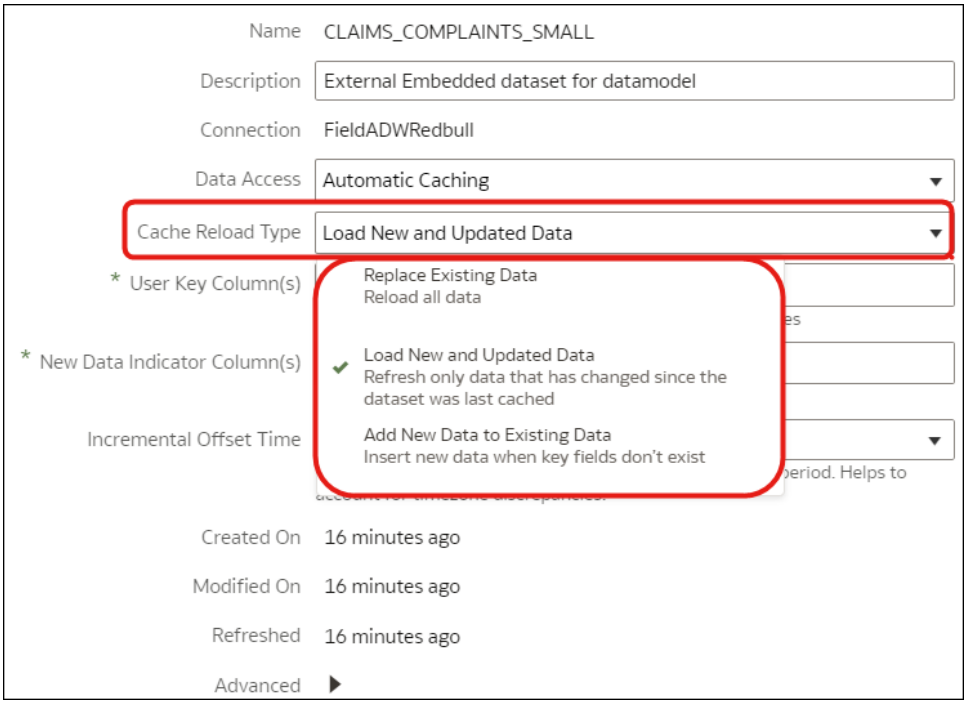


If the data access options aren't displayed, hover over the center of the right edge of the window to locate the **Expand** option, then click **Expand**.

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



6. In **Data Access**, select **Automatic Caching**.
7. 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.
8. In **User Key Column(s)**, specify the user key columns that identify unique records. Click the field to display available columns and select one or more columns.
9. In **New Data Indicator Column(s)**, specify the column or columns used to detect new or updated data. For example, you might specify a unique transaction ID column to identify new transactions in the data source.

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If you don't specify a new data indicator column, Oracle Analytics uses the file-modified timestamp to determine when new data is available.

If you're loading data data from files in Oracle Cloud Infrastructure Object Storage, the **New Data Indicator Column** field isn't displayed because Oracle Analytics uses the file-modified timestamp.

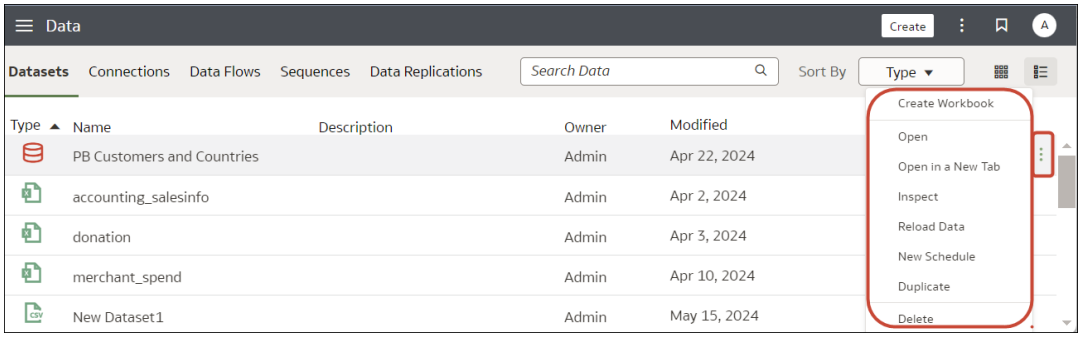
10. In **Incremental Offset Time**, change the default (None) if there's a time difference between the timestamps in your data and the default Oracle Analytics timezone (Universal Time Coordinated or UTC). For example, if your source system records in Pacific Time Zone (PST), which is eight hours behind UTC, set the incremental offset time to 8 hours.
11. Click **OK**.

Load Dataset Data Incrementally

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

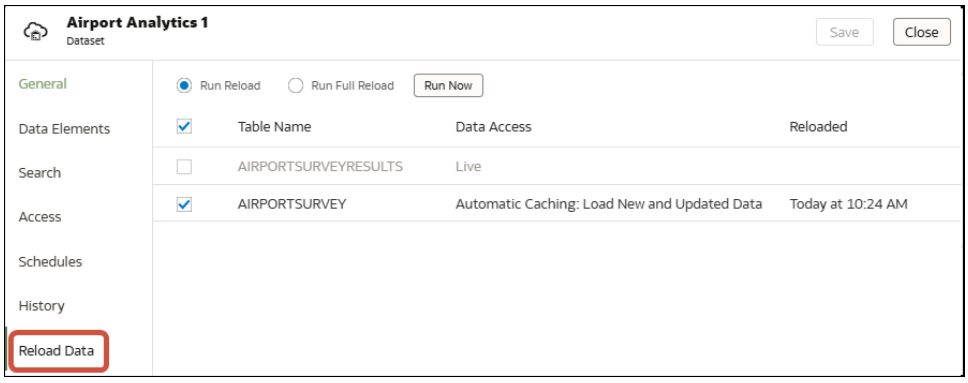
Before you start, configure your dataset to load incrementally. See Configure a Dataset to Load Incrementally.

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



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

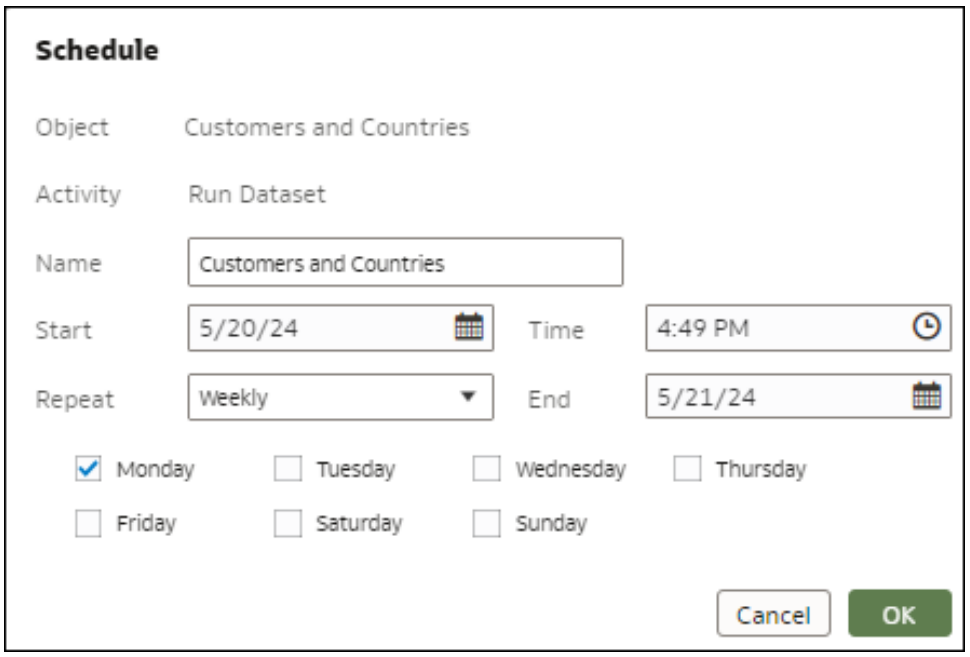
   Click **Run Reload**, then select the tables to reload, then click **Run Now**.



3. To load data regularly, 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**.

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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".



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.

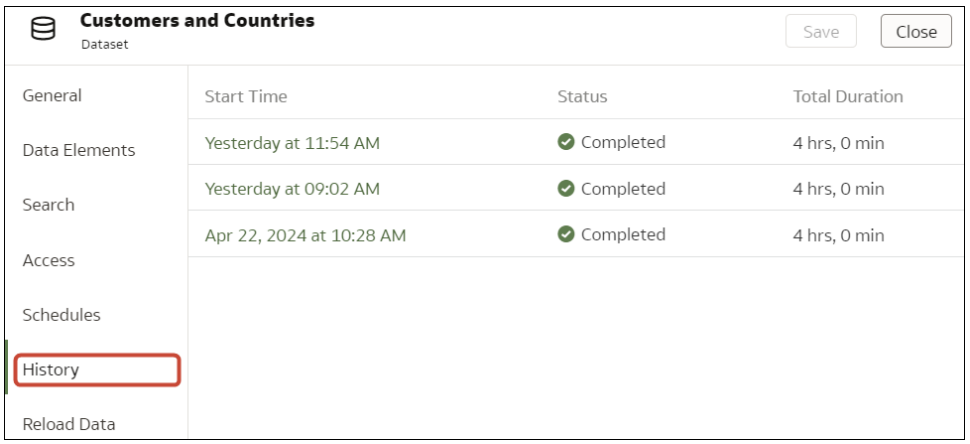
Oracle Analytics generates historical information when you reload datasets that use connections.

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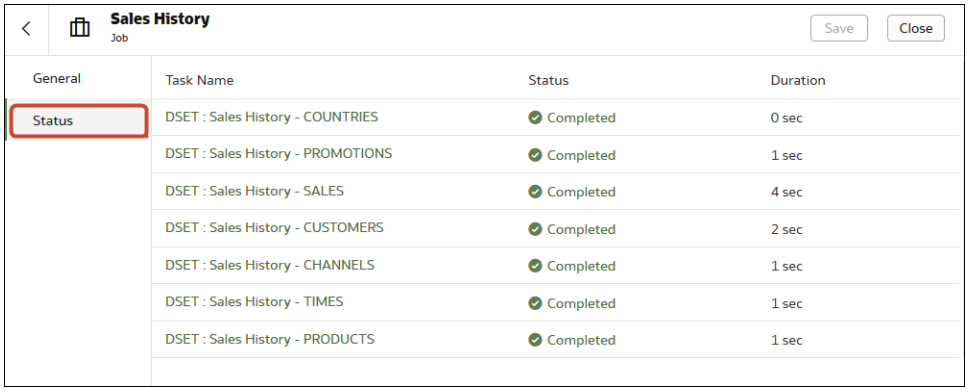
Oracle Analytics doesn't generate historical information and log files when you reload datasets that:

- 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.

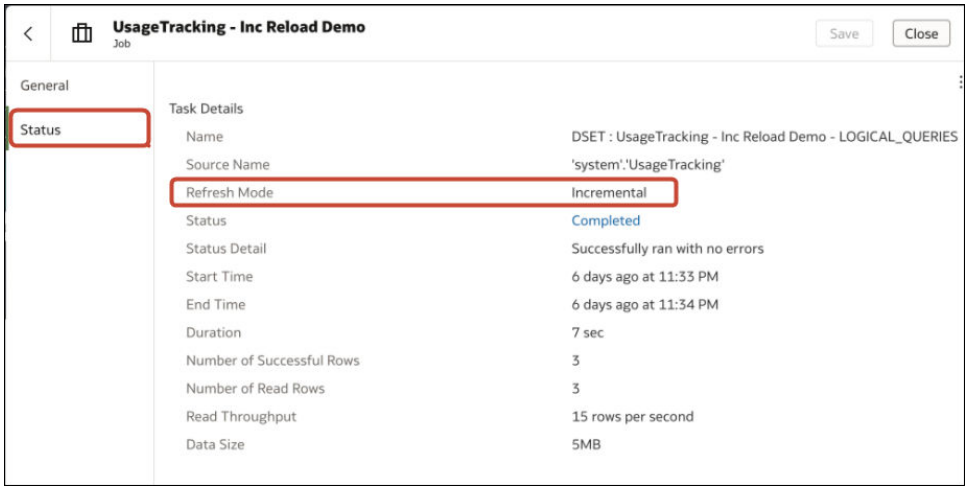


4. Click a job in the list to display the **General** tab, which provides an overview of the job.
5. Optional: Click the **Status** tab display tasks that were executed as part of the job.



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".

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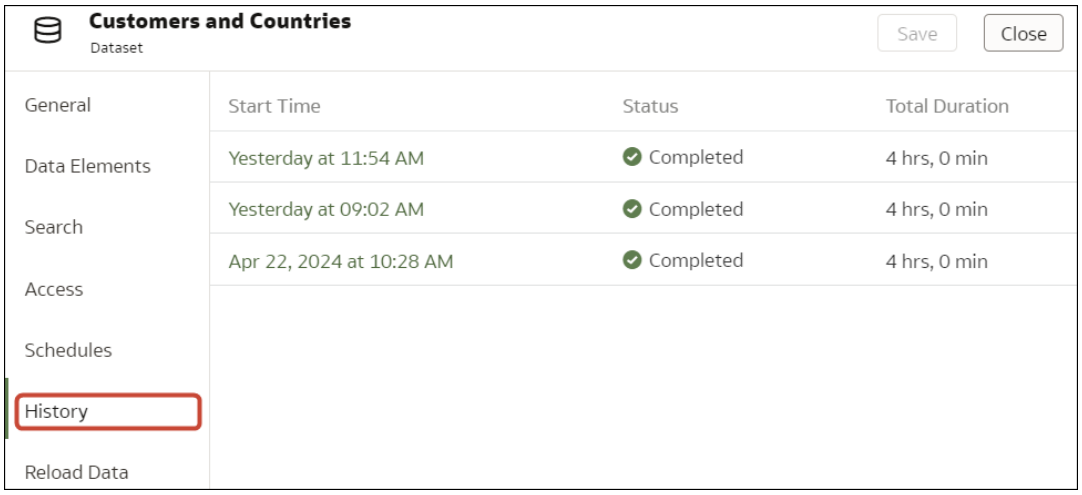
View and Download Log Files for a Dataset Reload Job

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.

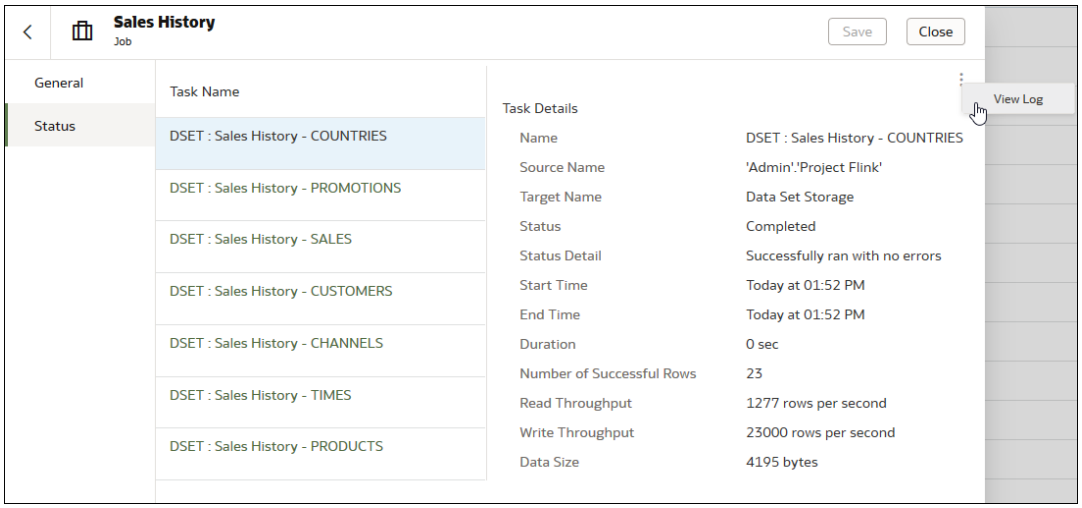
1. On the Home Page, click **Navigator** and then click **Data**.
2. On the **Datasets** tab, hover over a dataset, click **Actions**, and then click **Inspect**.
3. Click the **History** tab, then click the job that you want to look at.



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.

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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**.



Work with Dataset Reload Schedules

This topic describes what you need to know to create, modify, and manage dataset reload schedules.

Topics:

- Schedule a Dataset Reload
- View a Dataset Reload Schedule's Details
- Modify a Dataset Reload Schedule
- Delete a Dataset Reload Schedule

Schedule a Dataset Reload

You can create a one-time or repeating schedule to reload a dataset's data into cache.

Schedule a dataset reload to make sure that a dataset is automatically reloaded regularly and you don't want to have to remember to reload it manually. Also, you can schedule a dataset reload for a convenient time that doesn't interrupt or confuse workbook authors or consumers.

You can't schedule a reload (that is, the **New Schedule** option doesn't display in the **Actions** ⋮) if:

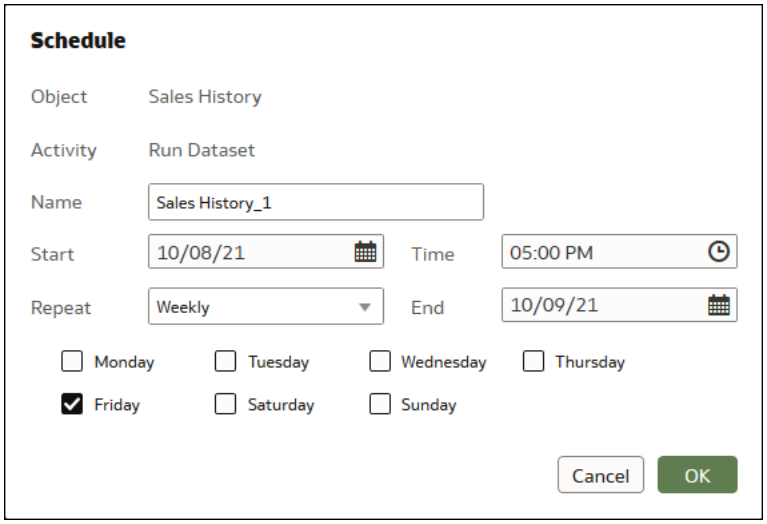
- A dataset contains only tables that are set to **Live**.
- A dataset uses only files.
- A dataset uses an Oracle EPM Cloud or Oracle Essbase connection.

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**.

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2. Click the **Datasets** tab.
3. Hover over the dataset that you want to reload, click **Actions** ⋮, and then click **New Schedule**.



4. Specify when and how often you want the dataset reload to run.
5. Click **OK**.

View a Dataset Reload Schedule's Details

You can view information about a dataset reload's schedule to find out when it last ran and when it will next run. You can also view historical information about the completed reload jobs run by the schedule.

You can access details about the dataset reload schedules that you create. You can't access dataset reload schedules that other users create. Administrators with the BI Service Administrator role and users who've been given Read-Write or Full Control permissions to the dataset can access its schedules.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want schedule information for, click **Inspect**, and then click **Schedules**.
4. Click the name of a schedule, and in the **Schedule** dialog click the **General** and **Schedule** tabs to view information about the schedule.
5. Optional: Click the **History** tab to view a list of the schedule's completed jobs. Click a job to drill down for more information about it, such as its start time and completion status.
6. Click **OK**.

Modify a Dataset Reload Schedule

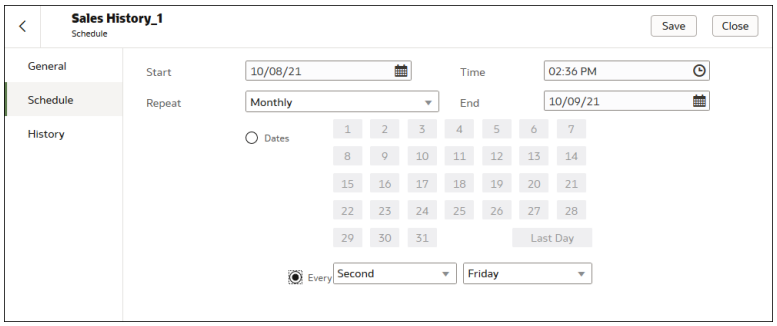
You can change the details of a dataset reload schedule. For example, when and how often you want the dataset reload to run.

You can modify the dataset reload schedules that you create. You can't access and modify dataset reload schedules that other users create. Administrators with the BI Service

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Administrator role and users who've been given Read-Write or Full Control permissions to the dataset can modify its schedules.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to modify schedule information for, click **Inspect**, and then click **Schedules**.
4. Click the name of a schedule, and in the **Schedule** dialog click the **Schedule** tab.



5. Update the schedule details.
6. Click **Save**.

Delete a Dataset Reload Schedule

You can delete a dataset's reload schedule when you no longer need it.

You can delete the dataset reload schedules that you create. You can't access and delete dataset reload schedules that other users create. Administrators with the BI Service Administrator role and users who've been given Read-Write or Full Control permissions to the dataset can delete its schedules.

After you delete a schedule, you can still view the historical information about the reloads it ran and completed. See View a Dataset's Reload History.

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 a schedule for, click **Inspect**, and then click **Schedules**.
4. Hover over the name of a schedule and click **Delete**.
5. Click **Close**.

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, if the dataset is indexed for searching, who can access the dataset, and a list of its data elements.

Your permissions determine which of the dataset's properties you can view and update.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.

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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**.

View the Dataset Storage Limit

As an administrator you can view the amount of dataset storage that's available, and how much has been used.

Your permissions determine which of the dataset's properties you can view and update.

1. On the Home page, click **Page Menu** and then click **Dataset Management**.
2. You can view the total amount storage that's used and available, and view the quota and usage for each user.
3. Click **Close**.

Rename a Dataset and Change Its Description

You can rename and change the description of any dataset that you have Full Control or Read-Write access to.

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**.

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4. Click the **General** tab.
5. Go to the **Object ID** field and click the **Copy** button.

Certify a Dataset

When you certify a dataset, you're confirming that the dataset contains accurate, reliable data. When users search for data from the Home page, certified data is ranked high in the search results.

> **Note**
>
> A file-based dataset must be indexed and certified before the users you shared the dataset with can use it to build visualizations from the Home Page. See Index a Dataset and Generate Visualizations from the Home Page with Questions.

You can certify datasets if you're a member of an Administrator role and have Full Control or Read-Write access to the dataset.

For best search results only certify the datasets with data that users need to find. Certifying all datasets yields too many search results. Oracle recommends that you first certify the minimum number of datasets and then certify additional datasets only as needed.

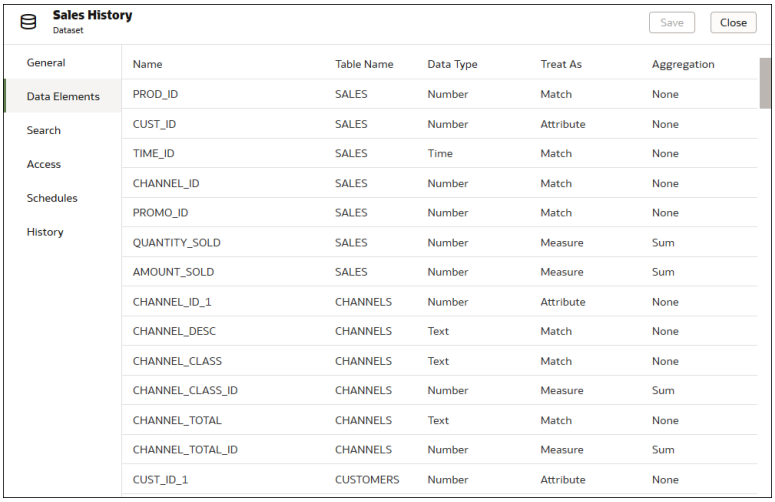
1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to certify, click **Actions**, and then click **Inspect**.
4. Click the **General** tab.
5. Go to the **Certified By** field and click the **Certify** button.
6. Click **Save**.

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.

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Make a Dataset's Data Available for Search

This topic describes what you need to know to index a dataset to include its data in the Home page's search results.

LiveLabs Sprint

Topics:

- About Indexing a Dataset
- Index a Dataset
- Index a Dataset on Demand
- Schedule When to Index a Dataset

About Indexing a Dataset

You must index a dataset so that its data is included in the Home page's search results.

> **Note**
>
> A file-based dataset must be indexed before you can use it to build visualizations from the Home Page. A file-based dataset must be indexed and certified before the users you shared the dataset with can use it to build visualizations from the Home Page. See Generate Visualizations from the Home Page with Questions and Certify a Dataset.

You can index any dataset that you have Full Control or Read-Write access to. When you enable a dataset to be indexed, you'll specify if you want to index all or some of a dataset's attributes by names, or by names and values, and which language to index the dataset in. By default the dataset is indexed when its data is refreshed so that the most current data is available when users search from the Home Page. Alternativley, you can add a schedule to indicate when and how often a dataset is indexed, or you can index a dataset on demand.

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You use the **Search** tab on the **Inspect** page to enable indexing of datasets based on files or data sources. Administrators use the **Data Model** pane on the Console's Search Index page to control which subject areas are indexed. See Configure Search Indexing.

Index a Dataset

You can specify how to index a dataset so that its data is included in the Home page's search results. You can index all or some of the dataset's attributes by name, or by name and value.

You can index any dataset that you have Full Control or Read-Write access to.

By default a dataset is indexed when the dataset is refreshed. However, you can create a schedule to specify when and how often you want a dataset to be indexed. See Schedule When to Index 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 index, click **Actions**, and then click **Inspect**.
4. Click the **Search** tab.
5. Click **Index Dataset for Searching** field and specify how you want the dataset to be indexed.
   - Select **Names only** to index metadata for all attributes.
   - Select **Names and values** to index metadata and data for all attributes.
   - Select **Custom** to select the attributes that you want to index and how you want them indexed.
6. Click the **Languages** field and select the language you want to use to produce the dataset's index.
7. Optional: Use the **Indexing Schedule** section to specify when you want the data indexed, or click **Run Now** to run the refresh immediately.
8. Click **Save**.

Index a Dataset on Demand

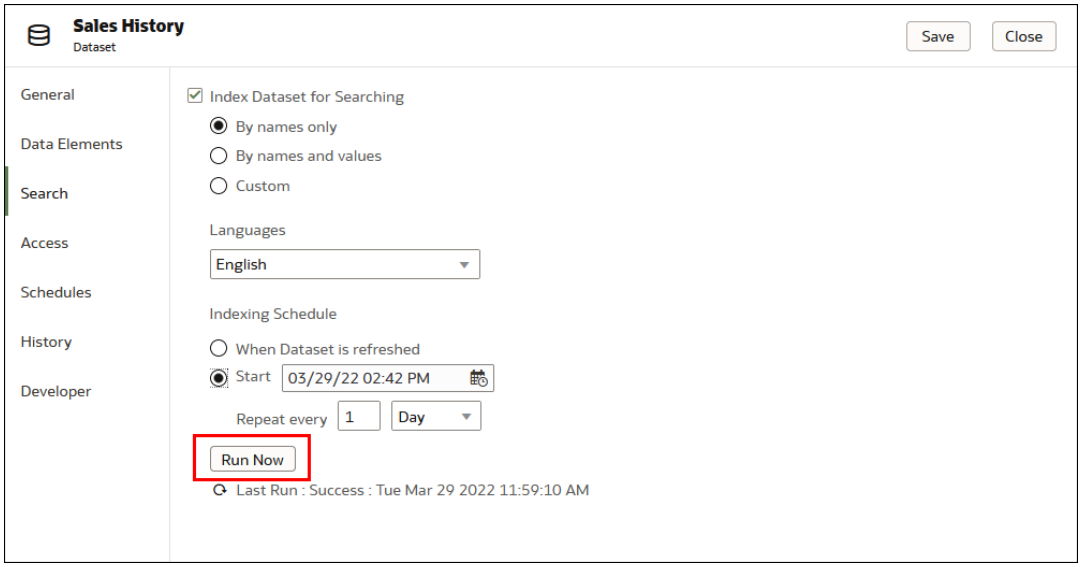
You don't have to wait for a dataset to be indexed after refresh, or wait for a dataset's indexing schedule to run. You can index a dataset anytime you need to make its data available in the Home Page's search results.

You can index any dataset that you have Full Control or Read-Write access to.

For information about enabling and setting up a dataset for indexing, see Index 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 index on demand, click **Actions**, and then click **Inspect**.
4. Click the **Search** tab.

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5. Click **Run Now** to index the dataset.

Schedule When to Index a Dataset

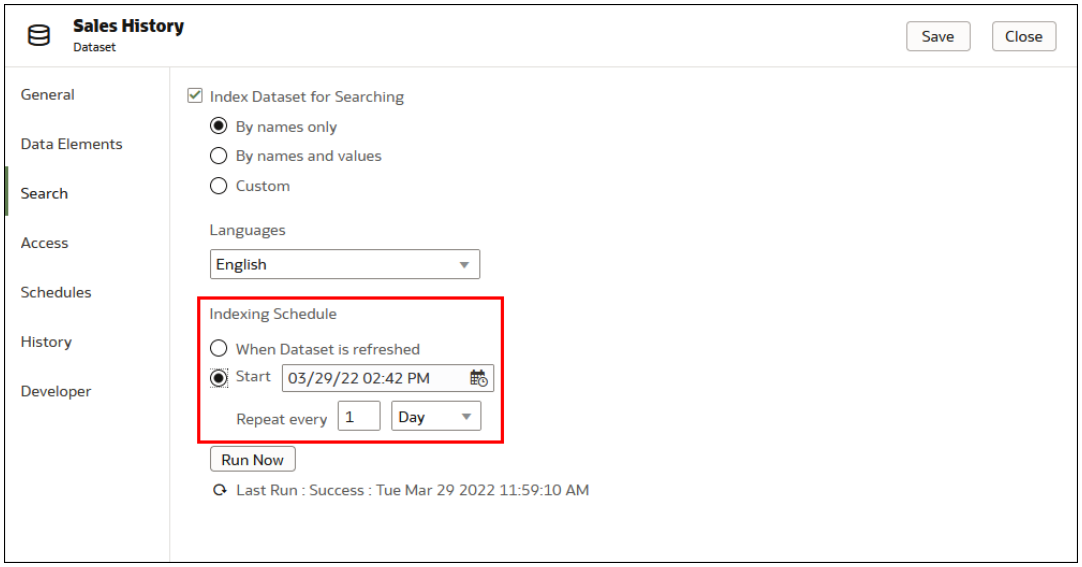
You can schedule when and how often a dataset is indexed. You can choose to index the dataset at a time that is convenient for and doesn't interrupt or confuse workbook authors or consumers.

By default when indexing is enabled for a dataset, the dataset is indexed when it's refreshed. Setting an indexing schedule overrides this default. You can enable indexing for any datasets that you have Full Control or Read-Write access to.

For information about enabling and setting up a dataset for indexing, see Index 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 add an indexing schedule to, click **Actions**, and then click **Inspect**.
4. Click the **Search** tab.
5. In the Indexing Schedule section, click **Start** and then click the **Select Date Time** button.

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6. In the dropdown calendar, browse to and select a month and day. At the bottom of the dropdown calendar, click the time stamp and specify what time you want indexing to run.
7. Go to the **Repeat every** field, enter a number. Click the dropdown and select how often you want the schedule to run.
8. Click **Save**.

Make Analytics Content Easier to Search

Content authors can specify synonyms for datasets to help users search for content from the Home page. For example, you might enable users to search on Sales, Revenue, or Income to locate data in a dataset column SALES_AMT.

Topics:

- About Making Analytics Content Easier to Search
- Specify Synonyms for Dataset Columns

About Making Analytics Content Easier to Search

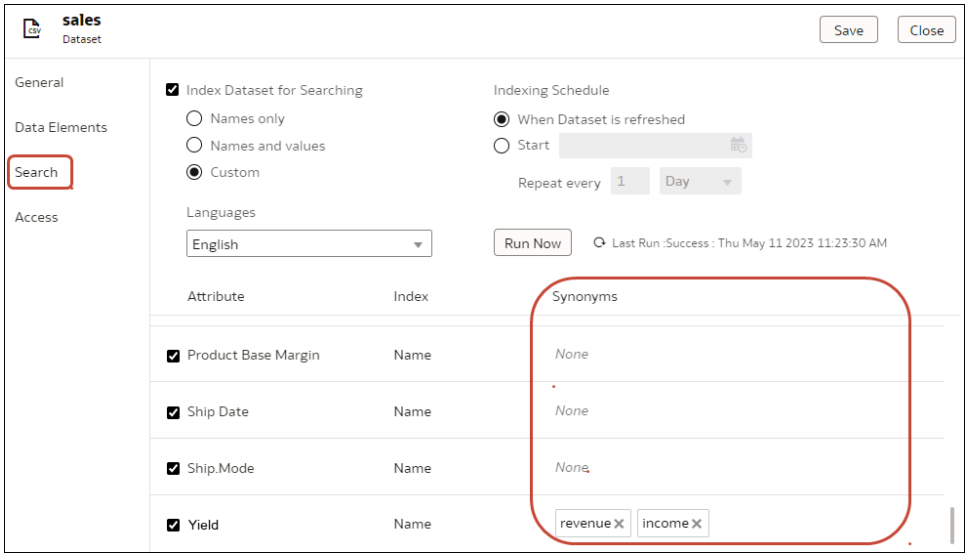
Content authors make analytics content easier to search from the Home page by specifying synonyms for columns in datasets.

For example, to make it easier for users to find data in a column named Yield, you might specify *revenue* and *income* as synonyms. From the Home page, users then can locate data in a column named Yield by entering revenue or income as a search term.

You can create and edit synonyms if you own a dataset or a dataset has been shared with you with read-write access.

You specify synonyms for dataset columns on the Search page of the Inspect dialog for datasets.

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Tips on specifying synonyms for column names:

- Enter one or multiple synonyms. For example, for a Yield column you might specify *revenue* and *income*.
- Synonyms can be up to 50 characters.
- You can specify a maximum of 20 synonyms for each column name.

You can't base synonyms on:

- Analytical functions, for example, sum, AND, OR, NOT, BETWEEN, IN, IS NULL, LIKE, Aggregate At, Aggregate By.
- Analytical terms, for example, null.
- Articles, prepositions, pronouns, and conjunctions that are usually removed before processing natural language (also known as *stop words*). For example, a, an, and, are, as, at, be, but, by.
- Boolean function names, for example, true, false, yes, no.
- Date formats, for example, nn/nnnn, nnnn/nn, nn/nn/nnnn, nnnn/nn/nn where n is an integer.
- Integers, for example, 123 or 123 456.
- Special characters, for example, `!@#$%^&*()+=[]{};\':"\\|,<>/?~.

Specify Synonyms for Dataset Columns

Make analytics content easier to search from the Home page by specifying synonyms for columns in your datasets.

1. On the Home page or Data page, select a dataset.
2. Hover over a dataset, then click **Actions**, then **Inspect**.
3. Click **Search**. From the **Index Dataset for** list, select an option.
4. In the **Synonyms** column, enter the terms for the data element row. For example, for a Yield column, you might specify *revenue* and *income* as synonyms.
5. Click **Save**, then click **Run Now**.

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Add or Update a Dataset's Permissions

You can assign users and roles and access permissions (Full Control, Read-Write, and Read-Only) to a dataset that you create or administer.

LiveLabs Sprint

Assign permissions to users and roles to specify who can access the dataset and what they can do with the dataset. For example, reload data, index the dataset, or download 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 add permissions to or update permissions for, click **Actions**, and then click **Inspect**.
4. Click the **Access** tab.
5. Optional: To modify permissions, locate a user or role and click the permission that you want to assign to it.
6. Optional: To delete a user or role, hover over it and click **Delete**.
7. Optional: To add users and roles, click the **Search** field and type the name of the user or role that you want to add. Select the user or role from the search results list to add it, and click the permission that you want to assign it.
8. Click **Save**.

Download a Dataset's Source File

You can download a file from a dataset that contains one table and one source file. You must have access to the dataset to download its 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.
- You don't have the original dataset file. For example, if another user uploaded the dataset file.
- You need a dataset file that another user uploaded and shared with you.

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.

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Duplicate a Dataset

You can duplicate any dataset that you have access to. Duplicating a dataset and modifying the copy is 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. Duplicated datasets retain Search settings.

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.

You can delete datasets that you have Full Control permissions to.

> **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**.

Enable Knowledge Enrichments in the Workbook Editor

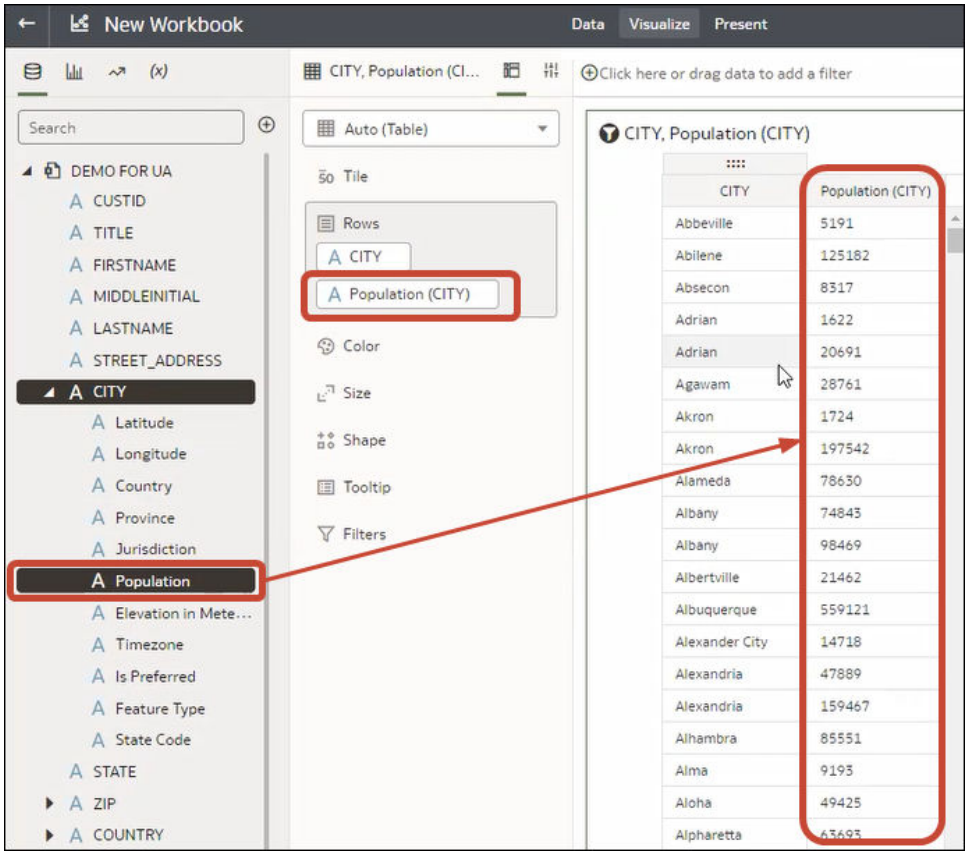
Oracle Analytics profiles datasets and generates knowledge enrichments that enable you to augment your data with data from other sources. For example, if your dataset contains a column with a list of cities, knowledge enrichments might provide information about the location, population, and size of the city.

Knowledge enrichments are usually enabled by default, but workbook editors can enable or disable them for datasets that they own or have editing privileges for.

1. On the Home page, click **Navigator** and then click **Data**.
2. Click the **Datasets** tab.
3. Locate the dataset that you want to edit, click **Actions**, and then click **Inspect**.
4. Select **Enable Knowledge Enrichments**.

Workbook editors can add knowledge enrichments directly from the Data Panel to visualizations. In this example, in a dataset with a city column, you can add a population column as an enrichment to the dataset..

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7

Visualize and Analyze Data

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

Video

Topics

- Begin to Build a Workbook and Create Visualizations
- Configure Settings for Canvas Layout Templates
- Open a Workbook in Edit Mode
- Work with a Workbook's Datasets
- Build a Visualization by Adding Data
- Tips on Editing a Visualization
- About Visualization Types
- Use Calculations in Workbooks
- Enhance Visualizations with Statistical Analytics
- Create a Legend Visualization
- Use Spark Charts to Examine Trends
- Sort Data in Visualizations
- Hide Columns in Visualizations
- Undo and Redo Edits
- Create a Custom Error Message for Visualizations with No Data
- 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
- About Visualization Properties
- Adjust Visualization Properties
- Apply Color to Visualizations
- About Workbook Themes
- Highlight Important Data Events with Conditional Formatting

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- Format Numeric Values of Columns
- Format Numeric Values of Visualizations
- Set Currency Symbols for Visualizations
- Add Notes to Visualizations
- Sort, Drill, and Select Data in Visualizations
- Use Calculations in Visualizations
- Explore Data on Mobile Devices Using A Built-in Browser
- About the Warning for Data Issues in Visualizations
- Create a Catalog Folder
- Move Catalog Folders and Contents
- Embed a Workbook and Visualizations in a Dashboard
- Save a Workbook to a Shared Catalog Folder
- Assign Shared Catalog Folder and Workbook Permissions
- Configure How Workbooks Open By Default
- Set Workbook Thumbnails
- Set Visualization Loading Overlay Opacity

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. Optional: If you want to select a canvas layout template, click **Select a layout**, select the layout, and then click **OK**.

   Oracle provides the ready-to-use layout templates called Filter Left and Filter Top, which are available for all workbooks.
4. In the Data Panel, locate and drag and drop data columns onto the Visualize canvas to start building visualizations.
5. Optional: If you modify the canvas layout and want to share the modified canvas layout template with others, right-click the canvas, select **Save as Shared Layout**, enter a name, and then click **Save**.

   As a content author you must have the Create and Edit Shared Layouts permission to create, save, and modify canvas layouts.

   When you save a modified canvas layout as shared layout, the layout retains settings previously made for viewing the canvas layout on different screen sizes. See Design Canvas Layouts for Different Screen Sizes.
6. Click **Save**.

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- To share a workbook with others and include it in the Home page's **Navigation Menu** as a link, you can save the workbook in the `/Shared Folders/`*first level subfolder* with **Add to Navigation Menu** selected.

> **Note**
>
> Exclude special characters from your workbook name otherwise it won't display in the Navigation Menu. See About Naming Restrictions for Catalog Objects.

Configure Settings for Canvas Layout Templates

You can configure settings for canvas layout templates to determine whether users are able to see and update them when they create workbooks. For example, you might want to hide a particular canvas layout template from users, or prevent users from updating a canvas layout template.

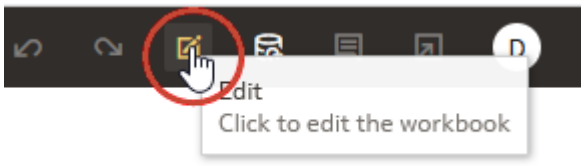
As a content author you must have the Manage Layouts and Themes, and Create and Edit Shared Layouts permissions to configure these settings.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Layouts and Themes**, select an option:
   - **Visible** - Select to display a layout template to users.
   - **Visible** - Deselect to hide a layout template from users.
3. Right click a layout template, select an option:
   - **Make Read-write** - Select to make a layout template readable and writable.
   - **Make Read-only** - Select to make a layout template read only.
   - **Delete** - Select to delete a layout template.

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**.



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Work with a Workbook's Datasets

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

Topics:

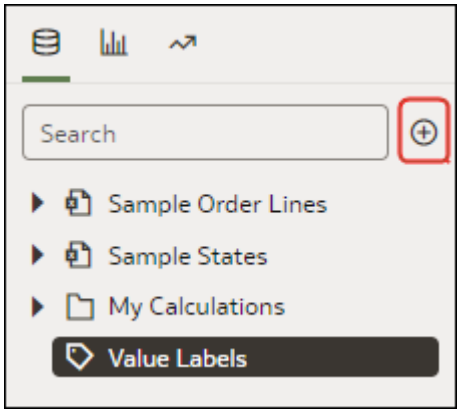
- Add Datasets to a Workbook
- Replace a Dataset in a Workbook
- Remove a Dataset from a Workbook
- Modify a Workbook's Datasets
- Blend Datasets

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.

   Tip: When you browse datasets, to see the name of the data model where the data originated, hover over datasets icon (in Grid View) or hover over the column name (in List View).

4. Select a dataset, then click **Add to Workbook**.

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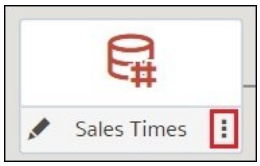
Replace a Dataset in a Workbook

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**.



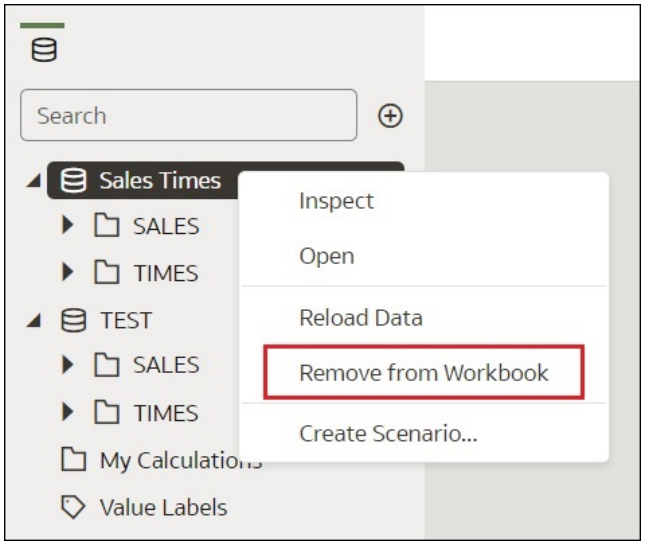
5. Select **Replace Dataset**.
6. In the Replace Dataset dialog, click the replacement dataset. Click **Select**.
7. Review, update, and specify the column mappings for the workbook's visualizations, calculations, and filters.
8. Click **Replace**.
9. Optional: If you want to add blending between datasets,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

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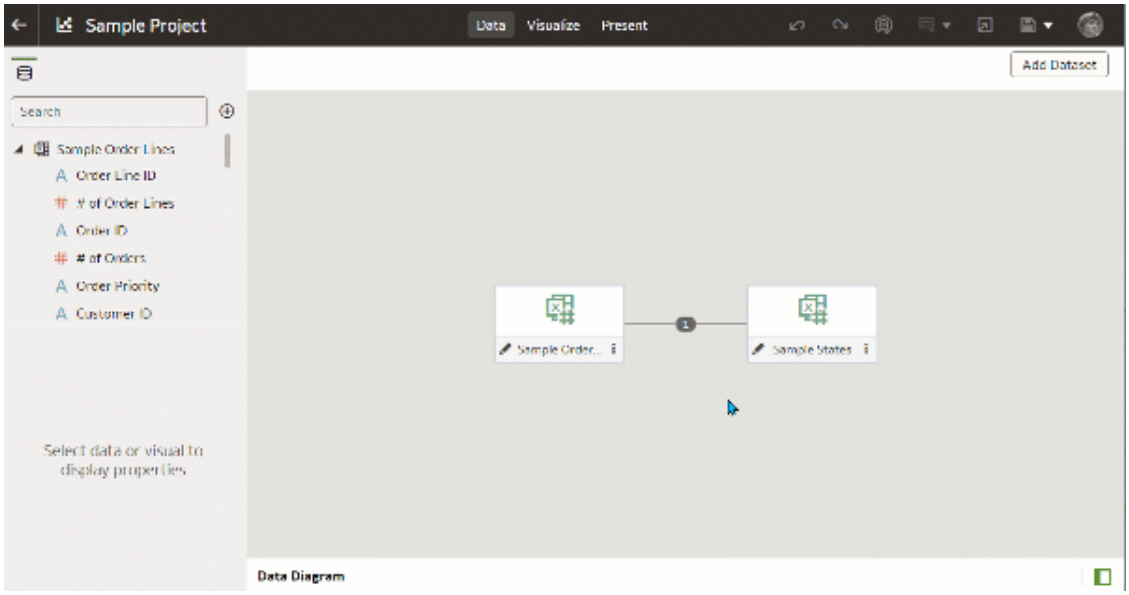


3. Click **Save**.

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 browser tab opens that contains the editor that you use to view or modify the dataset. The Workbook Editor remains open in its own browser tab 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.

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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 tab 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 tab.
   - 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 tab.
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

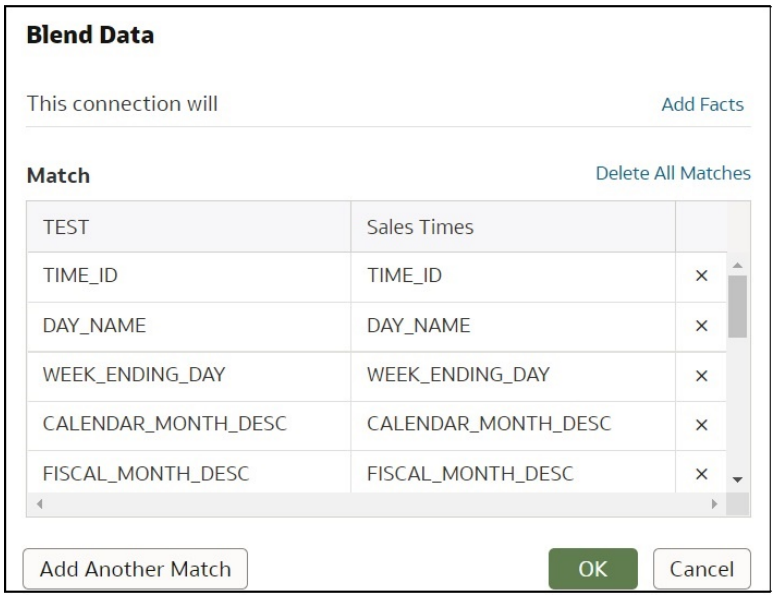
When you add more than one dataset to a workbook, Oracle Analytics tries to match columns between the datasets that you added. This matching is called blending.

Video

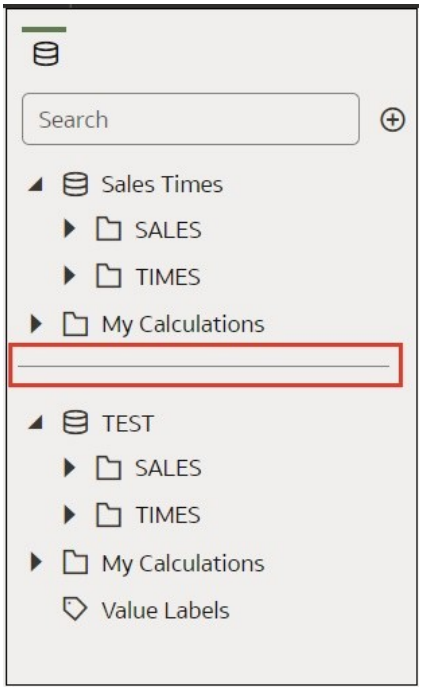
For example, Dataset A might contain new dimensions that extend the attributes of Dataset B. Or Dataset B might contain new facts that you can use alongside the measures that already exist in Dataset A.

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

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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.

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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.

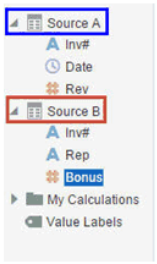
T1 - Source A

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.



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.

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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.

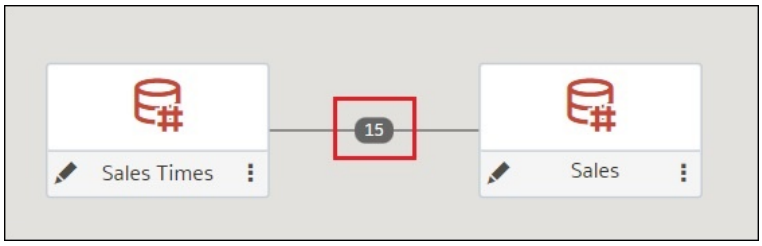
Datasets that use Oracle Essbase or Oracle EPM Cloud connections aren't available for blending.

> **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**.

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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**.

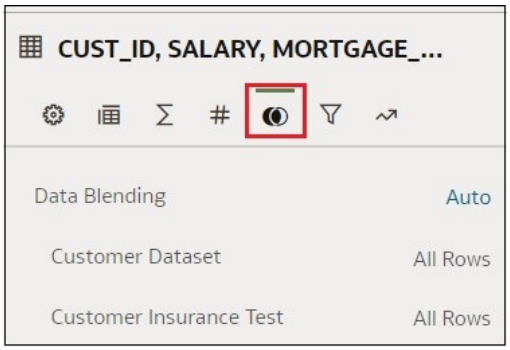
Change Data Blending in a Visualization

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**.

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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.

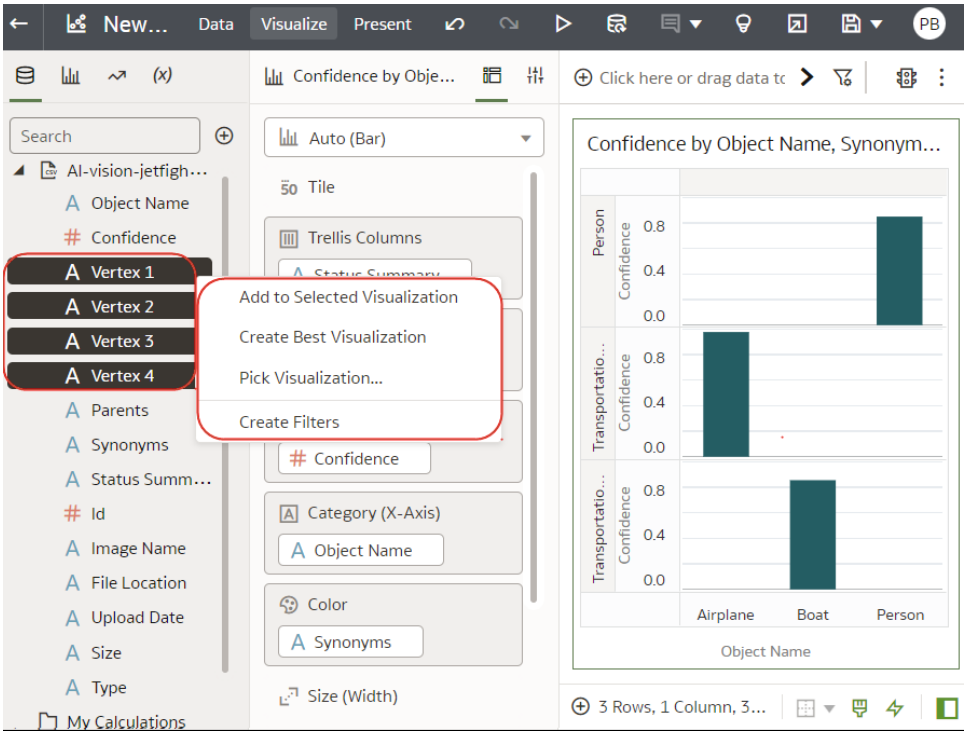
Topics:

- 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

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**.



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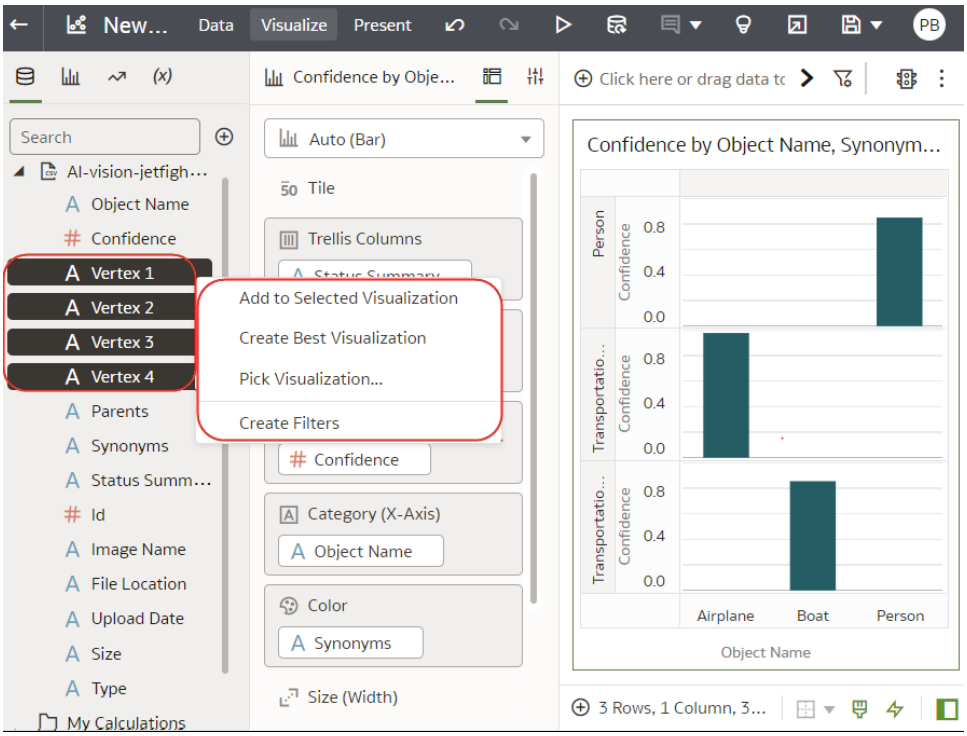
Add Data to a Visualization

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.

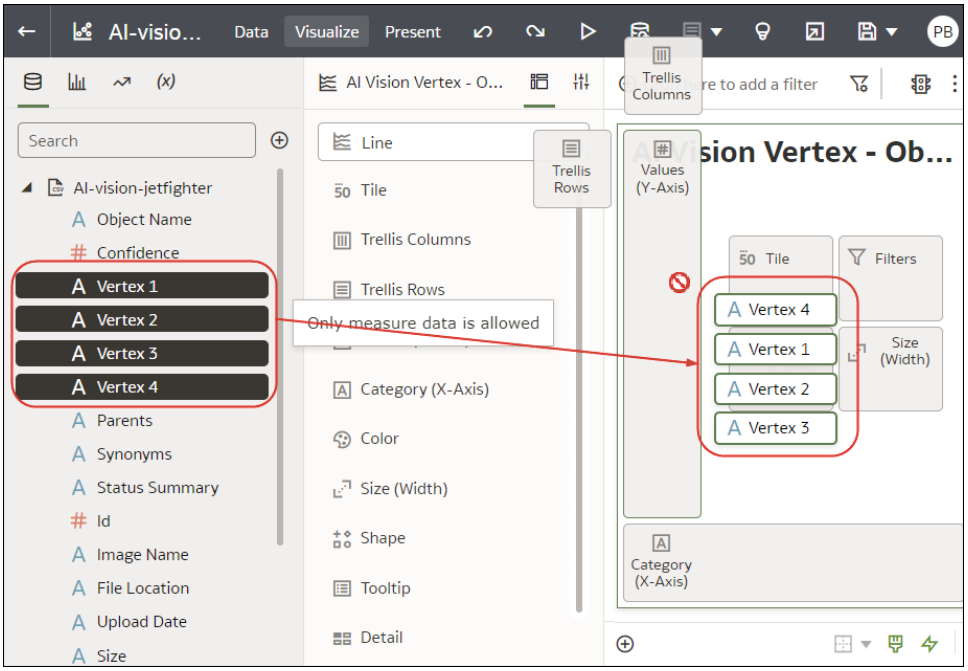
You can select compatible data elements from the datasets and drop them onto the Grammar Panel in the Visualize canvas. Based on your selections, visualizations are created on the canvas. The Grammar Panel contains sections such as Columns, Rows, Values, and Category.

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.

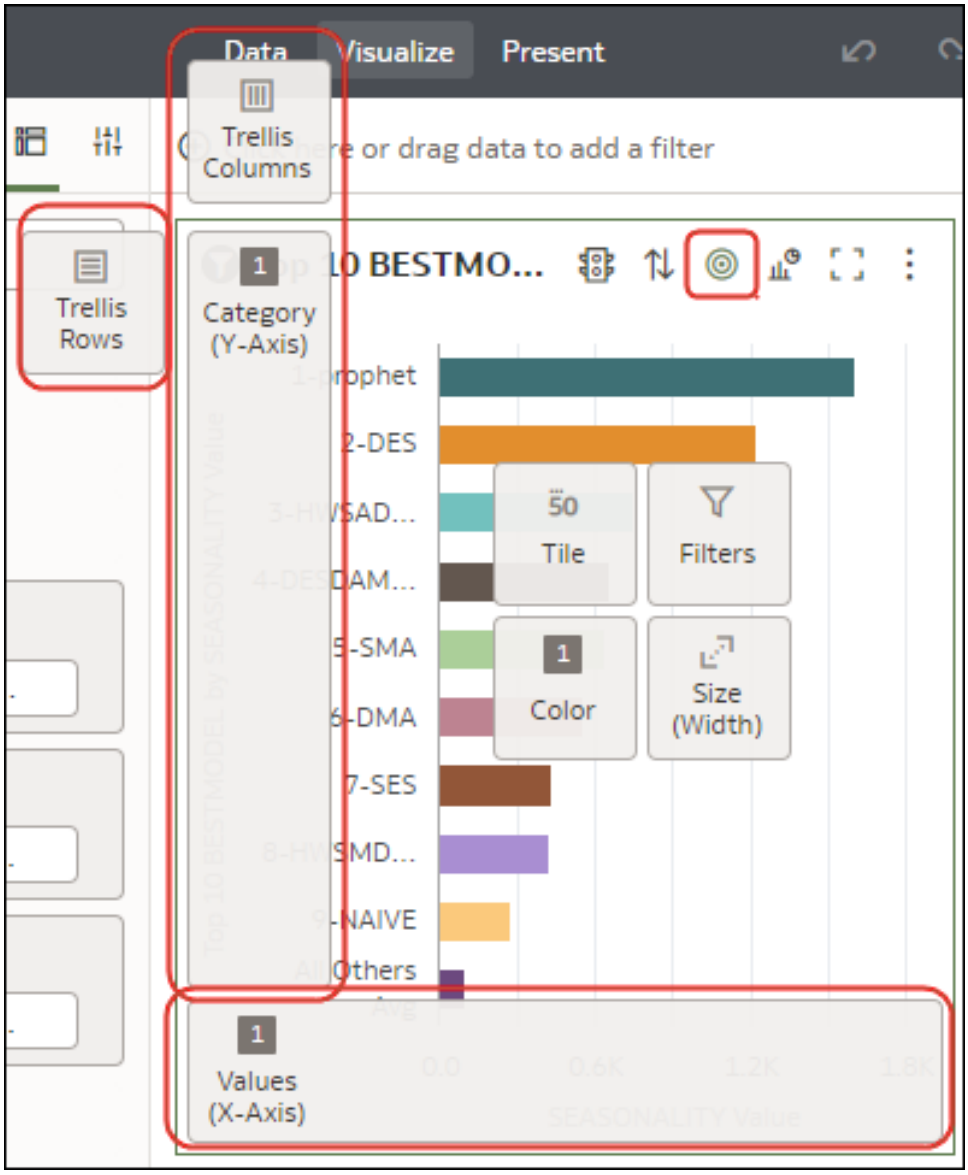
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Tips on adding data

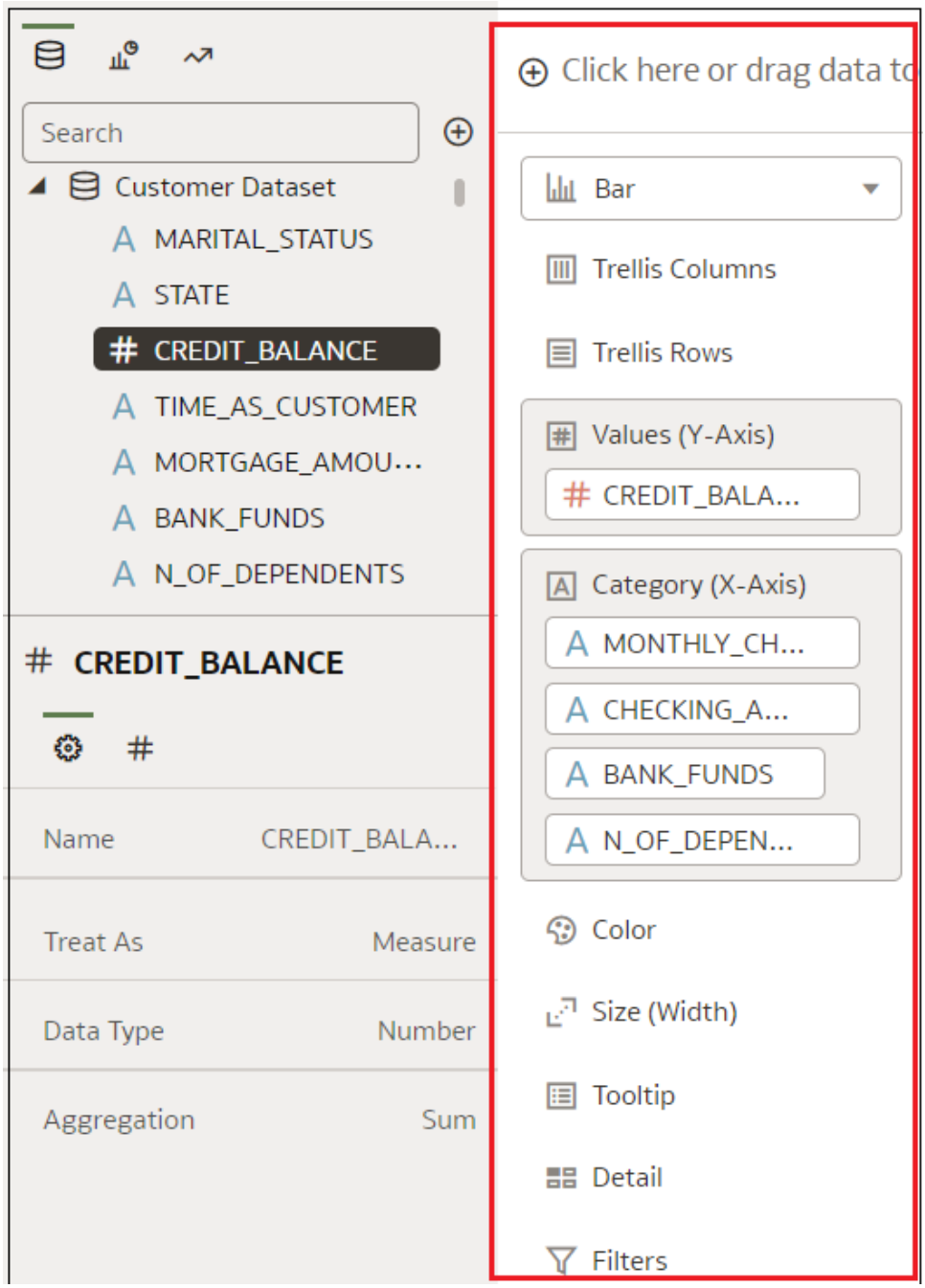
- To help you understand the components of a visualization, hover over it and click **Show Assignments** to annotate the visualization components, for example, the X-Axis and Y-Axis of a chart.

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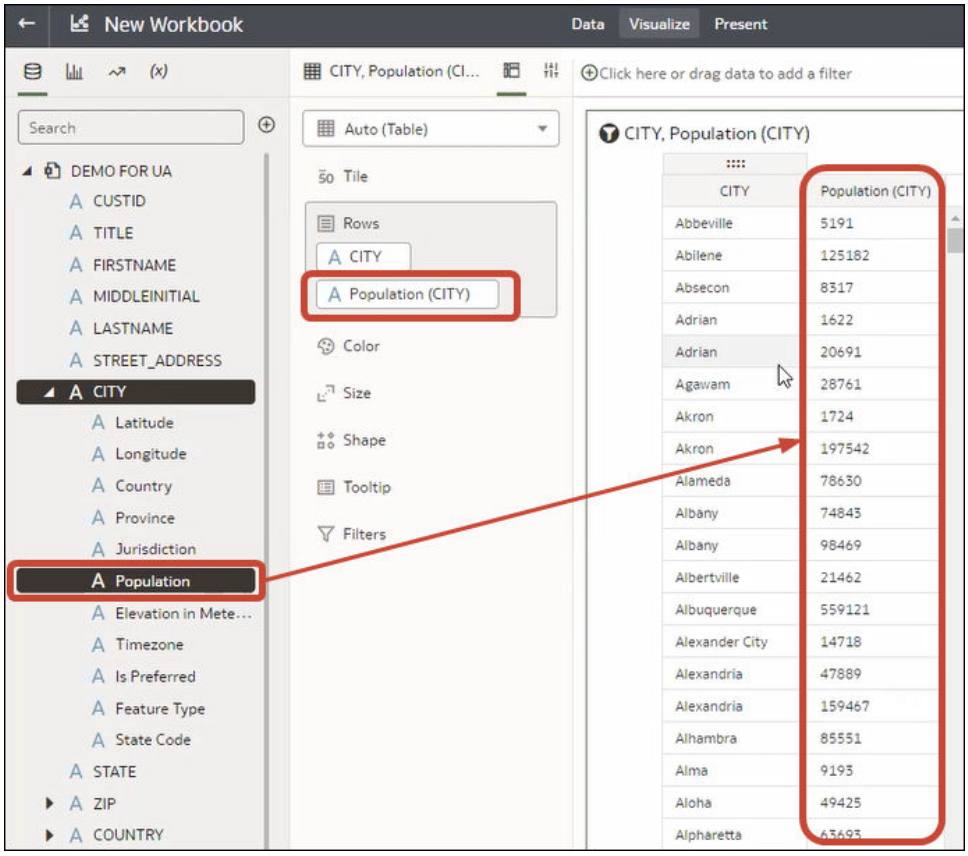
- Use the Grammar Panel to configure visualization components (for example, add, remove, re-order).

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- 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.

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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

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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, parameters, 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. You can also add parameters by using the appropriate syntax, see Syntax for Referencing Parameters.

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. Click **Properties**.
4. Go to the **Tooltip** field.
   - Click **All Data** and select **Custom** to customize a tooltip.
   - Click **Custom** or the pencil icon to update a customized tooltip.
5. Customize the tooltip text, formatting, data, or parameters.
6. Optional: Click **Preview** to see what your updates look like.
7. Click **OK**.

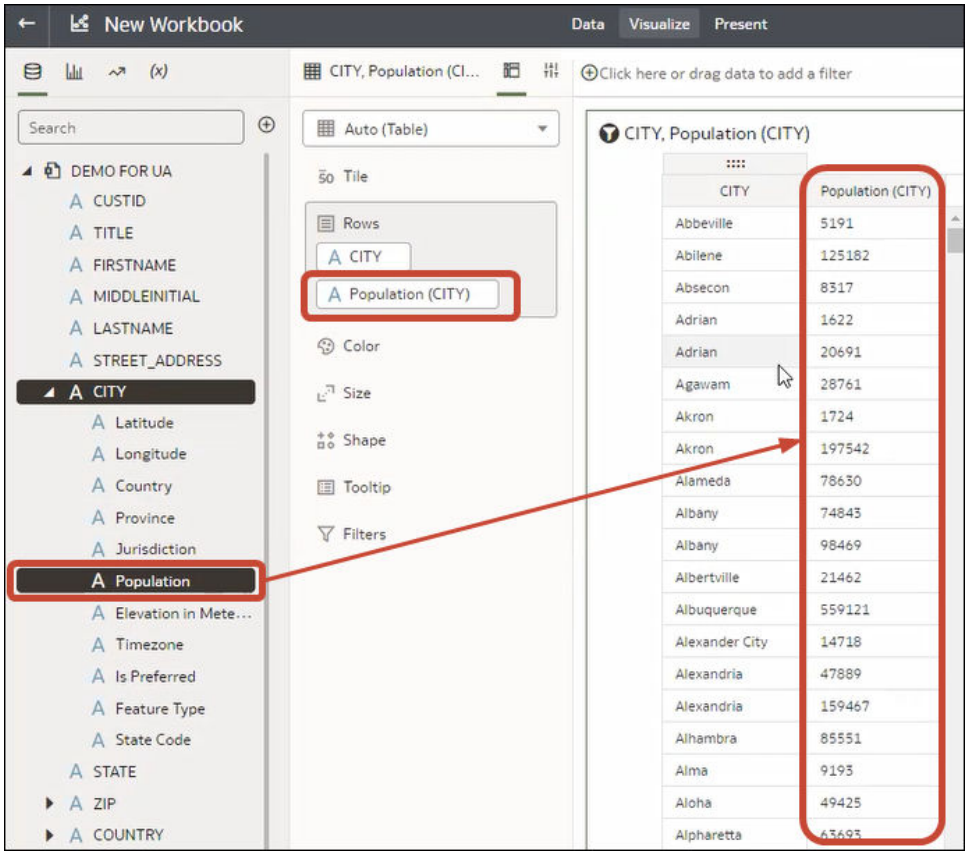
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Using Knowledge Enrichments in the Workbook Editor

Knowledge enrichments enable you to augment the data in your visualizations with data from other sources. For example, if you have a list of cities, knowledge enrichments might provide information about population number, size of city, location.

Take advantage of System Knowledge and Custom Knowledge updates in Oracle Analytics directly in the workbook editor to create data-rich visualizations.

In the workbook editor Data Panel, you'll see knowledge enrichments in the element tree displayed just like regular data elements in the dataset. In this example, workbook editors can add the knowledge enrichments "Population" and other city-related data to a workbook. When you create a workbook based on the dataset that contains CITY, you can add population and other data elements directly to your visualization.



Knowledge Enrichments are usually enabled by default, but if you own a dataset or have editing privileges for it, you can enable or disable them. See Enable Knowledge Enrichments in the Workbook Editor.

Tips on Editing a Visualization

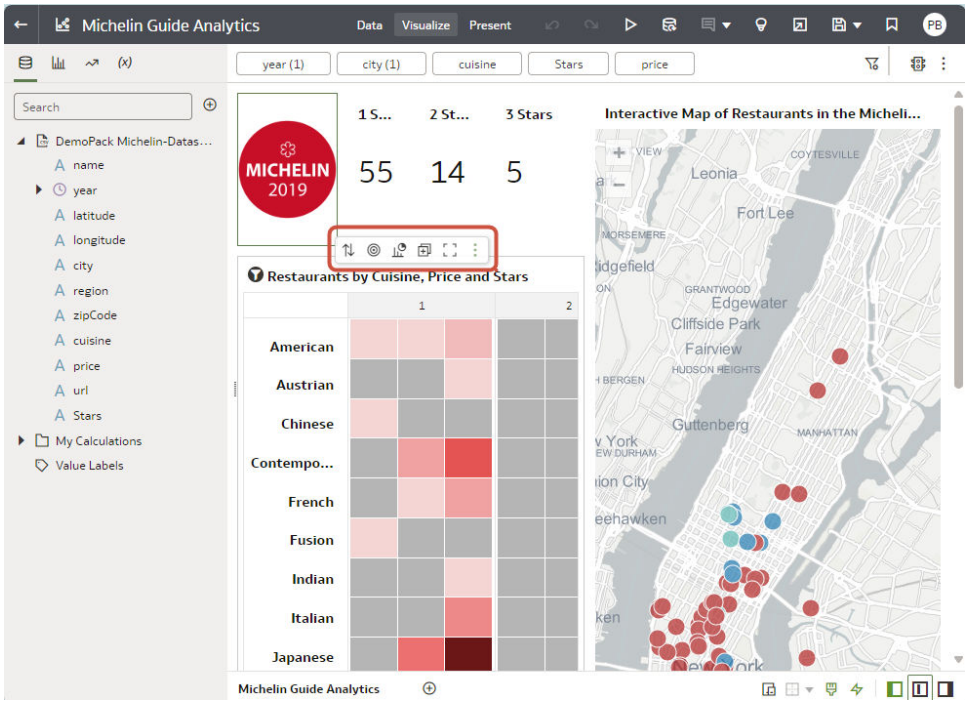
These tips can help you become more productive when you work with visualizations.

Access visualization options

The visualization toolbars provide quick access to formatting and editing options, and a menu (

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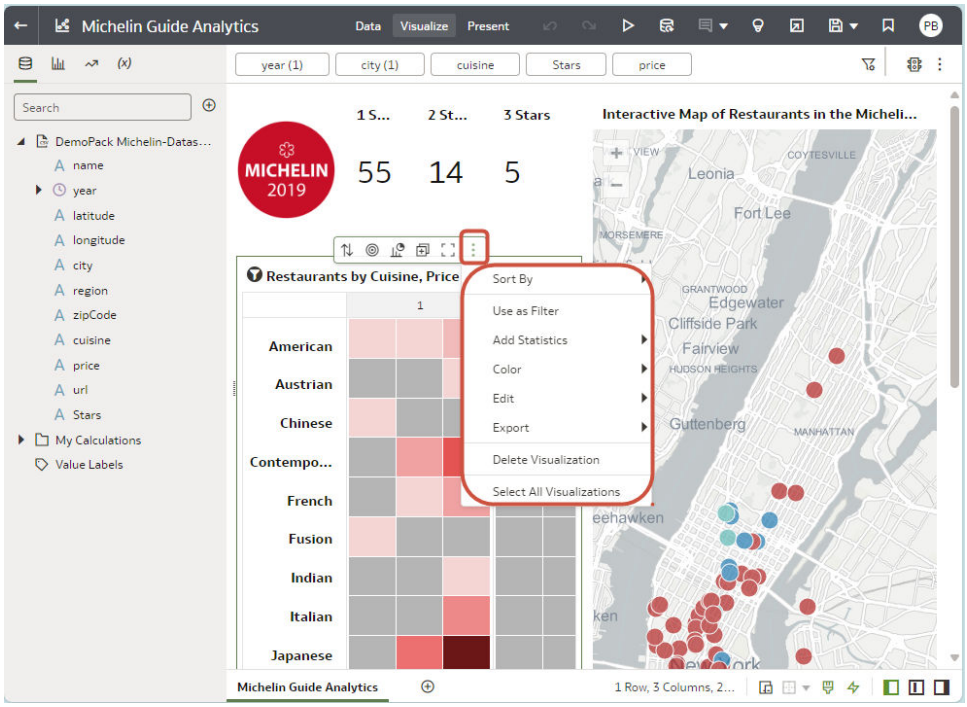
) with additional options.



Access the visualization menu

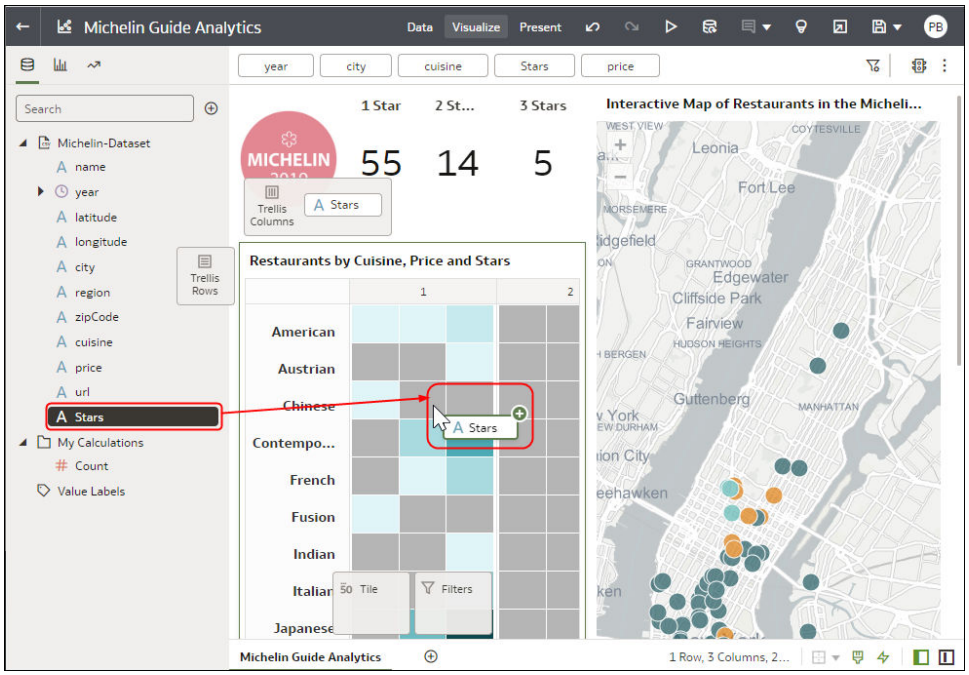
Hover over a visualization, and click **Menu** to display a more comprehensive visualization menu including options such as Sort By, Use as Filter, Add Statistics, Color, Edit, Export, or Delete Visualization.

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Add a field to an existing visualization

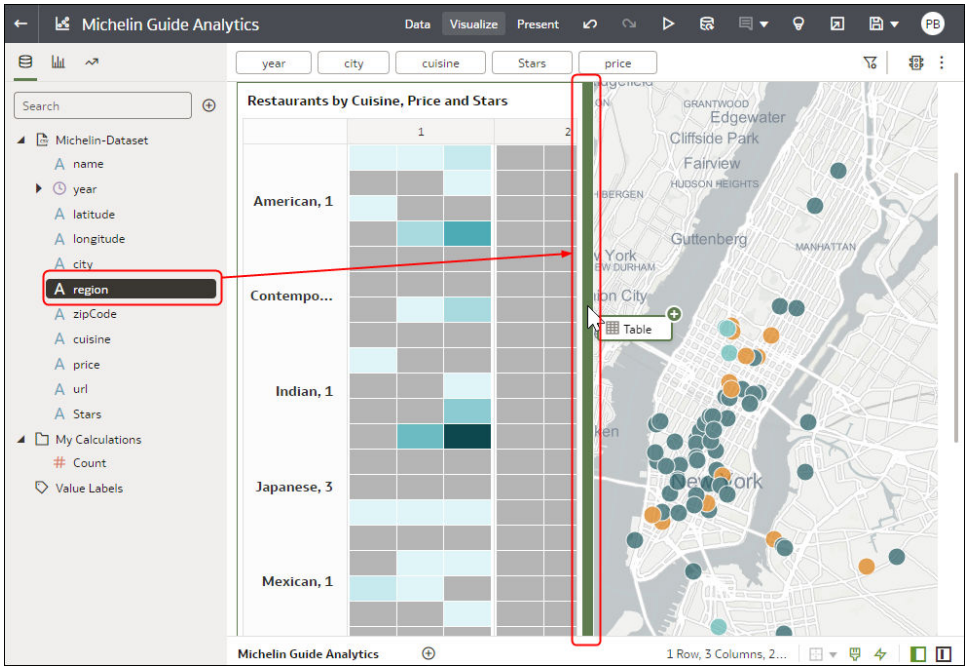
Drag the item from the Data Panel over the visualization until the cursor displays a green cross, indicating a valid drop zone.



Add a field to a new visualization

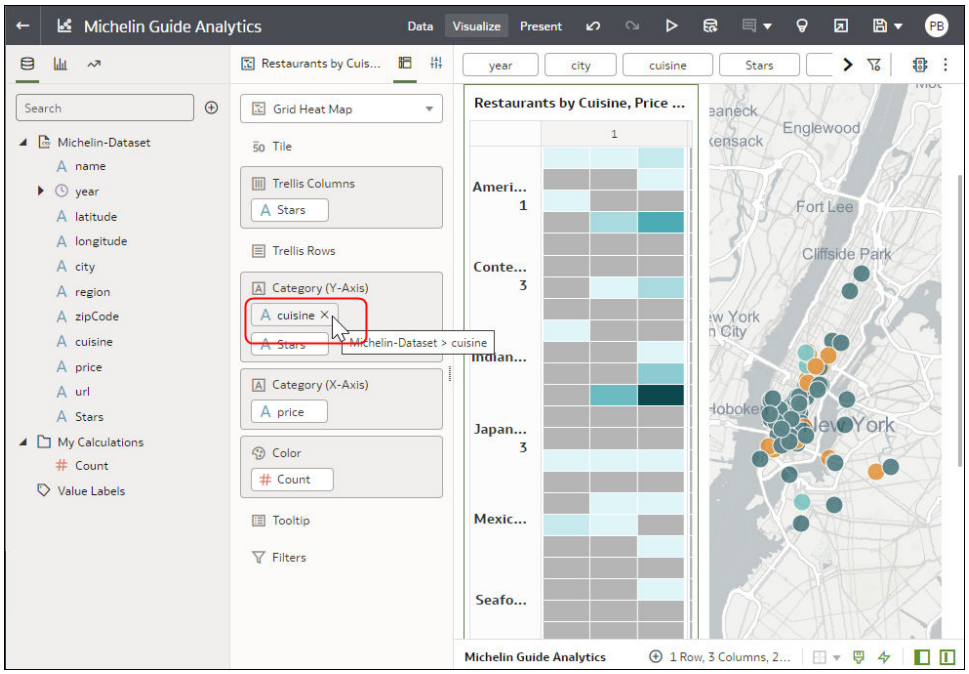
Drag the item from the Data Panel over the visualization until the cursor displays a green bar, indicating a valid drop zone.

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Delete a field from a visualization

Display the Grammar Panel, hover over the field, and click X.



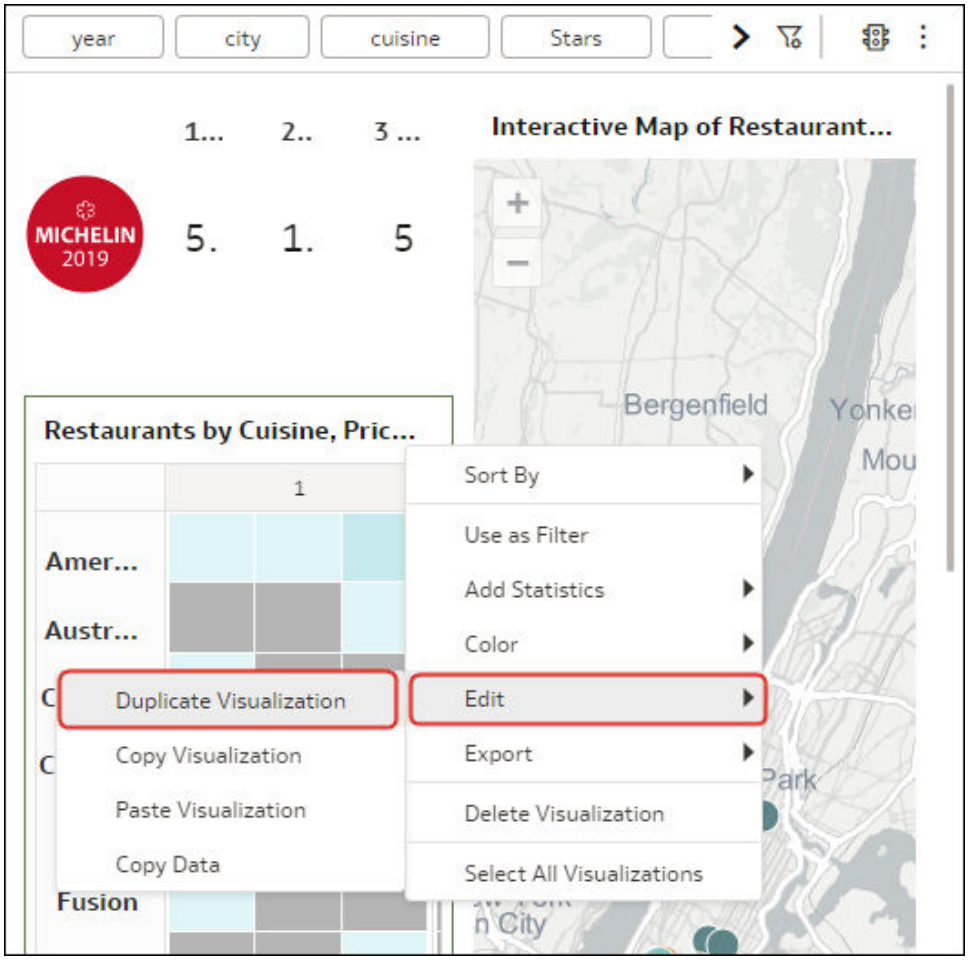
Duplicate a Visualization

Duplicate a visualization to create a copy to edit, or to make a copy for backup.

Sometimes it's quicker to copy an existing visualization than creating one from scratch.

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1. Open the workbook containing the visualization you want to copy.
2. In the Visualize pane, hover over the visualization, click **Menu**, then **Edit**, and then select **Duplicate Visualization**.



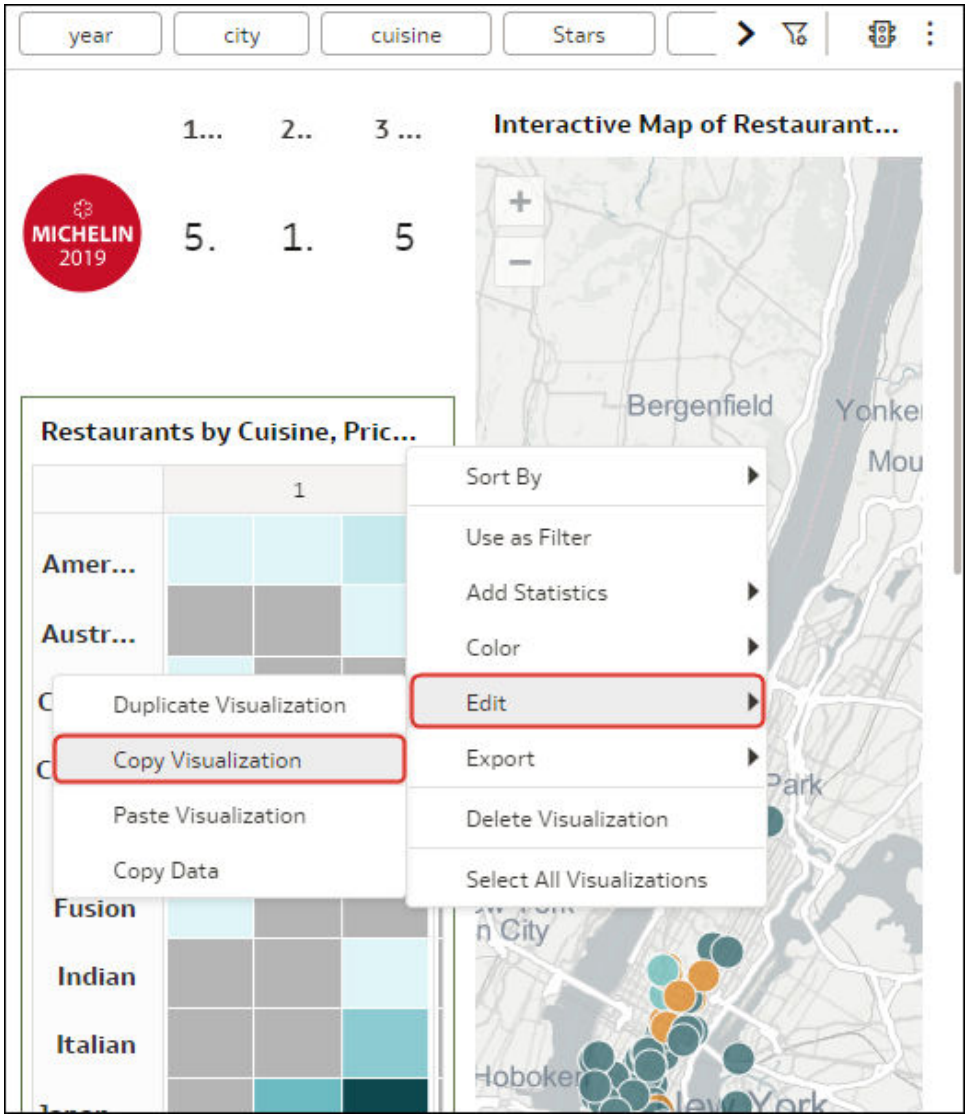
A copy of the visualization is created on the right of the original visualization, and in focus ready for you to edit.

Copy a Visualization from Another Workbook

Copy a visualization from one workbook and paste it to another to share analytics content. Copying a visualization also copies the dataset used by the visualization.

1. Open the workbook containing the visualization you want to copy.
2. In the Visualize pane, hover over the visualization, click **Menu**, select **Edit**, then select **Copy Visualization**.

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3. Create or open a workbook.
4. In Visualize, right-click the canvase, click **Edit**, and then **Paste Visualization**.

   The dataset used by the visualization is also copied into the workbook.

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
- Geospacial Graphs
- Grid Graphs
- Line Graphs
- Network Graphs

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- 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. The data limit is 10,000 rows.
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.
Language Narrative	Provides natural language descriptions of the attributes and measures in your dataset in the form of breakdown or trend.

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Visualization Type	More Information
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.

Geospacial Graphs

Geospacial 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 anaylize 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 tranform 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.
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.

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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 digram, 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.

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Visualization Type	More Information
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

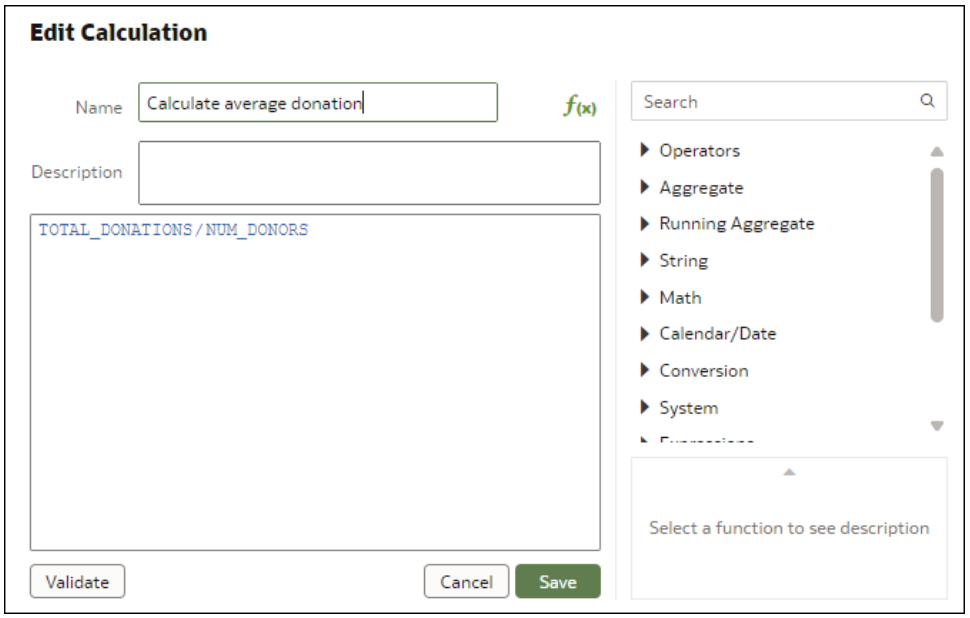
Calculations enable you to create reusable artifacts to enhance your analytics content. For example, you might calculate the a moving average or concatenate two text fields.

With calculations, you can create aggregates, strings, math functions, dates, filters, analytics, and spatial functions. For a full list of supported functions, see Functions.

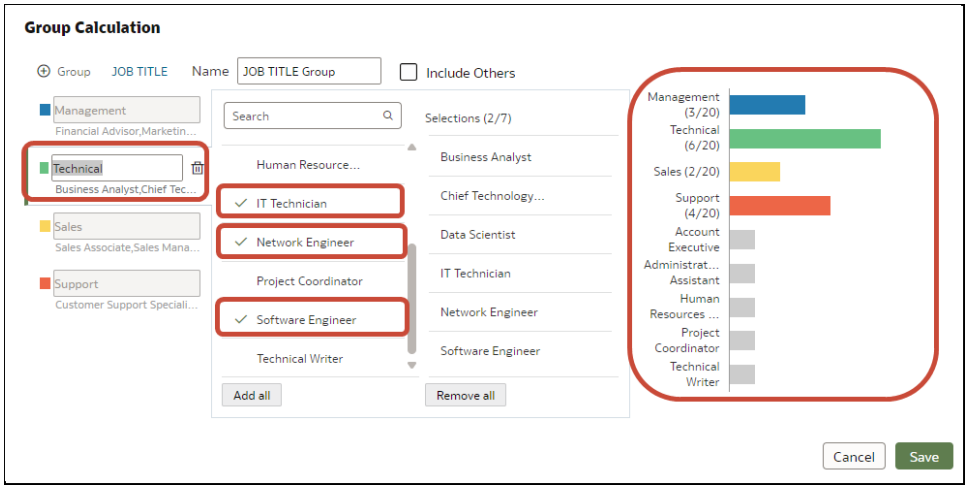
To create a calculation from the workbook editor, in the Data pane or Visualize pane, right-click on My Calculations in the Data Panel or click Add (+) at the top of the panel. Then select either **Create Calculation** or **Create Group Calculation**. You can also create a group calculation based on an existing calculation by right-clicking the calculation and selecting **Create Group Calculation**.

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- **Calculations** enable you to create data elements based on a wide range of expressions and functions. For example, contatenate text, create clusters or outliers, or calculate median values.



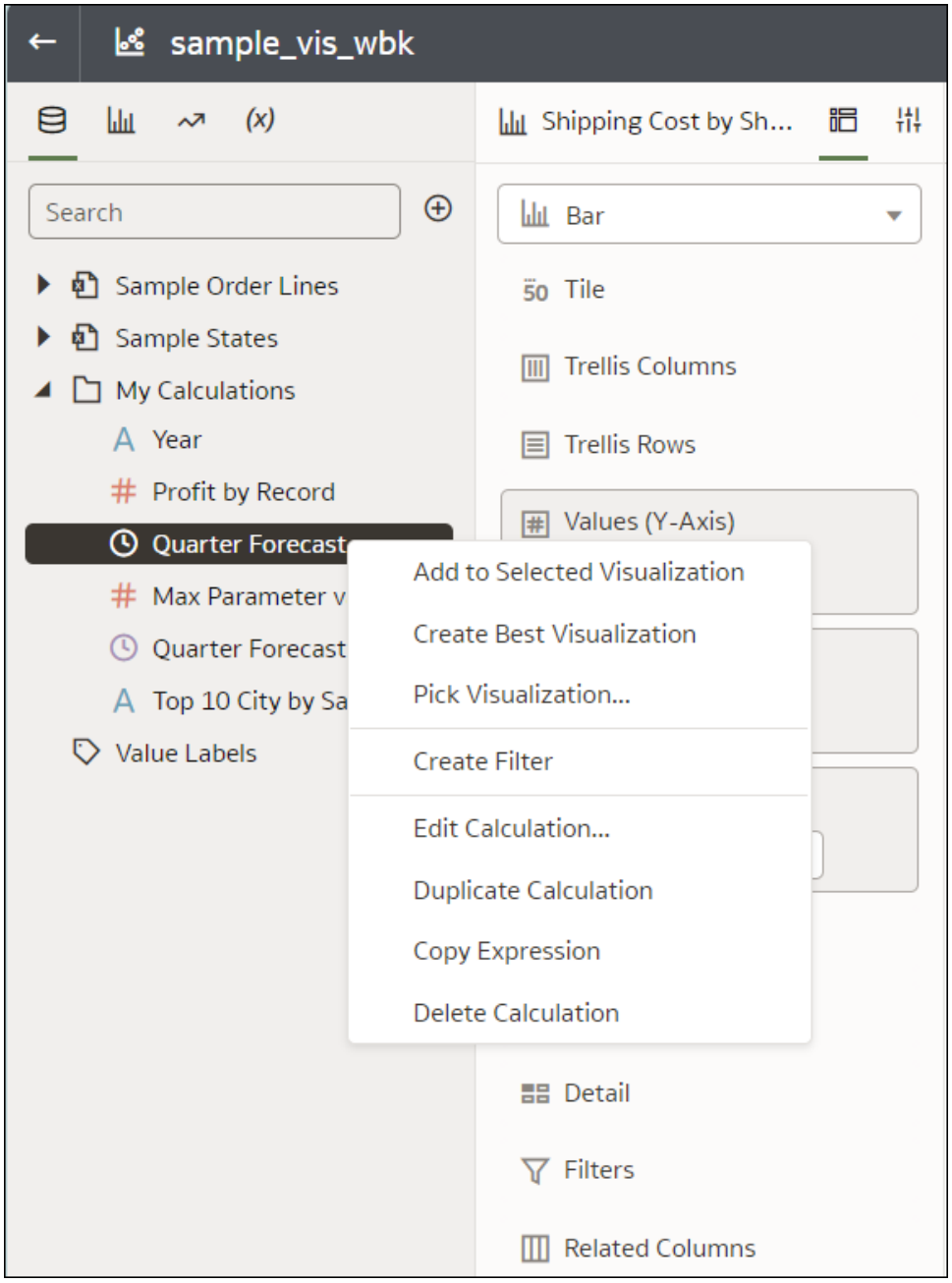
- **Group Calculations** enable you to categorize you data for easier analysis. For example, you might create job categories Management, Sales, Technical, and Support so that you can assign job titles to these categories and report on them.



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.

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You can organize your calculations by creating multiple levels of subfolders 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.

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Option	Use this option to
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 subfolders under the currently selected folder to organize your calculations. You can then drag and drop existing calculations into the subfolders.
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

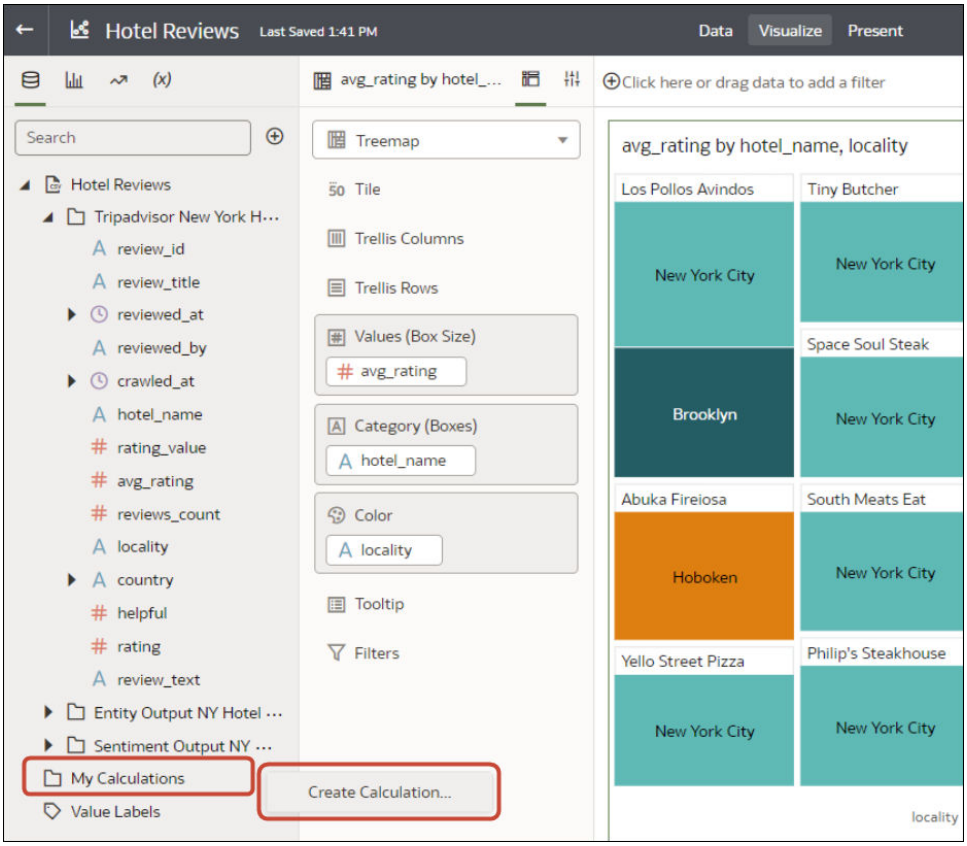
You can create a data element based on a calculation, and then add the data element to your workbook's visualizations. For example, you create a calculation called "SOME_NAME" and use the BIN function to classify AGE values into four buckets: 0 to 20, 21 to 40, 41 to 60, and 60 plus. You then add it 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.

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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

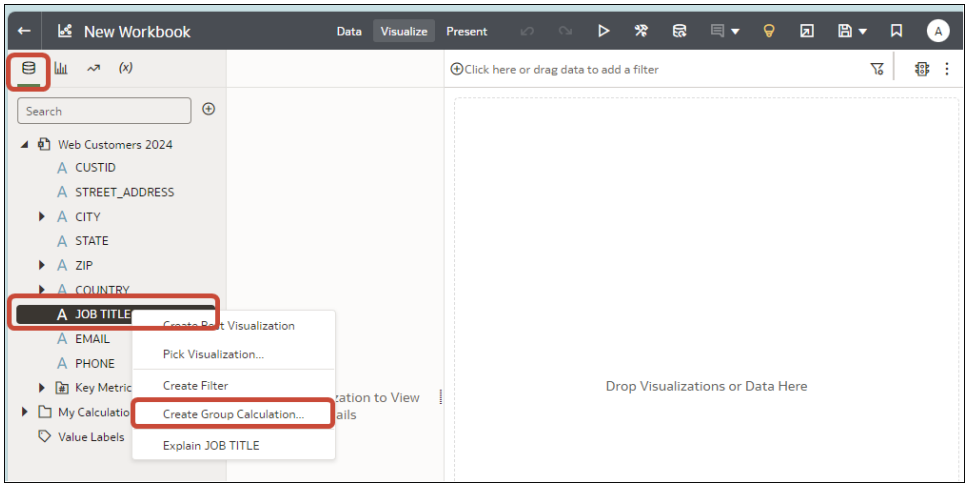
Create group calculations in your workbook to categorize you data for easier analysis.

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**.

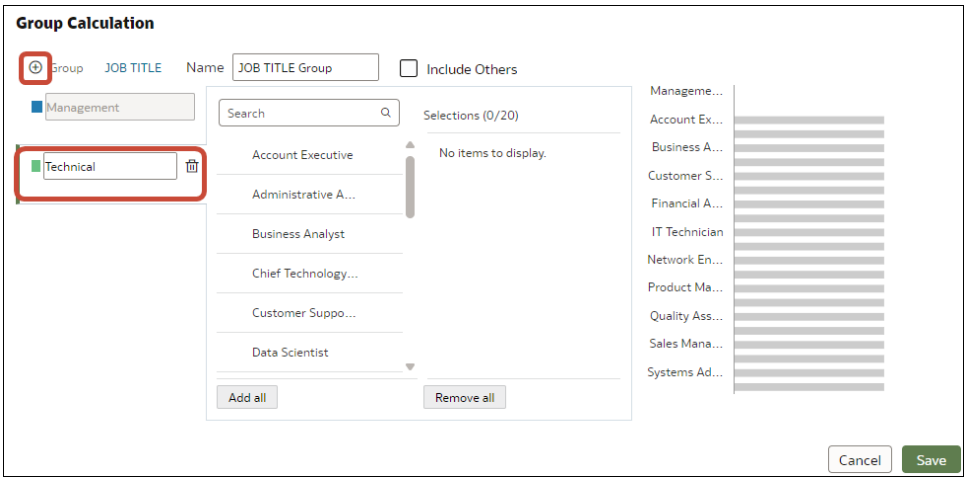
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3. In the **Name** field, change the default name to a meaningful name. For example, Job Categories.
4. At the left hand side, under **Group**, add the groups you want to create.

   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.

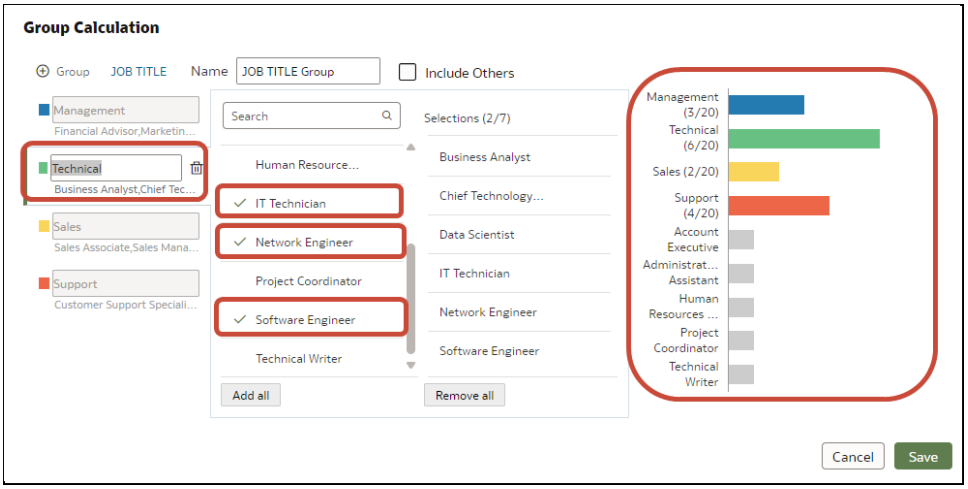


5. Add attributes from the central list to the groups.

   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 numer of attributes and only a sub-set are listed, use the **Search** field above to locate attributes to add.
   -

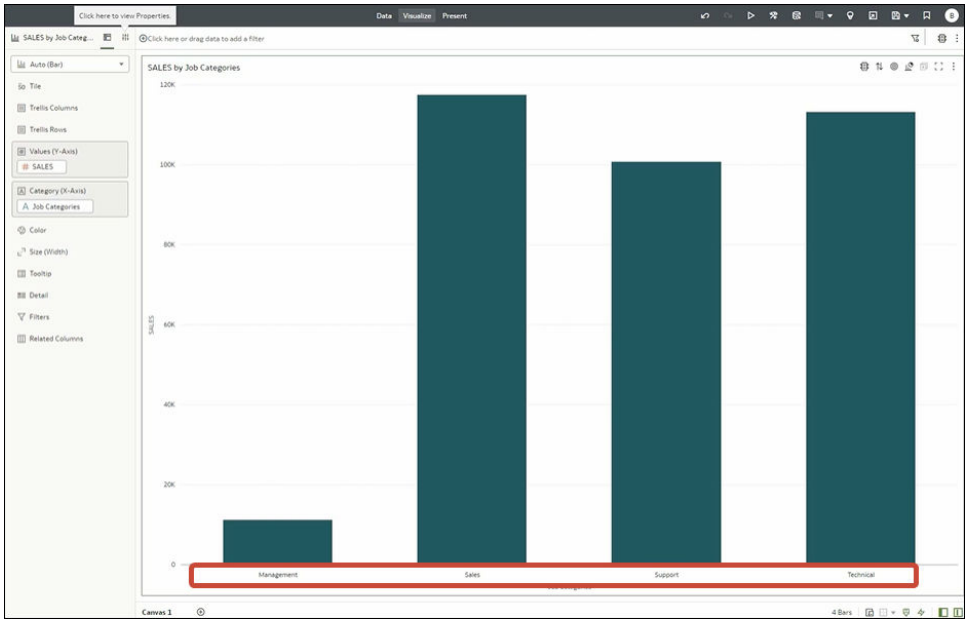
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As you populate the groups, you'll see the histogram at the right hand side update.

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.

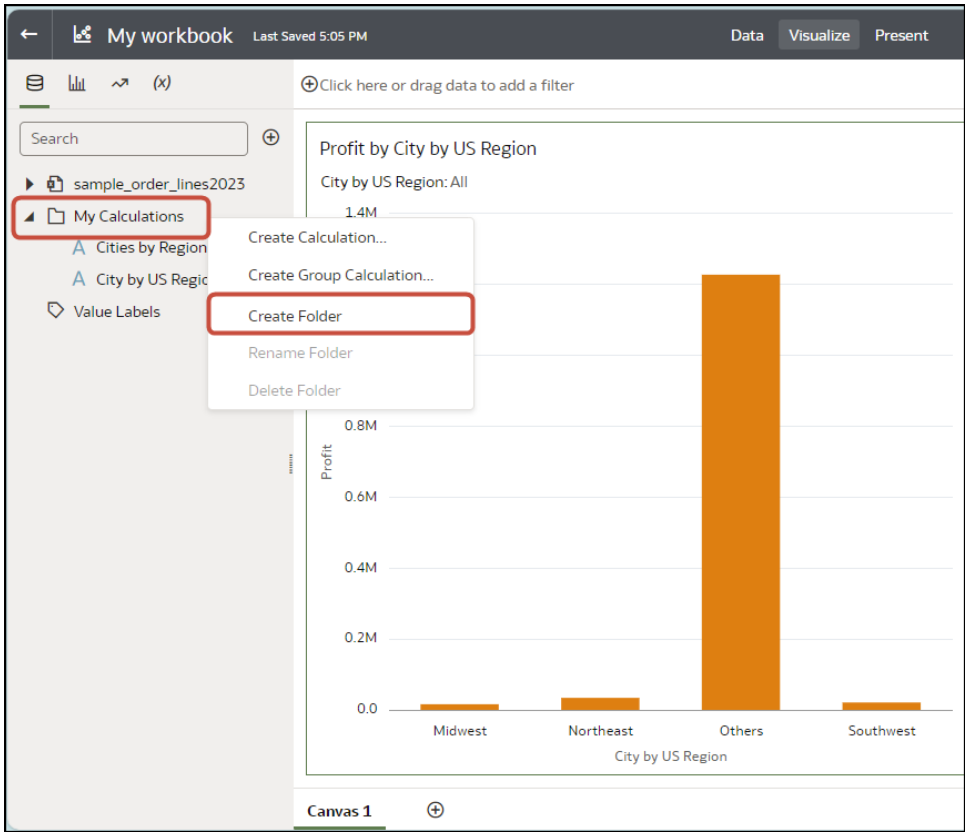


Create a Folder to Store Calculations in a Workbook

In workbooks you can organize your calculations by creating multiple levels of 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**.

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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:

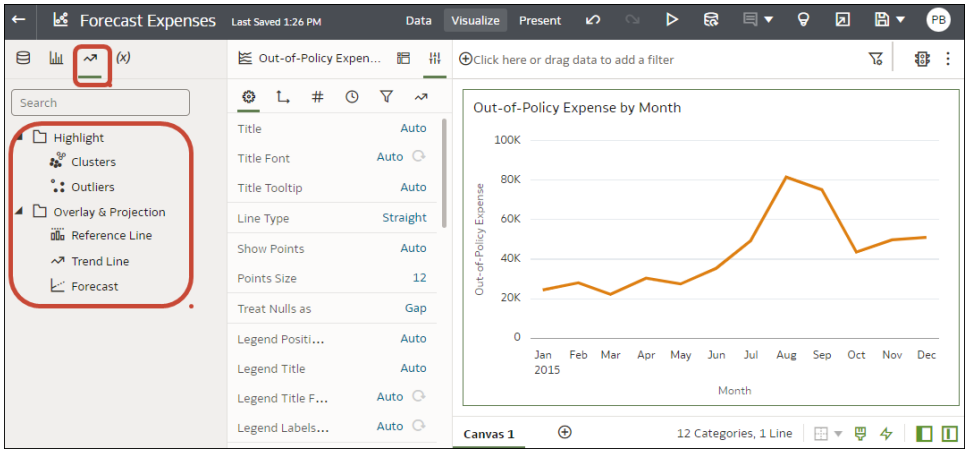
- Before You Start with Statistical Analytics
- What Statistical Analytics Can I Add to Visualizations?
- Add Statistical Analytics to Visualizations
- Add a Forecast to a Visualization
- Add a Reference Line to a Visualization
- Create a Cluster or Outlier in a Visualization

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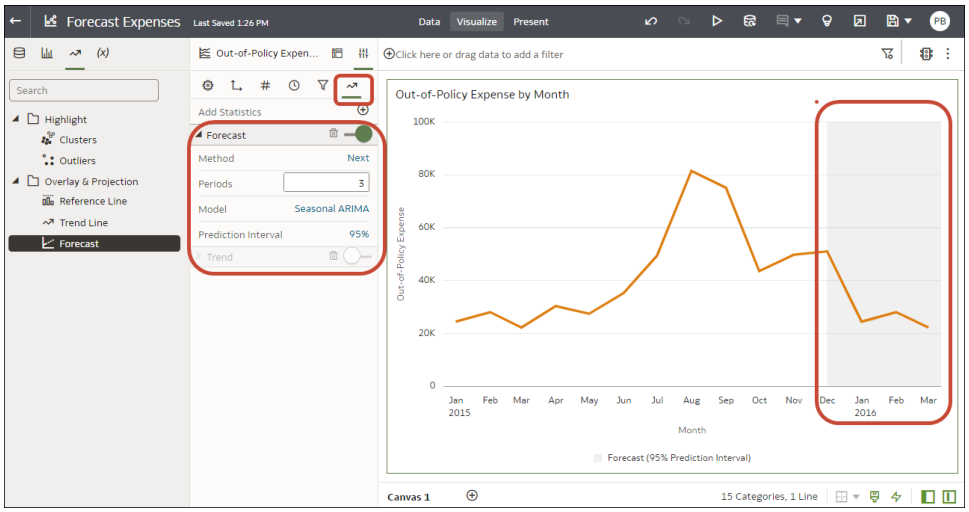
Before You Start with Statistical Analytics

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.

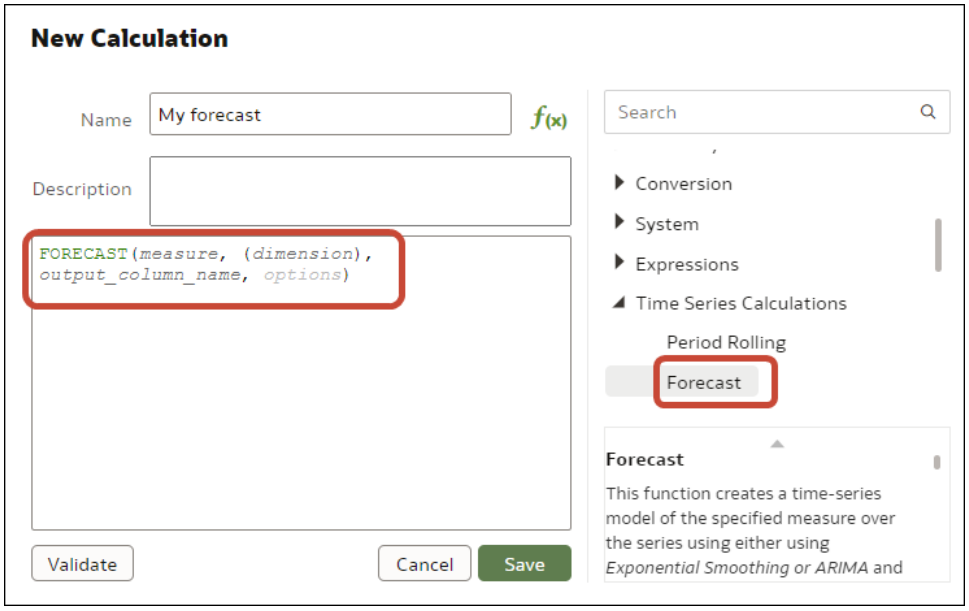


You configure basic options for these analytics on the Grammar panel. For example, if your visualization analyzes Out-of-Policy Expenses by Month, you might use the **Periods** option to specify the number of months to forecast (in this example, '3' forecasts three months January, February, and March 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.

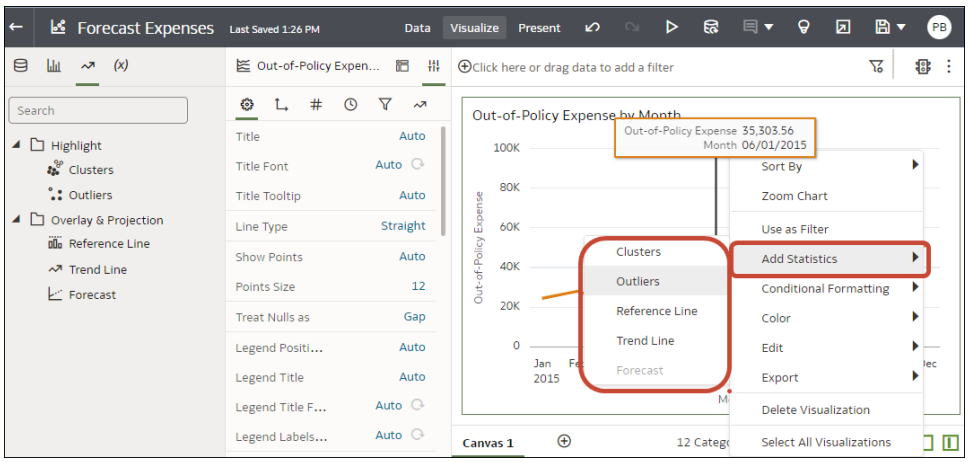
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See Create a Calculated Data Element.

See Create a Calculated Data Element.

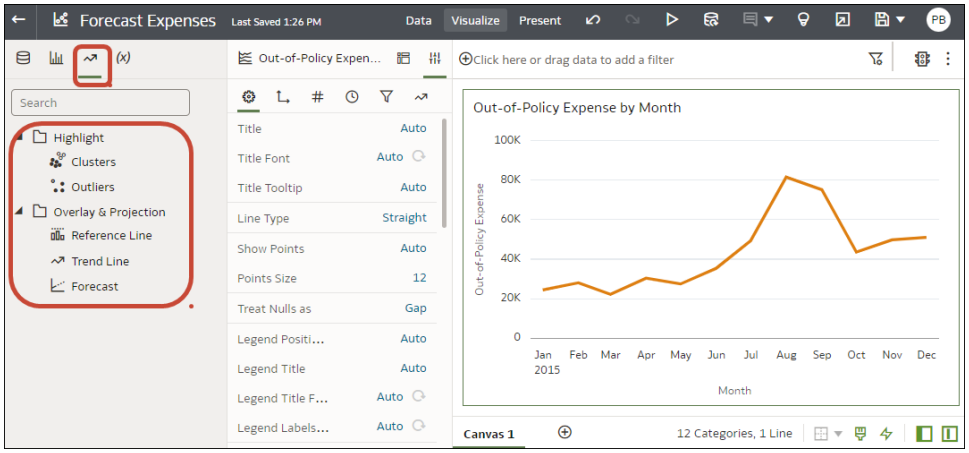
You can also access the statistical analytics options by right-clicking on a visualization, and selecting **Add Statistics**.



What Statistical Analytics Can I Add to Visualizations?

Add these statistical analytics to your visualizations to achieve better insights into your data.

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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.

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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

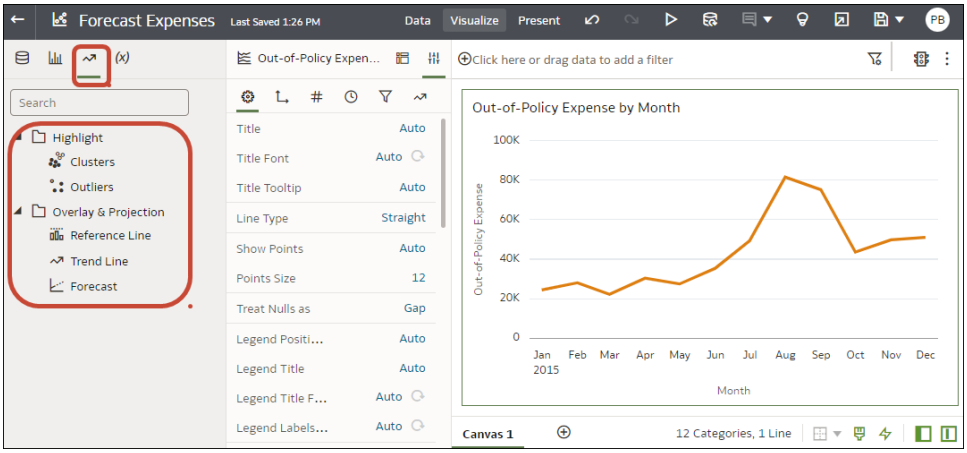
Statistical analytics enable you to highlight clusters or outliers, add forecasts, and show trend and reference lines in your workbooks. Select them on the Analytics tab of the Data Panel in the workbook editor.

Alternatively, you can add forecasts, trendlines, and clusters to a workbook using text-only analytics functions. See Analytics Functions.

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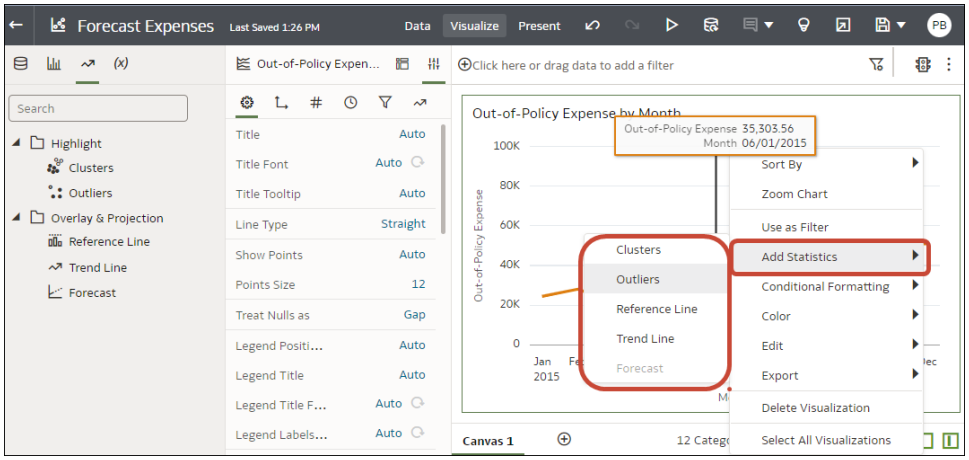
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Make sure that you have the required data in your visualization for the type of analytics you want to add.

   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.

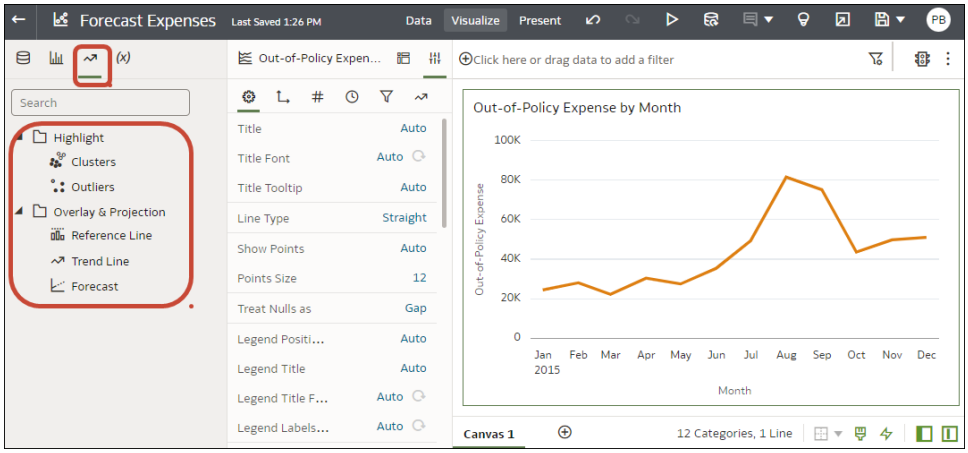
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.

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2. Make sure that you have the required data in your visualization for the type of analytics you want to add.

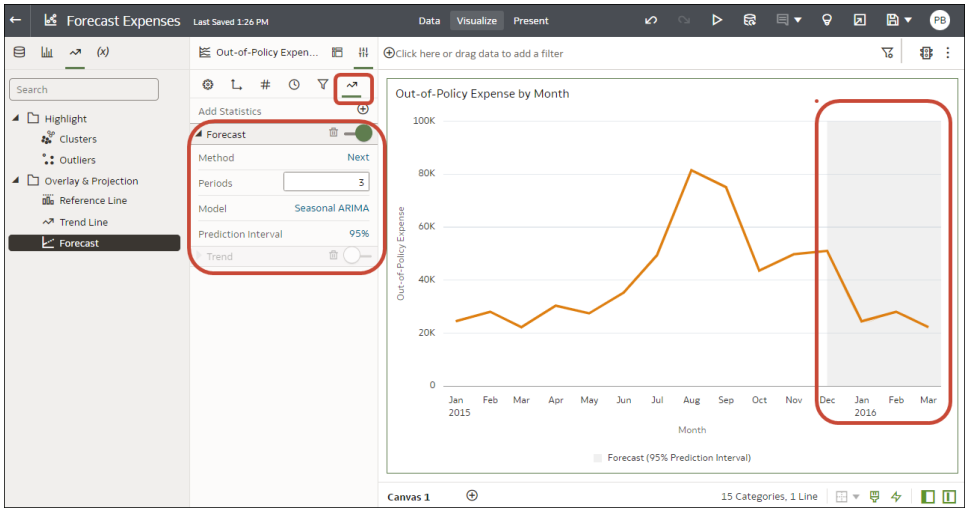
   For example, for a forecast, you need at least one time dimension and a measure or metric.

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.

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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.

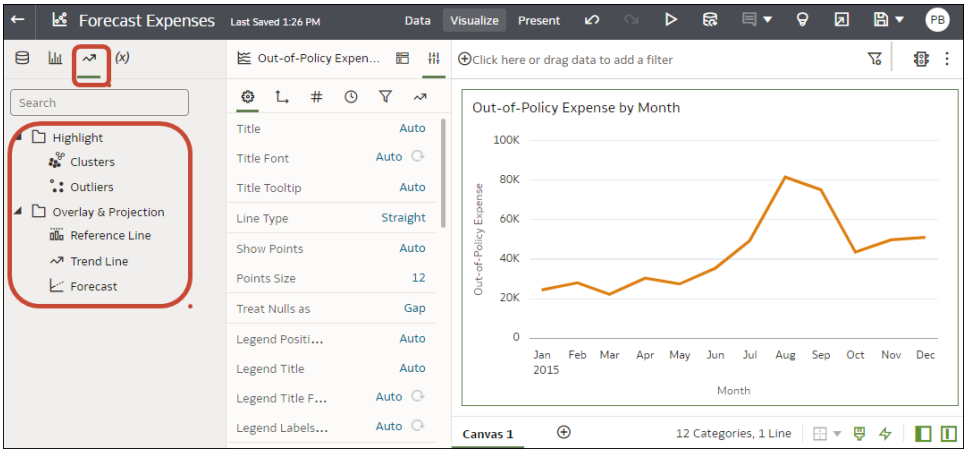
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data Panel, click the **Analytics** icon .
3. Click **Add Statistics**, and select **Reference Line**.
4. Use **Column** to select a measure, date, or non-date attribute.
5. In the Analytics pane select properties 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.

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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**.

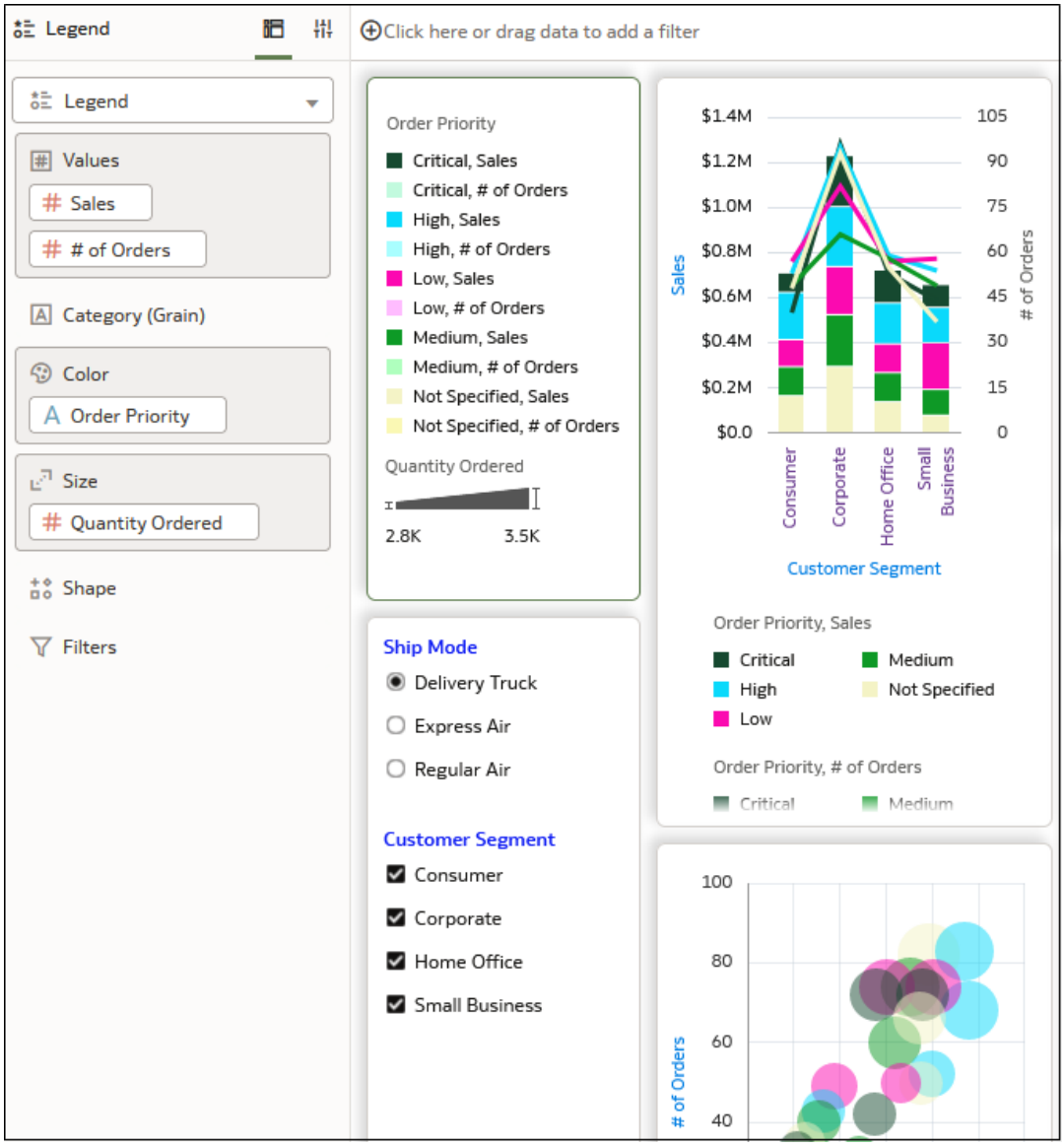


2. Click **Edit**, click **Visualize** and in the Data panel select **Visualizations**.
3. Drag and drop a **Legend** visualization from the **Visualizations** pane onto the canvas.

   You can place the legend on the canvas in the location most appropriate for your workbook
4. 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.

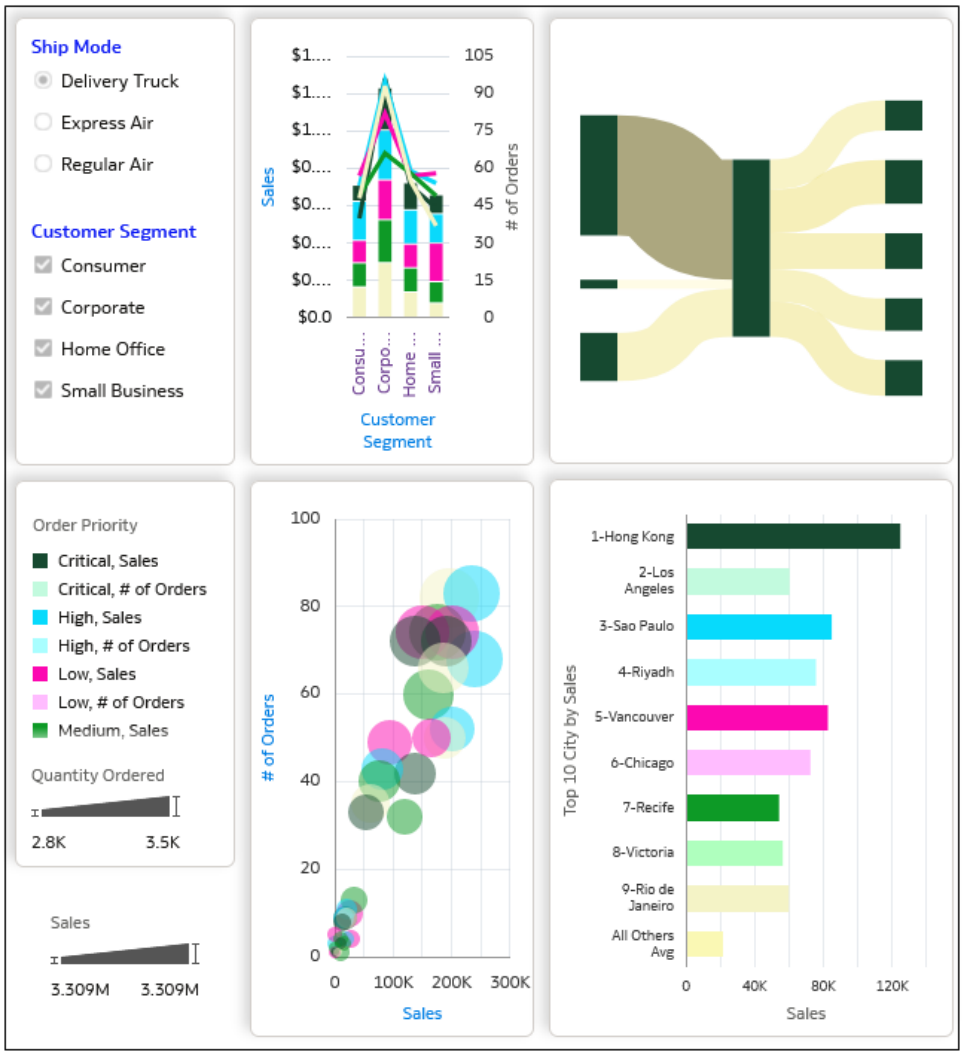
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For example, in the image, **Order Priority** is dragged to **Color** in the Grammar pane, **Sales** and **# of Orders** are dragged to **values** in the Grammar pane, and **Quantity Ordered** is dragged to **Size** in the Grammar pane.



5. 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.
6. Click **Save**.

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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.

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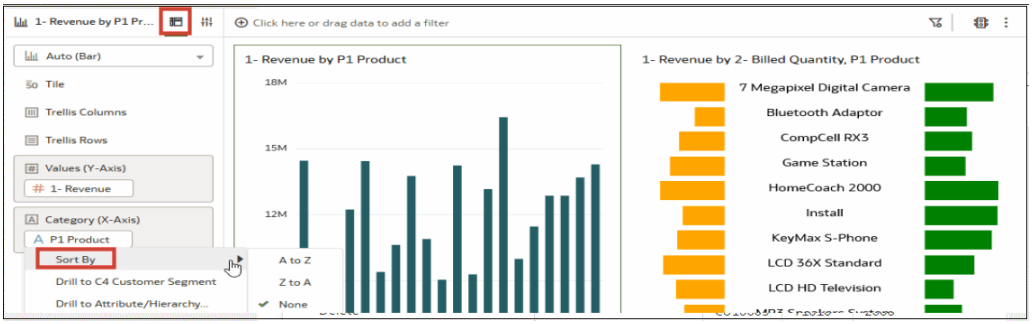
6. If you want to change spark chart display settings, click General in the Properties pane.
   - Click **Chart** to display one of the following spark charts, Line with Area, Line, Bar, or Area.
   - Click **Color** to assign a color to the spark chart.
   - Click **Position** to place the chart after 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).



Hide Columns in Visualizations

The topics in this section explain how to hide columns in a visualization and why it's useful.

Topics:

- About Hidden Columns
- Hide a Column in a Visualization

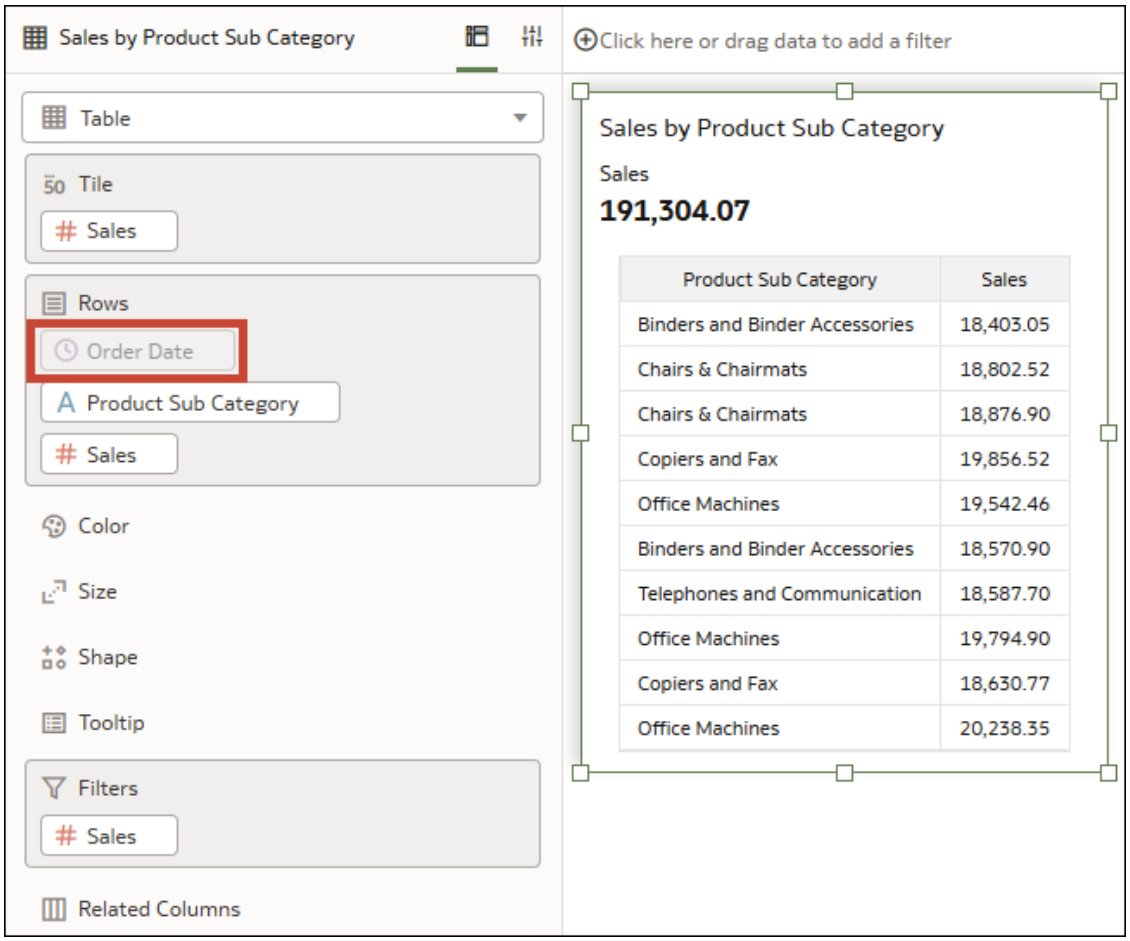
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About Hidden Columns

In Oracle Analytics, you can hide a column in a visualization when you want to use the column, but not show it to end users.

> **Note**
>
> Hidden columns in the visualization affect the grain of the visualization query.

For example, you might want to sort the data in a table visualization called Sales by Product Sub Category using the column Order Date, but you might not want that column to be visible in the table. When you select a column to hide, the data element is grayed out in the Grammar pane.



When a column is hidden, you can't see the column values in the visualization, nor can you see the column name in the visualization title or any labels within the visualization. However, the hidden column's name is still visible in the following situations:

- The hidden column's name is visible in any tooltips.
- The hidden column is available to use in the visualization's Sort By, Drill, and Drill to menus.

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- If you're using the hidden column in a filter, its name is visible within the filter name. You can hide the filter in the filter bar, dashboard filter, or visualization filter toolbar, as applicable. See Filter Data.

You can hide attribute and measure columns in the following sections in the Grammar panel for a visualization, depending on the visualization type:

- Trellis Columns
- Trellis Rows
- Category
- Rows
- Color
- Shape
- Detail

You can use hidden columns in data actions. Additionally, any series or datapoint coloring used in a visualization still considers hidden columns.

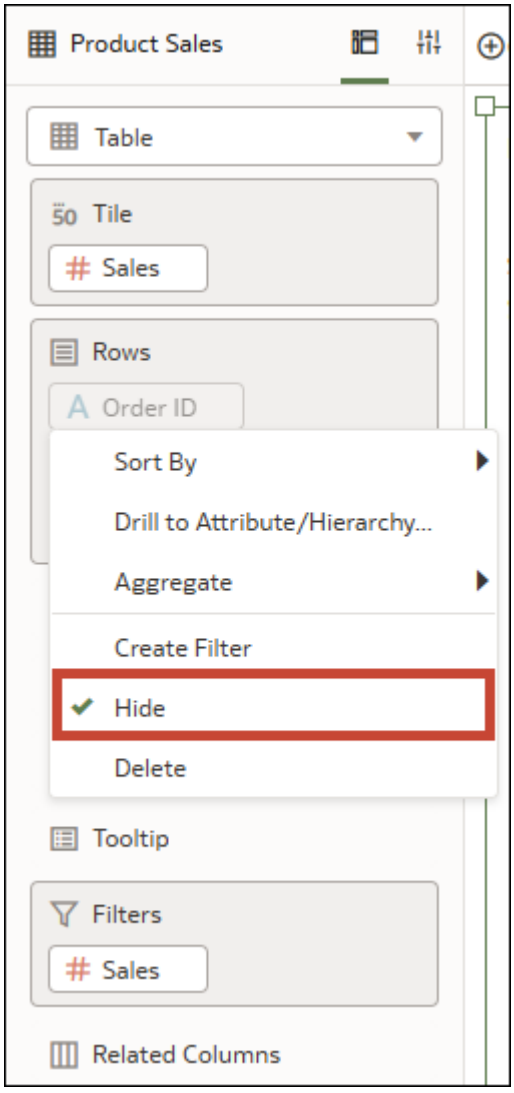
You can't hide columns for map or network chart visualizations, nor can you hide calculations for any visualization type.

Hide a Column in a Visualization

Hide a column in a visualization so it isn't visible to end users.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click a visualization to select it.
3. In the Grammar panel, locate the column you want to hide, right-click the column name, and then select **Hide**.

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4. Click **Save**.

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.



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- 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

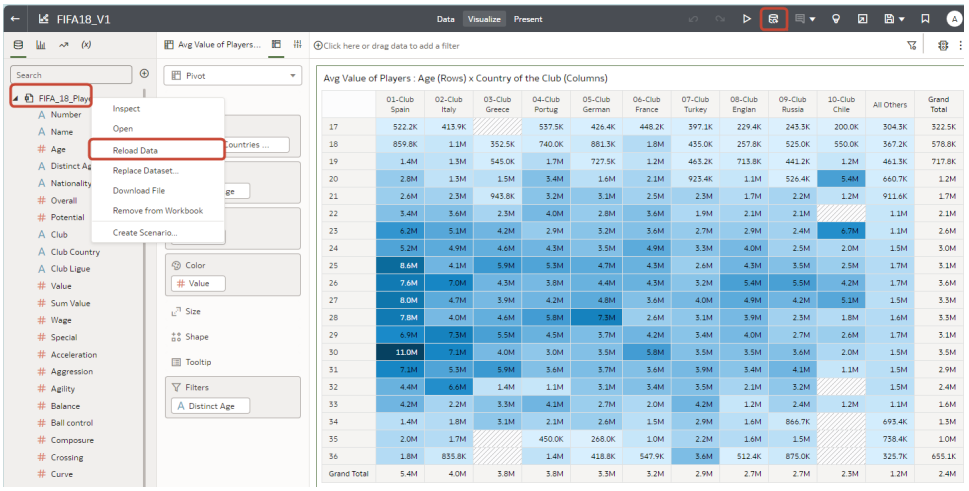
Refresh the data in a workbook to ensure that your visualizations contain the most current data.

See About Refreshing a Workbook's Data.

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A user with Administrator privileges 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.

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

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Visualize**.
3. Click the **Auto Apply Data** button to pause data queries.

   Data queries are temporarily disabled.
4. 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.
5. Click the bubble if you want to refresh the data now.

   Data queries are still disabled.
6. 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

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- 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**.

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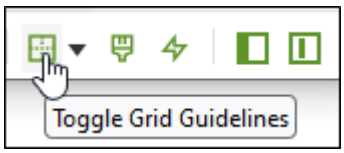
3. Update the canvas properties.
4. Click **Save**.

Align Visualizations Using Canvas Grid Guidelines

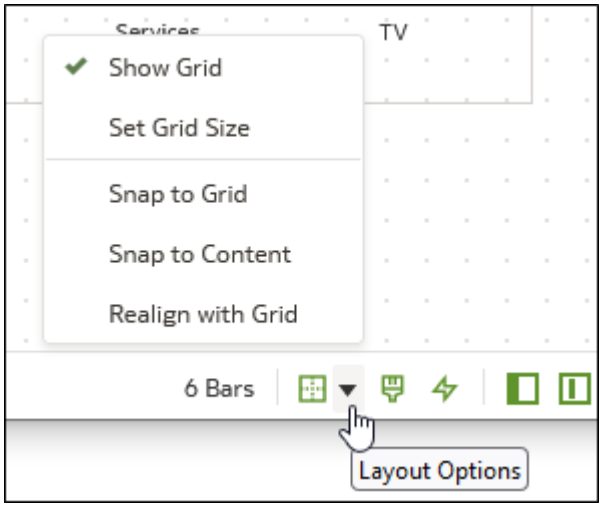
You can help to control the alignment of visualizations in a canvas using grid guideline settings when the canvas Layout property is set to **Freeform**.

You can use these settings to make it easier to align visualizations using canvas grid guideline settings.

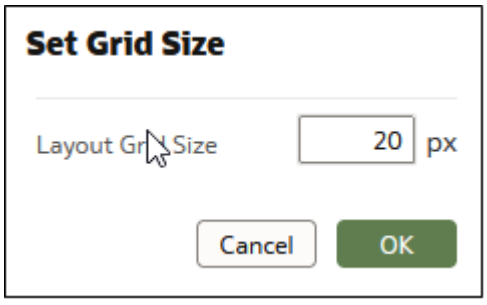
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Toggle Grid Guidelines** to display grid guidelines.



3. Click **Layout Options**.



4. Click **Set Grid Size** and enter the distance in pixels between the grid guidelines.



5. Click and drag visualizations into the positions that you require them to be in on the canvas.

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6. 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

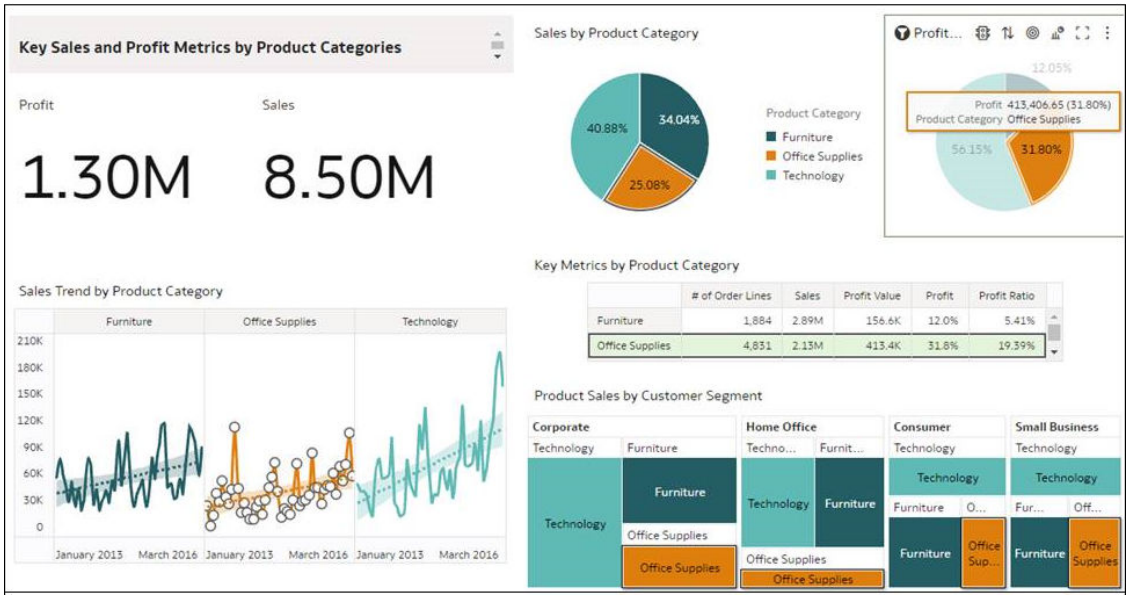
You can configure brushing on a canvas so that when a user selects data points in a visualization, the datapoints are automatically highlighted in other visualizations.

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:

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- All the visualizations in a canvas with a single dataset.
- All the visualizations of joined datasets with multiple datasets.

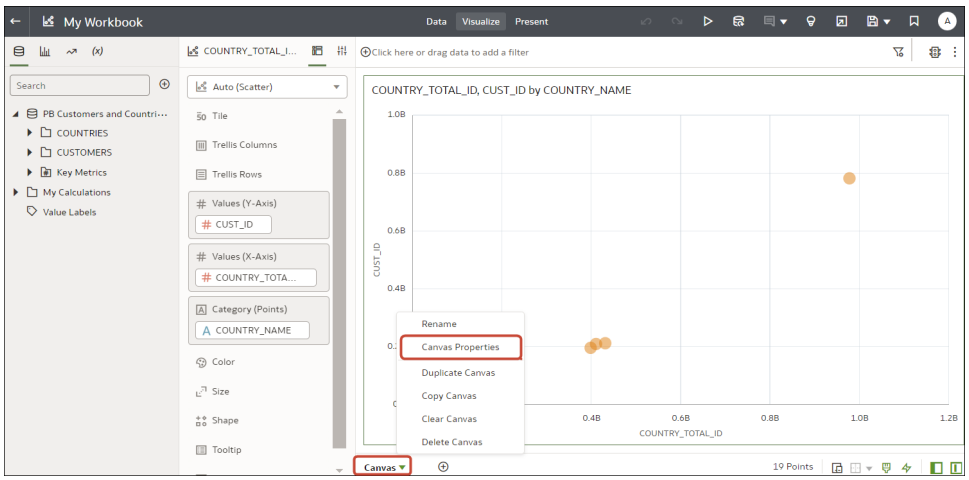
  If a data element from a dataset is specified as a filter but isn't matched with the joined datasets, then the filter only applies to the visualization of the dataset that it was specified for.

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

If you have administration privileges, 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.

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- **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

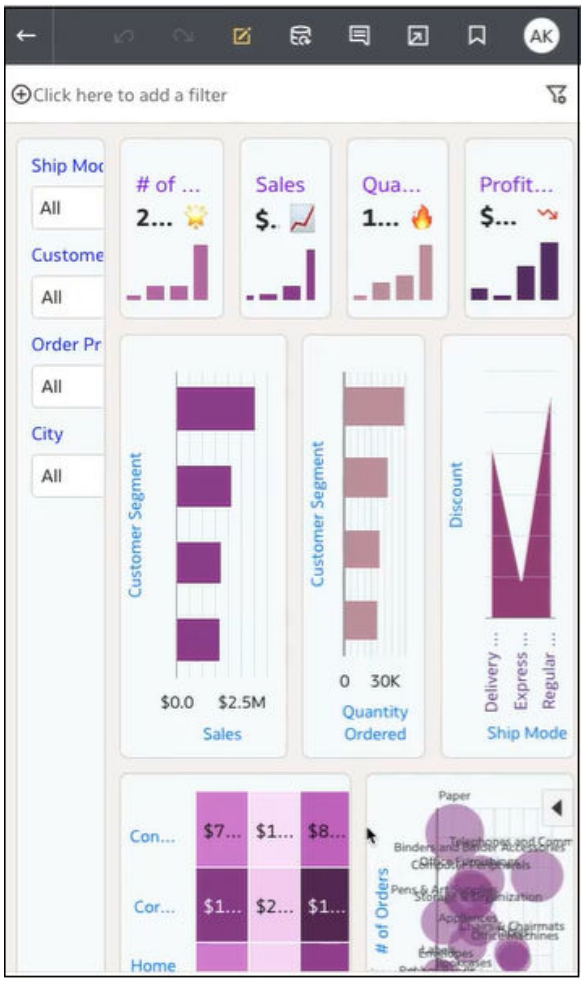
You can design canvas layouts to fit different sized devices optimizing content in the browser, for example on a mobile, a tablet, or a laptop.

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.

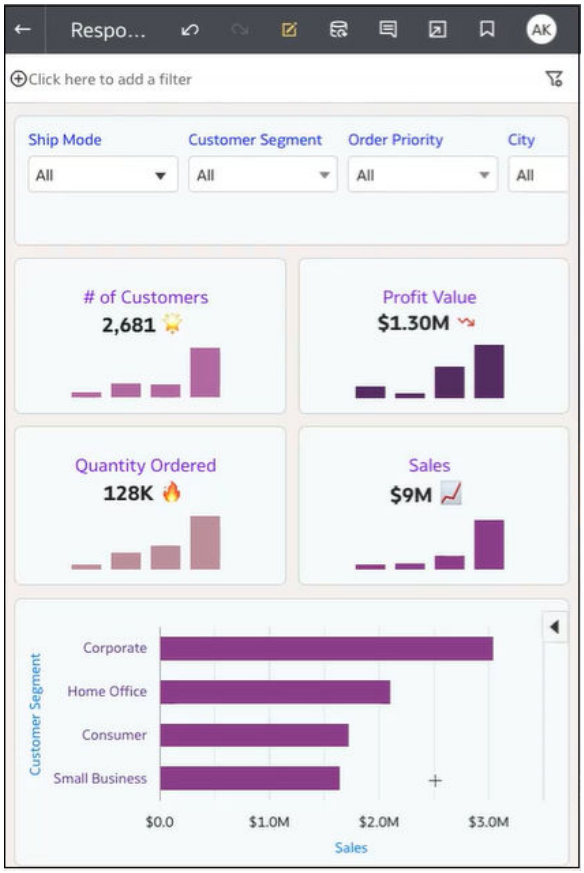
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As an author you can design canvas breakpoints so that when the canvas screen size reduces in size, the rendering of visualizations changes to fit the new screen size. For example, if the available screen size is too small to display a complete visualization, 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.

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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.

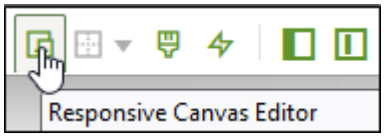
When you add a breakpoint to a canvas, the breakpoint screen size determine how visualizations display when viewed at that screen size. You can reposition, resize, or remove visualizations for a canvas breakpoint to optimize how users see visualizations. You can specify different visualization configurations 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

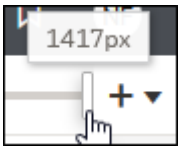
You can create canvas breakpoints to determine how visualizations display to consumer users on devices with different screen sizes. For example, you can set different breakpoints to optimize viewing on a mobile device browser, a tablet, or a laptop.

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.

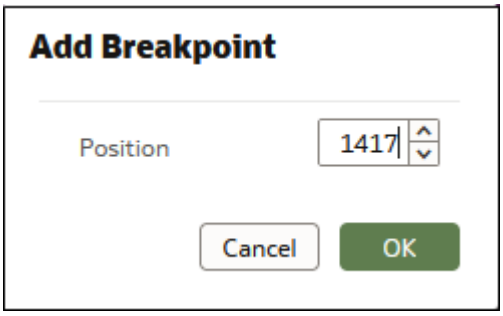
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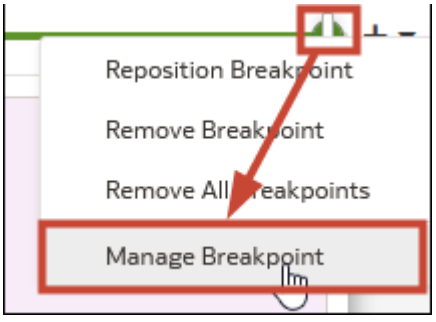
5. Set a canvas breakpoint:
   - **Add a breakpoint at the current slider position** - Click and drag the slider to the value in pixels for the screen size that you want to use for this breakpoint,

     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.

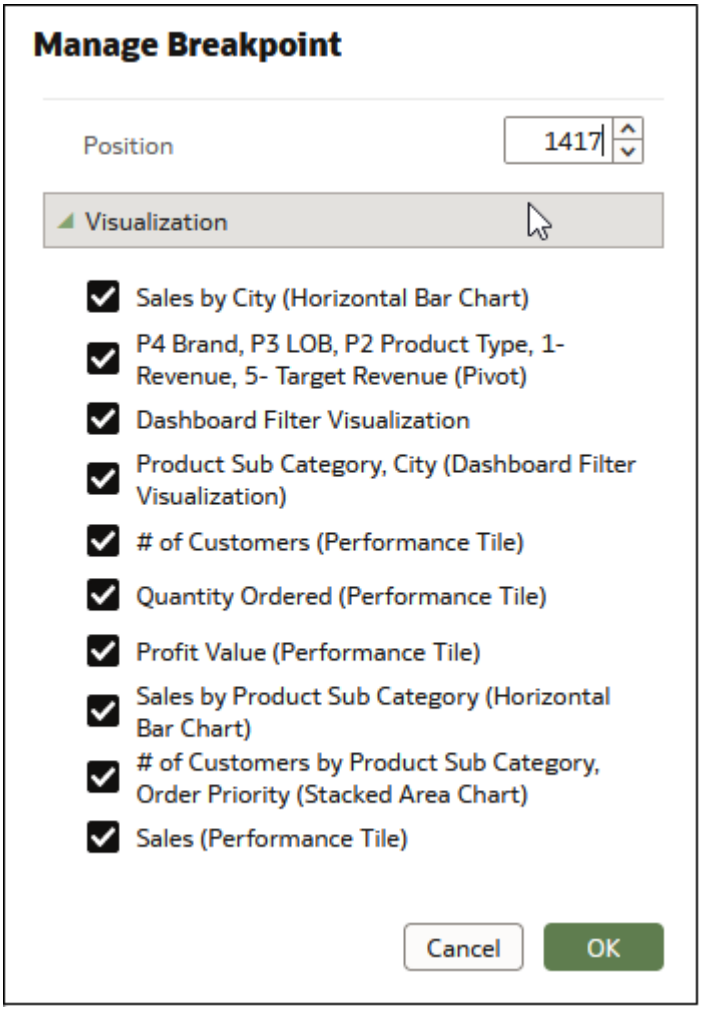
     

6. Repeat the previous step to define additional canvas breakpoints.
7. Include or exclude visualizations for each canvas breakpoint:
   - Right-click the canvas breakpoint that you want to manage () and click **Manage Breakpoint**.

   - Click a visualization from the list to exclude or include in the canvas for this canvas breakpoint, then click **OK**.

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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.

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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

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- 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:

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- 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 and enable Contextual Insights.
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.

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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.

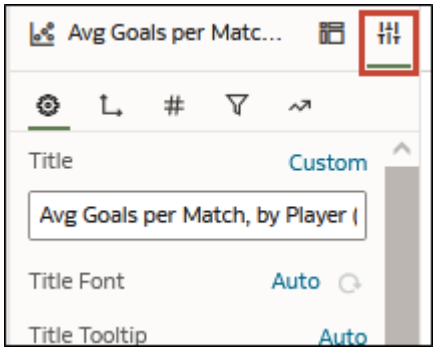
Adjust Visualization Properties

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:

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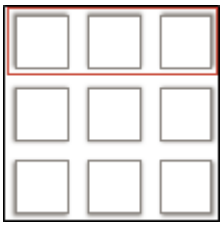
- Click **Square** or **Round** to create a standard border with square or round edges.
- Click **Custom** to define your own border color, border width, edge radius, and line style (solid, dashed, or dotted line).

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**.

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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**.

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Apply Color to Visualizations

Use color to enhance your visualizations. For example, you might change the default color pallet 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 pane 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. 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

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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.

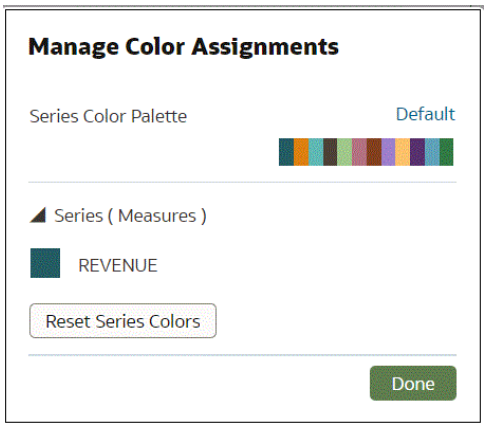
Change the Visualization Color Palette

You can switch between the various color palettes until you find the one you want.

LiveLabs Sprint

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.



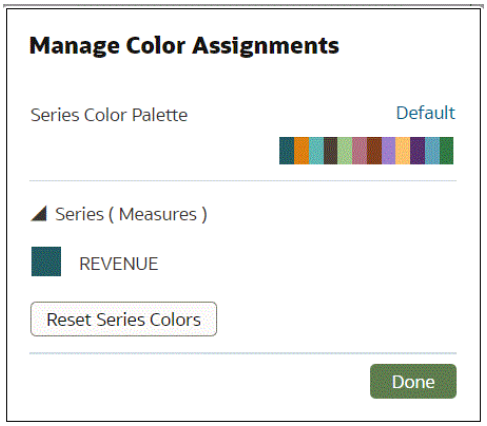
6. From the Series Color list, click a color palette and click **Done**.

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).

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About Workbook Themes

A workbook theme defines the default style settings that are applied when you create a workbook and its visualizations. You can configure a workbook theme to change various theme style settings for example, color palette, font family, or background color. You can change any of these theme settings to alter the appearance of a workbook and its visualizations.

You must have the permissions, Manage Layouts and Themes, and Create and Edit Shared Themes to create and update workbook themes.

Topics:

- Create a Workbook Theme
- Create a Modified Workbook Theme
- Select an Alternative Workbook Theme
- Configure Settings for Workbook Themes

Create a Workbook Theme

You can create a workbook theme by updating an existing theme and saving it with a new name to share with others. For example, you might want a new workbook theme called Redwood Dark that's based on the Redwood theme, but uses a darker color palette.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the workbook **Menu** and select **Workbook Themes**.
3. If you want to create a workbook theme based on one that's not currently selected, click **Theme**, and select one of the **Shared Themes**. For example select **Redwood**.
4. Click **Workbook styles** to change workbook style settings.
5. Click **Visualization styles** to change visualization style settings.
6. Click **Save as a new shared theme**, enter a name and click **Create**.
7. Click **OK**.

Create a Modified Workbook Theme

You can update a workbook theme and save it to an automatically-generated modified theme name. For example, if you modify the Redwood theme, the workbook theme name

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automatically changes to Redwood (modified), and you can then save it using the new name, and including your modifications.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the workbook **Menu** and select **Workbook Themes**.
3. Optional: If you want to select a theme to modify, click **Theme**, and select the theme. For example select **Redwood**.
4. Click **Workbook styles** to modify workbook style settings.
5. Click **Visualization styles** to modify visualization style settings.

   Any changes you make to a visualization in the Properties pane, General tab, take precedence over changes you make here.
6. Click **OK**.

Select an Alternative Workbook Theme

You can select an alternative theme to use in a workbook. For example, you might want to choose a modified theme to replace the current default Redwood theme for a workbook.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the workbook **Menu** and select **Workbook Themes**.
3. Click **Theme**, and select another theme from the list. For example, Redwood (modified).
4. Click **OK**.

Configure Settings for Workbook Themes

You can configure the visibility of a workbook theme, and whether users can update a workbook theme. For example, you might want to hide a particular workbook theme from users when they create or update workbooks.

As a content author you must have the Manage Layouts and Themes, and Create and Edit Shared Themes permissions to configure these settings.

You can configure theme settings:

- **Visible** - Shows or hides a theme when users create a workbook.
- **Set as default** - Displays a theme as the default when users create a workbook.
- **Make Read-write** - Makes a theme readable and writable.
- **Make Read-only** - Makes a theme read-only.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Layout and Themes**.
3. Click **Themes**, and select or deselect **Visible**.
4. Right-click a theme and select an option.

Highlight Important Data Events with Conditional Formatting

Use conditional formatting to highlight important data events in your visualizations so that you can take action.

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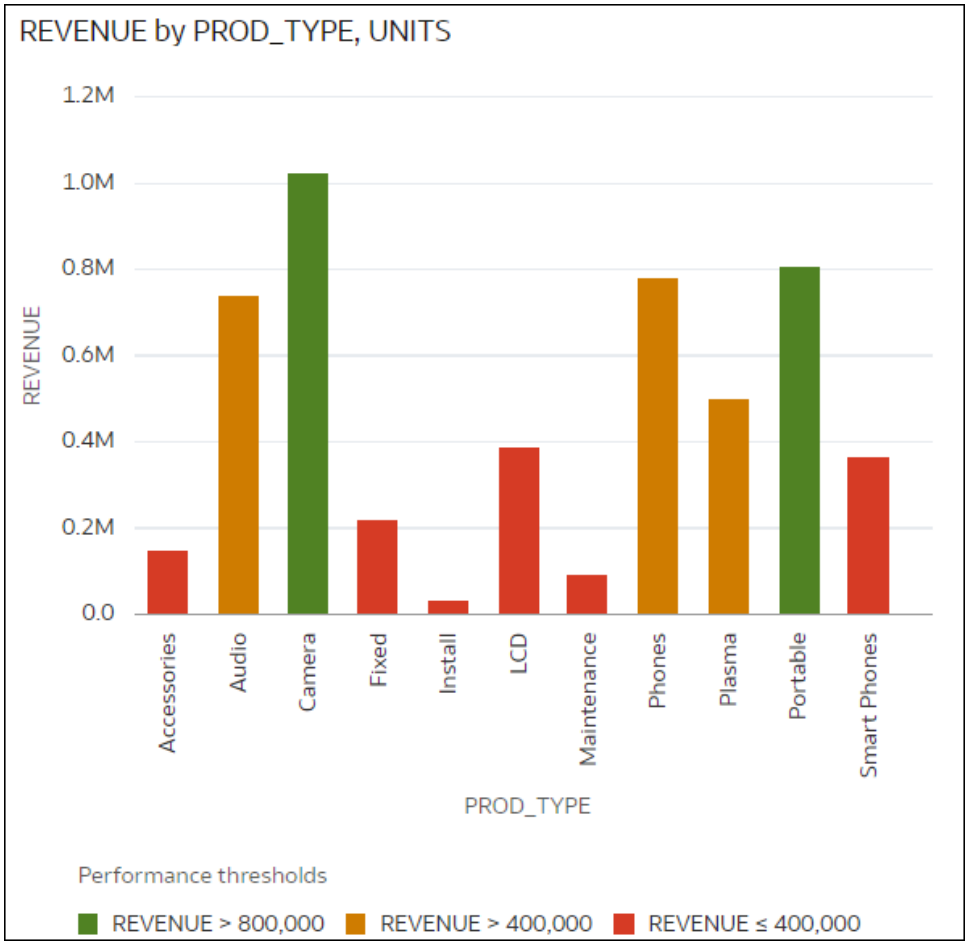
Video

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 - Hightlight Values with Emojis
- Example - Highlight Attribute Values

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.



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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 measures and attributes at the same time.
- Change the order in which rules are applied.
- Turn rules on and off.
- Emphasize data in Table and Pivot visualizations with emojis and icons.

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 also apply conditional formatting based on attribute values. For example, you might highlight projects in green if a Status value is 'Open', or highlight projects in blue if a region value is 'East'.

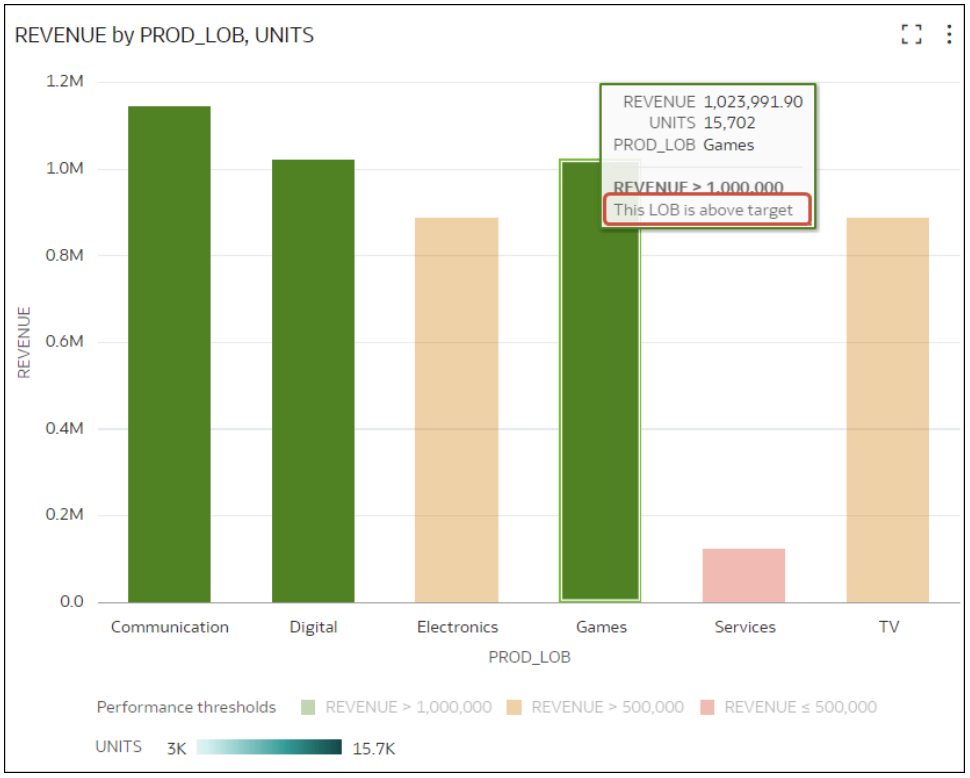
You can:

- 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.

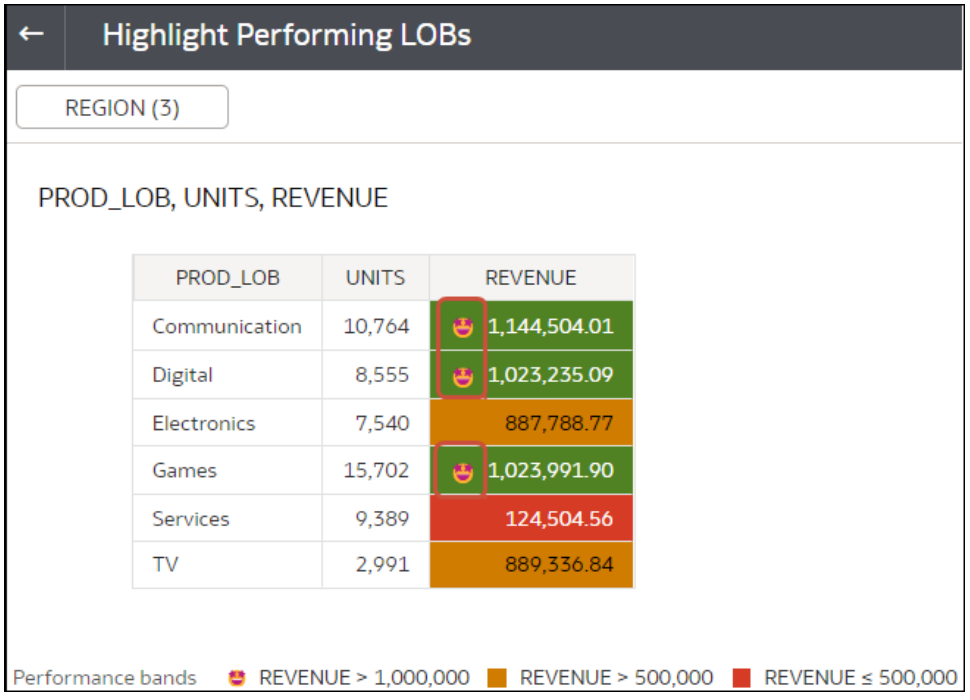
You can also:

- 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.

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- Annotate Table and Pivot visualizations with icons and emojis. For example, you can use an emoji to highlight when revenue exceeds 1,000,000.



- Combine the formatting of values that match more than one rule, using the **Enable rule blending** option). For example, you might have these two rules:

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- Rule 1 is revenue greater than one million and highlights in green with the italic Calibri font.
- Rule 2 is revenue less than target and highlights in red with the Monospace font.

In this scenario, a revenue greater than one million but less than target has 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, you might have these two rules:

- Rule 1 is revenue greater than one million and highlights in green.
- Rule 2 is revenue less than target and highlights in red.

In this scenario, an item where revenue meets both criteria highlights in red.

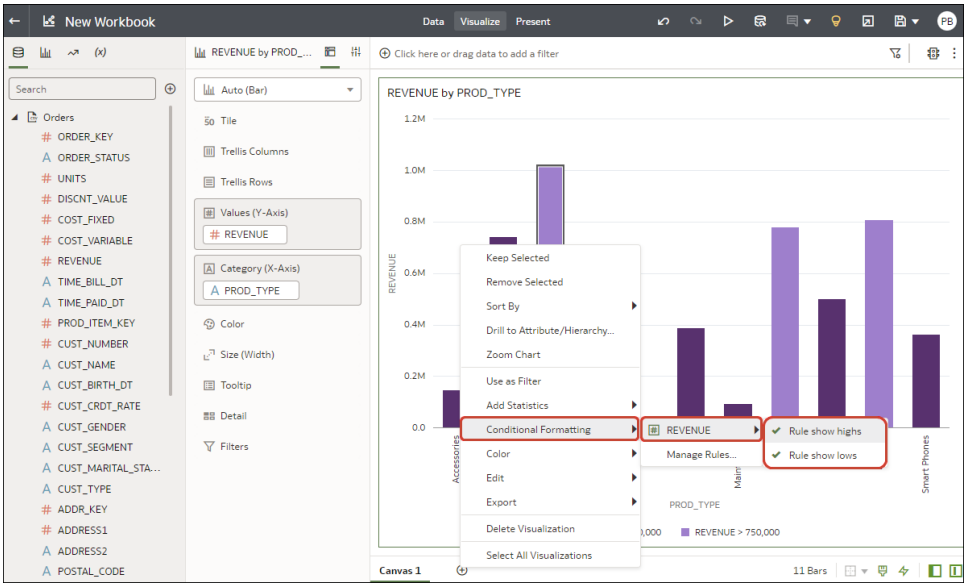
Format Data with Existing Conditional Format Rules

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

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.
4. Click a measure, for example, REVENUE, to display rules available for that 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.

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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 rentral property meet high, medium, and low thresholds.

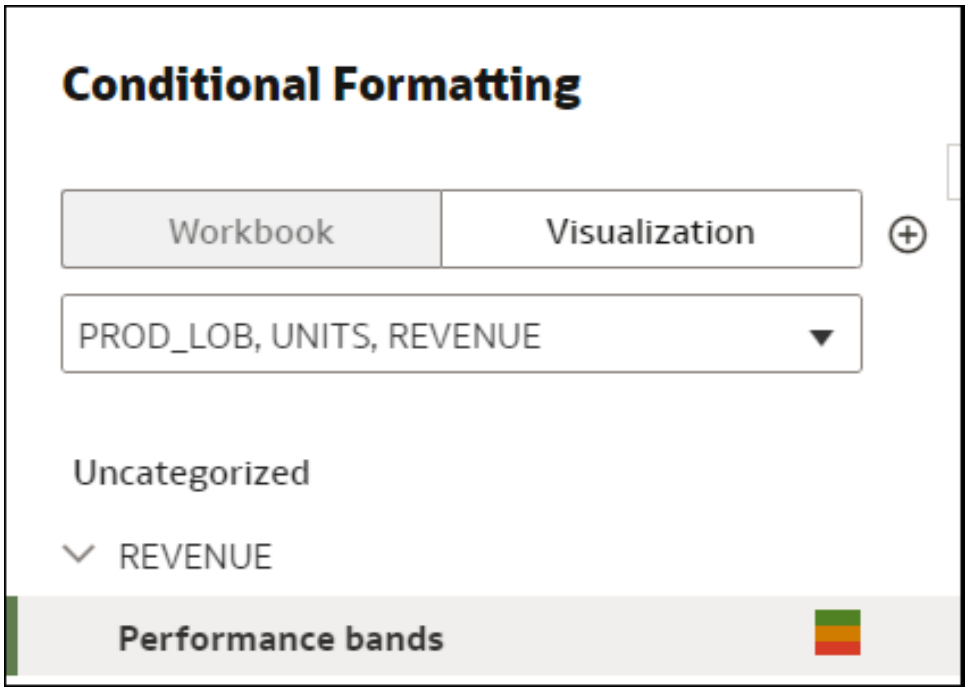
Video

To apply conditional formatting to totals and subtotals, see:

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**

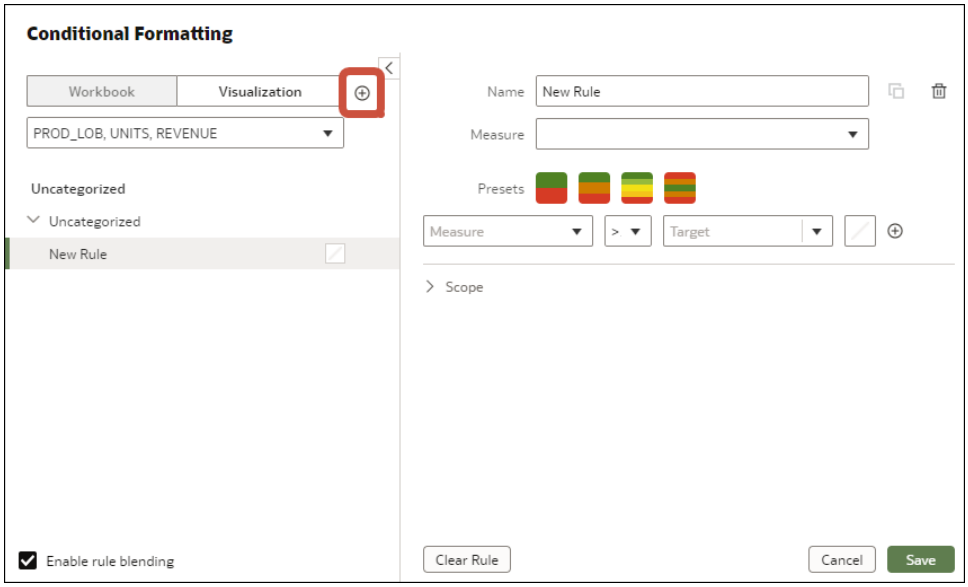
   Existing rules are listed under their target measure. Rules are displayed as **Uncategorized** until their target measure is specified. For example, in this screenshot, the rule "Performance bands" is listed under the measure REVENUE.



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**.

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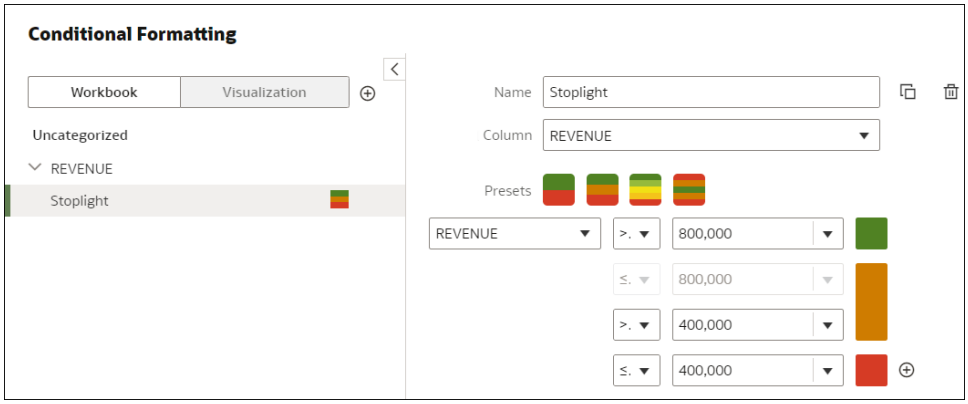


5. In **Name**, change the default name to a more user-friendly term.
6. In **Column**, select the data measure or attribute that the rule evaluates.

   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.

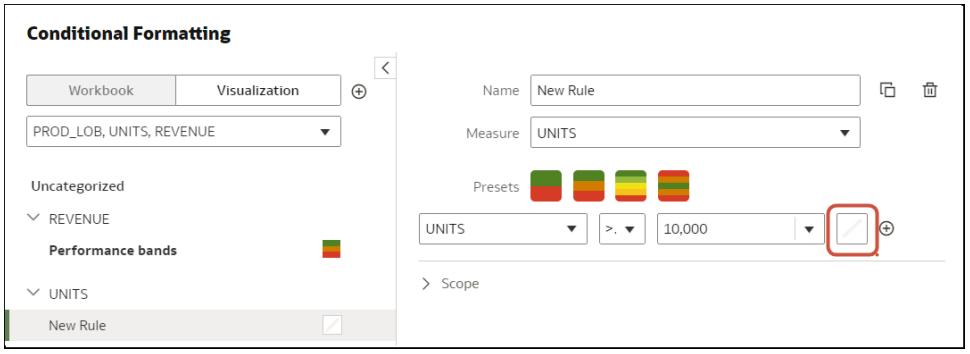
   For example, to highlight REVENUE rates greater than 1,000,000, select the greater than symbol **>** in the operator field and enter 1,000,000 in the value field.

   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.

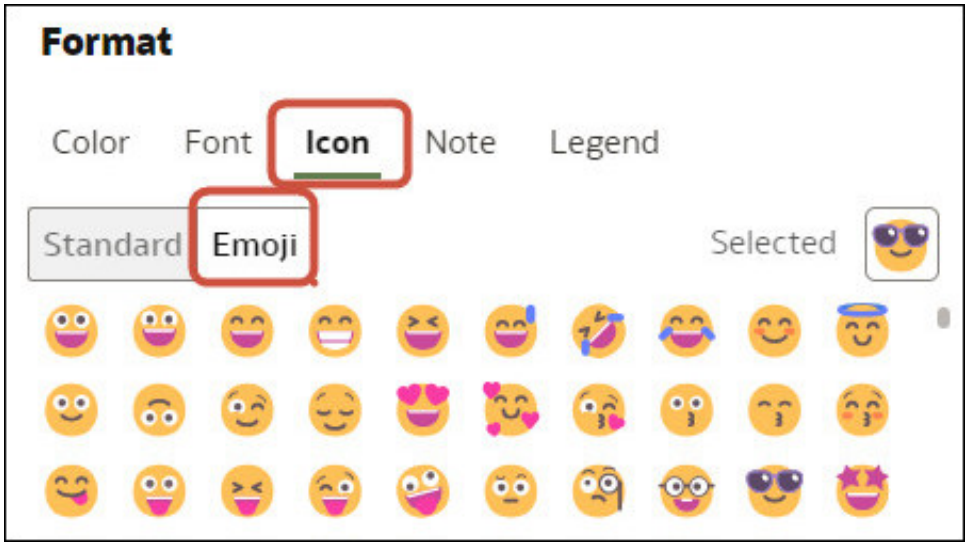


8. Click **Format** to configure the fill color, font, icon or emoji (tabular data), note, and legend for the new rule.

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For example, in Table or Pivot visualizations, to display an emoji when a measure meets the condition threshold, click **Icon**, then **Emoji**, then select an emoji.



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.

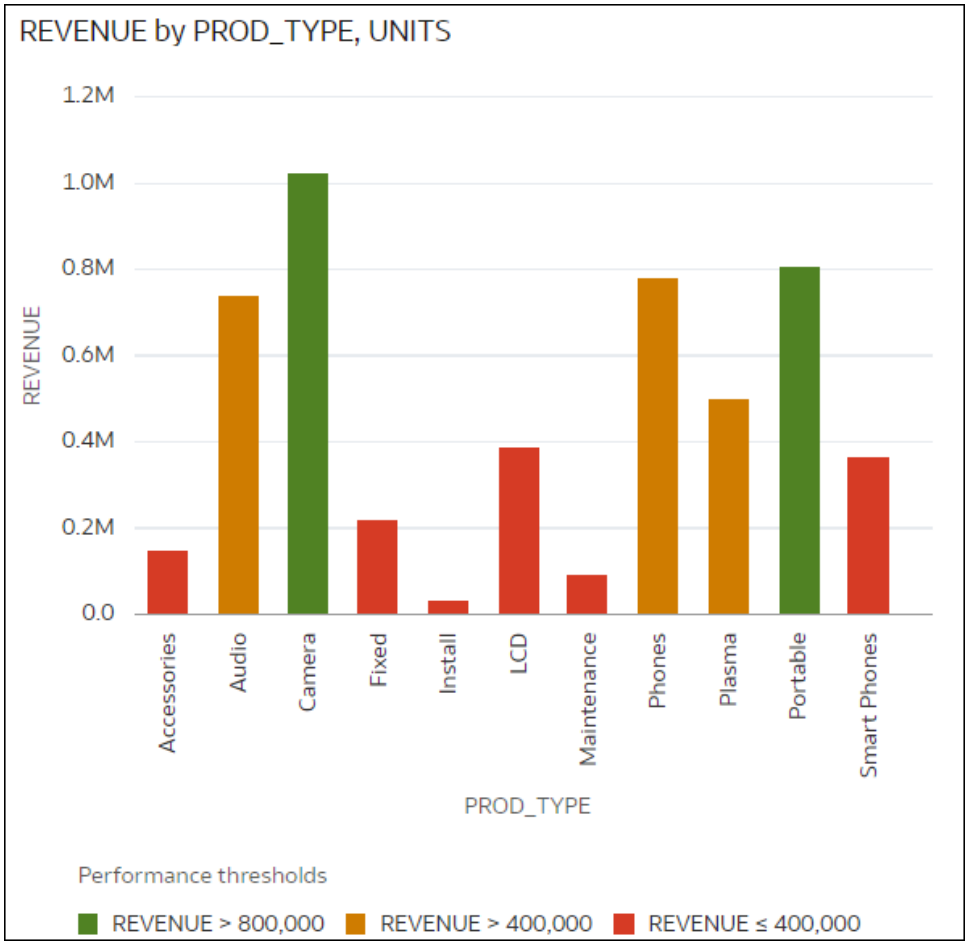
10. Click **Save**.

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.

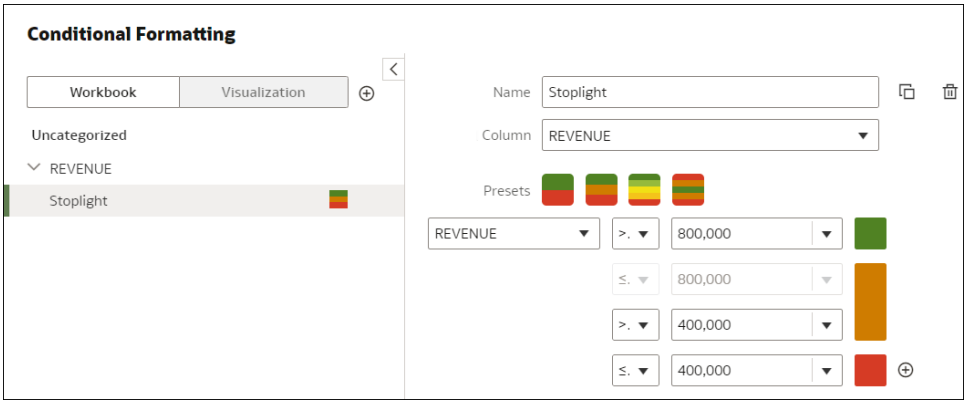
In this example you highlight the revenue level for product types such as audio, phones, and accessories. You show the revenues over 800,000 in green, revenues between 400,000 and 800,000 in amber, and revenues below 400,000 in red.

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Here's how to configure this example using the Conditional Formatting dialog.

- In the **Name** field, enter Stoplight.
- In the **Column** 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.

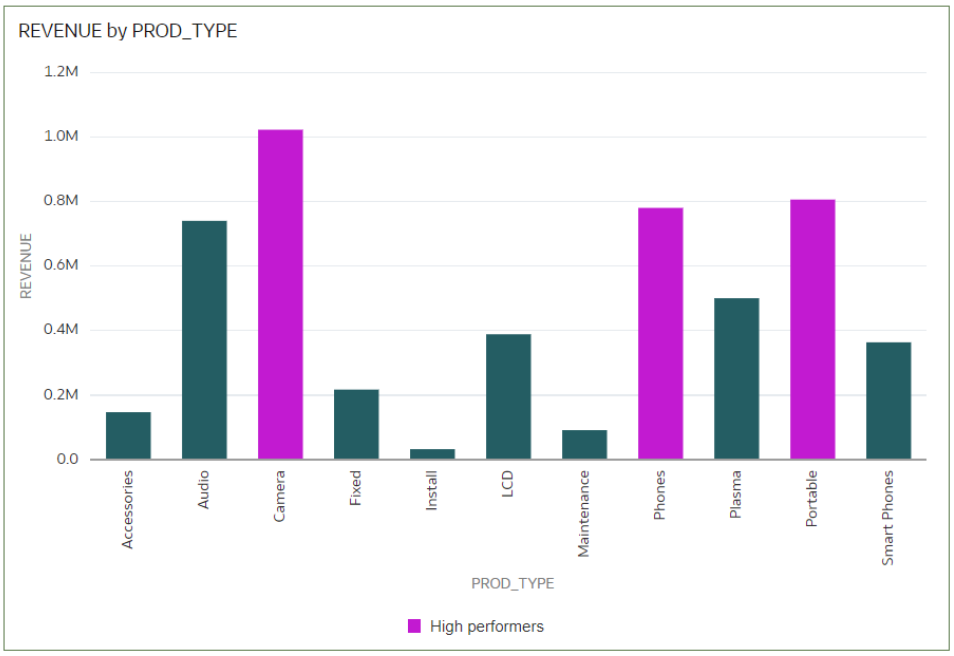


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Example - Compare a Measure to a Target or Goal

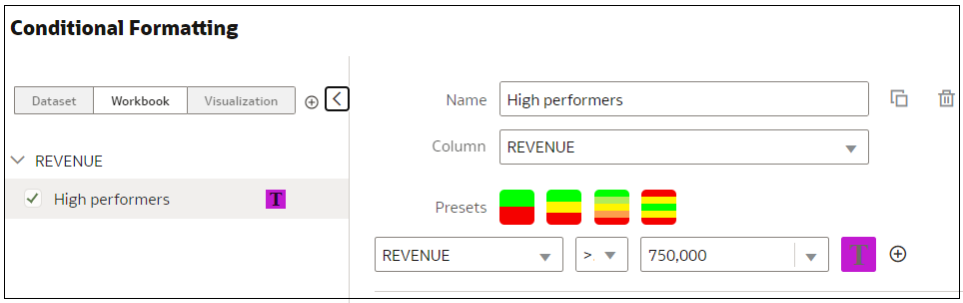
This example shows how to use conditional formatting to compare a measure to a target or goal.

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 **Column** 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.

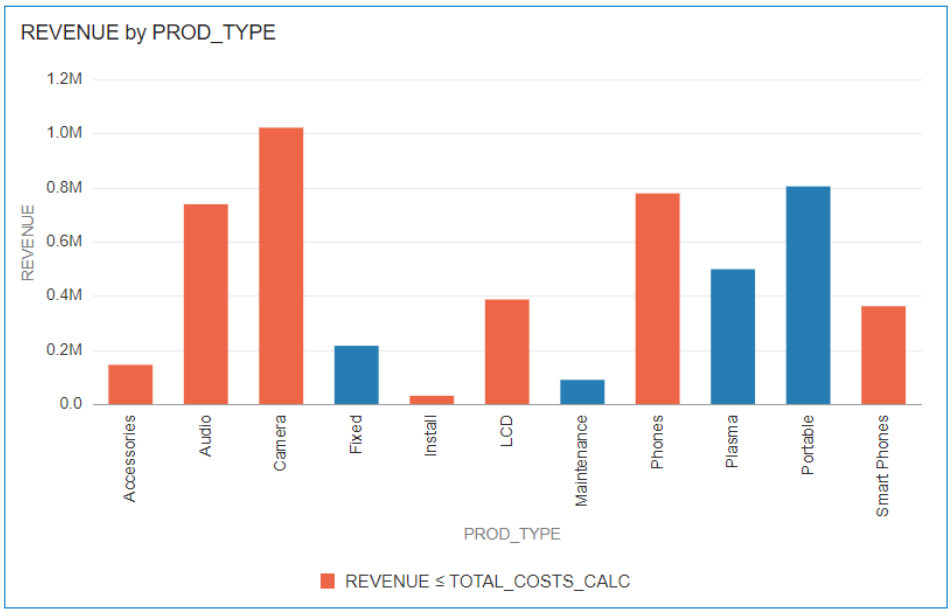


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Example - Compare a Measure to a Complex Expression Value

This example shows how to use conditional formatting to compare a measure to a value calculated by an expression.

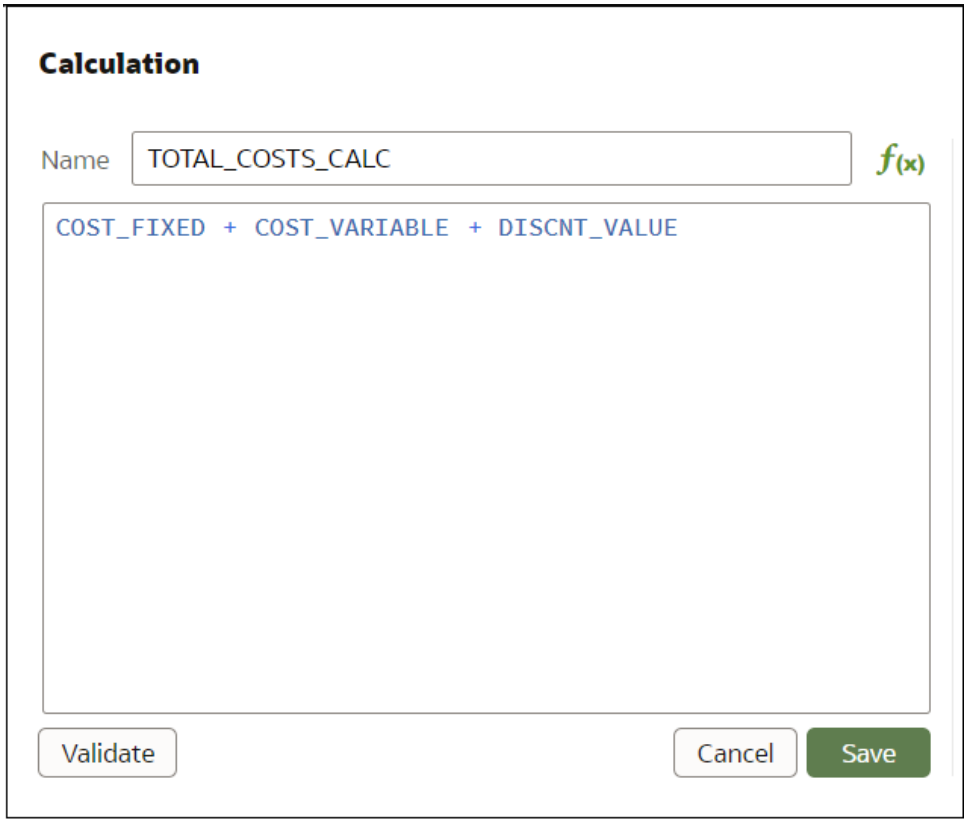
In this example, you compare revenue to total costs, which you calculate using an expression that sums fixed costs, variable costs, and discount value.



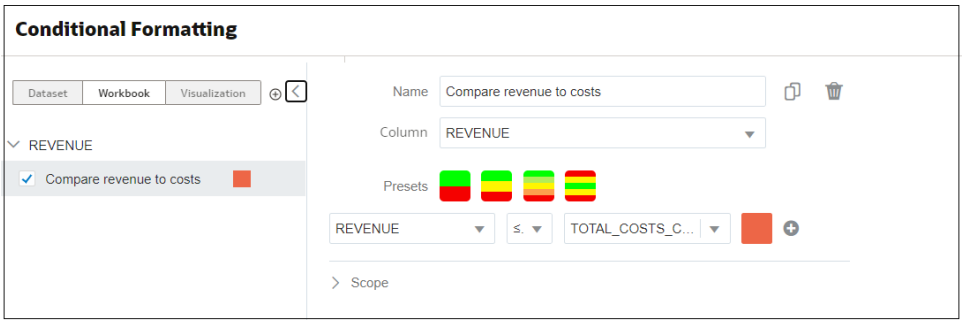
Here's how to configure this example using the Conditional Formatting dialog.

- In the **Name** field, enter Compare revenue to costs.
- In the **Column** field, select Revenue.
- In the operator list, select the equal to or less than symbol ≤.
- 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 `COST_FIXED + COST_VARIABLE + DISCNT_VALUE`.

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- Validate the expression and click **Save**.
- Click **Format** to display the color picker and select a red shade.

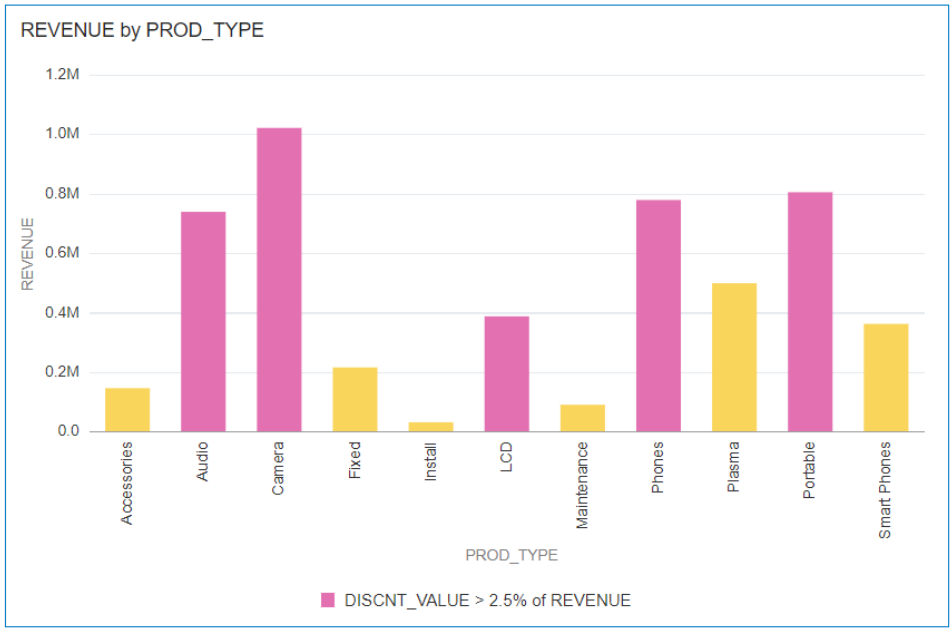


Example - Compare a Measure to a Percentage of a Value

This example shows how to use conditional formatting to compare a measure to a percentage of a value.

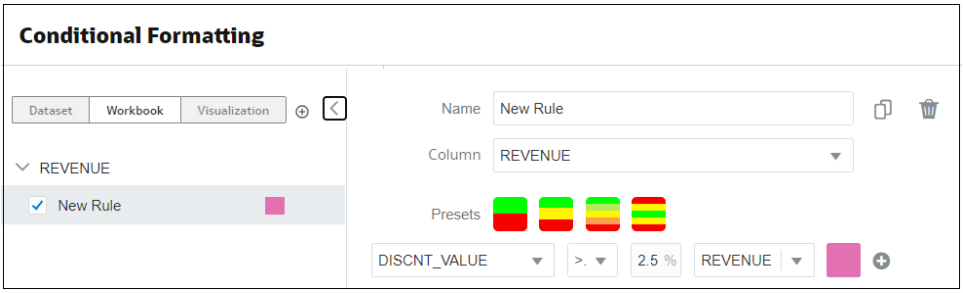
In this example you highlight product types such as audio, phones, and accessories where the discount value (stored in DISCNT_VALUE) is greater than 2.5% of revenue.

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Here's how to configure this example using the Conditional Formatting dialog.

- In the **Column** 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.

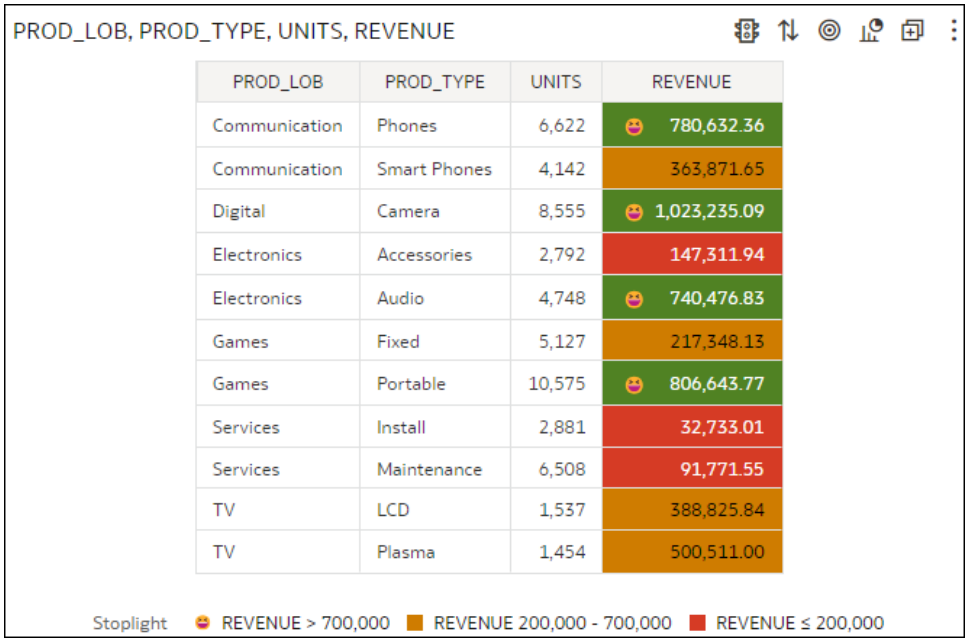


Example - Hightlight Values with Emojis

This example shows how to use emojis in conditional formatting to highlight values.

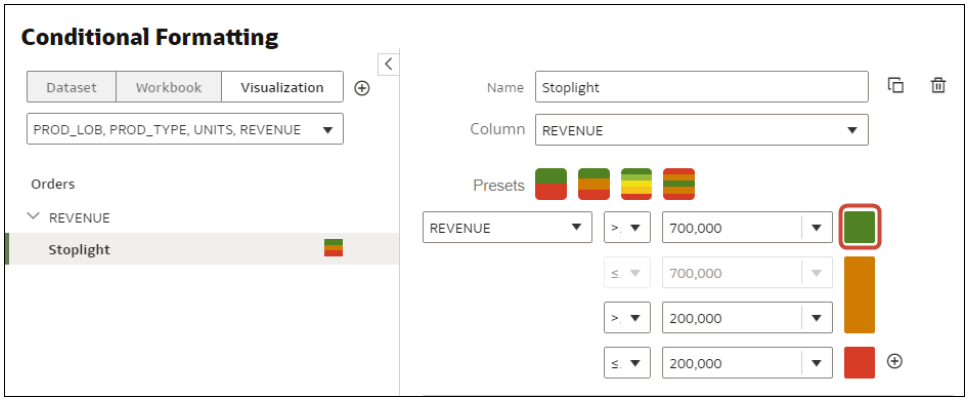
In this example you highlight product types such as audio, phones, and accessories with an emoji where the revenue is greater than 700,000, in addition to stoplight formatting.

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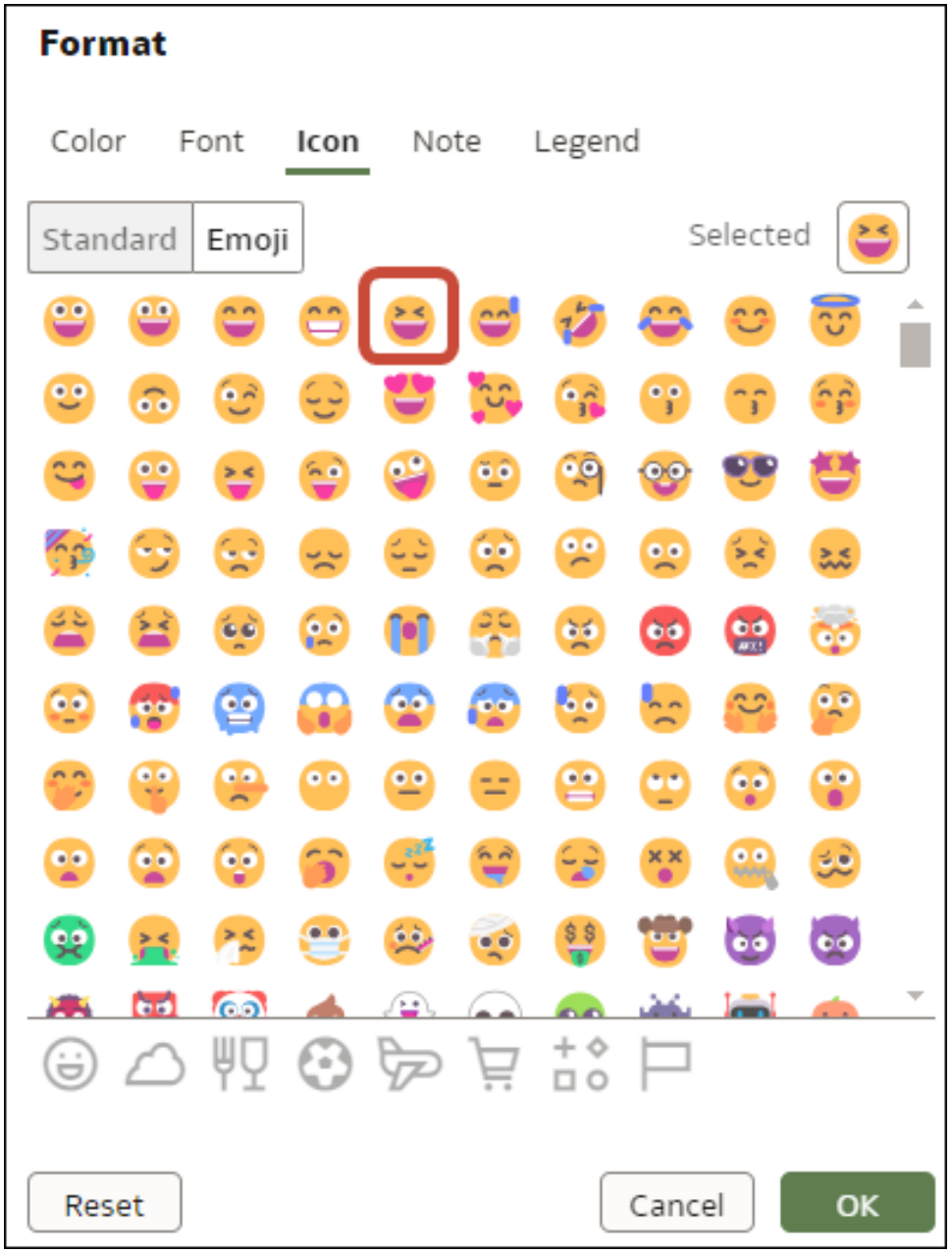
Here's how to configure this example using the Conditional Formatting dialog.

- Create a rule and click the **3 Steps Threshold** in **Presets**.
- In the **Column** field, select REVENUE 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.



- Click **Icon**, then click **Emoji**, and select a smile emoji.

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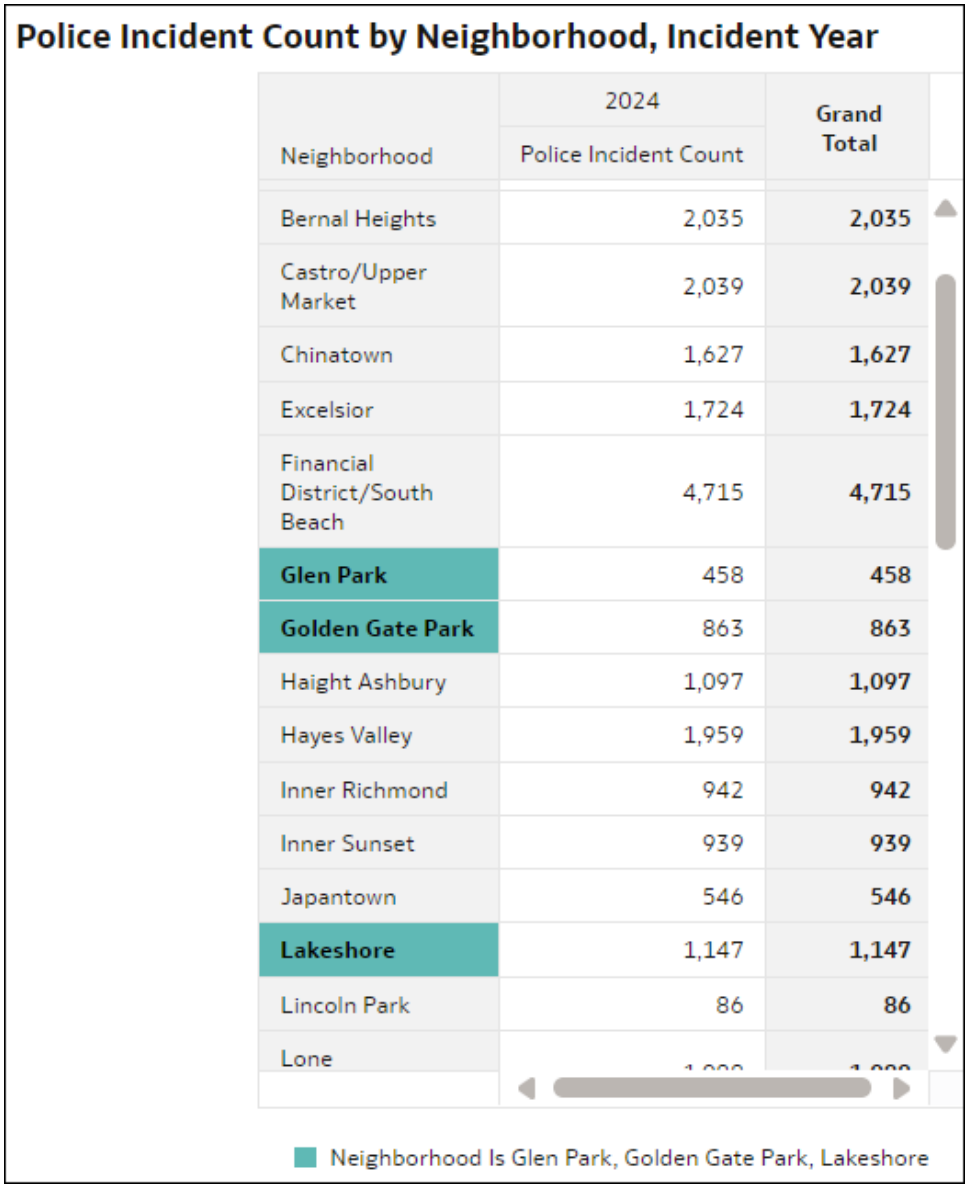


Example - Highlight Attribute Values

This example shows how to use conditional formatting to highlight attribute values in a police incident report.

In this example you highlight the neighborhoods Glen Park, Golden Gate Park, and Lakeshore in a police incident report.

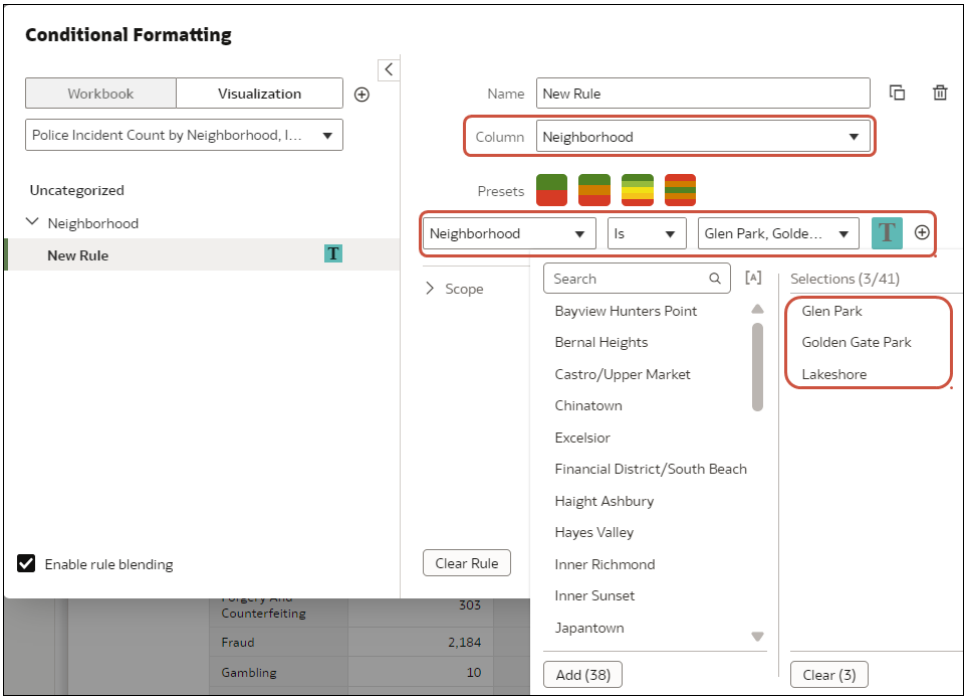
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Here's how to configure this example using the Conditional Formatting dialog.

- Create a rule.
- Select Neighborhood as the **Column** and select values Glen Park, Golden Gate Park, and Lakeshore in the dropdown to the right of the **Is** field.

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- Click **Format** and select bold text and a blue background.

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.

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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$.

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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

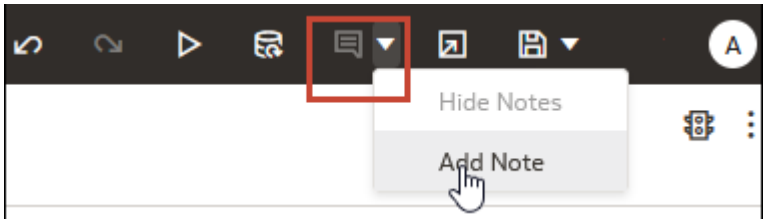
You can add notes to call out important information in a workbook's visualizations. You can use notes to annotate one or all of the visualizations in a canvas, or to emphasize specific data points in a visualization, such as columns in a table or clusters in a scatter plot.

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**.

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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.

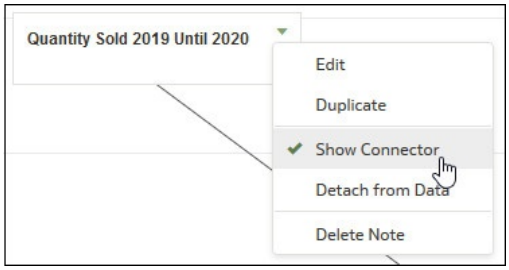


3. Click **Save**.

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**.



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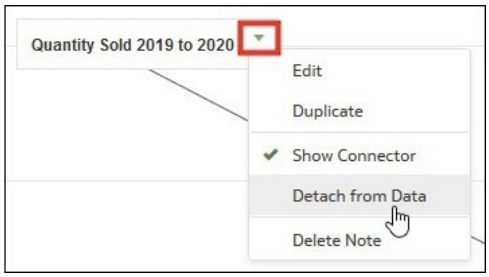
3. Click **Save**.

Delete a Note's Data Connectors

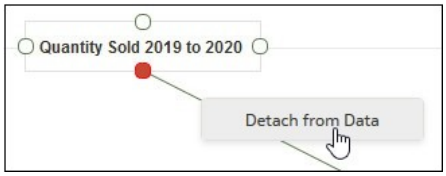
You can delete one or more of a note's data connectors.

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**.



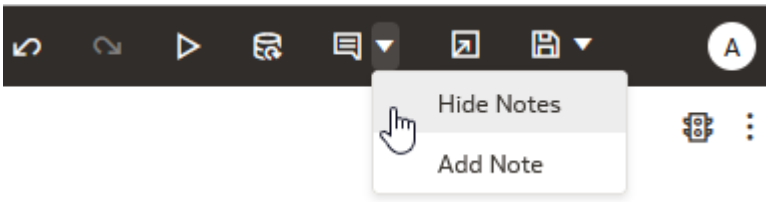
4. Click **Save**.

Show or Hide a Visualization's Notes

By default a workbook's visualization notes are displayed, but you can hide or show all notes.

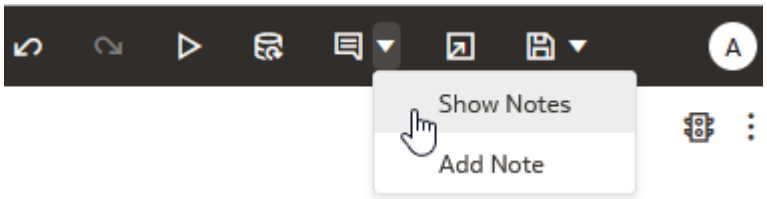
If you create a presentation flow from a workbook, then all of the included canvases' notes are displayed in the dashboard even if you hide all notes in Visualize. In the Present page where you add canvases to create the presentation flow and workbook, you can use a canvas' **Notes** properties to show 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**.



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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.

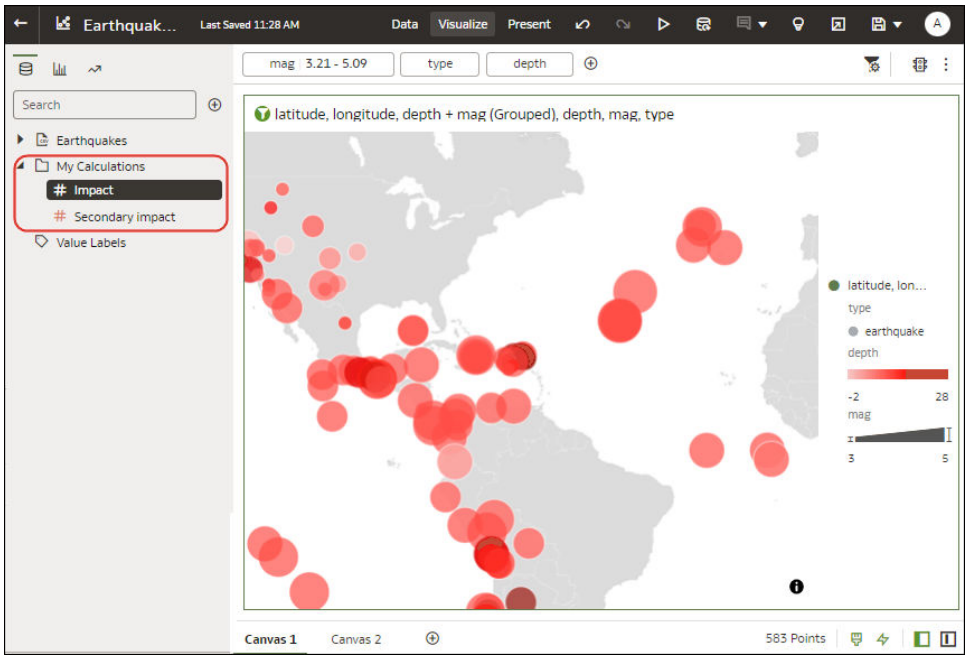
     If you're working with a table view with multiple sorts, then the system always sorts the last column that you sorted first. In some cases where specific values display in the left column, you can't sort the center column. For example, if the left column is Product and the center column is Product Type, 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.

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Use Calculations in Visualizations

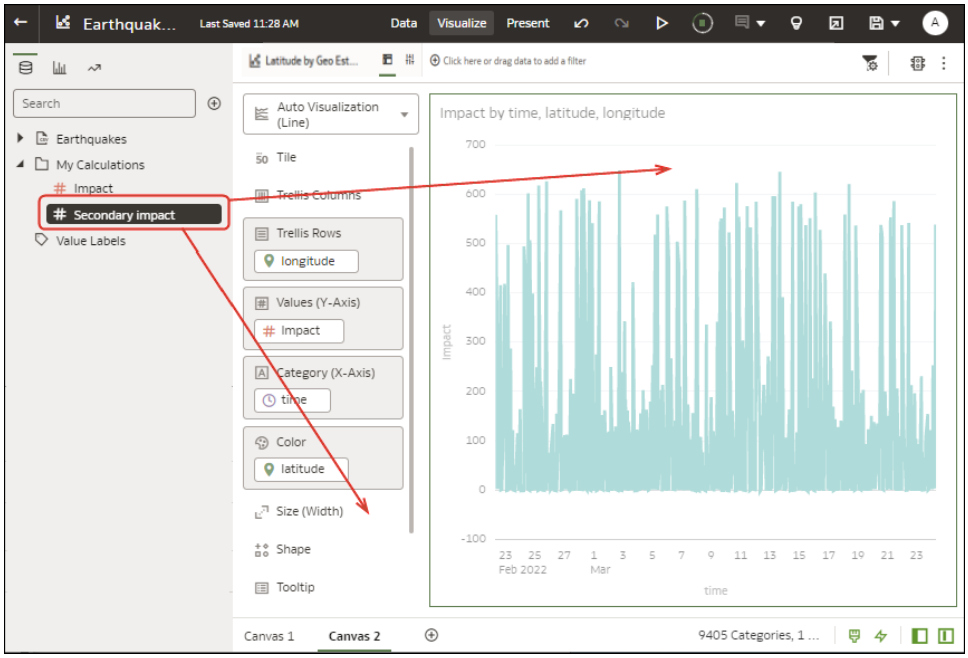
You can create and modify custom calculations to use with your datasets when building visualizations in a workbook.

- 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.

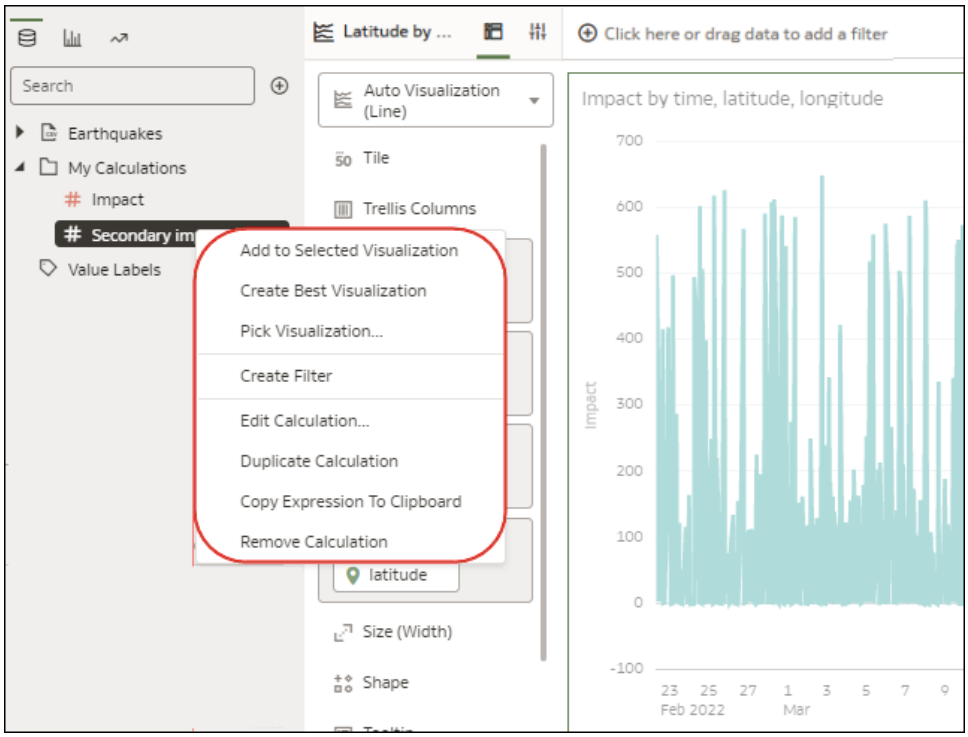


- To add a calculation to a visualization, drag it from the My Calculations area to the visualization or Grammar Panel.

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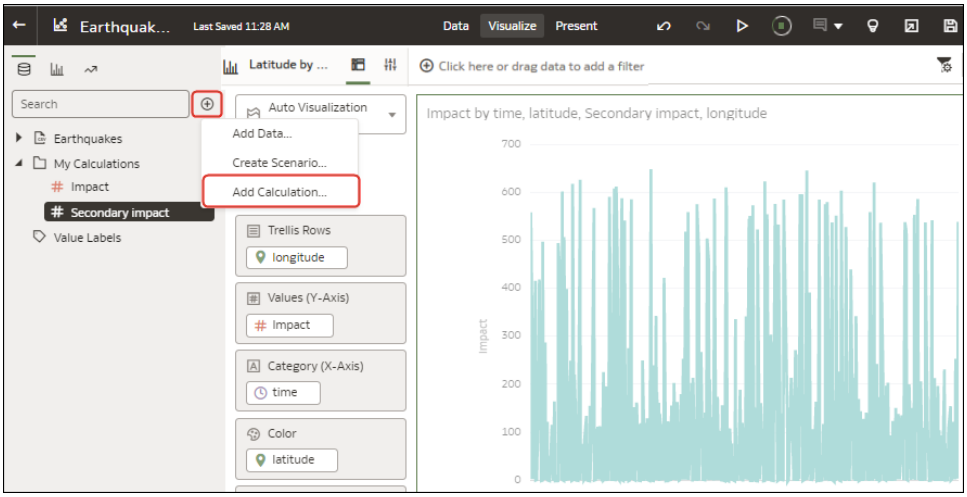


- Right-click a calculation to its editing options. For example, you might add it to the selected visualization, use it to filter your data, or let Oracle Analytics choose the best visualization type for you (that is, **Create Best Visualization**).



- 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.

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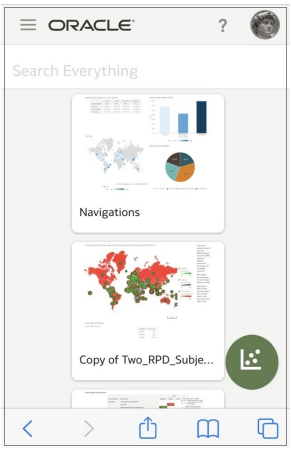
Explore Data on Mobile Devices Using A Built-in Browser

Explore your data at your desk and on the move using the browser in mobile devices on Android, Windows, or Apple operating systems.

> **Note**
>
> Using a mobile device's browser provides limited Oracle Analytics capabilities. For more comprehensive analytics capabilities, use one of the mobile apps available for Oracle Analytics.

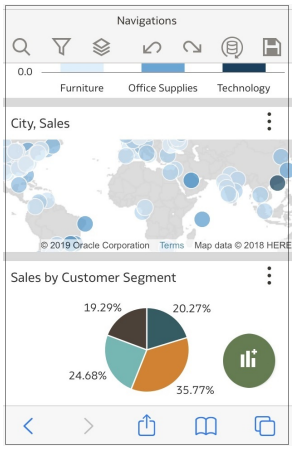
Using the browser in mobile devices, you can view analytics content (dashboards and analyses, workbooks and visualizations). You can also create workbooks and visualizations using a simplified editor.

- Log into Oracle Analytics to get to the Home page.

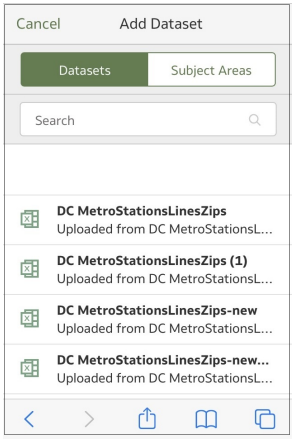


- Tap a workbook or visualization to display the content.

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- Tap the add icon  to create a visualization. You see the simplified visualization designer.



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.

Create a Catalog Folder

You can create catalog folders that only you can access (My Folders) or that other users can access (Shared Folders). Catalog folders help you to organize, find, and manage the workbooks that you create or modify.

You need the DV Content Author application role to create folders and subfolders in My Folders and Shared Folders.

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You need to assign permissions to the shared catalog folders that you create. A shared catalog folder's permissions determine which users and roles can access the shared catalog folder. The permissions that you assign to the shared catalog folder default to the workbooks that you save to the shared catalog folder. See Add or Update Shared Catalog Folder Permissions and Add or Update a Shared Workbook's Permissions.

1. In the Home Page, click **Navigator**, and then click **Catalog**.
2. Click **My Folders** or **Shared Folders** to navigate to where you want to create the new catalog folder.
3. From the Catalog header, click **Page Menu** in the top right corner of the page (⋮) and then click **Create folder**.
4. In New Folder, enter a catalog folder name and click **Create**.
5. Optional: To create a subfolder within a catalog folder, locate the catalog folder where you want to add the subfolder, click **Actions**, then select **New Folder**. In New Folder, enter a catalog folder name and click **Create**.

Move Catalog Folders and Contents

You can move catalog folders and their contents to improve catalog folders organization. For example you can drag and drop a folder and it's contents to move it into a different folder.

You need the DV Content Author application role to move folders and their contents in My Folders and Shared Folders.

1. In the Home Page, click **Navigator**, and then click **Catalog**.
2. Click **My Folders** or **Shared Folders**.
3. Select the catalog folder or catalog folder contents that you want to move and use one of the options.
   - Drag and drop the selected folder or contents to another folder.
   - Click the **Move item** box, then in Move <folder name> select a folder location, and click **OK**.
   - Right-click and select **Move to**, then in Move <folder name>, select a folder location, and click **OK**.

Embed a Workbook and Visualizations in a Dashboard

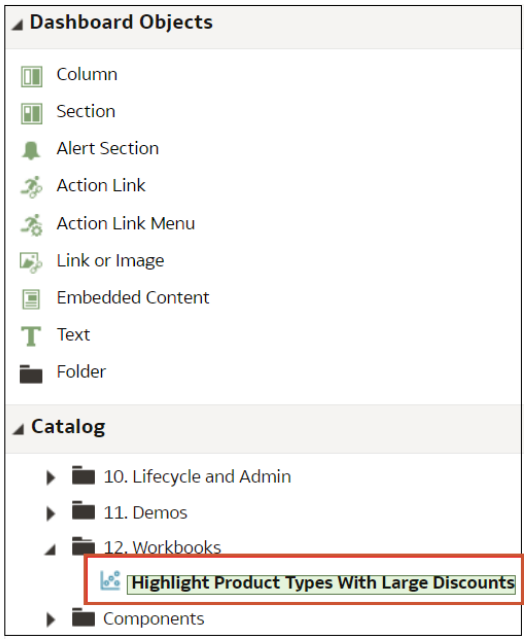
Embed workbooks in dashboards to share them with analysts.

Before you start, create your workbooks and store them in the catalog. For information about embedding, see Tips on Embedding Workbook Canvases in Dashboards. If your workbook contains more than one canvas, you can choose which canvas you want to display on the dashboard.

1. On the Home page, click the **Page Menu**, select **Open Classic Home**, and then open or create a dashboard to embed the workbook into and save it to Shared Folders.
2. In the dashboard designer **Catalog** pane, navigate to the workbook and drag it onto the dashboard canvas.

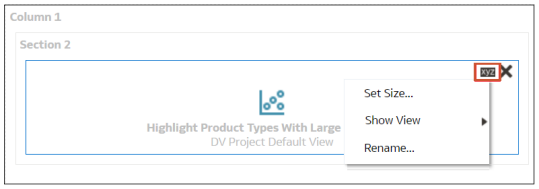
   For example, you might have stored your visualization workbook in the Shared Folders area in a folder named Workbooks.

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3. To modify the display size or specify which canvas to display, click **Properties**.

   By default, the last canvas in the workbook is displayed.



Tips on Embedding Workbook Canvases in Dashboards

Follow these tips to get the best out of embedding content.

Use the supported prompt types

When you embed workbooks in dashboards, you can use these prompt types to control the filters in the workbook. This table lists the supported prompts and operators.

Prompt user inputs	Column Type	Supported operators	Filter type in workbooks
Text field Choice list Check boxes Radio buttons List box	Dimension (non-numeric)	"is in" and "is not in"	List filter
Slider Text field	Fact (numeric)	">=", "<=" and "is between"	Number range filter
Calendar	Date	">=" and "<="	Date range filter

Don't embed workbook canvases to print or share via Delivers:

Note that consumers won't be able to see embedded workbook canvases when they:

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- Print dashboard pages.
- Access dashboard pages shared with them using Delivers.

Save a Workbook to a Shared Catalog Folder

You can save a workbook to a shared catalog folder when you want individual users or groups of users to access the workbook.

Any user who can create a workbook can also create a shared catalog folder when saving the workbook. If you create a shared catalog folder, then you need to specify which users can access it. A workbook's permissions determine which users can access the workbook. See Assign Shared Catalog Folder and Workbook Permissions.

A workbook contains artifacts, which are stand-alone Oracle Analytics objects that you can include in other workbooks (for example, datasets). Sometimes these artifacts aren't already shared. In such cases, when you add or update a workbook's permissions Oracle Analytics displays the Shared Related Artifact dialog where you can specify if you want to share these artifacts.

Sometimes you might choose to not share the artifacts, such as when you want to review and assign the artifact's permissions manually, or when the user must select a different artifact in the shared workbook (for example, select a different dataset).

1. Create or open a workbook:
   - To create a workbook, on the Home page, click **Create**, click **Workbook**, and build the workbook.
   - To open a workbook, on the Home Page, click **Navigator**, click **Catalog**, and navigate to and open the workbook in edit mode. Modify the workbook.
2. From the Workbook editor, click **Save** or **Save As** to save the workbook.
3. In Save Workbook, click **All**, click **Shared Folders**, and then locate and click the shared catalog folder where you want to save the workbook.
4. Click **Save**.
5. If the Shared Related Artifact dialog is displayed, then specify if you want to share the artifacts included in the workbook (for example, the workbook's datasets) and click **Apply**.

Assign Shared Catalog Folder and Workbook Permissions

You can view, modify, and add access permissions for catalog folders and workbooks. Permissions determine the actions a user can perform when working with shared folders and workbooks.

You must be assigned to the Content Author role to change the permissions on workbooks or folders.

Topics:

- Add or Update Shared Catalog Folder Permissions
- Add or Update a Shared Workbook's Permissions
- Workbook Permissions Rules

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Add or Update a Shared Workbook's Permissions

You can assign users and roles, access permissions (Read-Write and Read-Only), and share permissions (View and Edit) to a workbook that you create or administer.

The shared catalog folder's permissions default into the workbook's Access and Share tabs. You can set permissions on the workbook to fine-tune the default permissions. See Workbook Permissions Rules.

A workbook's default permissions are based on roles. Roles and the permissions you assign in the **Access** tab determine who can access the workbook and what they can do with it. For example, open, open in a new tab, inspect, favorite, rename, export, move to, duplicate, and delete.

The permissions you assign in the **Share** tab determine which actions users can perform on the workbook, such as rename, move to, save and save as.

A workbook contains artifacts, which are stand-alone Oracle Analytics objects that you can include in other workbooks (for example, datasets). Sometimes these artifacts aren't already shared. In such cases, when you add or update a workbook's permissions Oracle Analytics displays the Shared Related Artifact dialog where you can specify if you want to share these artifacts with the users who can access the workbook.

Sometimes you might choose to not share the artifacts, such as when you want to review and assign the artifact's permissions manually, or when the user must select a different artifact in the workbook that you are adding or updating permissions for (for example, select a different dataset).

Oracle recommends that you use the Oracle Analytics Home Page and not the Classic Home Page to update workbook permissions.

1. In the Home Page, click **Navigator**, and then click **Catalog**.
2. Click **Shared Folders**, and then navigate to the workbook.
3. Hover over the workbook, click **Actions**, and then click **Inspect**.
4. Click the **Access** tab to add or update users and roles and permissions. The permissions in this tab default from the access permissions set on the shared catalog folder.
5. Click the **Share** tab to add or update users and roles and permissions. The permissions that default into this tab are the same permissions that default into the **Access** tab.
6. Click **Save**.
7. If the Shared Related Artifact dialog is displayed, then specify if you want to share the artifacts included in the workbook (for example, the workbook's datasets) and click **Apply**.

Add or Update Shared Catalog Folder Permissions

You can assign users and roles and access permissions (Read-Write or Read-Only) to the shared catalog folders you create or administer.

A shared catalog subfolder's default permissions are based on roles. Roles and the permissions you assign in the **Access** tab determine who can access the shared catalog subfolder and what then can do with it. For example, open, inspect, rename, move to, duplicate, or delete.

The users and roles and permissions you specify are applied to any shared catalog subfolders that you create and the workbooks that you save to the shared catalog subfolder. You can fine tune permissions on shared catalog subfolders and workbooks.

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A shared catalog folder can contains artifacts, which are stand-alone Oracle Analytics objects (for example, datasets). When you add or update a shared catalog folder's permissions Oracle Analytics displays the Shared Related Artifact dialog where you can specify if you want to share these artifacts with the users who can access the shared catalog folder.

Sometimes you might choose to not share the artifacts, such as when you want to review and assign the artifact's permissions manually.

1. In the Home Page, click **Navigator**, and then click **Catalog**.
2. Click **Shared Folders**, and then navigate to the shared catalog folder that you want to update permissions for.
3. Hover over the shared catalog folder, click **Actions**, and then click **Inspect**.
4. Click the **Access** tab to add users and roles and permissions, or update permissions for the existing users and roles.
5. Click **Save**.
6. If the Shared Related Artifacts dialog is displayed, then specify if you want to share the artifacts included in the shared catalog folder (for example, datasets) and click **Apply**.

Workbook Permissions Rules

Use these rules to help you set a workbook's permissions.

Access (Read-Only and Read-Write) Rules:

- Permissions are evaluated by hierarchies configured for roles.
- Permissions set for roles closest to the top level in the role hierarchy are superseded by permissions set for roles at a lower level in the role hierarchy.
- User permissions always override role permissions.

Share (Edit and View) Rules:

- If a user is a member of any role with edit permission, that user can edit the workbook.
- If a user has edit permission, that user can edit the workbook.
- If a user is a member of any role with view permission, that user can view the workbook.
- If a user has view permission, that user can view the workbook.

How Share and Access Permissions Affect Saving a Workbook Opened by a DVConsumer User

Share	Access: Read-Only	Access: Read-Write
View	**Save** and **Save As** aren't enabled.	**Save** and **Save As** aren't enabled.
Edit	**Save** and **Save As** aren't enabled.	**Save** and **Save As** aren't enabled.

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How Share and Access Permissions Affect Saving a Workbook Opened by a DVContentAuthor User

Share	Access: Read-Only	Access: Read-Write
View	**Save** and **Save As** aren't enabled.	**Save** and **Save As** aren't enabled.
Edit	**Save** isn't enabled, but **Save As** is enabled.	**Save** and **Save As** are both enabled.

Configure How Workbooks Open By Default

All workbooks open in Viewer mode by default, but as a workbook author, you can configure workbooks to open in Edit mode or in Viewer mode by default.

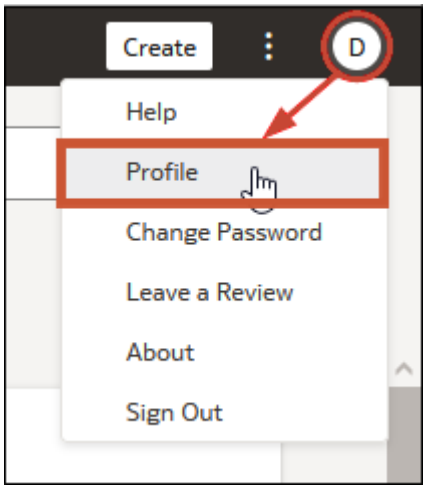
Topics:

- Configure All of Your Workbooks to Open in Edit Mode by Default
- Configure a Workbook to Open in Edit Mode

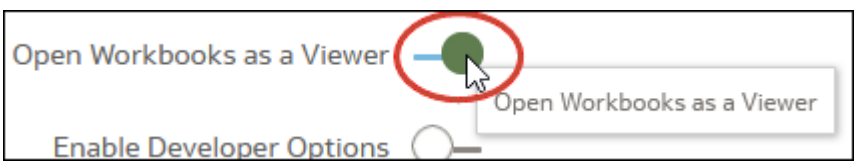
Configure All of Your Workbooks to Open in Edit Mode by Default

This task is for workbook authors. All of your workbooks open in Viewer mode by default, but you can change this behavior so that all of your workbooks open in Edit mode by default.

1. On the Home page, click your user profile icon, then select **Profile** from the menu.

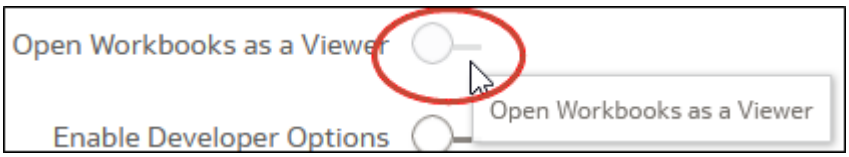


2. Click **Advanced**, and then click the **Open Workbooks as a Viewer** toggle.
   - **Open Workbooks as a Viewer** toggle ON (green circle) - All of your workbooks open in Viewer mode by default.



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- **Open Workbooks as a Viewer** toggle OFF (white circle) - All of your workbooks open in Edit mode by default.

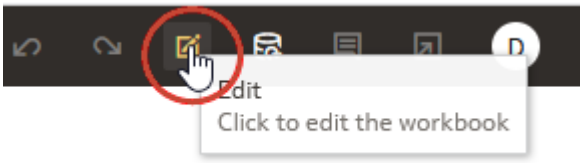


3. Click **Close**.

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. If workbooks that you don't own are editable, you can make those workbooks open in Edit mode as well.

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**.

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.

> **Note**
>
> Your administrator controls whether or not thumbnails are allowed. If thumbnails are disabled, thumbnails never display, that is, this setting is always “Off”. See Security Options.

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**.

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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**.

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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
- About Selection Steps
- Use the Workbook Filter Bar
- 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 or Selection Step

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:

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- **Workbook** - A workbook filter is used in the workbook filter bar and applies to all canvases in the workbook. See Use the Workbook Filter Bar.
- **Canvas** - A canvas filter is also used in the workbook filter bar, but applies only to a single canvas in the workbook. See Use the Workbook Filter Bar.
- **Dashboard** - A dashboard filter is used directly on a canvas to enable consumers to filter data on that canvas. See Use Dashboard Filters.
- **Visualization** - A visualization filter applies only to a single visualization. See Use Visualization Filters.

For information about applying filters to datasets, see Filter a Dataset Table and Use Role-Based Filters in a Dataset.

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.

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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.

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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.

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- **Selection Steps** - Selection steps let you filter hierarchical columns in visualizations to refine the data displayed. See About Selection Steps.

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.

- Dashboard Filter General Properties
- Dashboard Filter Date/Time Properties
- Dashboard Filter Control Properties
- Dashboard and Visualization Filters Properties

See also Filter Bar Properties.

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.

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Property	Description
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**
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.

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Property	Description
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.
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.

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Property	Description
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.
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.

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Property	Description
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.
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, this 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	Indicates whether a visualization is used as a filter on the canvas. The Use as Filter icon is green when the visualization is active as a filter. See Use a Visualization as a Filter.

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Property	Description
Show Filter Toggle	Specifies if the Use as Filter icon is visible on the visualization itself when the visualization is being used as a filter.
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
Label	Specifies how the filter label is generated and whether it's displayed. Applies to visualization filters. **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	Specifies whether more than one value can be selected if the data element being used as the filter is text, uncountable values, or dates. Applies to visualization filters. See Disable Multi Select for Filters.
Filter This Viz By	Indicates what the visualization is filtered by. The options available include workbook, canvas, and dashboard filters, and selection steps.
Apply This Filter To	Specifies which visualizations the dashboard filters 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.

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How Filters Limit Each Other

You can set the limit values properties for filters and selection steps at different levels in a workbook. Carefully designing how they behave and interact provides the end user with filters and selection steps that contain predictable and intuitive values to choose from.

Limit Values Setting Levels

Before you add filters and selection steps 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 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.
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 and selection steps in the filter bar. See Specify Limit Values By for the Workbook Filter Bar.
3	Individual filters and selection steps in the workbook filter bar	Any filters and selection steps that you add to the filter bar inherit the **Limit Values By** setting selected for the filter bar. You can select an individual filter or selection step and use **Limit Values** to override the filter bar's setting for that particular item. This setting level isn't available for individual parameters used in the filter bar. See Specify Limit Values for Workbook and Canvas Filters and Selection Steps.
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. This setting level isn't available for parameters used as dashboard filters. 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.

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Limit Values Setting Options

The following options are available depending on whether you're configuring the **Limit Values By** setting for the workbook filter bar, or the **Limit Values** setting for individual filters and selection steps in the filter bar or for dashboard filters.

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. Doesn't apply to selection steps. 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. This option is enabled by default for workbook, canvas, and dashboard filters.
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. Doesn't apply to selection steps. For dashboard filters, limits the filter selection values by the other dashboard filter and workbook or canvas filter selections.
None	For both the filter bar and for individual filters and selection steps in the filter bar, doesn't limit the selection values by the other selections in the filter bar. For dashboard filters, doesn't limit filter selection values by the other dashboard filter and filter bar selections.
Filter Name	For individual filters and selection steps in the filter bar, uses the selected selection step, workbook, canvas, or dashboard filter's selections to limit selection values. For dashboard filters, uses the selected selection step, workbook, canvas, or other dashboard filter's selections to limit selection values. You can choose more than one.

Example Using Filters

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.

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- 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.
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.

> **Note**
>
> Administrators can switch off workbook personalization for the entire organization using the system setting **Enable Personalization in Workbooks**. See System Settings - Enable Personalization in Workbooks.

For information about sharing a workbook URL that users can use to view the workbook with specific filter selections persisted, see Share a Workbook URL with Persisted Filter Values.

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.

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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.

About Selection Steps

The topics in this section explain how you can use selection steps in workbooks.

Topics:

- Selection Steps in Workbooks
- How Selection Steps and Filters Differ
- Selection Steps Action and Operator Reference

Selection Steps in Workbooks

In Oracle Analytics, you can use selection steps to specify which levels or members of a hierarchy you want to display in table or pivot table visualizations that use that hierarchy.

Selection steps are similar to filters, but instead of filtering to select values from a column, they let you select members of a hierarchy to participate in the query. You can choose which levels or members of the hierarchy you want to keep, add, or remove in your selection. You can add as many selection steps as you need, and they're applied in a specific order.

Hierarchies

Oracle Analytics supports using selection steps for both level-based hierarchies and parent-child hierarchies, including those with skip-level or ragged structures.

Level-based hierarchies (structure hierarchies) - In these hierarchies, members of the same type occur only at a single level, while members in parent-child hierarchies all have the same type. In level-based hierarchies, levels roll up from a lower level to higher level, for example, months can roll up into a year. These roll ups occur over the hierarchy elements and span natural business relationships.

Parent-child hierarchies (value hierarchies) - In these hierarchies, the business relationships occur between different members of the same real-world type such as the manager-employee relationship in an organizational hierarchy tree. Parent-child hierarchies don't have explicitly named levels. There isn't a limit to the number of implicit levels in a parent-child hierarchy.

How Selection Steps and Filters Differ

It's important to understand the differences between filters and selection steps in workbooks so you can apply them effectively.

Purpose and Application

Filters act on individual columns to reduce or focus the data in one or more visualizations. Filters can apply to any visualization that uses data from the same dataset or subject area as the filter, including joined datasets. For more information, see About Filters.

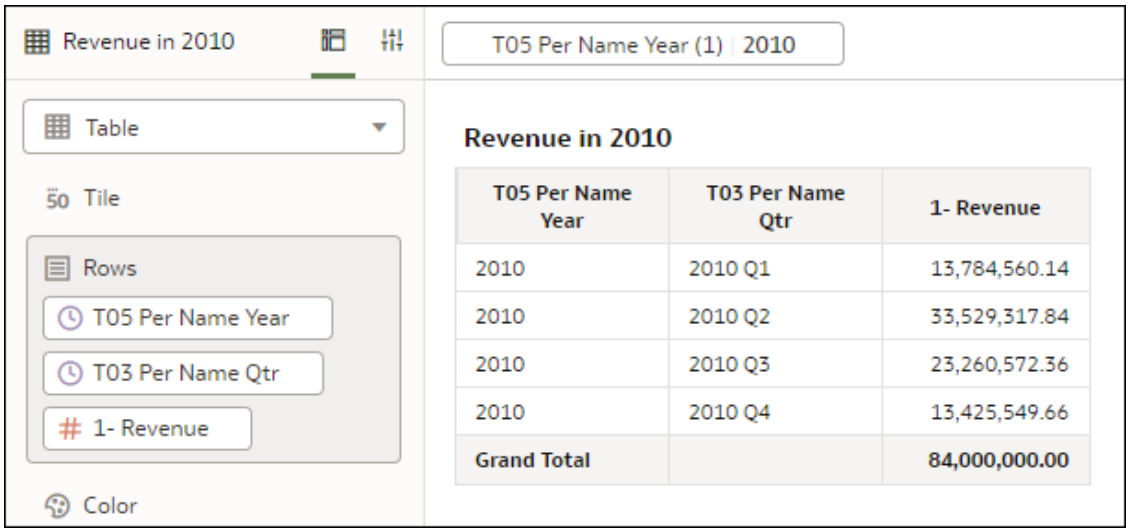
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Selection steps act on hierarchies and don't actually filter the data in visualizations. Instead, they specify which levels or members from the hierarchy are displayed in any visualizations that use the same hierarchy that the selection step is based on. Selection steps have no effect on visualizations that don't use the same hierarchy.

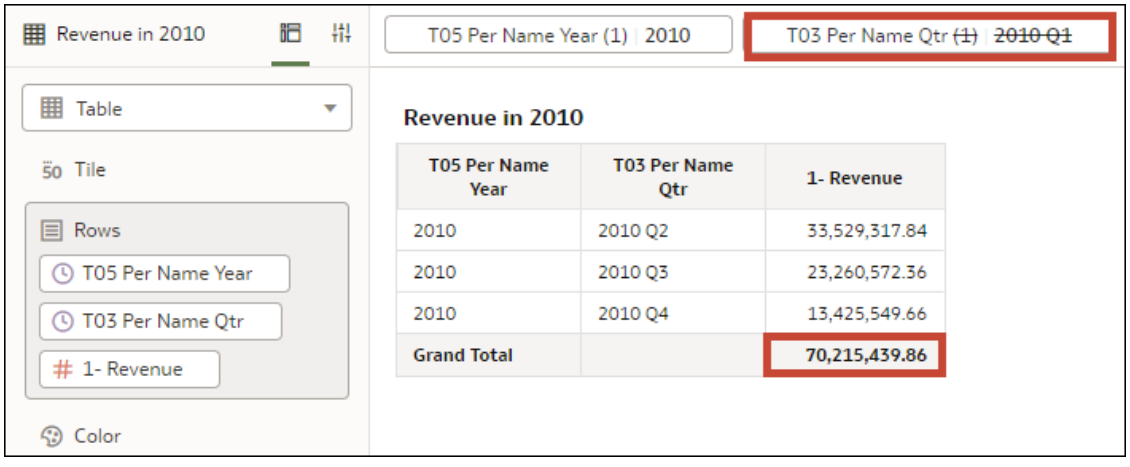
Impact on Aggregation

Filters are applied to data before aggregation and therefore affect any aggregate values in visualizations. Selection steps are applied after aggregation and therefore have no impact on aggregate values.

For example, suppose you have a table visualization named Revenue in 2010 that uses attribute and measure columns to show revenue by quarter for the year 2010, including the grand total for the whole year.

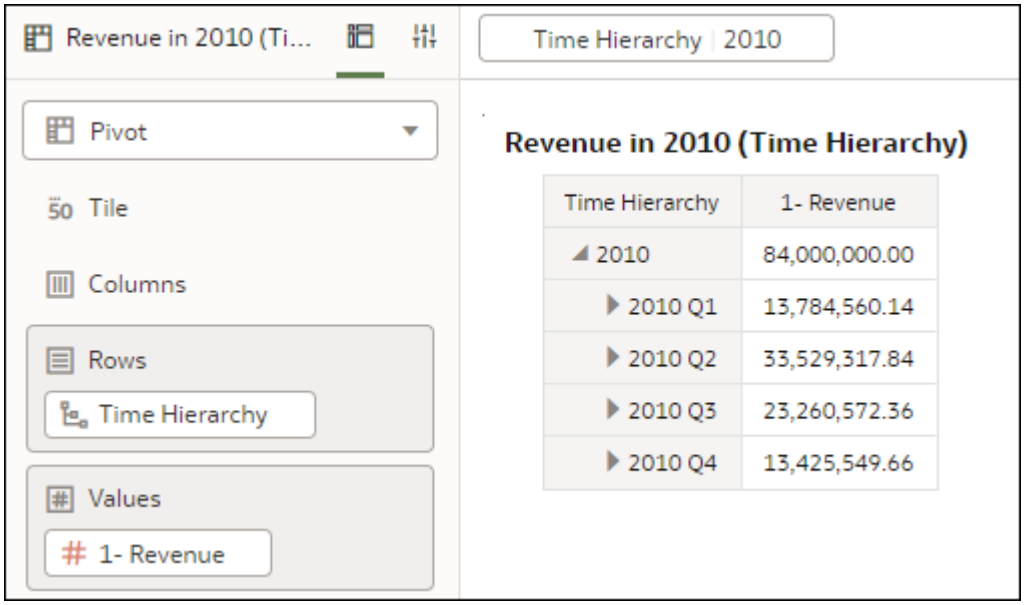


If you add a canvas filter in the workbook filter bar to exclude the first quarter of 2010, the row for the first quarter disappears from the table and the grand total for the whole year changes to reflect the excluded filter value.

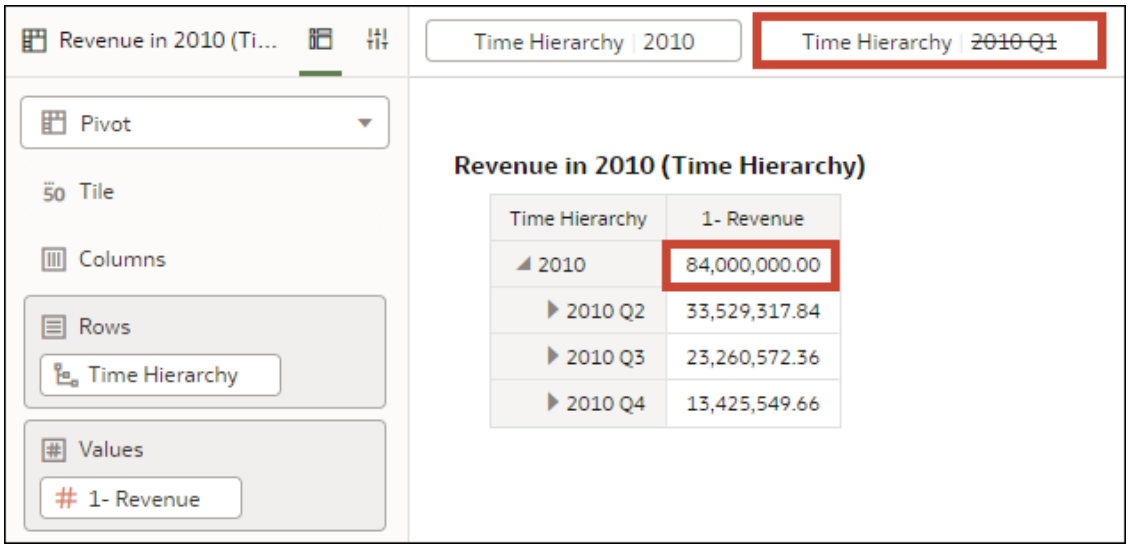


Now suppose your table visualization uses a time hierarchy to show the same data, now named Revenue in 2010 (Time Hierarchy).

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If you add a selection step in the workbook filter bar to remove the first quarter of 2010, the row for the first quarter is gone from the table, but total revenue for the whole year doesn't change. This is because that selection step is applied after the query for revenue in 2010 was aggregated so it's only removing the 2010 Q1 member from the visualization.

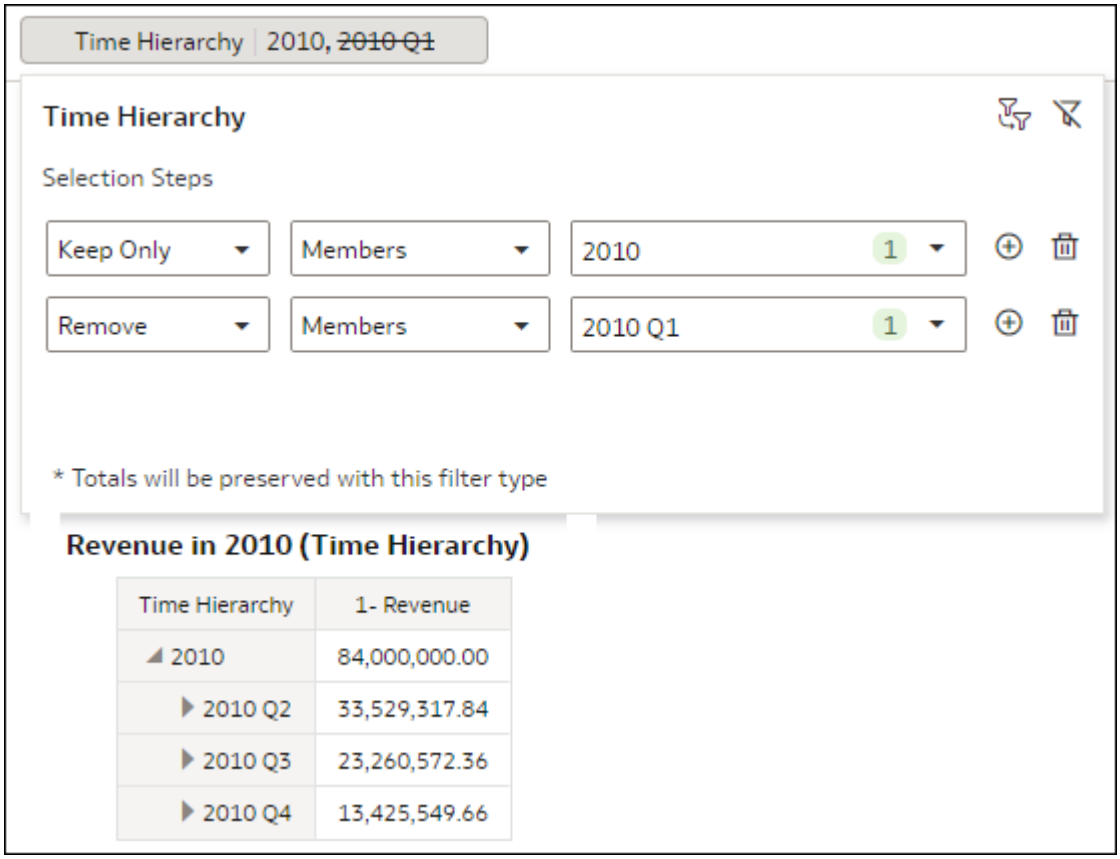


Order of Operation

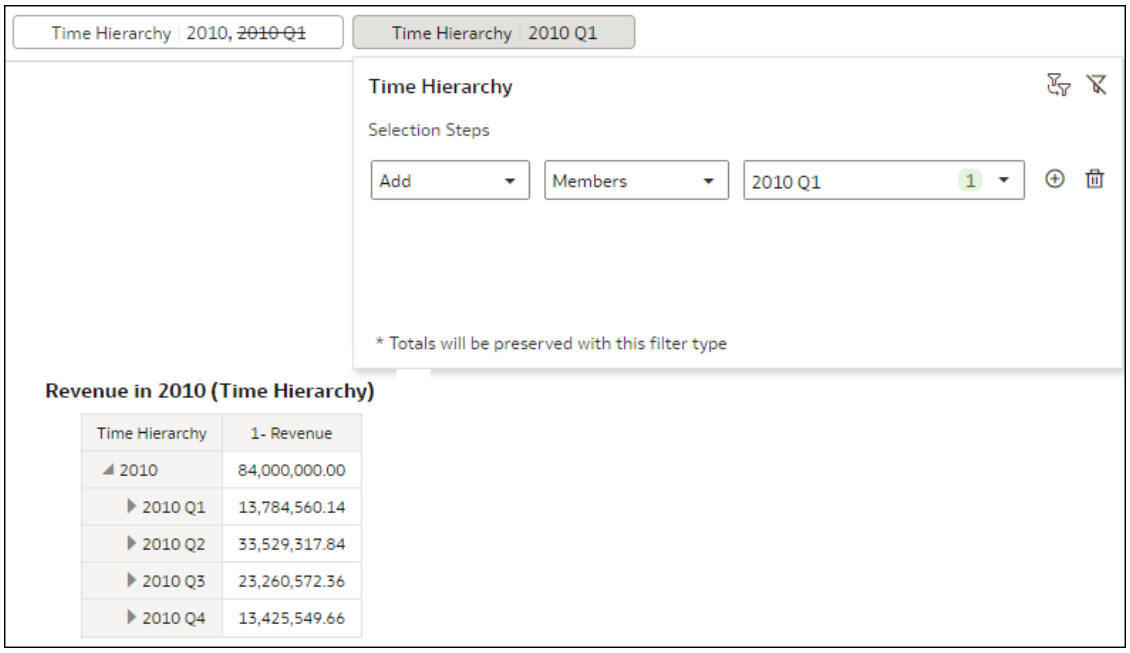
In the workbook filter bar, the order in which workbook or canvas filters appear is irrelevant. However, the order in which selections steps appear is critical because it dictates the order in which they're applied.

For example, suppose you have a table visualization named Revenue in 2010 that uses a time hierarchy to show revenue by quarter for the year 2010, including the total revenue for the year. Suppose the first selection step in the filter bar starts with the year 2010 and then removes the first quarter, 2010 Q1, so only the revenue amounts for the year itself and the remaining three quarters are displayed.

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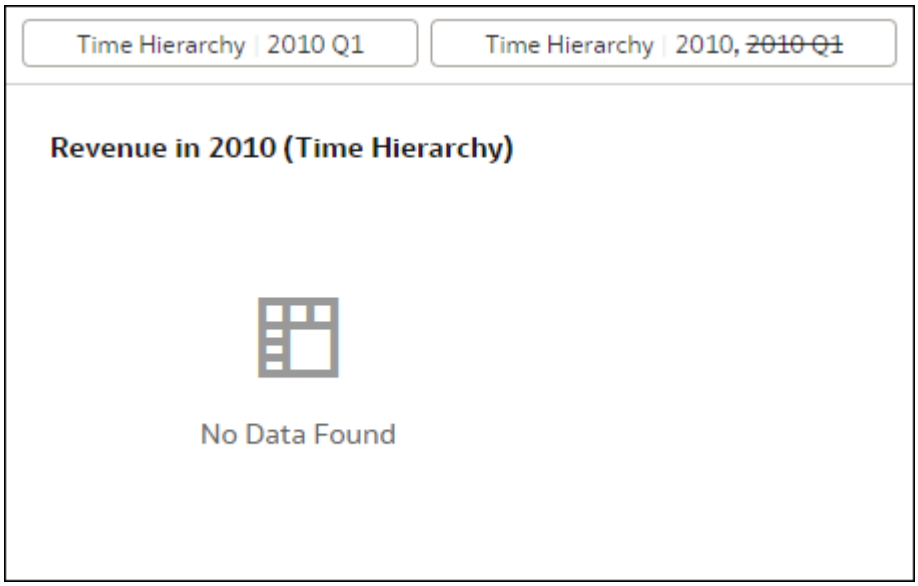
If you add another, separate selection step in the filter bar that adds back the first quarter, 2010 Q1, the visualization displays all four quarters for the year 2010, as expected.



If you swap the order of these two selection steps in the filter bar, the visualization doesn't display any data. This is because now, the selection step adding the member 2010 Q1 is

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applied first so the visualization starts with only 2010 Q1. The second selection step to keep 2010 and remove 2010 Q1 doesn't work because you can't keep the member 2010 if it's not in the selection to begin with.



It's important to make sure the selection steps appear in a logical order so that when they're applied, the visualization displays the data you expect.

Selection Steps Action and Operator Reference

Selection steps use actions and operators to help you access the specific data that you want to display in a table or visualization.

The combination of the action, operator, and values that you select determines what the selection step does.

To add a selection step, see Add Selection Steps in the Filter Bar.

Actions

There are three actions available for selection steps:

- **Add** - Lets you select levels or members to add to the selection.
- **Keep Only** - Lets you select the levels or members that you want to keep within the selection. This action doesn't add anything to the selection, it works only on levels or members that are already included in the selection. This is the default action.
- **Remove** - Lets you select levels or members to remove from the selection.

Operators

The operators available for a selection step depend on the type of hierarchy you're using.

The **Levels** operator is available only for level-based hierarchies. It lets you specify the levels you want the selection step to act on; for example, Year, Quarter, Month, and Day for a time-based hierarchy.

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When you choose any other operator, you can specify which members of the hierarchy you want the selection step to act on. Members are those data points residing at specific nodes in the hierarchy.

The following operators are available for both level-based hierarchies and parent-child hierarchies:

- **Members** - Lets you specify the exact members you want the selection step to act on. Only the selected members are displayed in the visualization. This is the default operator.
- **+ Children** - Lets you specify members so that the selection step acts on them and their children. The members and their children are displayed in the visualization.
- **+ Parents** - Lets you specify members so that the selection step acts on them and their parents. The members and their parents are displayed in the visualization.
- **+ Descendants** - Lets you specify members so that the selection step acts on them and their descendants. The members and all their descendants, down to the lowest members, are displayed in the visualization.
- **+ Ancestors** - Lets you specify members so that the selection step acts on them and their ancestors. The members and their ancestors are displayed in the visualization.
- **+ Siblings** - Lets you specify members so that the selection step acts on them and their siblings. The members and their siblings are displayed in the visualization.
- **+ Leaves** - Lets you specify members so that the selection step acts on them and all the leaves under them. The specified members and the lowest members under them are displayed in the visualization. Any members in between are excluded.
- **Children** - Lets you specify members so that the selection step acts only on their children (not the selected members themselves). Only the children are displayed in the visualization.
- **Parents** - Lets you specify members so that the selection step acts only on their parents. Only the parents are displayed in the visualization.
- **Descendants** - Lets you specify members so that the selection step acts only on their descendants. Only the descendants are displayed in the visualization.
- **Ancestors** - Lets you specify members so that the selection step acts only on their ancestors. Only the ancestors are displayed in the visualization.
- **Siblings** - Lets you specify members so that the selection step acts only on their siblings. Only the siblings are displayed in the visualization.
- **Leaves** - Lets you specify members so that the selection step acts only on the leaves under them. Only the leaves are displayed in the visualization.

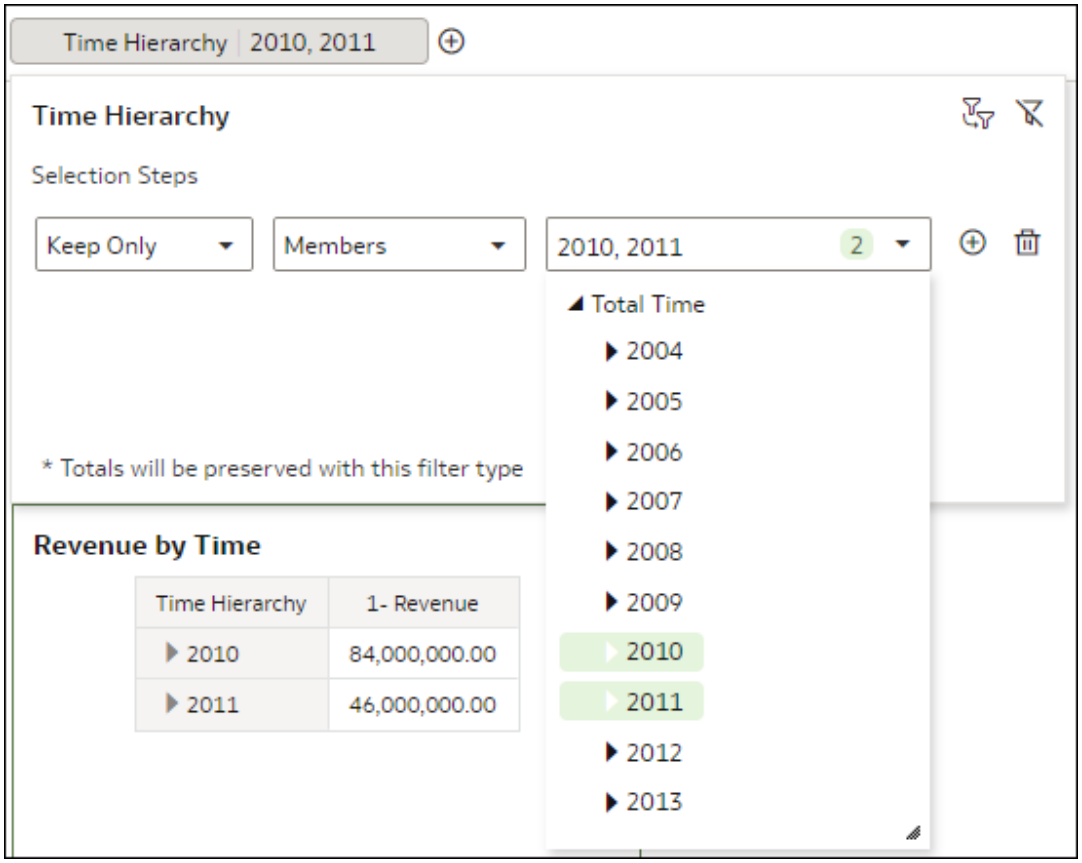
Operator Examples

The following examples illustrate the outcome of a selection step using the action **Keep Only** and each type of operator for a time-based level hierarchy and a parent-child hierarchy of sales representatives.

- **Members**

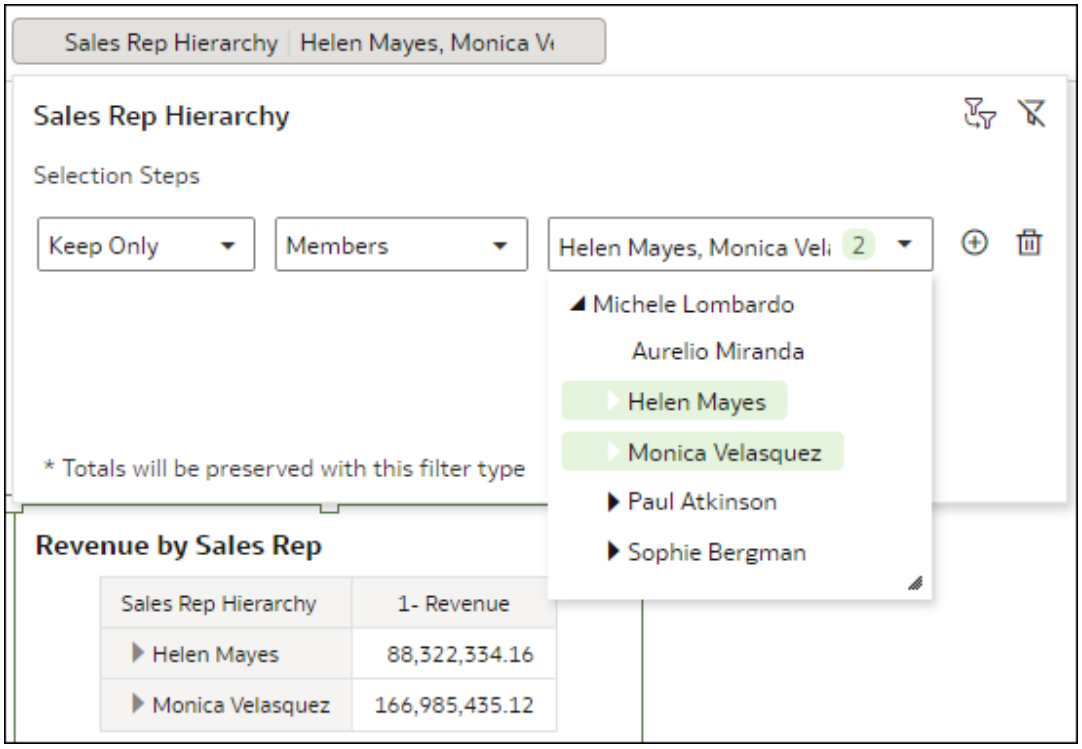
  Level hierarchy example: For a table showing revenue for a time dimension, if you use a selection step with the action Keep Only, the operator Members, and the members 2010 and 2011, the table shows the revenue for only those two years.

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Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Members, and the members Helen Mayes and Monica Velasquez, the table shows the revenue for only those two representatives. The names in the table are displayed alphabetically.

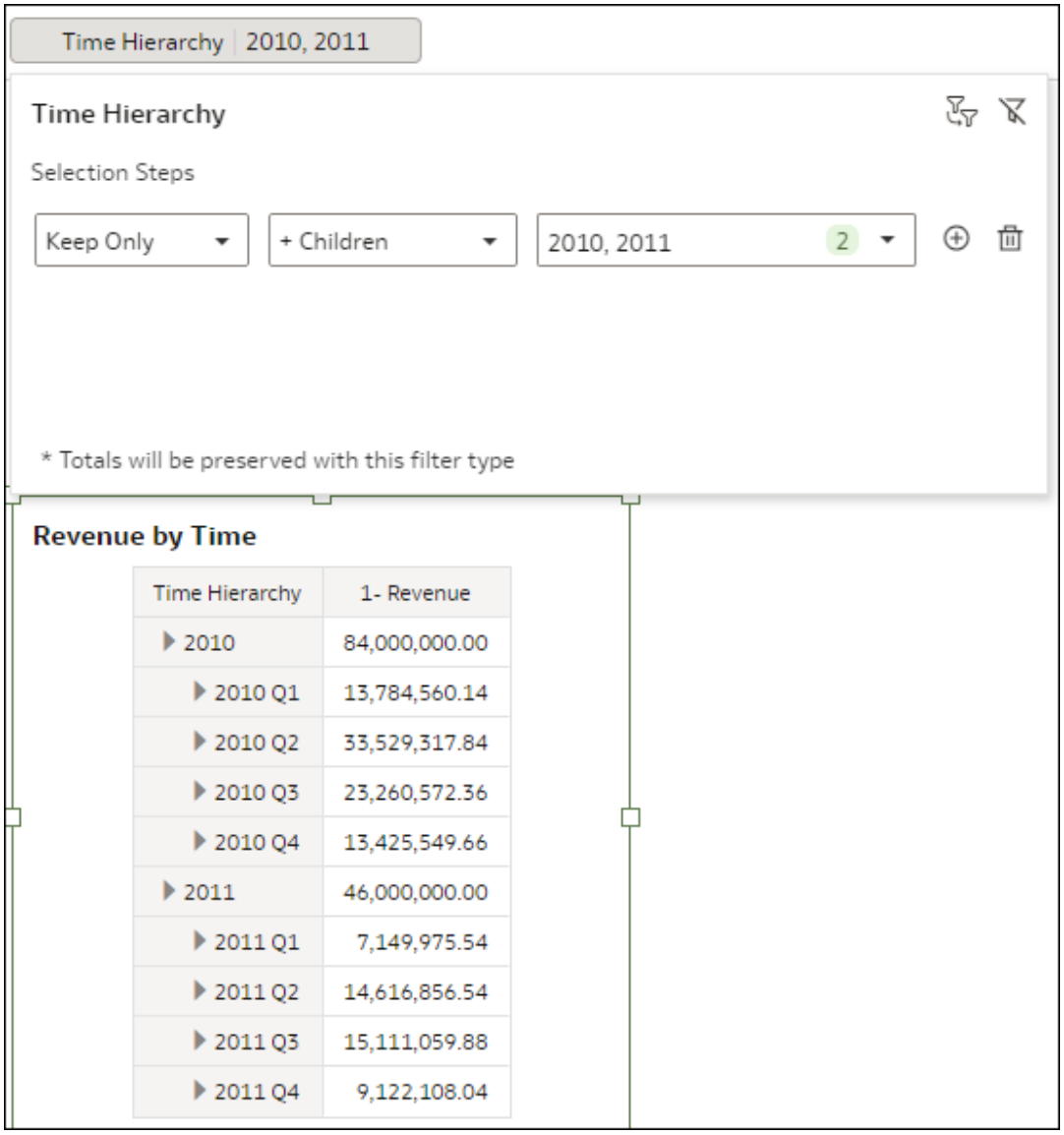
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- **+ Children**

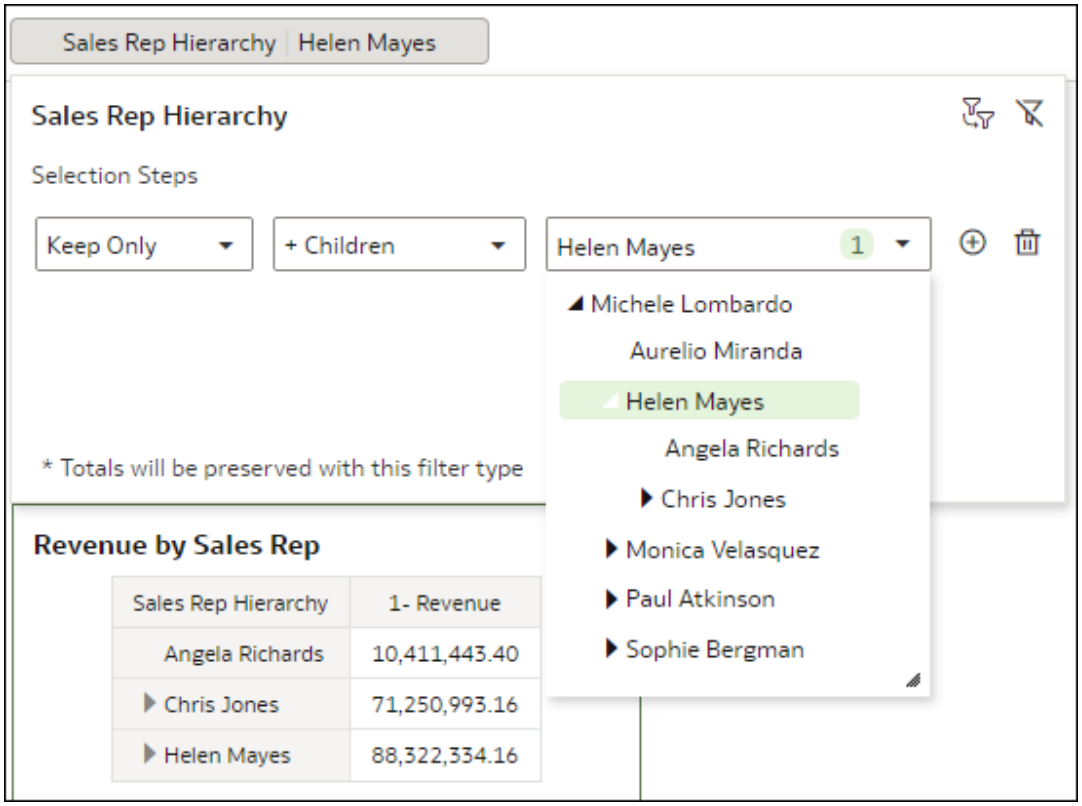
  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Children, and the members 2010 and 2011, the table shows the revenue for those two years and their children, in this case, four quarters.

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Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Children, and the member Helen Mayes, the table shows the revenue for her and the representatives reporting directly to her. The names in the table are displayed alphabetically.

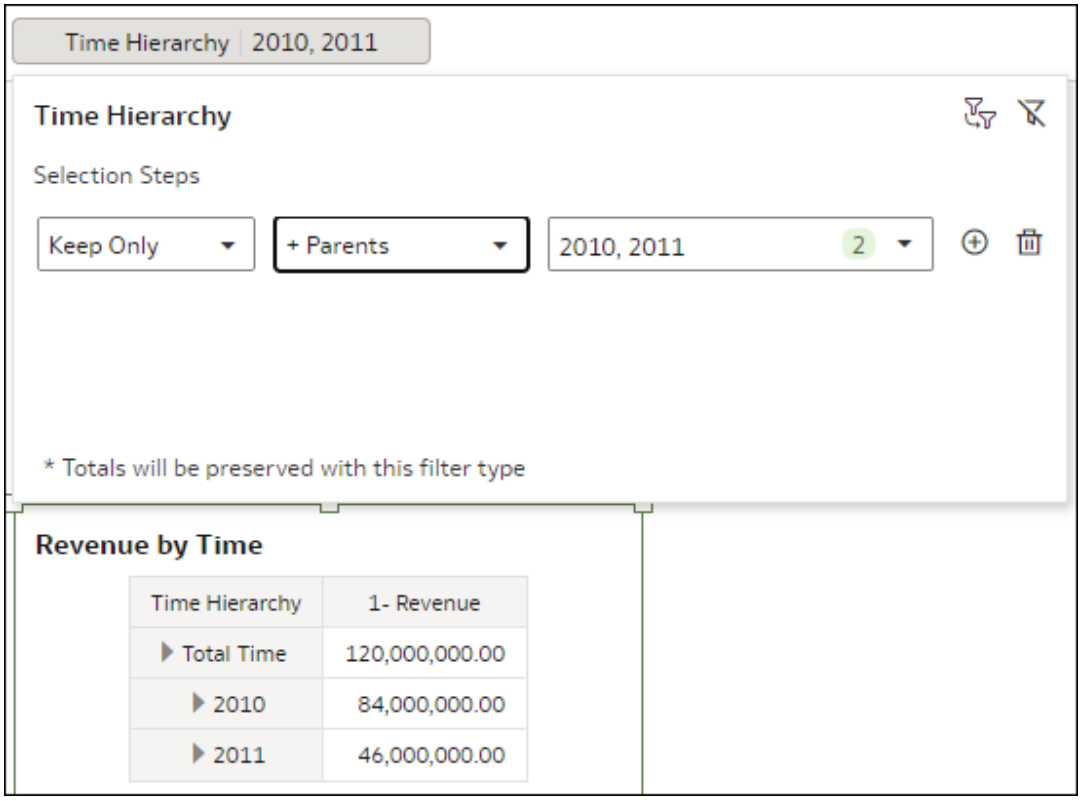
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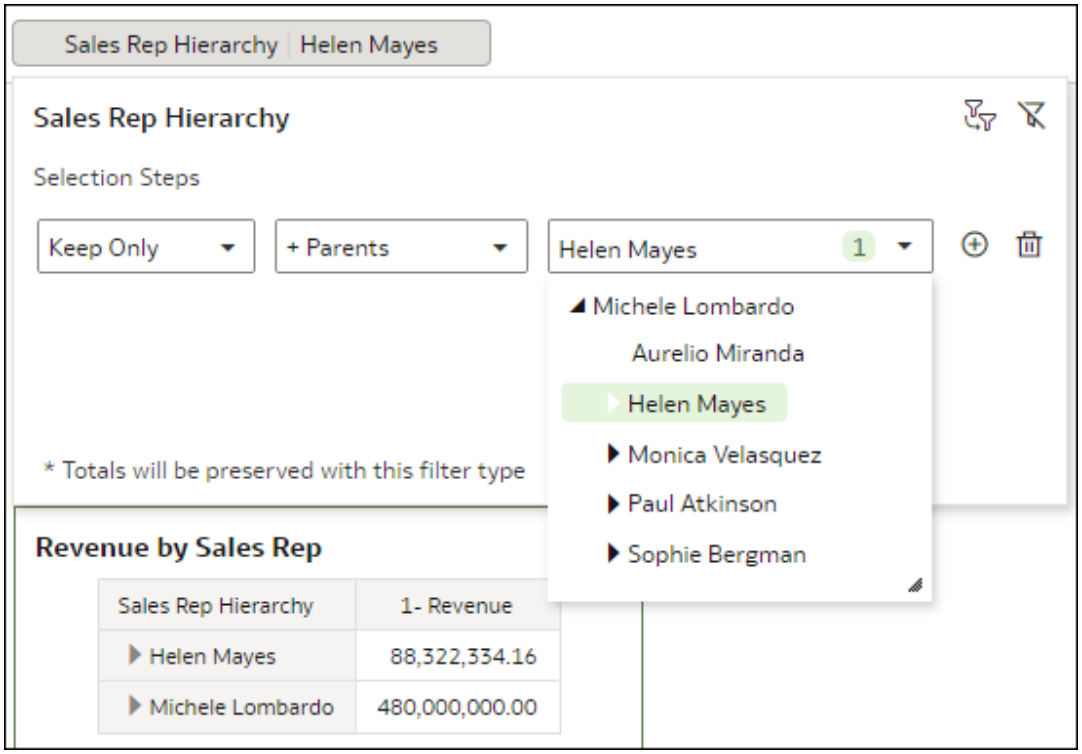
- **+ Parents**

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Parents, and the members 2010 and 2011, the table shows the revenue for those two years and their parent, in this case, Total Time.

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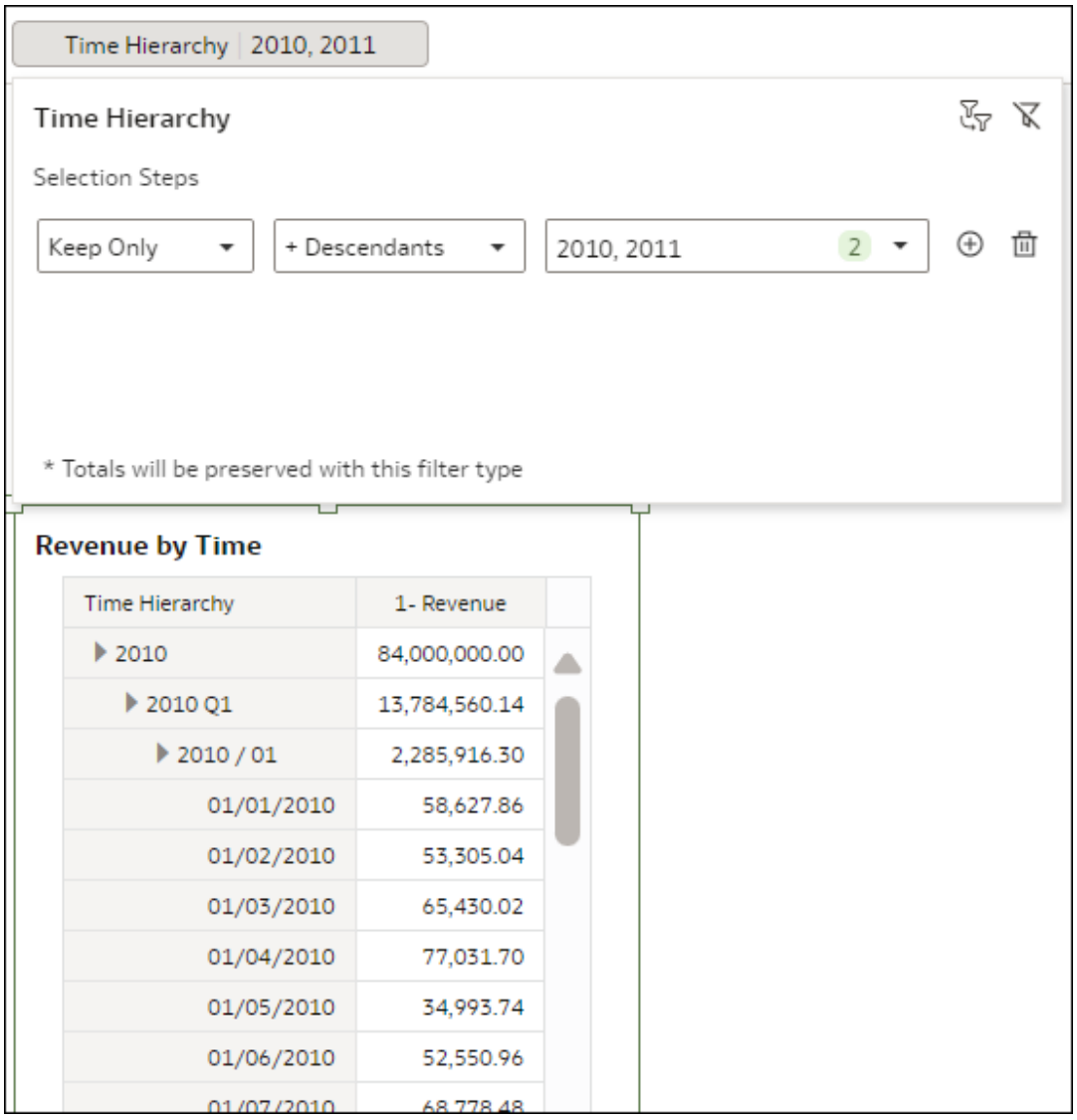
Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Parents, and the member Helen Mayes, the table shows the revenue for her and the representative she reports to. The names in the table are displayed alphabetically.



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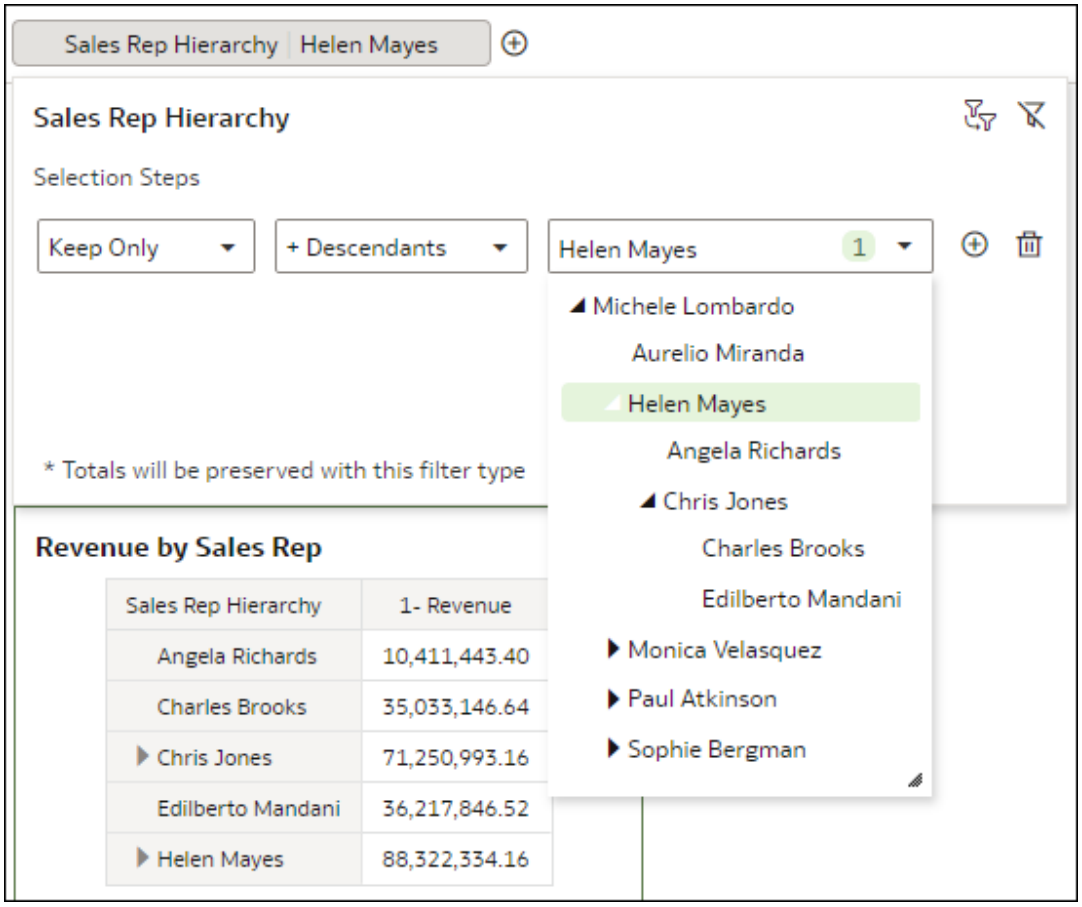
- **+ Descendants**

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Descendants, and the members 2010 and 2011, the table shows the revenue for those two years and all their descendants, in this case, quarters, months, and days.



Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Descendants, and the member Helen Mayes, the table shows the revenue for her and all the representatives in the reporting structure under her. The names in the table are displayed alphabetically.

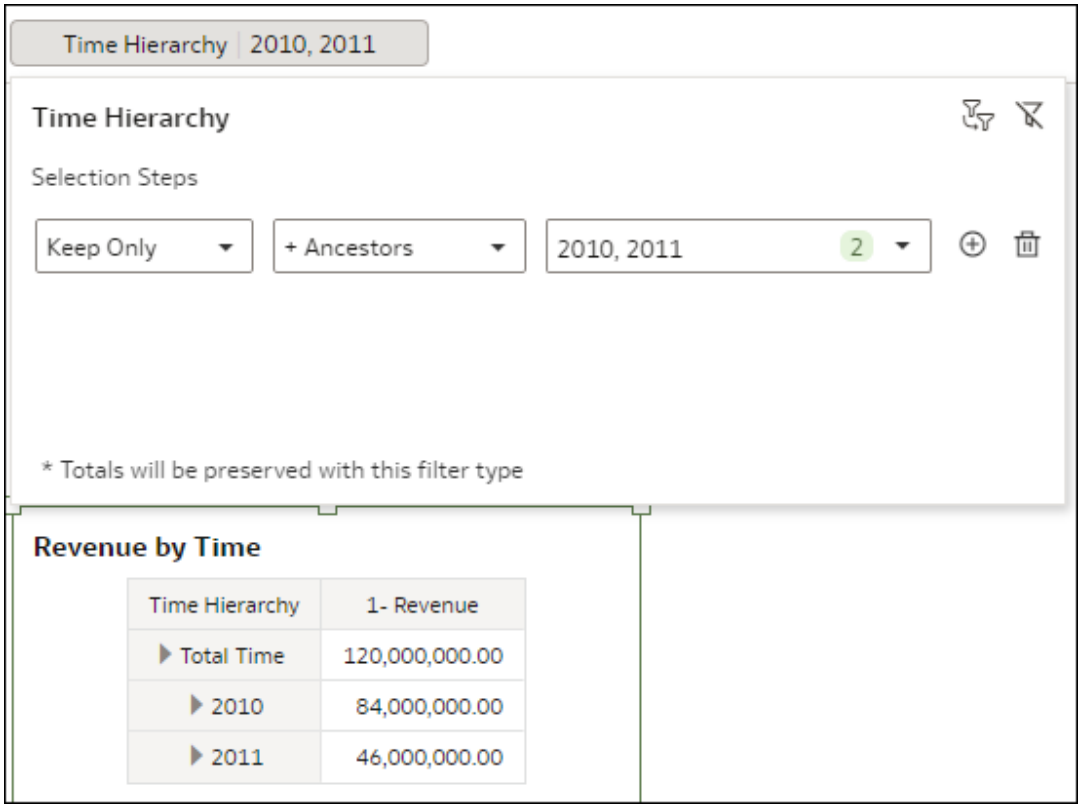
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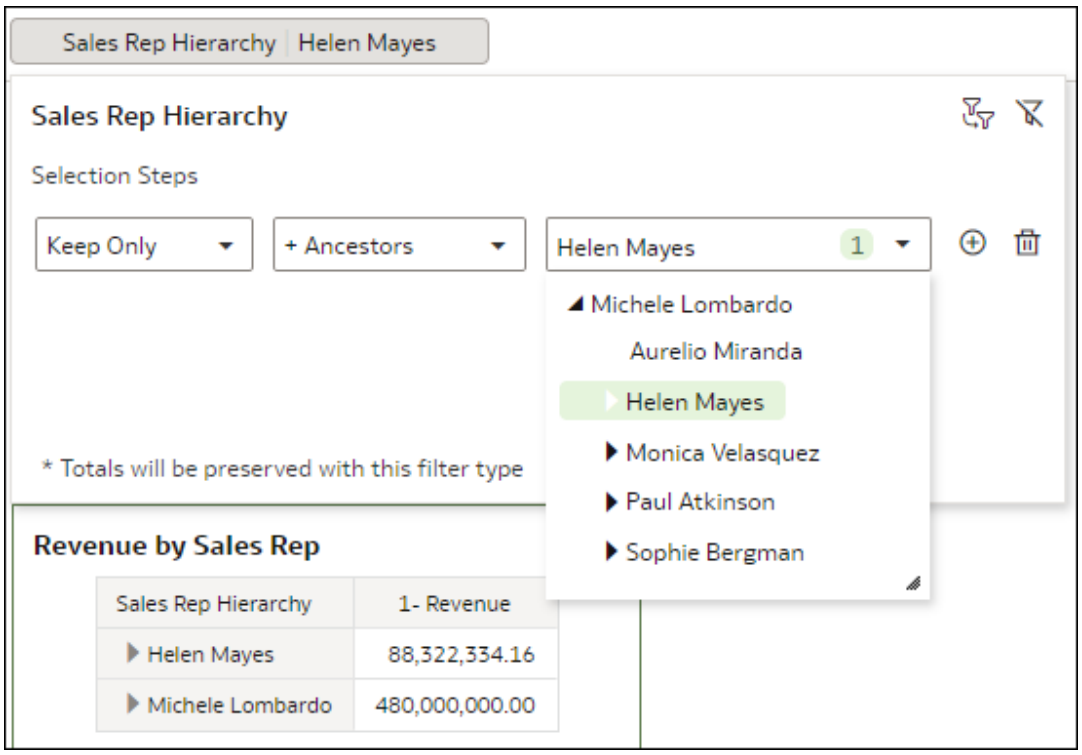
- **+ Ancestors** - Lets you specify members so that the selection step acts on them and their ancestors. The members and their ancestors are displayed in the visualization.

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Ancestors, and the members 2010 and 2011, the table shows the revenue for those two years and their ancestor, in this case, Total Time.

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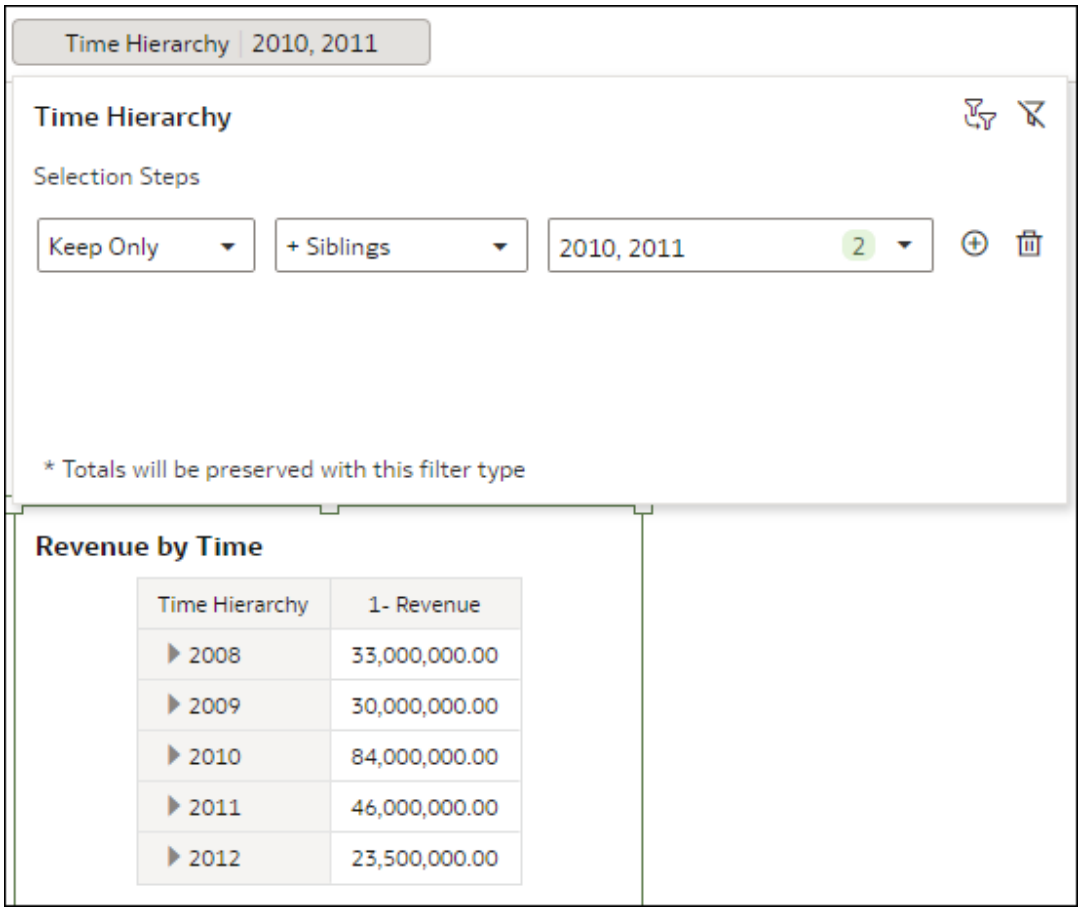
Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Ancestors, and the member Helen Mayes, the table shows the revenue for her and the representative she reports to. The names in the table are displayed alphabetically.



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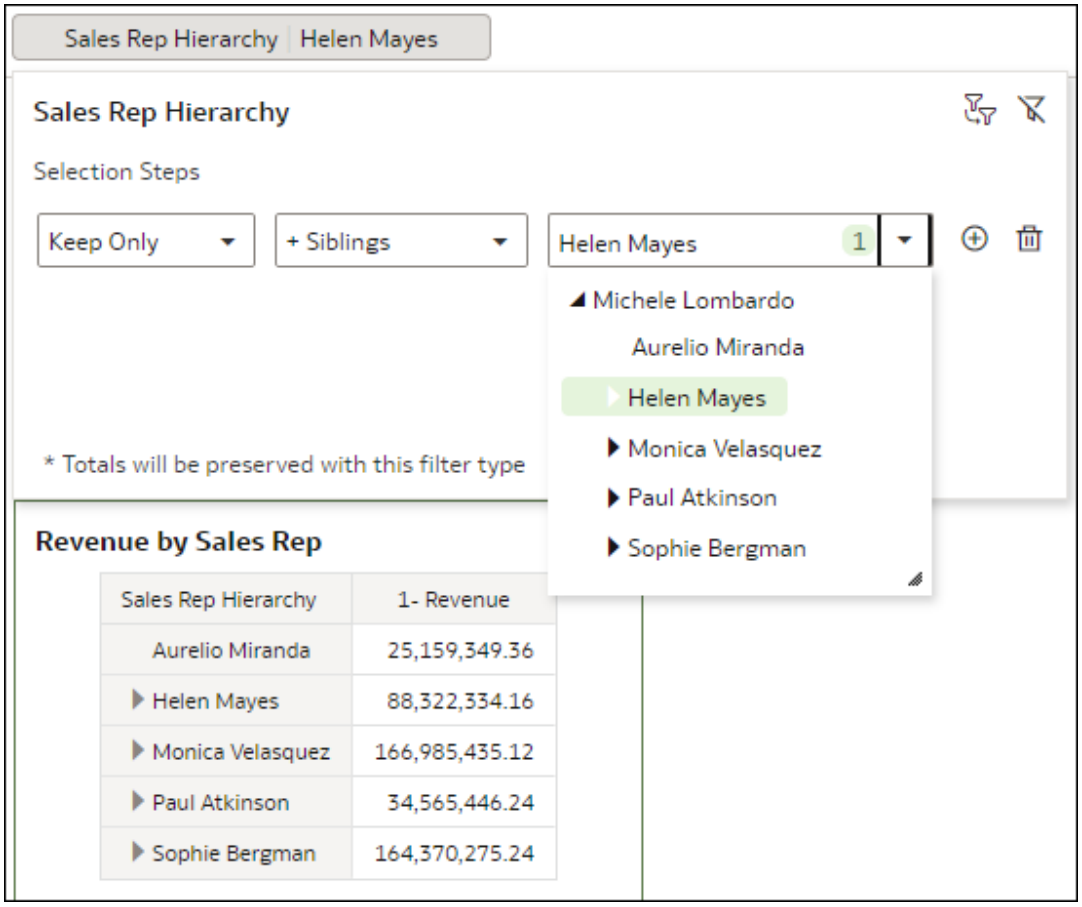
- **+ Siblings** - Lets you specify members so that the selection step acts on them and their siblings. The members and their siblings are displayed in the visualization.

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Siblings, and the members 2010 and 2011, the table shows the revenue for those two years and their siblings, in this case, the rest of the years between 2008 and 2012.



Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Siblings, and the member Helen Mayes, the table shows the revenue for her and the other representatives at the same reporting level. The names in the table are displayed alphabetically.

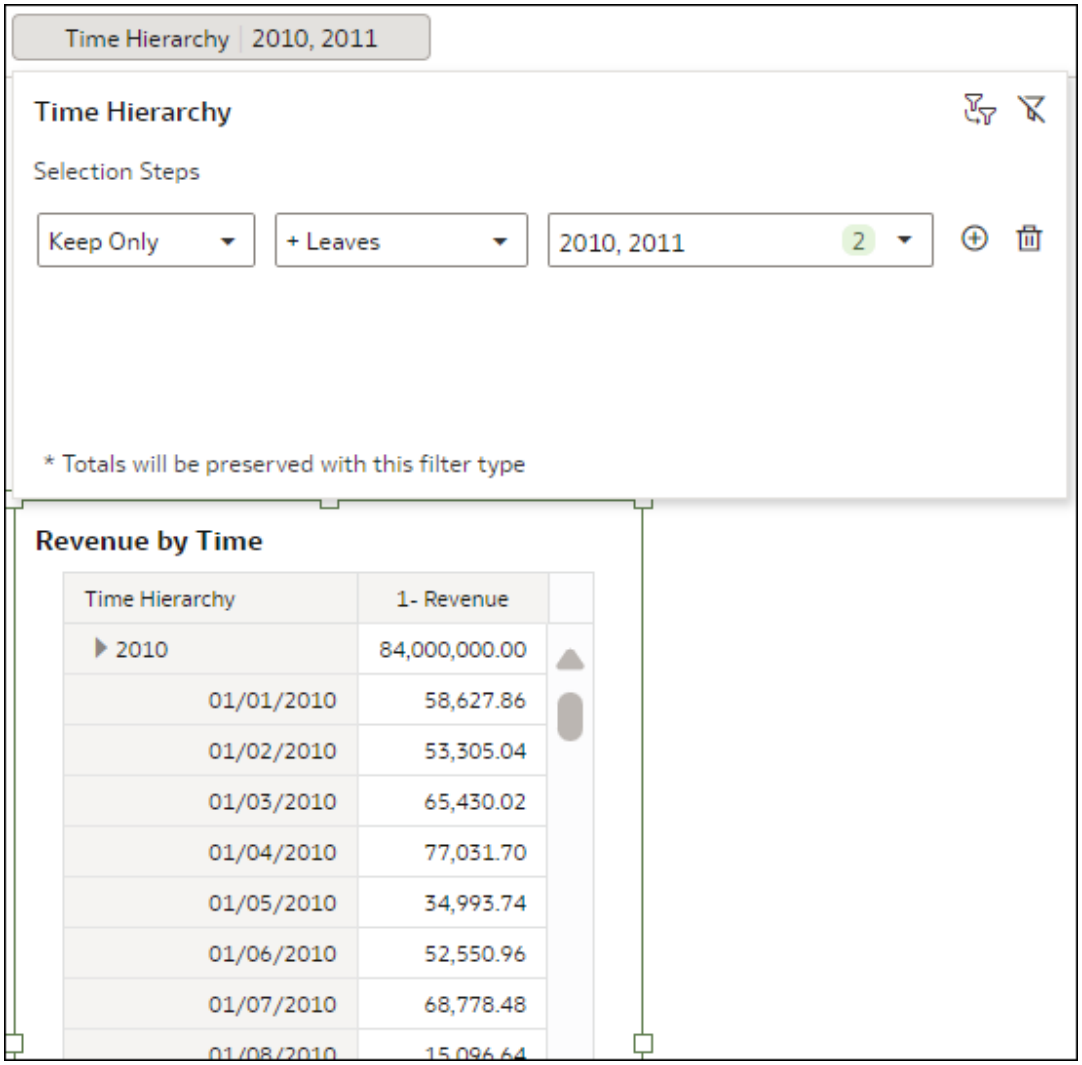
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- **+ Leaves** - Lets you specify members so that the selection step acts on them and all the leaves under them. The specified members and the lowest members under them are displayed in the visualization. Any members in between are excluded.

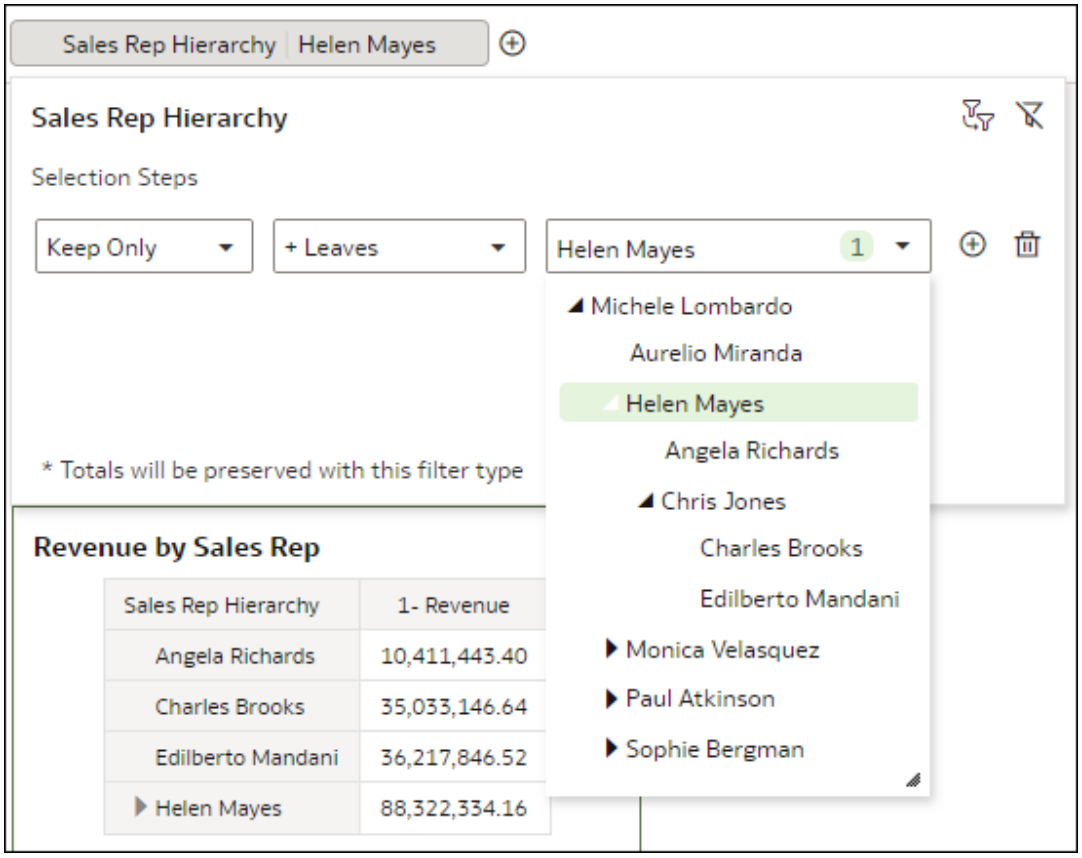
  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator + Leaves, and the members 2010 and 2011, the table shows the revenue for those two years and all their leaves, in this case, days.

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Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator + Leaves, and the member Helen Mayes, the table shows the revenue for her and all the representatives at the lowest level under her, excluding any in between. The names in the table are displayed alphabetically.

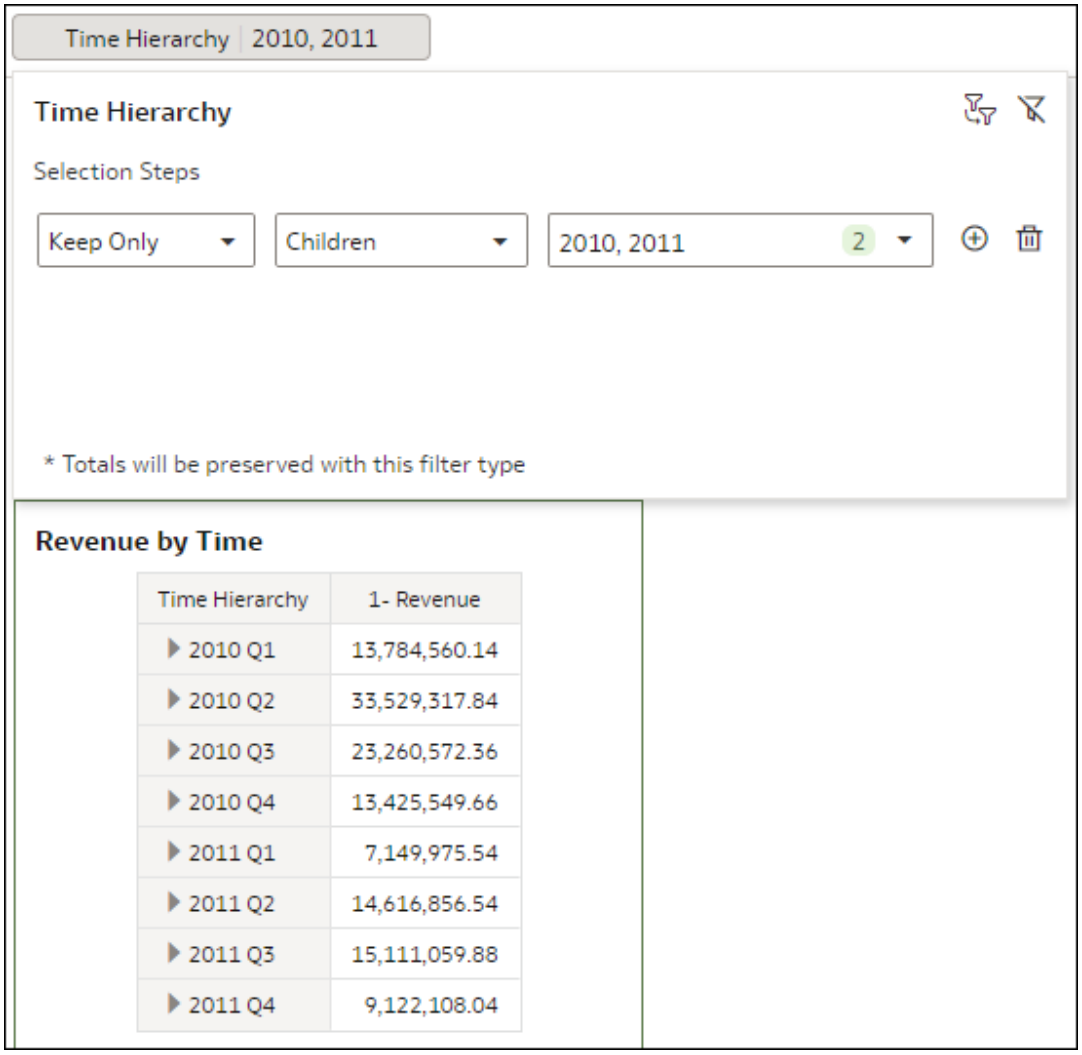
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- **Children** - Lets you specify members so that the selection step acts only on their children (not the selected members themselves). Only the children are displayed in the visualization.

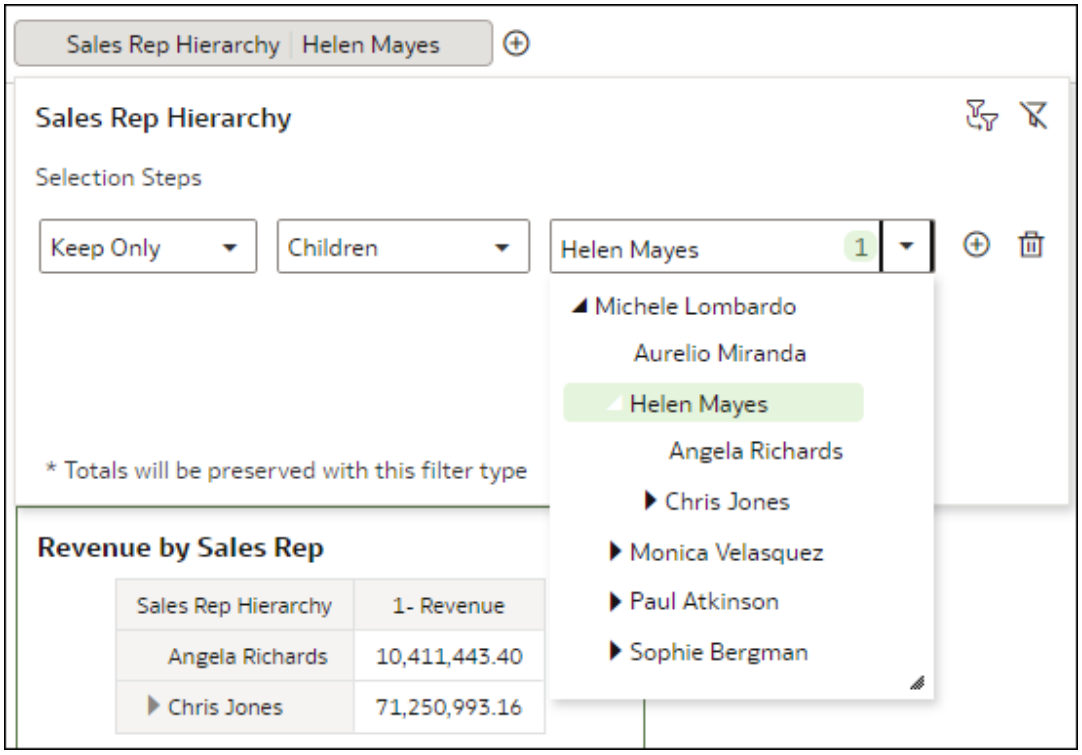
  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Children, and the members 2010 and 2011, the table shows the revenue for the children of those two years, in this case, the quarters.

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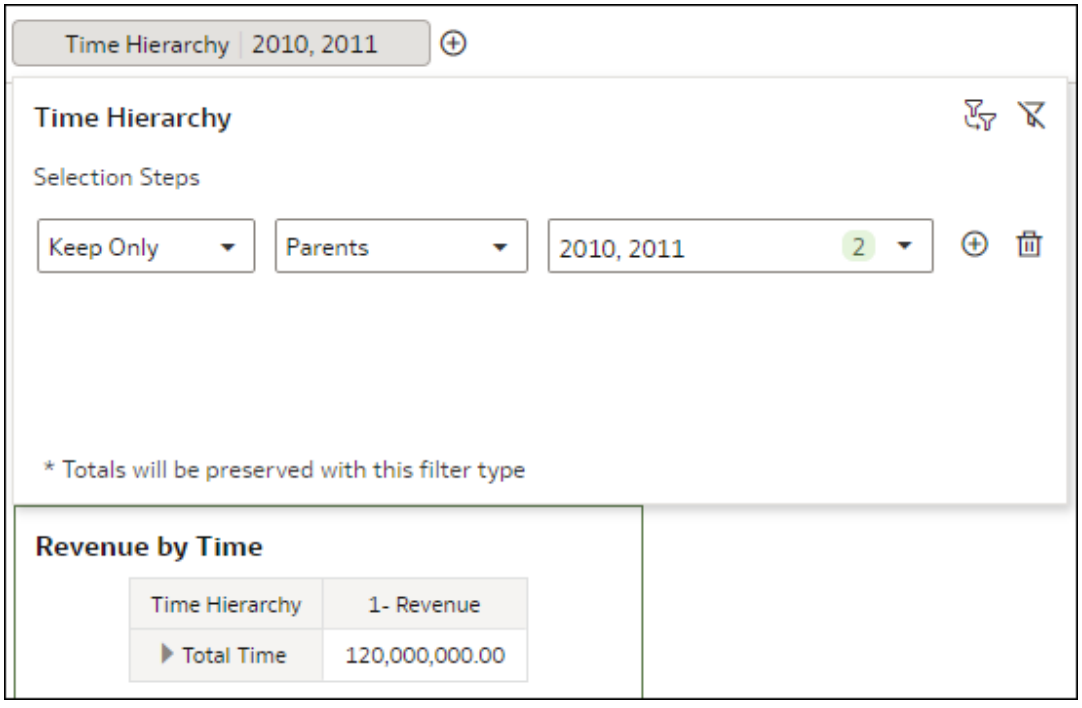
Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Children, and the member Helen Mayes, the table shows the revenue for the two representatives reporting directly to her. The names in the table are displayed alphabetically.

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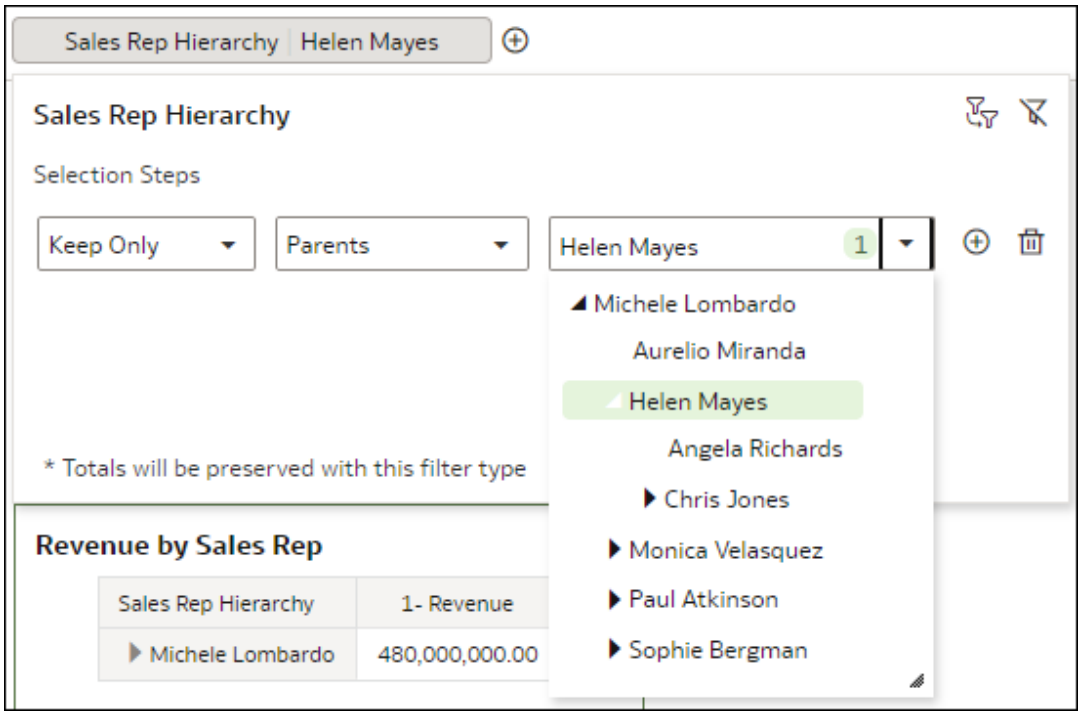
- **Parents** - Lets you specify members so that the selection step acts only on their parents. Only the parents are displayed in the visualization.

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Parents, and the members 2010 and 2011, the table shows the revenue for the parent of those two years, in this case, Total Time.



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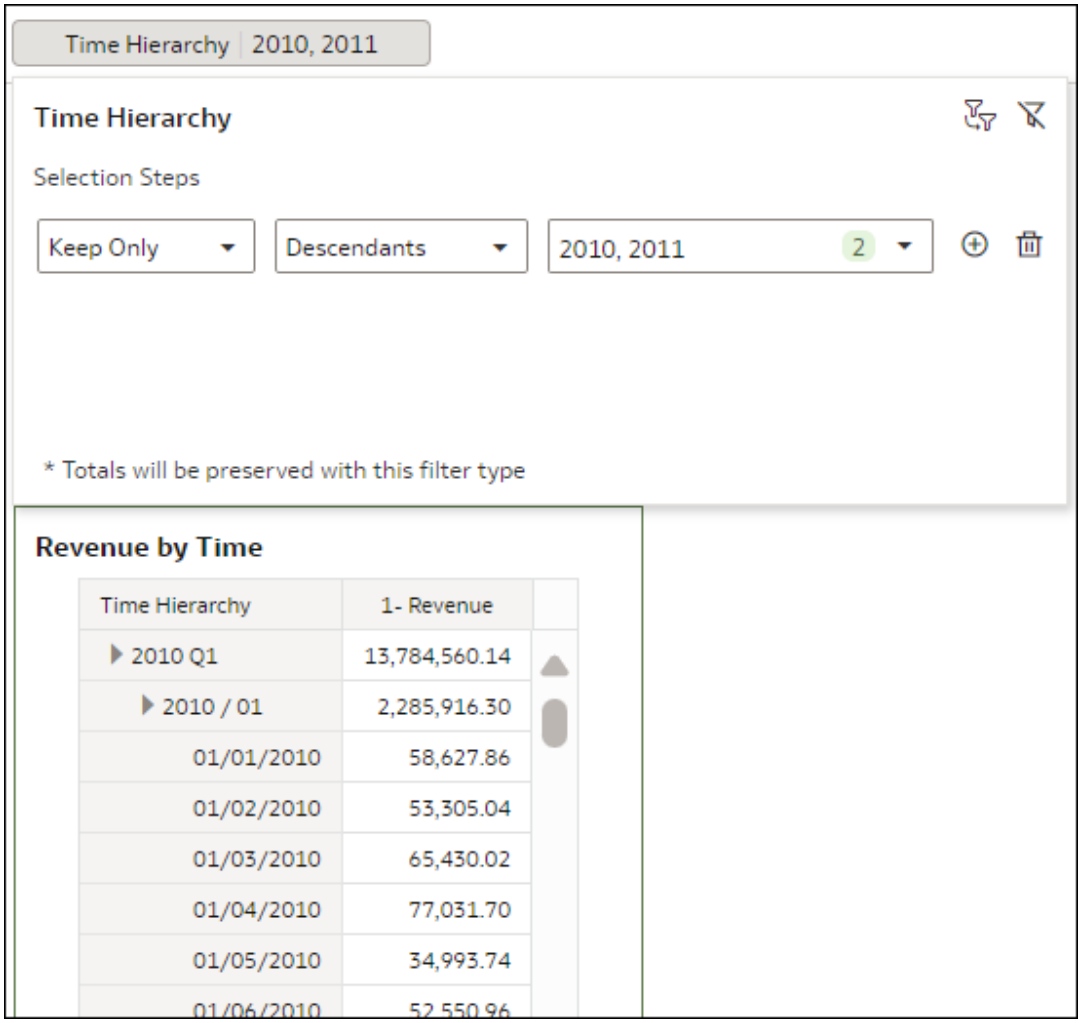
Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Parents, and the member Helen Mayes, the table shows the revenue for the representative she reports to.



- **Descendants** - Lets you specify members so that the selection step acts only on their descendants. Only the descendants are displayed in the visualization.

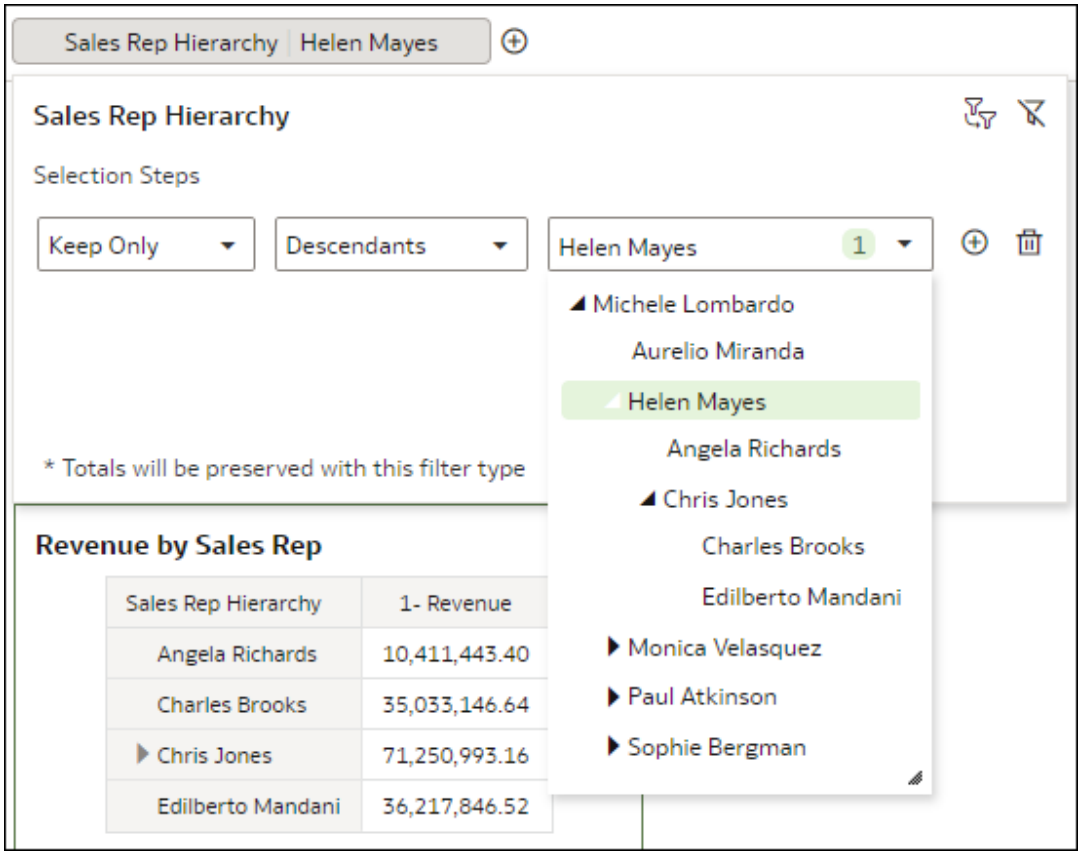
  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Descendants, and the members 2010 and 2011, the table shows the revenue for all the descendants of those two years, in this case, quarters, months, and days.

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Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Descendants, and the member Helen Mayes, the table shows the revenue for all the representatives in the reporting structure under her. The names in the table are displayed alphabetically.

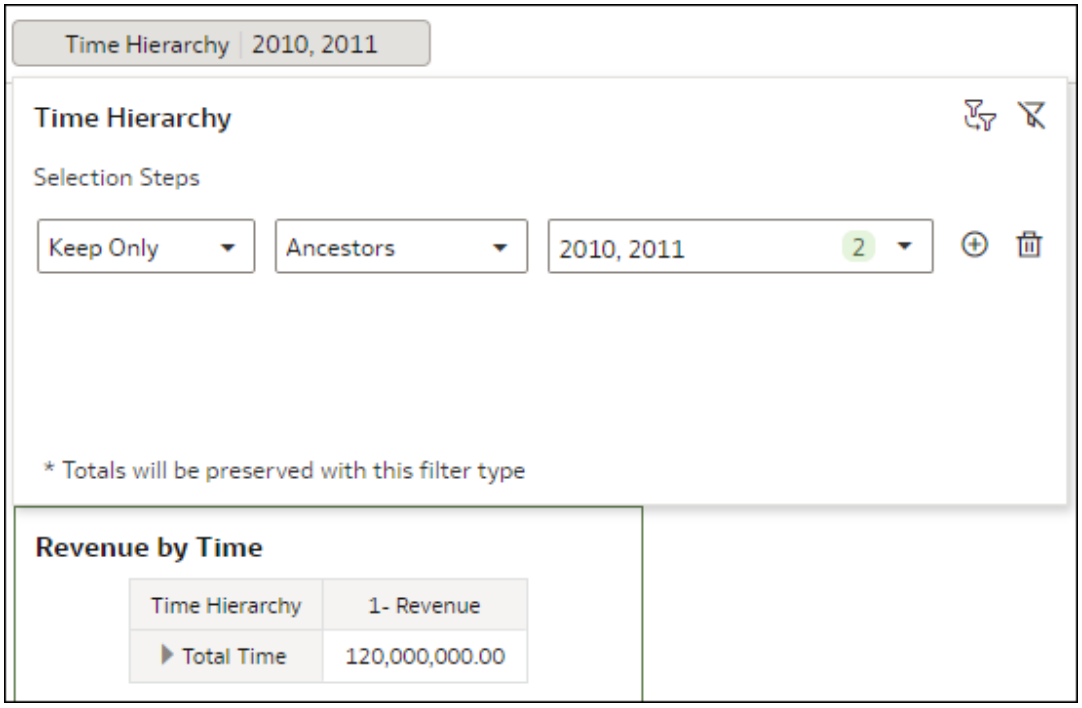
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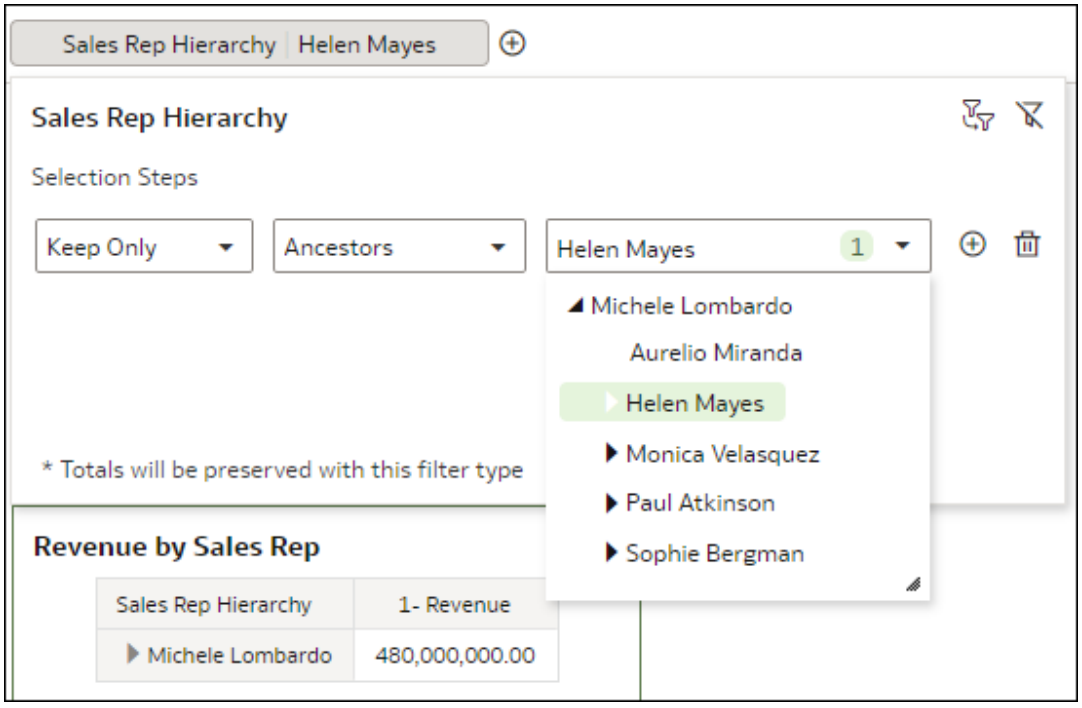
- **Ancestors** - Lets you specify members so that the selection step acts only on their ancestors. Only the ancestors are displayed in the visualization.

  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Ancestors, and the members 2010 and 2011, the table shows the revenue for the ancestor of those two years, in this case, Total Time.

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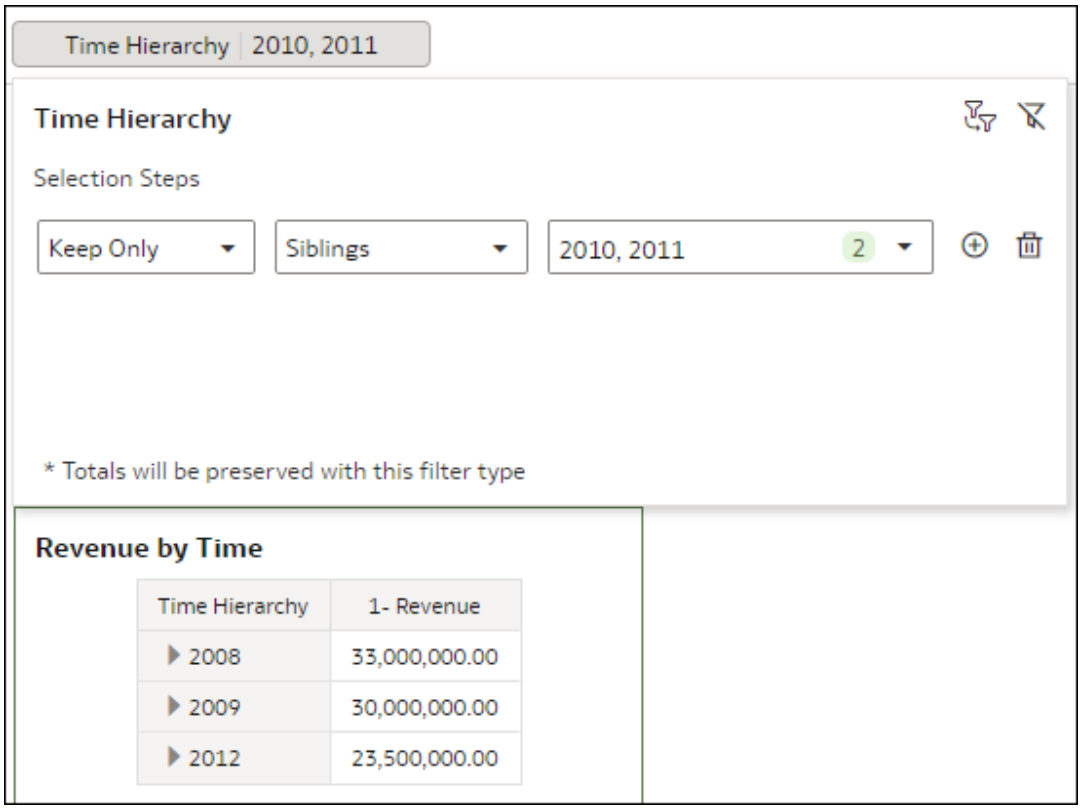
Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Ancestors, and the member Helen Mayes, the table shows the revenue for the representative she reports to.



- **Siblings** - Lets you specify members so that the selection step acts only on their siblings. Only the siblings are displayed in the visualization.

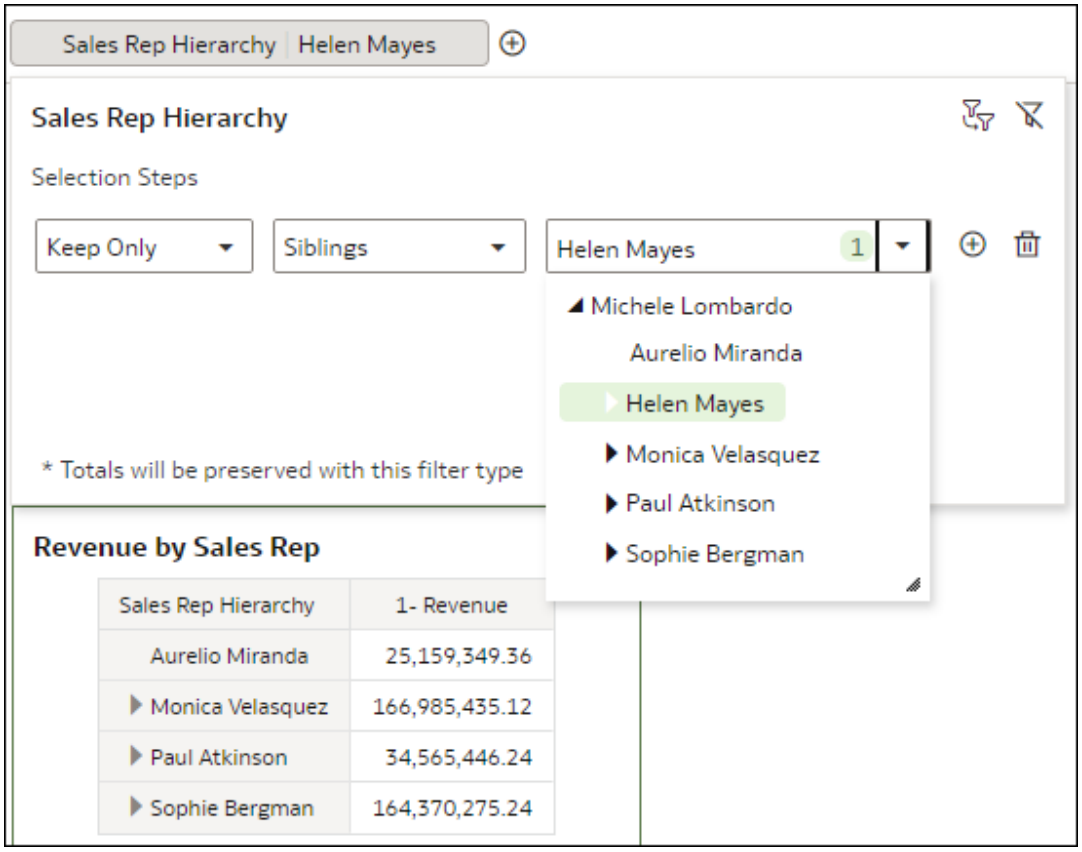
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Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Siblings, and the members 2010 and 2011, the table shows the revenue for the siblings of those two years, in this case, the rest of the years between 2008 and 2012.



Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Siblings, and the member Helen Mayes, the table shows the revenue for the other representatives at the same reporting level as her. The names in the table are displayed alphabetically.

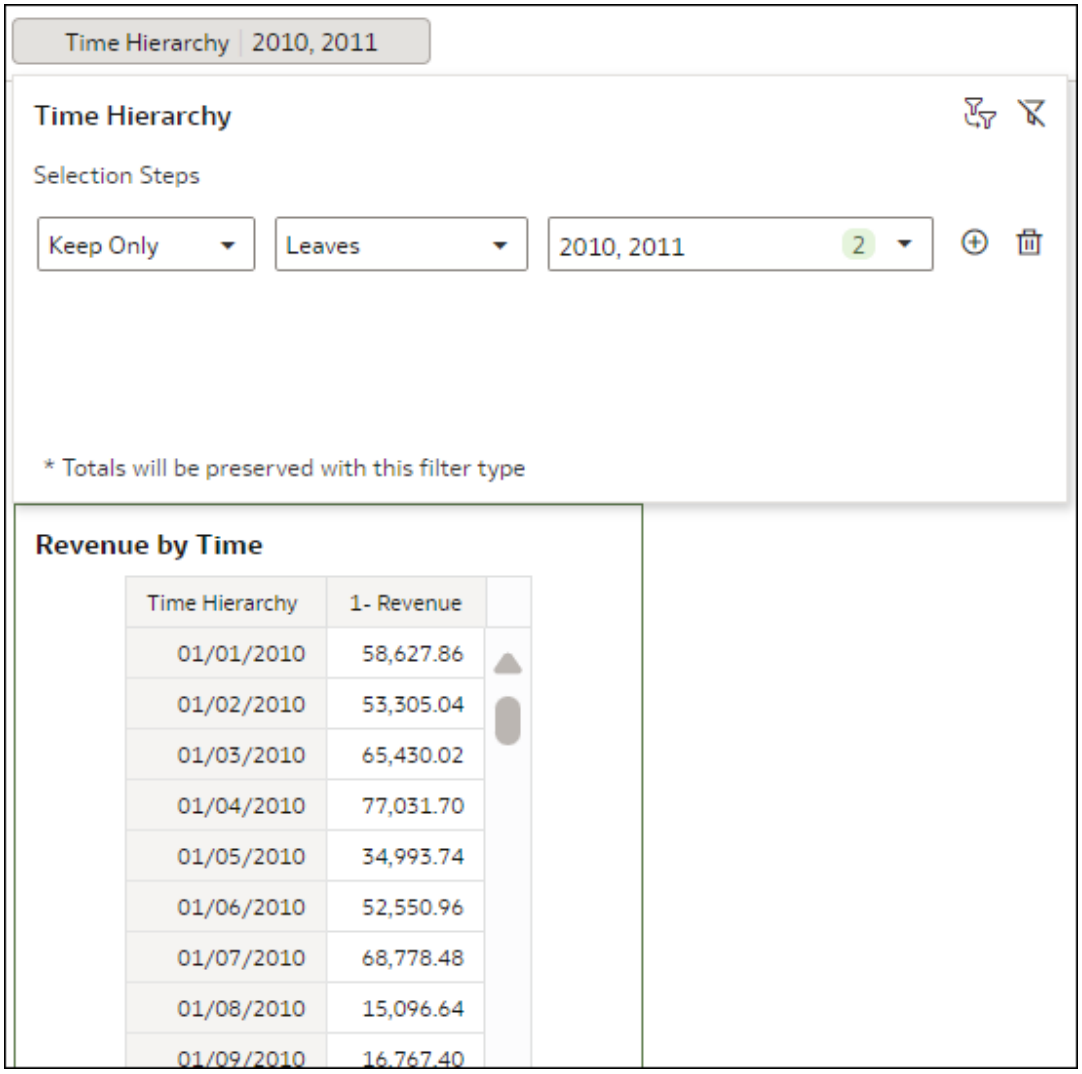
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- **Leaves** - Lets you specify members so that the selection step acts only on the leaves under them. Only the leaves are displayed in the visualization.

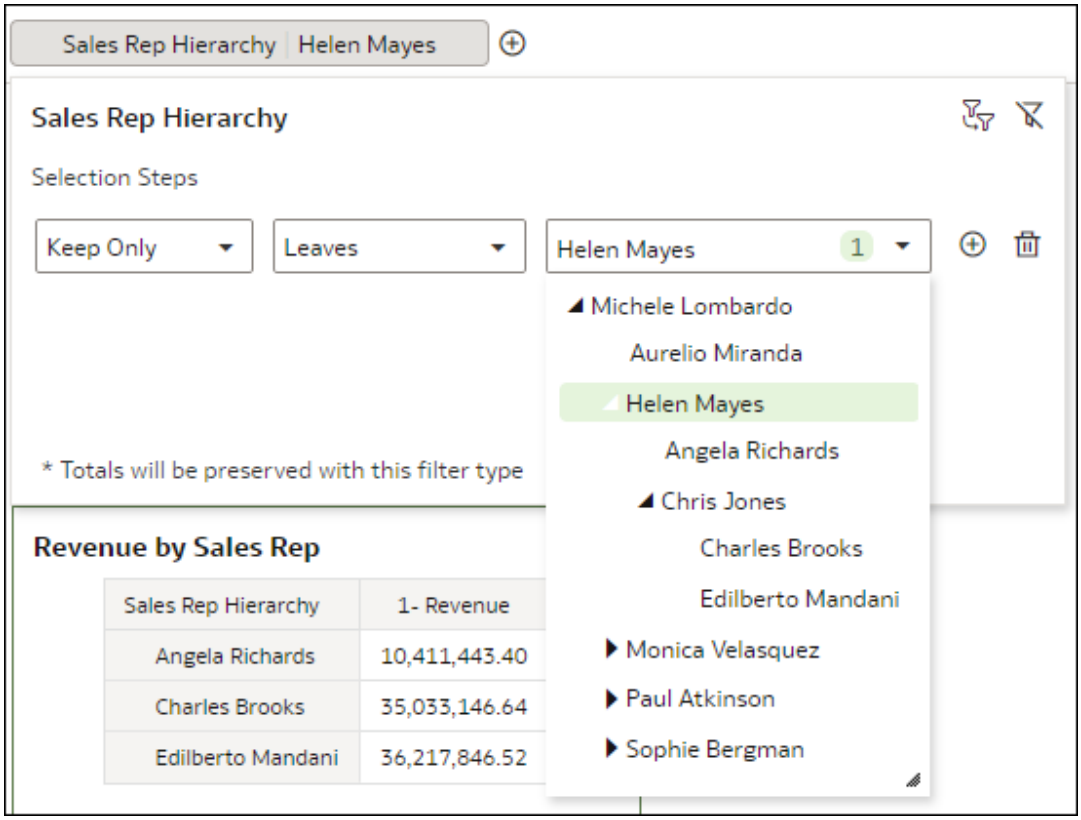
  Level hierarchy example: For a table showing revenue for a time hierarchy, if you use a selection step with the action Keep Only, the operator Leaves, and the members 2010 and 2011, the table shows the revenue for all the leaves of those two years, in this case, days.

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Parent-child hierarchy example: For a table showing revenue for a sales representative hierarchy, if you use a selection step with the action Keep Only, the operator Leaves, and the member Helen Mayes, the table shows the revenue for all the representatives at the lowest level under her, excluding any in between. The names in the table are displayed alphabetically.

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Use the Workbook Filter Bar

You can use 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 the Workbook Filter Bar
- Filter Bar Properties
- Add Workbook and Canvas Filters
- Add Selection Steps in the Filter Bar
- Specify Limit Values By for the Workbook Filter Bar
- Specify Limit Values for Workbook and Canvas Filters and Selection Steps
- Display or Hide Selected Values in the Workbook Filter Bar
- Manually Apply Selections in the Workbook Filter Bar
- Convert Canvas Filters to Dashboard Filters
- Use a Parameter in the Filter Bar

About the Workbook Filter Bar

You can add workbook filters, canvas filters, selection steps and parameters to the workbook filter bar.

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These items in the filter bar are generally the first level of filtering that you add to a workbook. You can then add other levels 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.

Filters in the filter bar can be pinned (called workbook filters) to limit the data on all canvases in the workbook, or unpinned (called canvas filters) to limit the data on a single canvas. See Add Workbook and Canvas Filters.

Selection steps work slightly differently than filters in the filter bar, but they can also be pinned or unpinned. For more information, see About Selection Steps.

For information about using parameters in the filter bar, see Use a Parameter in the Filter Bar.

You can hide the items 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).

Filter Bar Properties

You can modify these properties found in the Filter Bar Menu for items in the filter bar, depending on whether they're workbook and canvas filters, selection steps or parameters.

Property	Description
Limit Values By	Specifies how the filters and selection steps in the filter bar get their selection values. See Specify Limit Values By for the Workbook Filter Bar. You can't configure this property for parameters used in the filter bar.
Filter Values	Specifies whether the selected values for the filters, selection steps, and parameters in the filter bar are displayed. **Options** • **Show All** - Displays selected values for all existing items in the filter bar. • **Hide All** - Hides selected values for all existing items in the filter bar. • **Show by Default** - Shows selected values for items that you add next. Items that you added before selecting this option aren't affected. See Display or Hide Selected Values in the Workbook Filter Bar.
Auto-Apply Filters	Specifies whether the filter, selection step, and parameter value selections in the filter bar are automatically applied. **Options** • **On** - Applies value selections as you make them in the filter bar. • **Off** - Doesn't automatically apply any selections you make in the filter bar. Adds an Apply button to the Filter or Selection Steps dialog. See Manually Apply Selections in the Workbook Filter Bar.

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Property	Description
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. You can't convert workbook filters, selection steps, or parameters used in the filter bar to dashboard filters using this option.

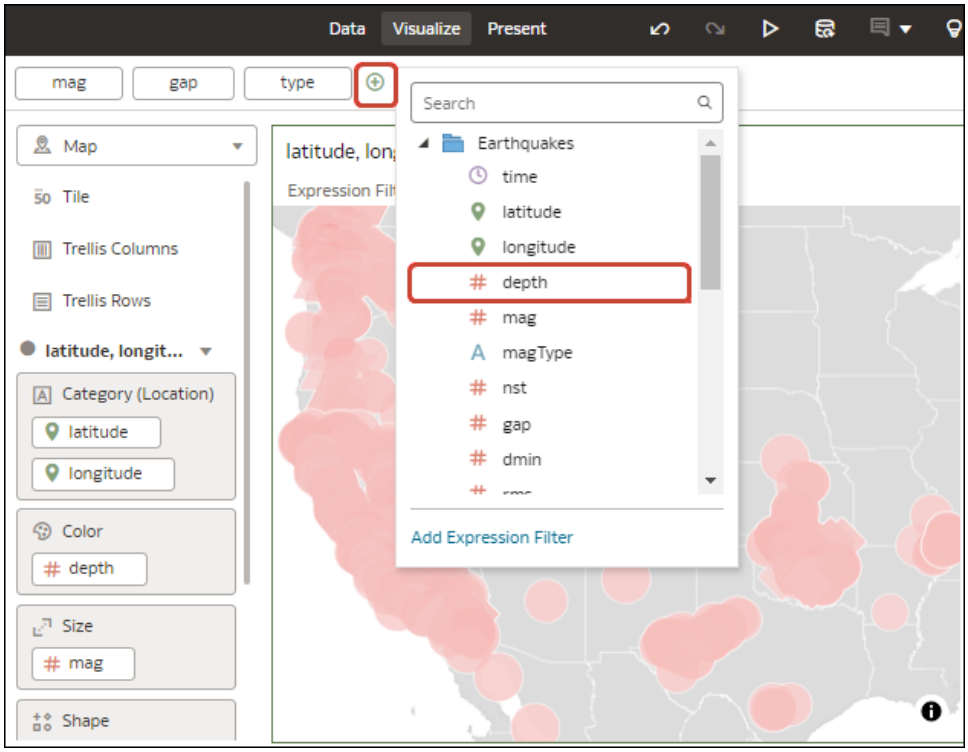
Add Workbook and Canvas Filters

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.

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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**.

Add Selection Steps in the Filter Bar

Use selection steps in the workbook filter bar to select the levels or members you want to display in a table or pivot table visualization that uses a level or parent-child hierarchy.

You can create selection steps only for hierarchical data elements. A selection step affects only visualizations that use the same hierarchy as the selection step.

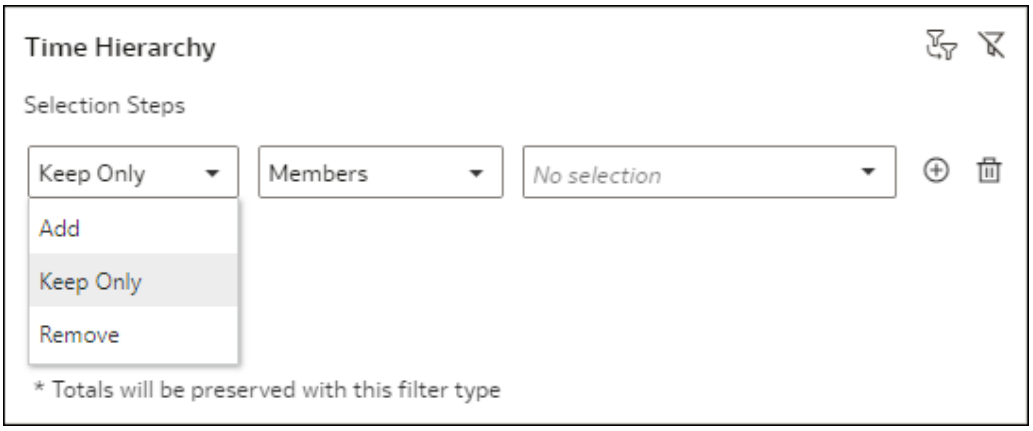
For more information about selection steps, including how to use the different actions and operators, see About Selection Steps.

For information about which filter bar properties apply to selection steps, see Filter Bar Properties.

For information about the Limit Values setting for selection steps, see How Filters Limit Each Other.

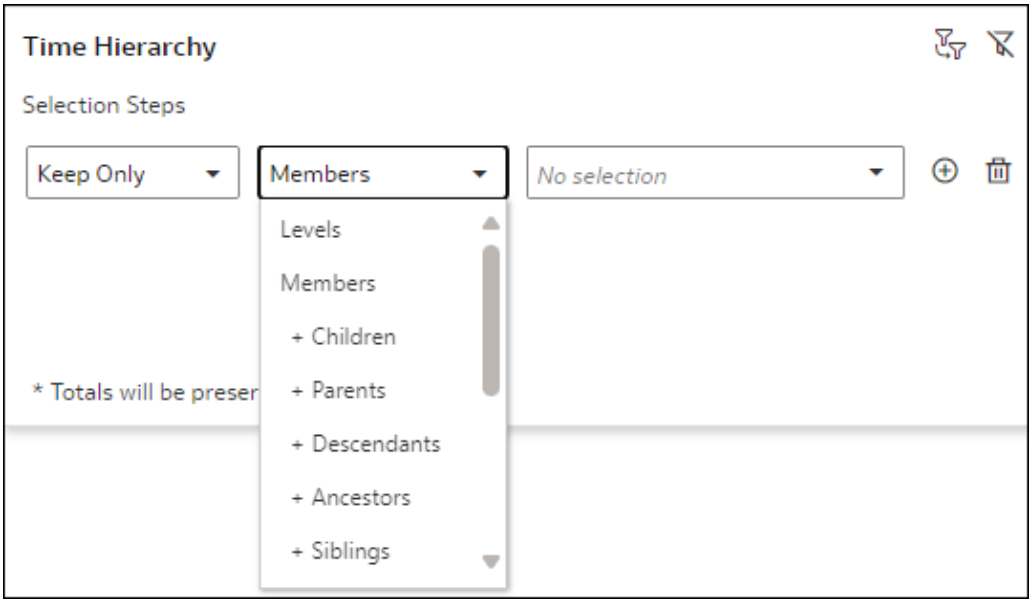
For information about disabling a selection step, see Disable a Filter or Selection Step.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the Data panel, drag and drop a hierarchical data element to the filter bar.
3. In the Selection Steps dialog:
   a. Select an action from the Actions drop-down list.



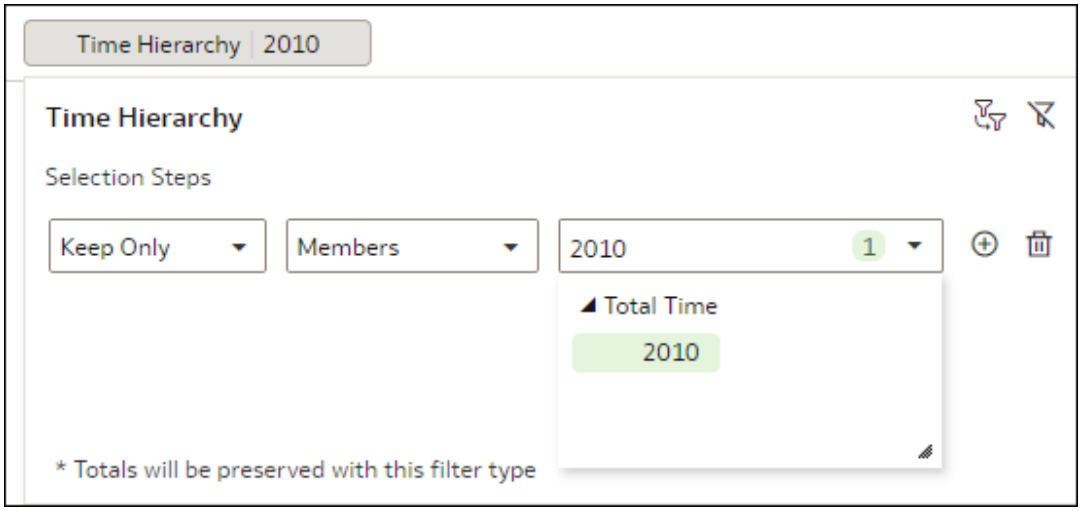
   b. Select an operation from the Operators drop-down list.

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c. Use Ctrl-click to select the levels or members from the Values drop-down list.

4. Optional: To quickly see the exact members selected, click the green highlighted number in the member selection drop-down list.



5. Click **Save**.

Specify Limit Values By for the Workbook Filter Bar

Configure the **Limit Values By** setting for the workbook filter bar to apply to each filter and selection step that you add to it.

Before you add different filters and selection steps to your workbook, it's important to understand the limit values settings and how they affect each other, see How Filters Limit Each Other.

To use an individual filter or selection step's **Limit Values** setting to override the filter bar's **Limit Values By** setting, see Specify Limit Values for Workbook and Canvas Filters and Selection Steps.

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1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Filter Bar Menu**, then hover over **Limit Values By** .
3. Click an option to select it.
4. Click **Save**.

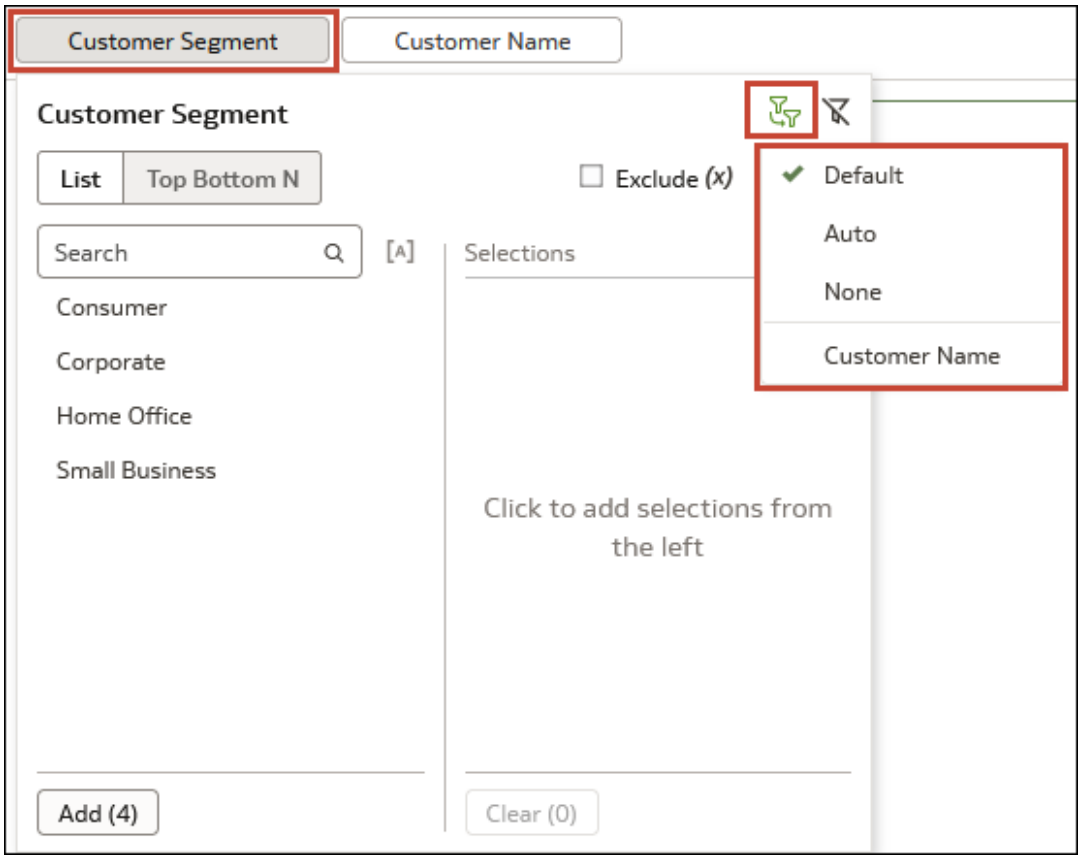
Specify Limit Values for Workbook and Canvas Filters and Selection Steps

Configure the **Limit Values** setting for individual filters and selection steps in the filter bar to specify if the selections from one item determine the available selections for others.

Before you add different filters and selection steps 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** setting is turned on by default for filters, but is off by default for selection steps.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the filter or selection step to open the Filter or Selection Steps dialog.
3. Click **Limit Values** and click an option to select it.



4. Click **Save**.

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Display or Hide Selected Values in the Workbook Filter Bar

You can display the selected filter, selection step or parameter values in the labels in the filter bar so that you don't have to open a dialog to check the 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 selected values in the filter bar. For more information about this property, see Filter Bar Properties.

For a pinned workbook filter or selection step, you can change the value 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 Selections in the Workbook Filter Bar

As you select filter, selection step or parameter values in the filter bar, Oracle Analytics automatically applies them. You can change this behavior when you want to manually apply the selections instead.

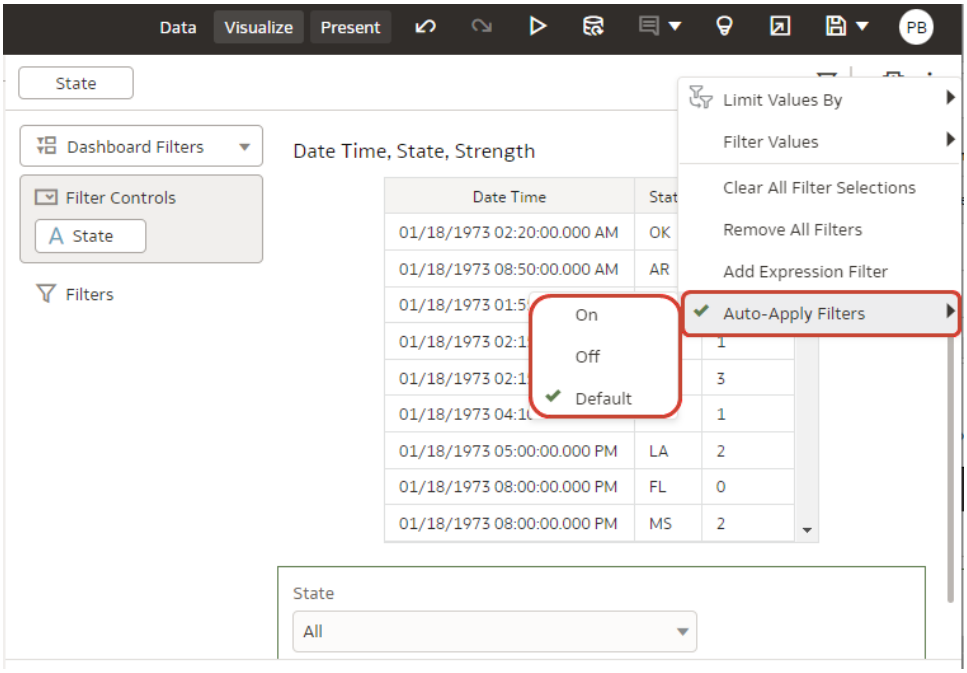
Use the **Auto-Apply Filters** property in the **Filter Bar Menu** to specify if you want to manually apply all selections. When you set this property, it applies to all items in the filter bar across all canvases.

When set to **Off**, you can select values and then click the **Apply** button when you want to apply the 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.

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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**.

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Use a Parameter in the Filter Bar

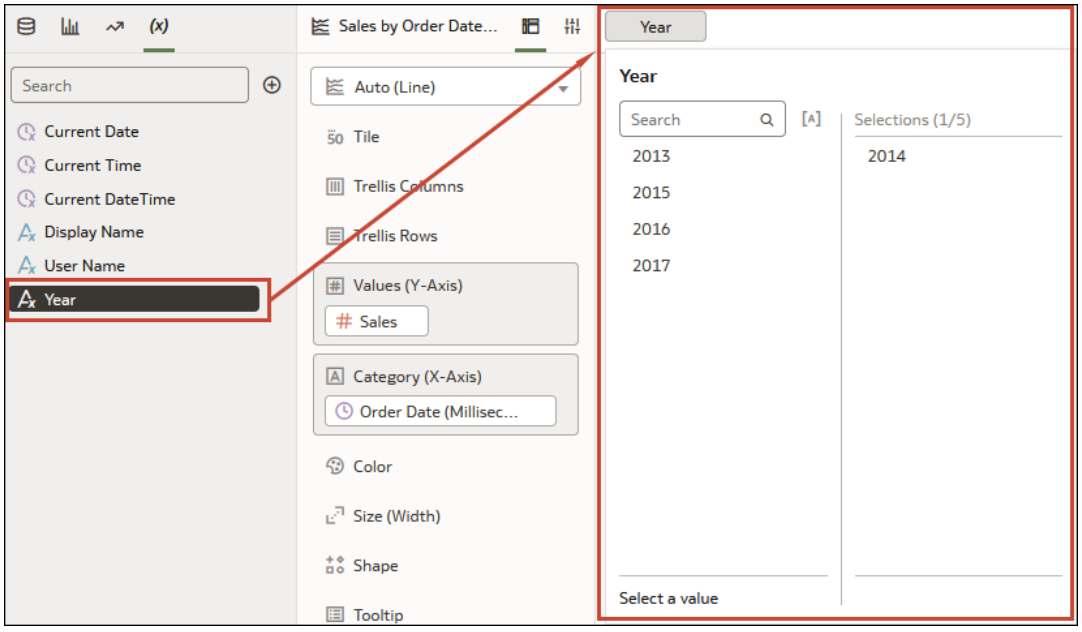
Adding a parameter to the filter bar allows you to set the parameter value for the whole workbook or an individual canvas.

> **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

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- 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 consumers 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 the Workbook Filter Bar. You can then add and configure dashboard filters on each canvas to allow consumers 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.

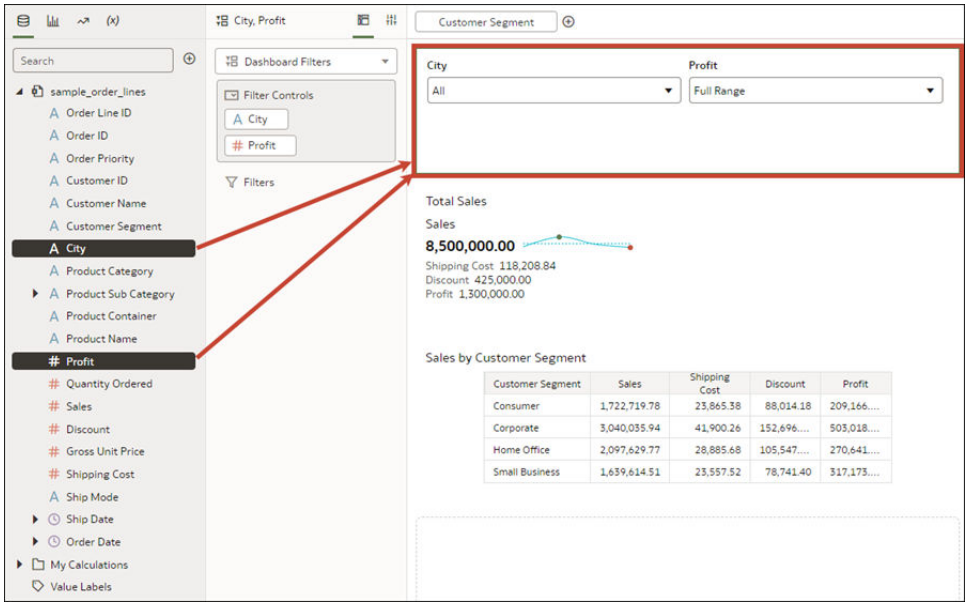
Dashboard filters enable end users to select their own filter values to change the data in the visualizations.

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.

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4. Optional: Click a filter control to open the Filter dialog, then select the data values filter on.
5. Click **Save**.

Specify Limit Values for Dashboard Filters

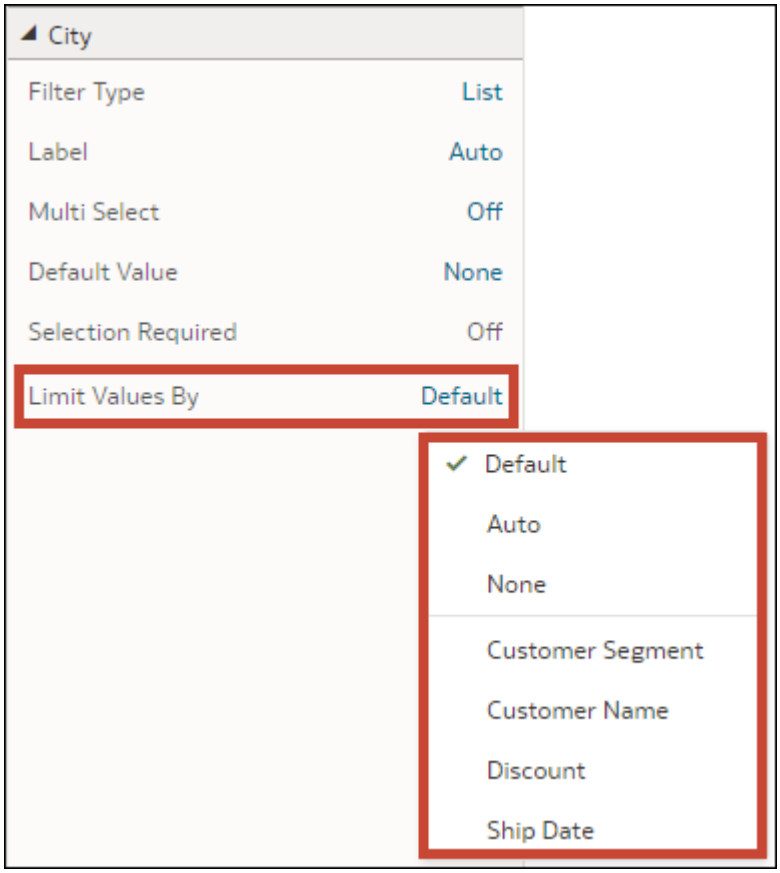
You can specify how a dashboard filter gets its selection values, for example from the workbook filter bar or other dashboard filters.

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.

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 **Filter Controls**.
4. Locate and expand the filter you want to set the limit by for.
5. Click the **Limit Values By** field and select how you want to limit the filter's selection values.

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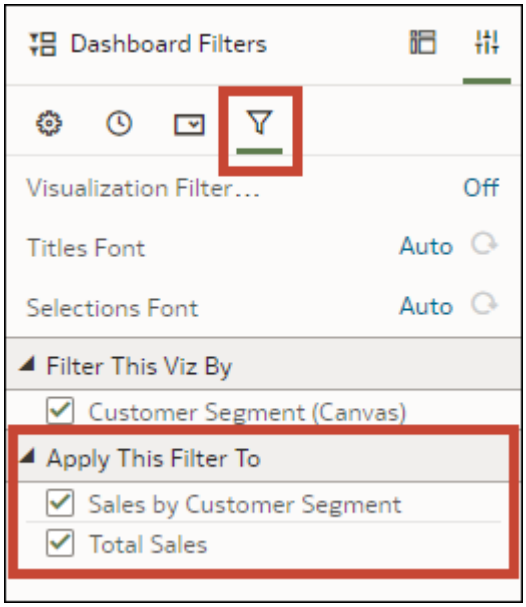
6. Click **Save**.

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.

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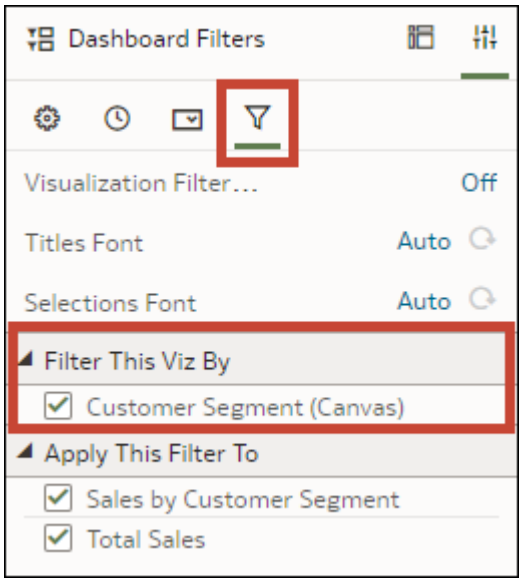


5. Click **Save**.

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**.

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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.

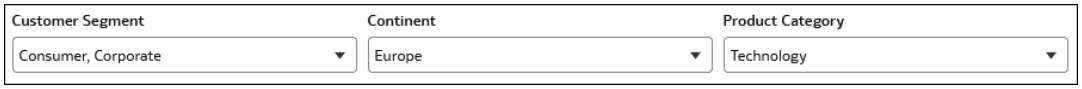
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click the dashboard filters visualization to select it.
3. Click **Properties** to open the Properties pane, then click **General**.
4. Click the **Orientation** field and select an orientation.
5. Click **Save**.

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



- Filter Chip



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.

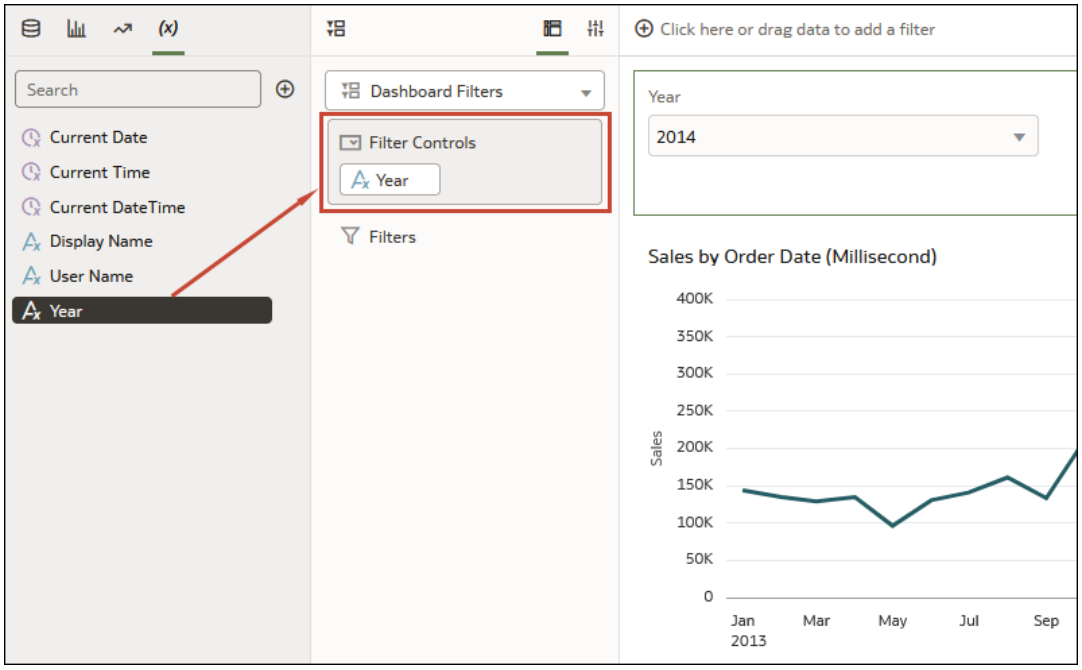
> **Note**
>
> Adding a parameter as a dashboard filter control functions as a column selector, it doesn't filter data.

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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. Consumers can select a dimension value interactively, or automatically play through dimension values, similar to a time-lapse video or animation.

As another example, you might analyze Olympic medals between 2000 and 2012 in an animation showing the numbers changing over the years.

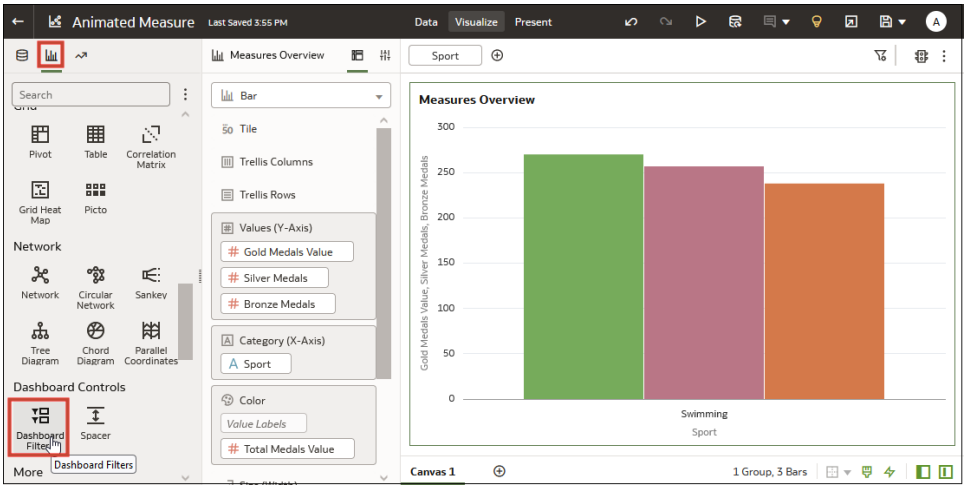
Before you can create a slider dashboard filter, you need to have one or more visualizations on your canvas for which the dimension, in this case, Year, can be used as a filter. Each visualization must include the same dimension data.

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.

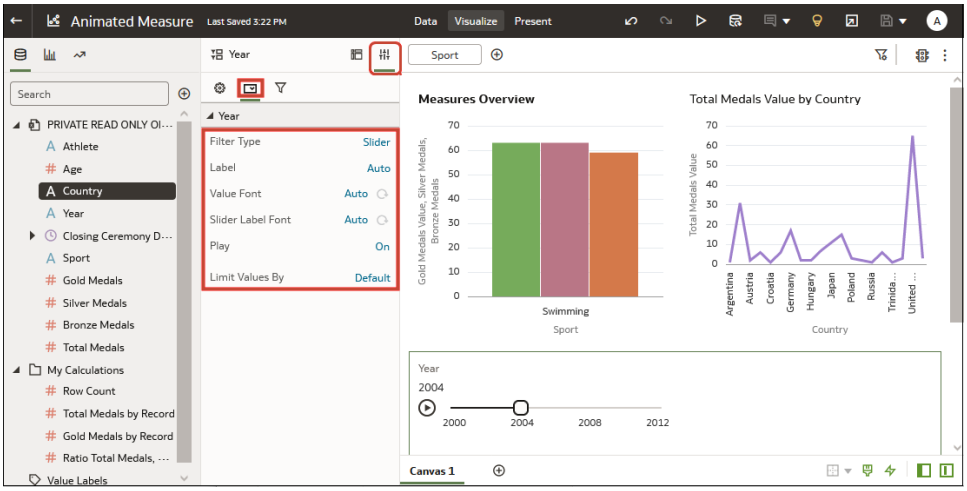
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For more information about slider filters, see Filter Types. For more information about slider dashboard filter properties, see Dashboard Filter Control Properties.

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.

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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 the Workbook Filter Bar. You can then add and configure dashboard filters on each canvas to allow consumers 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 consumer, see Show or Hide a Visualization Filter in Present.

Add Visualization Filters

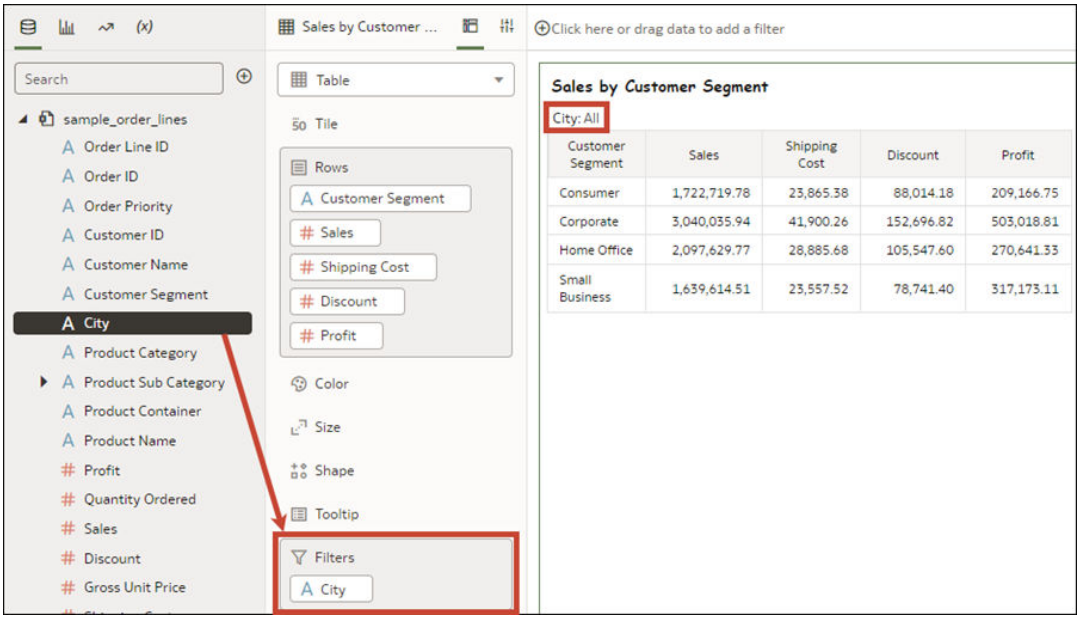
Add visualization filters to a visualization to filter the data in that visualization only, without affecting anything else in the workbook.

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.

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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:

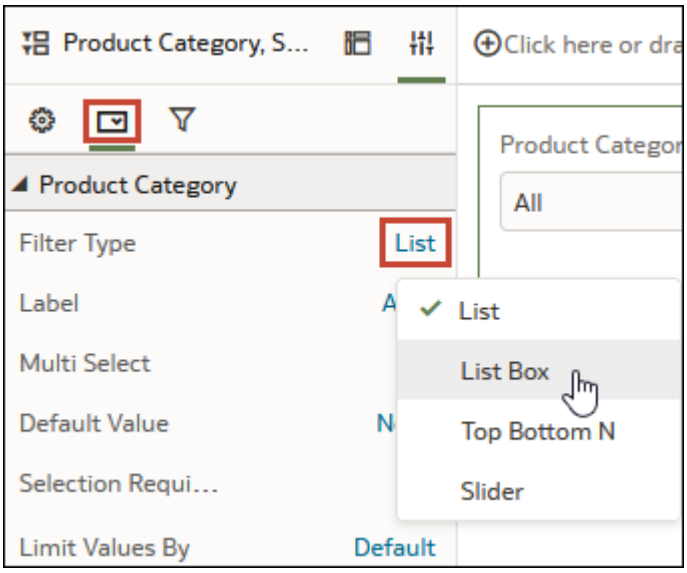
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a. Click the dashboard filters visualization to select it.

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.

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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**.

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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 or Selection Step

You can disable a filter or selection step 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 or selection step, on the filter bar, click the item to open the Filter or Selection Steps 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**.

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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
- Create a Parameter that Uses a Logical SQL Query for a Double Column
- Create a Parameter with the SQL Expression Data Type
- 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.

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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.

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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:

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  - 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.

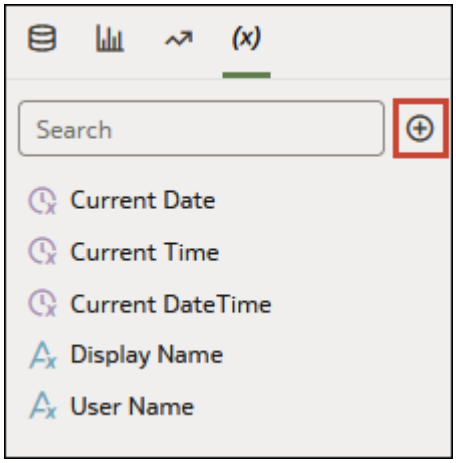
For information about how to choose the parameter's properties, see About Parameter Properties.

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**.

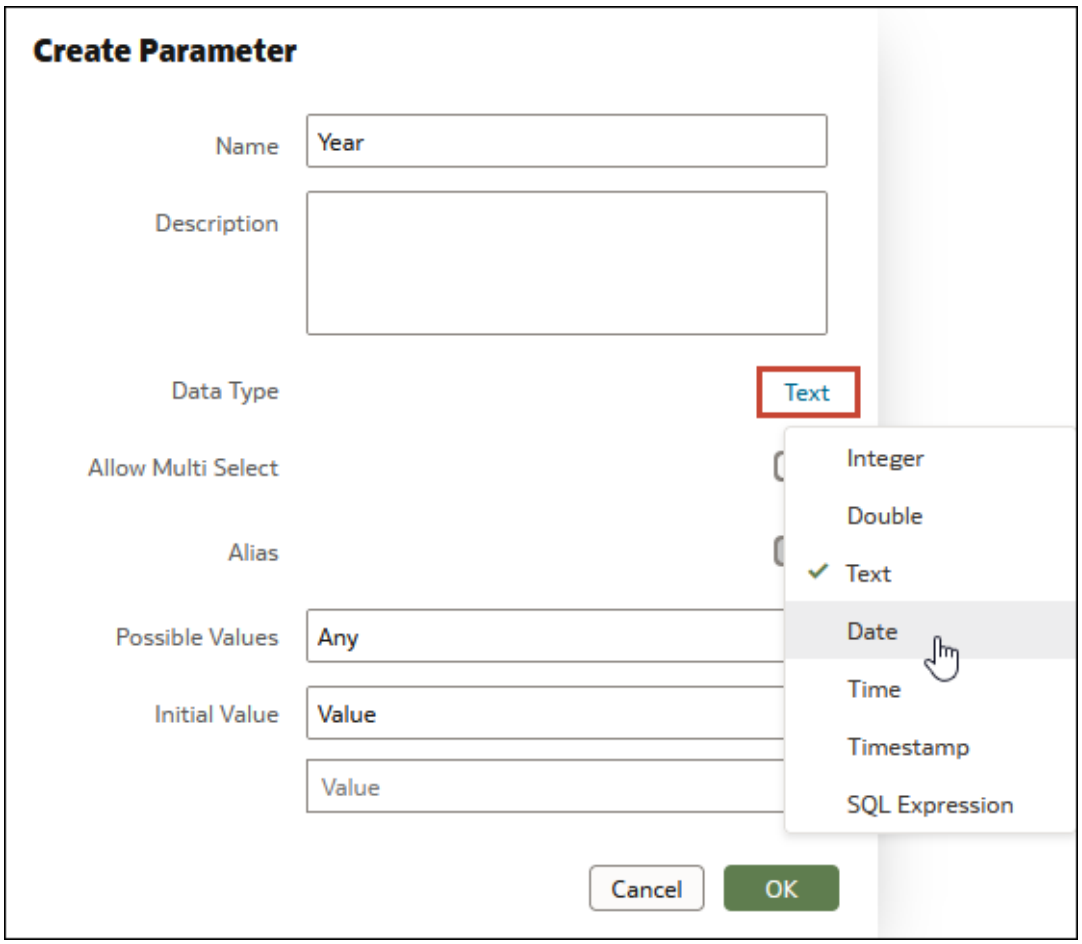


3. In the Parameters Pane, click **Add**.

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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.



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**.

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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.

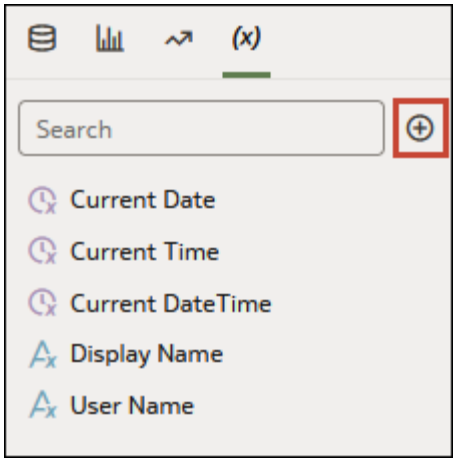
Double columns are available only in datasets created from local subject areas. In a double column, one column represents the data descriptor value and is displayed to the end user. The second column represents an identifier of the data descriptor and isn't displayed to the end user.

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**.

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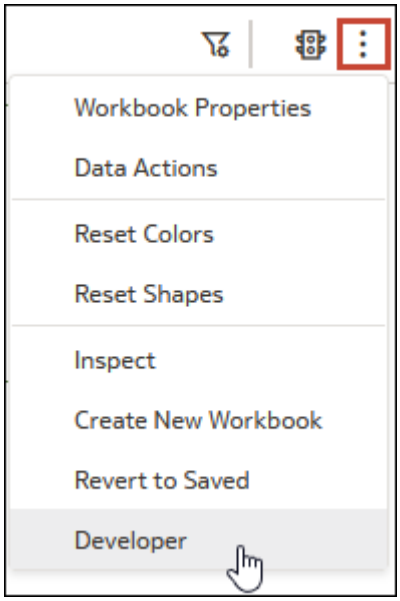
Create a Parameter with the SQL Expression Data Type

For a parameter that uses the SQL expression data type, you must enter or paste a Logical SQL expression to supply the column value that you want the parameter to use.

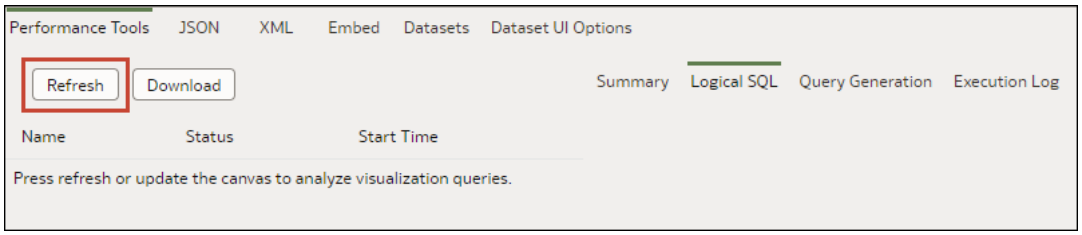
If the **Developer** option isn't displayed from the workbook, then you must enable the developer options from your profile settings. See Developer Options.

For information about referencing parameters in SQL expressions, see Syntax for Referencing Parameters.

1. On the Home page, select the workbook to add a parameter to, click **Actions**, and then select **Open**.
2. To find and copy the Logical SQL expression for the column that you want to specify as a parameter value, in the workbook drag and drop the column to a canvas.
3. Click **Menu** on the workbook toolbar and select **Developer**.



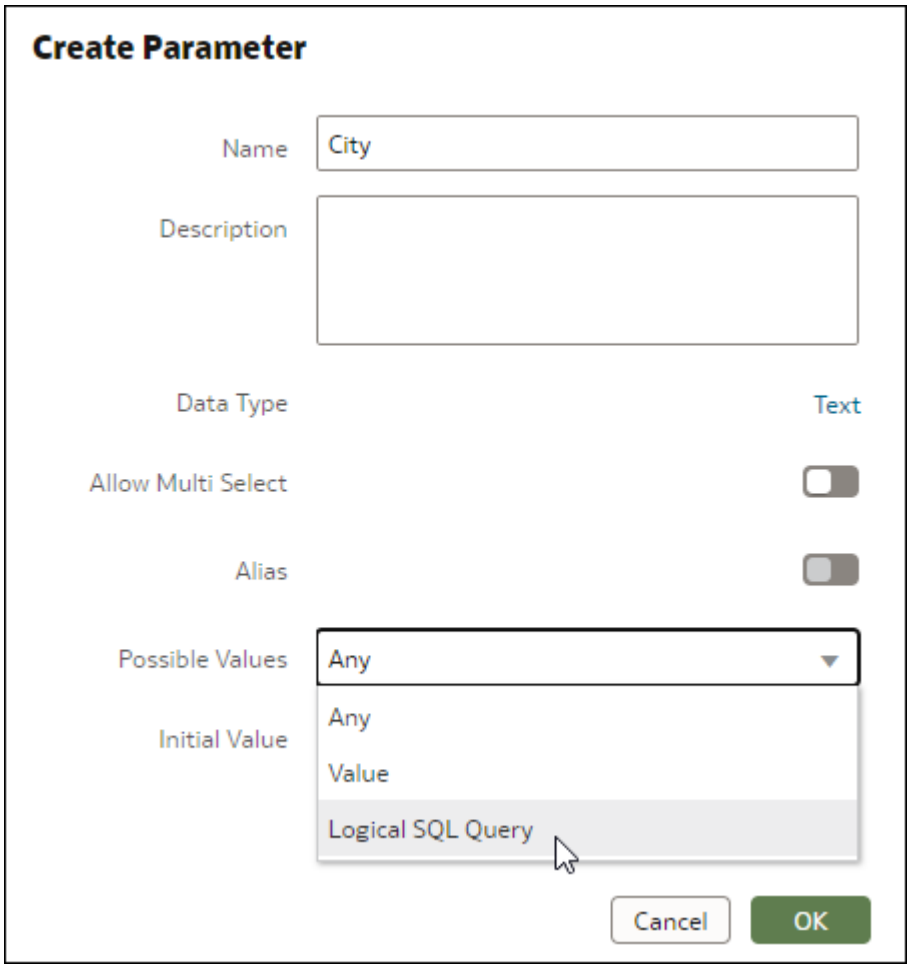
4. In the Developer pane, click **Performance Tools** and then click **Logical SQL**. Click **Refresh**.



5. Locate and copy the Logical SQL SELECT statement for the column that you want to use as a value in the parameter.
6. In the Workbook editor, go to the **Data Panel** click **Parameters**.
7. In the Parameters Pane, click **Add**.

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8. In the **Name** field, enter a name.
9. Click **Data Type** and select **SQL Expression**.
10. In the **Available Values** field select **Logical SQL Query**.



11. In the text box, paste the column's Logical SQL expression. For example,

```
SELECT
   0 s_0
   XSA('Admin'.'sample_order_line')."sample_order_line"."City" s_1
FROM XSA('Admin'.'sample_order_line')
ORDER BY 2 ASC NULLS LAST
FETCH FIRST 125001 ROWS ONLY
```

12. Optional: Alternatively, provide an expression that includes a parameter with a default value. For example,

```
SELECT @parameter("Current Date")(DATE'2023-05-02') FROM
XSA('Admin'.'sample_order_line')
```

13. Click **Validate** to validate the Logical SQL expression that you pasted.
14. Click **OK**.
15. Click **Save**.

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Syntax for Referencing Parameters

Use the syntax provided to reference parameters from a workbook visualization's properties, SQL expression, tooltips, or calculations.

To reference a parameter use:

```
@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

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- 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**.

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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.

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.

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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.

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 consumer. The second column represents an identifier of the data descriptor and isn't displayed to the consumer.

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.

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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

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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 consumers to focus on specific data.

You can configure the Visibility Parameter property for any visualization (except those created from custom plugins) 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 consumers to select the parameter values and control whether the visualization is shown or hidden.

The visualizations are hidden only in Preview, 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.

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- **Superset** - Displays the visualization when all of the values specified in the parameter condition are included in the user-selected values.

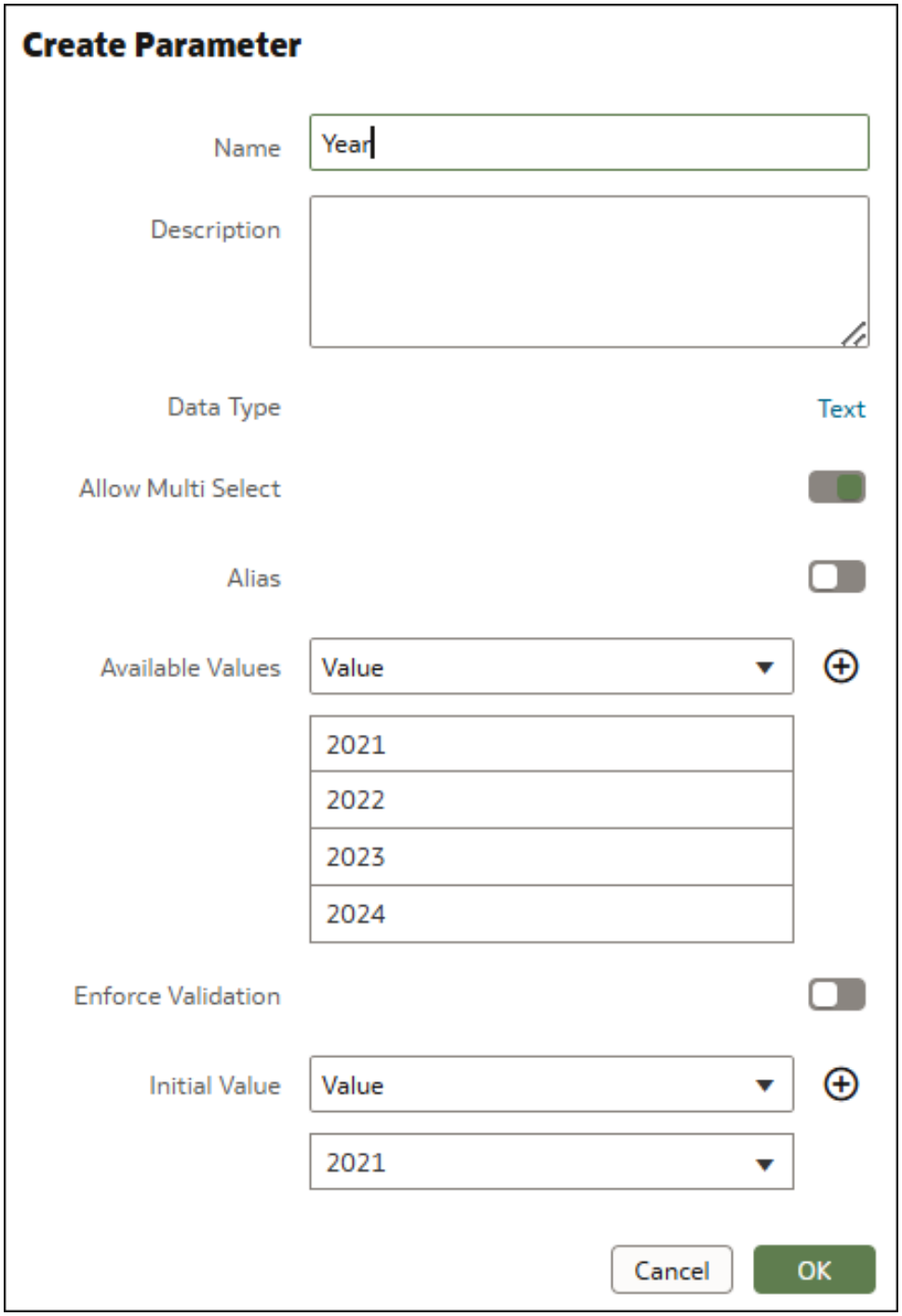
Condition Examples

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

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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.

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- **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 a consumer selects for the parameter.

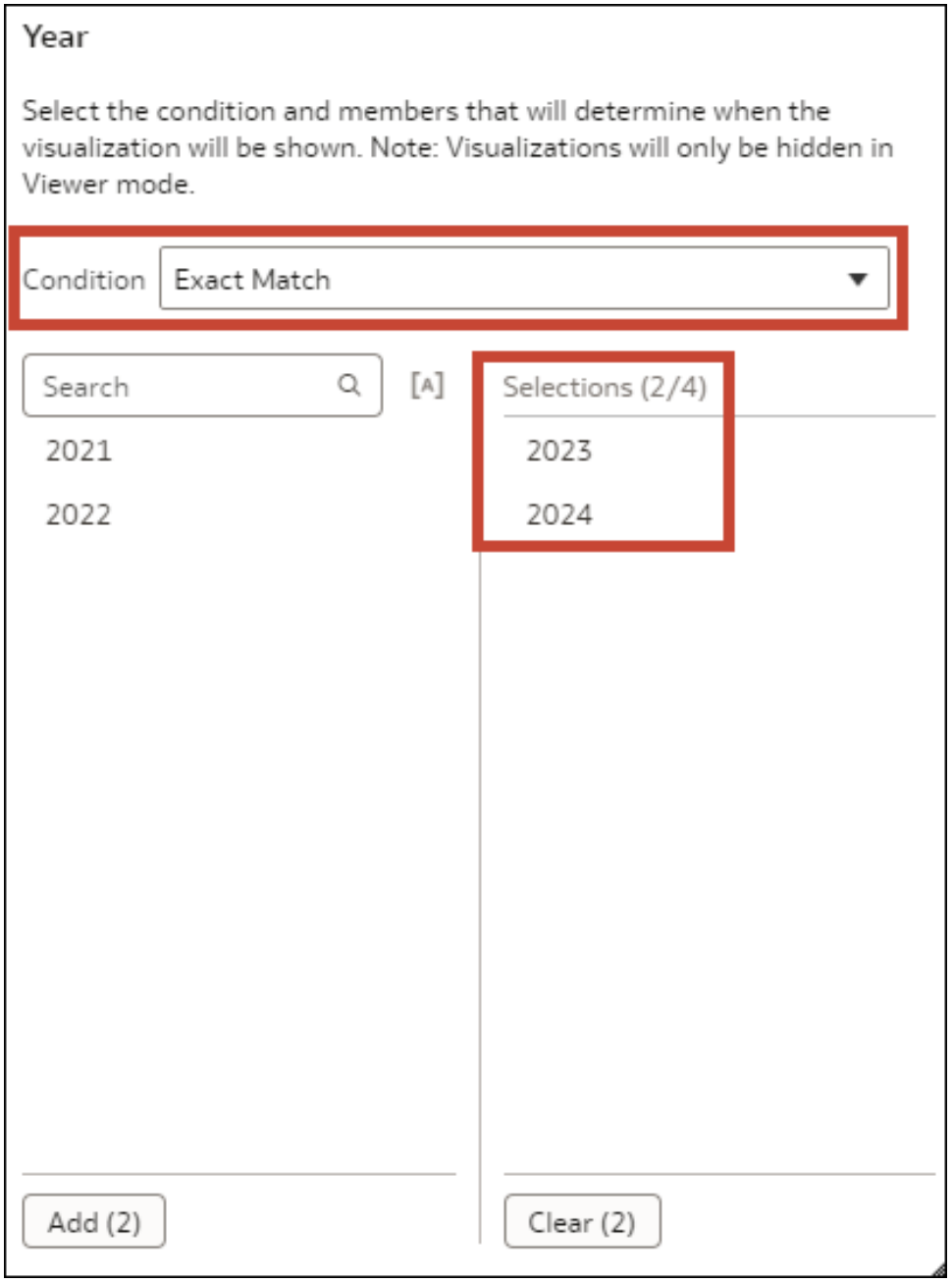
Before you configure the Visibility Parameter property, do the following:

- 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.
- Create a filter using the parameter so that consumers 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.

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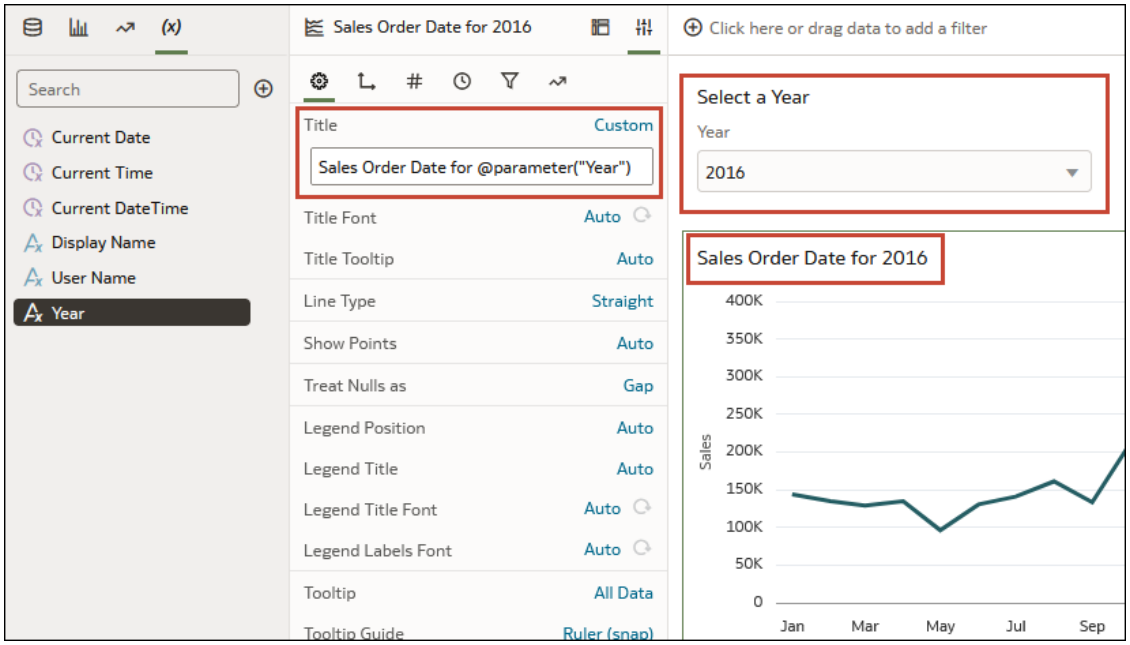
7. Click **Save**.
8. To test that the functionality works as intended for consumers, click **Preview** and try out the filter selections.

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.

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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")
   ```

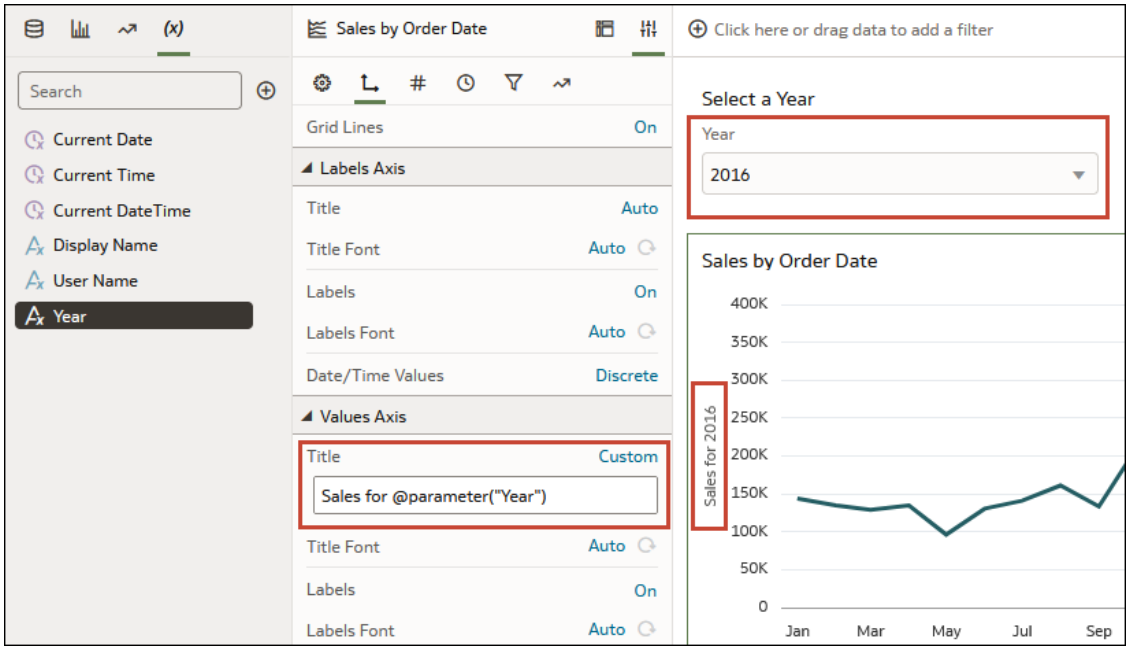
5. Click **Save** to save the workbook.

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.

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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 an Expression Filter

You can include a parameter in an expression filter's SQL expression to create a complex visualization filter.

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.

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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.

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.

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.

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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**.

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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

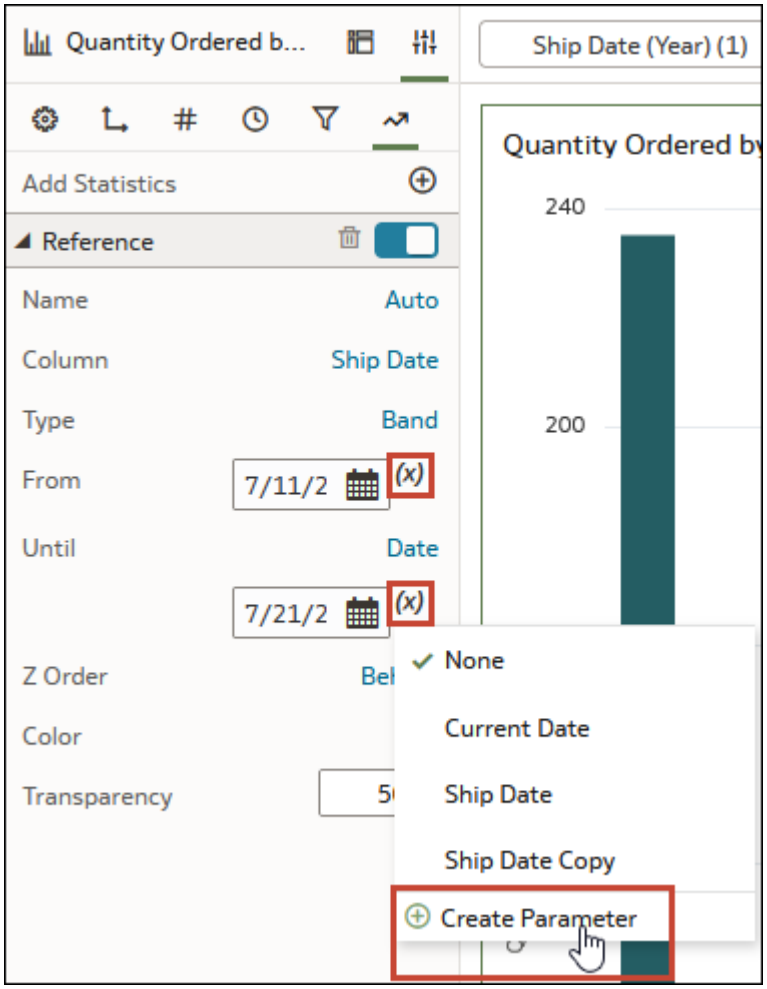
You can bind a parameter to a visualization's reference line or band's date value or date range when you want to use a parameter value to place the reference line or band on the visualization.

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.

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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 reviews 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.

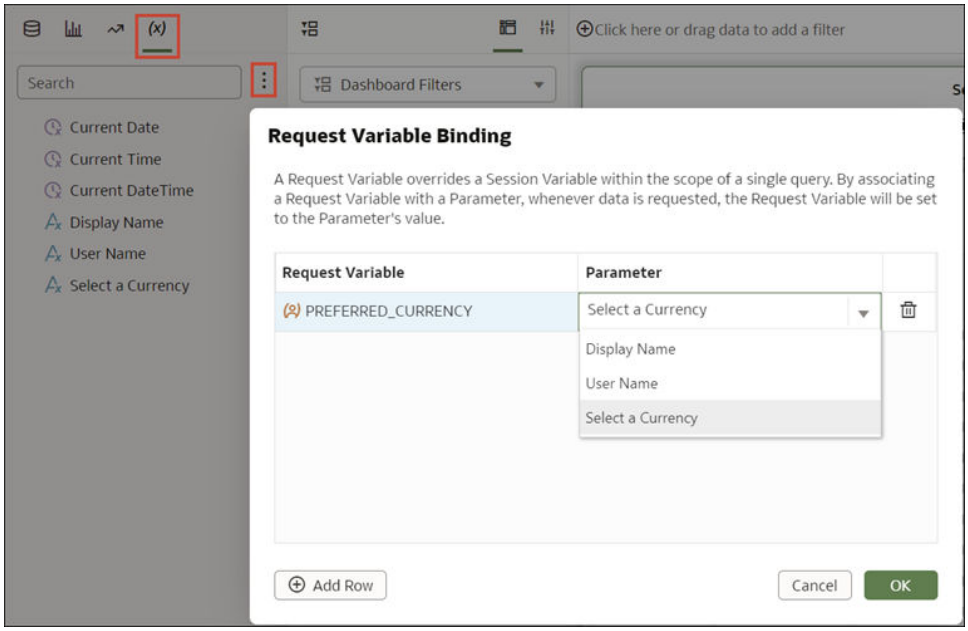
If the parameter a request variable is bound to accepts multiple initial values, the request variable is set to the first value and the remaining values are ignored. You can bind only one parameter to a request variable.

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**.

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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**.

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10

Understand Your Data Using Insights

Use Auto Insights and Explain to understand your data and create the best analytics content. Use Contextual Insights to understand data in a specific visualization.

Topics:

- Use Auto Insights to Understand Your Data
- Use Explain to Understand Your Data
- Use Contextual Insights to Understand Your Data

Use Auto Insights to Understand Your Data

In Oracle Analytics, gain insights into your data using Auto Insights.

Topics:

- What Are Auto Insights?
- Use Auto Insights to Get Immediate Insights into Your Data
- Visualization Types Generated by Auto Insights
- Interact with Auto Insights to Focus on What You're Interested In
- Refresh Auto Insights to Include Filters
- Administration and Limitations

What Are Auto Insights?

With Auto Insights, you can build canvases from scratch by automatically scanning your dataset and generating visualizations that show remarkable insights from the data.

You can build canvases by choosing from a gallery of meaningful insights built directly from your data. Auto Insights algorithms run silently on your data as your dataset is created, identify which columns hold the most meaningful insights, and represent these as Oracle Analytics visualizations in a gallery panel on your canvas.

As a workbook designer, you can quickly go from a blank page to fully built, meaningful visualizations and insights into your data. You can also adjust the initial scope of Auto Insights and modify which columns to select and which type of insights to look for. Refining the scope of Auto Insights lets you quickly refresh a set of new insights, taking into account a user's directions.

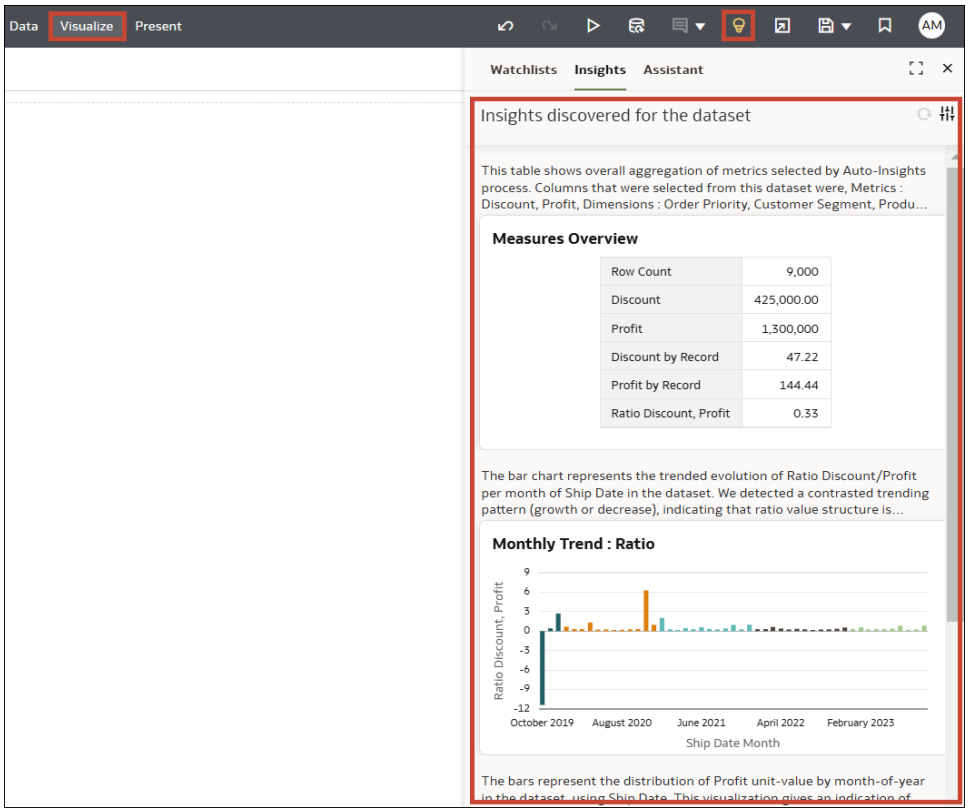
Use Auto Insights to Get Immediate Insights into Your Data

When you upload a dataset to Oracle Analytics, Auto Insights compute interesting insights on the data.

Click **Auto Insights** in the top right corner of the Visualize page  (it turns from white to yellow when insights are ready) and scroll through the panel for a list of ranked insights. The

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artificial intelligence engine that generates these insights is focused on finding the columns with the most appropriate data for interesting insights, and on how to apply advanced analytics techniques to those columns.



The list of insights shown varies based on the following information:

- Which types of columns are present in your dataset (for example, how many dimensions, how many dates, how many metrics)
- Which data is present in each of the columns (for example, what are the cardinalities of dimensions, their sparsity, distribution)

For example, if there are no date columns in your data, then there won't be any insights about trending or seasonality.

As you scroll down the panel of insights, visualizations are rendered with an overall text description to help you understand what the insight is about, how to read it, and why it qualifies to display in this panel. Typically, insights that show a high contrast in values (for example, crossing line trends, high variations in bars, spread in scatter plots) will rank higher in the panel. You can drag any of these insights onto your workbook canvas by clicking the **Plus** icon on any visualization, or by double-clicking the visualization itself.

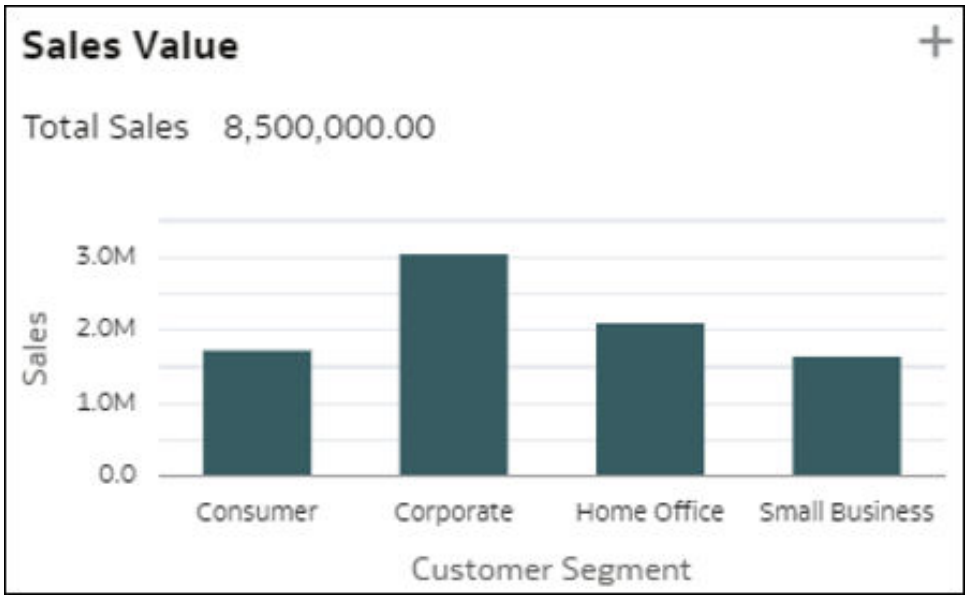
Once the visualizations you selected are on the canvas, they behave exactly as if you manually designed them from scratch. Any viewer can fully interact with any of these visualizations (for example, keep selected, use as filters), or even customize them further by replacing formats and columns or editing calculations. Any custom calculations required to support the insights you dragged onto your canvas are automatically added under the My Calculations folder. You can review these calculations to understand their formulas and modify them further.

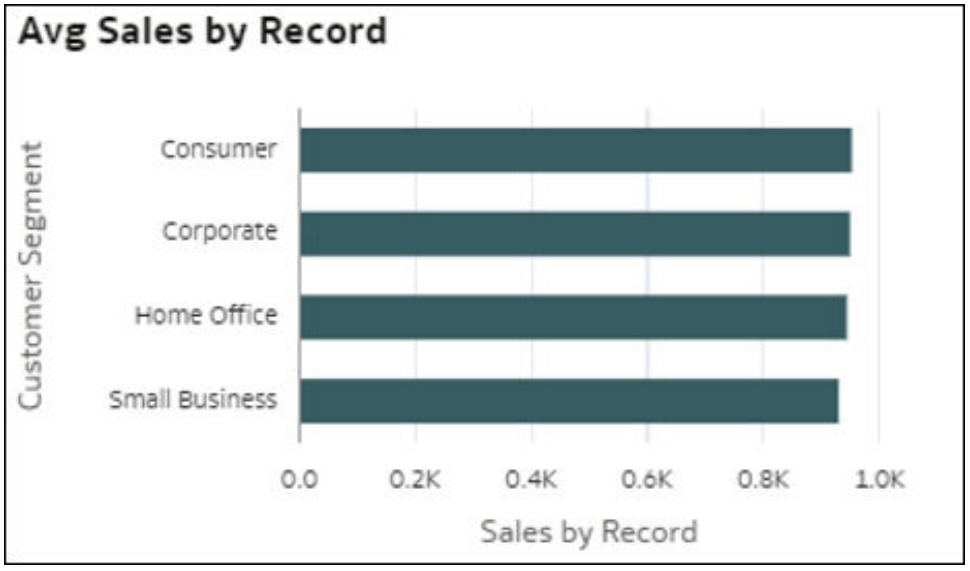
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Visualization Types Generated by Auto Insights

Auto Insights generate various types of visualizations that deliver specific insights into your data. Each of these visualizations leverages different columns from your data and is ranked depending on the value of the insight within the context of your data.

- **Dimension Breakdowns** - These visualizations aggregate a measure value for the various members of a dimension in your data. This lets you gain a quick view of how the selected metric is distributed against a given dimension. The measure can be a metric from your dataset, a count of records, or an average value of the metric per record.





- **Heatmap Pivot Tables** - These visualizations aggregate a measure value for the intersections of two dimensions in your data. Each cell in the pivot table represents an intersection of the members of the two selected D2 dimensions. These visualizations help you quickly understand where the highest values are for the measure by looking at the

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darkest cells in the tables. Measures in this visualization can be a metric from your dataset, a count of records, an average value of metric per record, or a percentage representing any of these options (with the top right total equal to 100%).

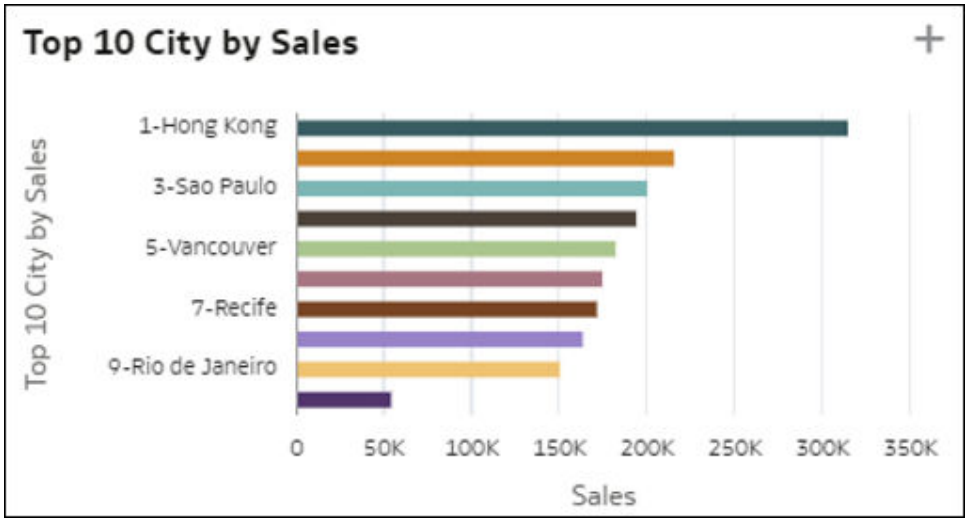
% of Sales

	Consumer	Corporate	Home Office	Small Business	Grand Total
Furniture	7.64%	11.33%	8.89%	6.18%	34.04%
Office Supplies	4.72%	8.24%	6.54%	5.58%	25.08%
Technology	7.91%	16.19%	9.25%	7.53%	40.88%
Grand Total	20.27%	35.77%	24.68%	19.29%	100.00%

Avg Sales

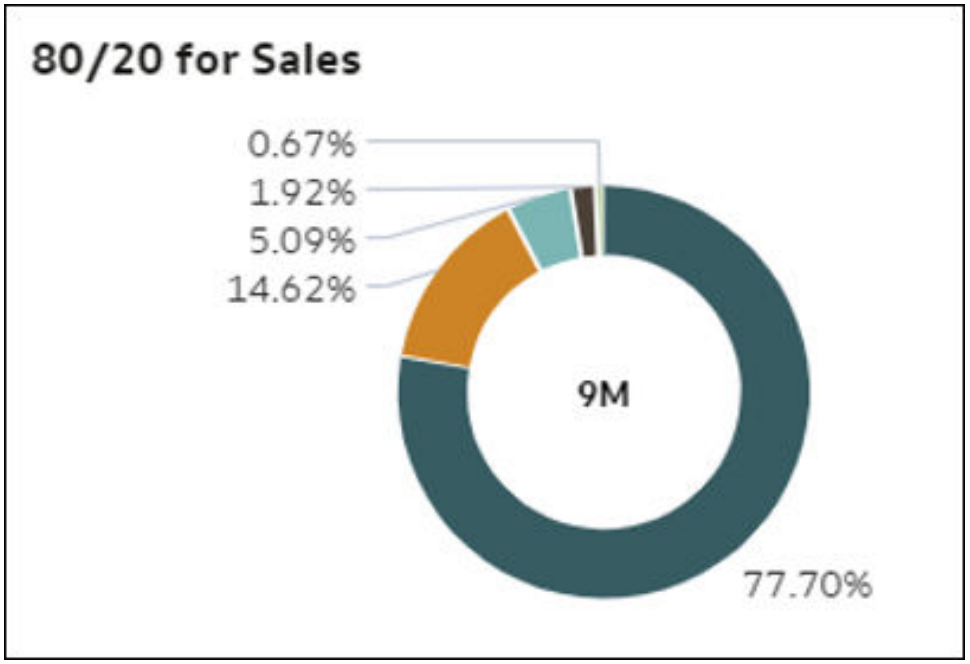
	Consumer	Corporate	Home Office	Small Business	Grand Total
Furniture	1,623.84	1,426.31	1,638.47	1,510.53	1,535.72
Office Supplies	433.57	413.94	453.26	480.54	441.29
Technology	1,388.69	1,646.50	1,467.53	1,491.03	1,520.72
Grand Total	952.31	948.83	943.60	929.49	944.44

- **Top 10 Individuals** - This visualization shows the top members of a dimension by their decreasing value for a measure in your dataset. The last bar in the chart shows the average value of the measure for all the members that are not among the top nine. That is, the average value of M1 for all individuals that are not top ranking. This information shows how far ahead the top individuals are compared with the average of the rest of the population.

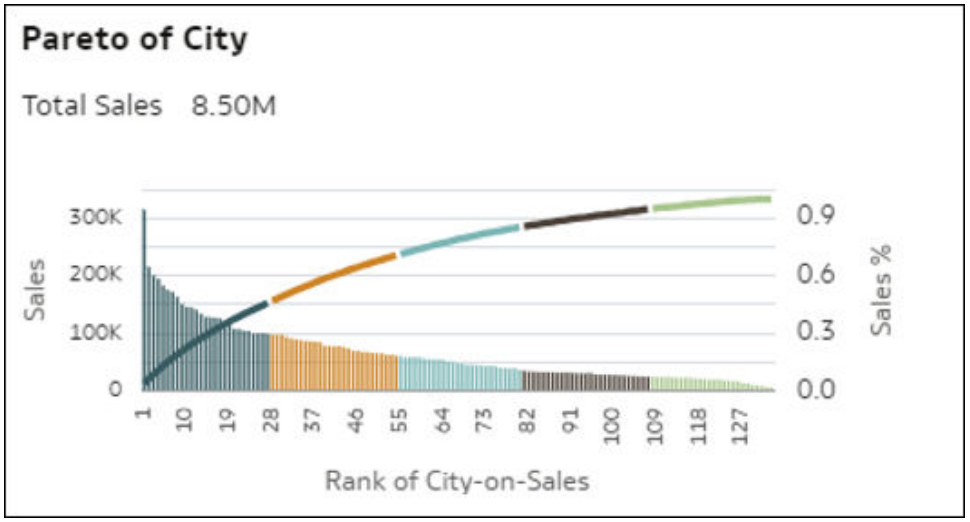


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- **80/20** - This visualization shows, for a given measure, how much the records in the top 20% of your data weigh out of the total dataset. The top 20% is calculated based on detailed rows in your dataset. The donut chart shows the importance of the top individuals in your data for that measure. The arcs on the donut chart represent quintiles of records, that is, successive chunks of 20% of the records by decreasing number of rows (top 20% individuals, followed by the next 20%, and so on). The size of the arcs represents the total aggregated value of the measure for each quintile.

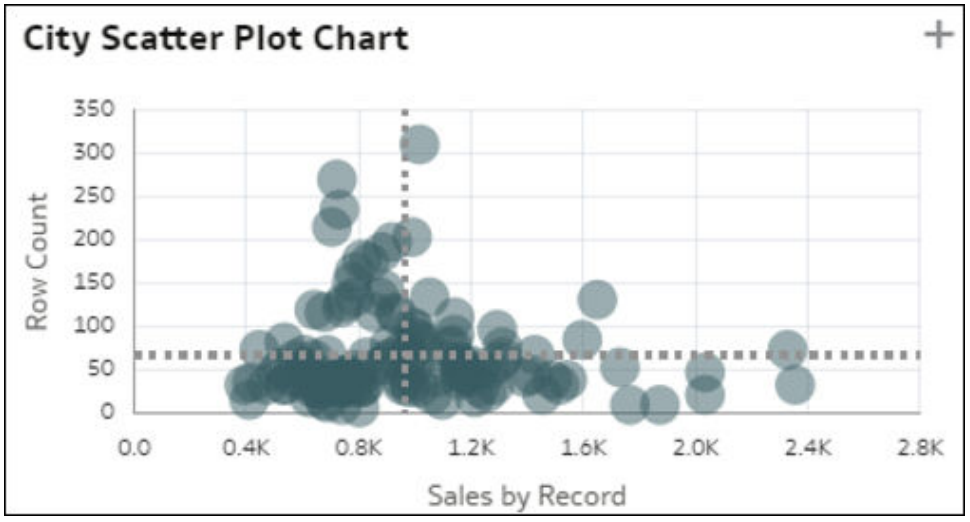


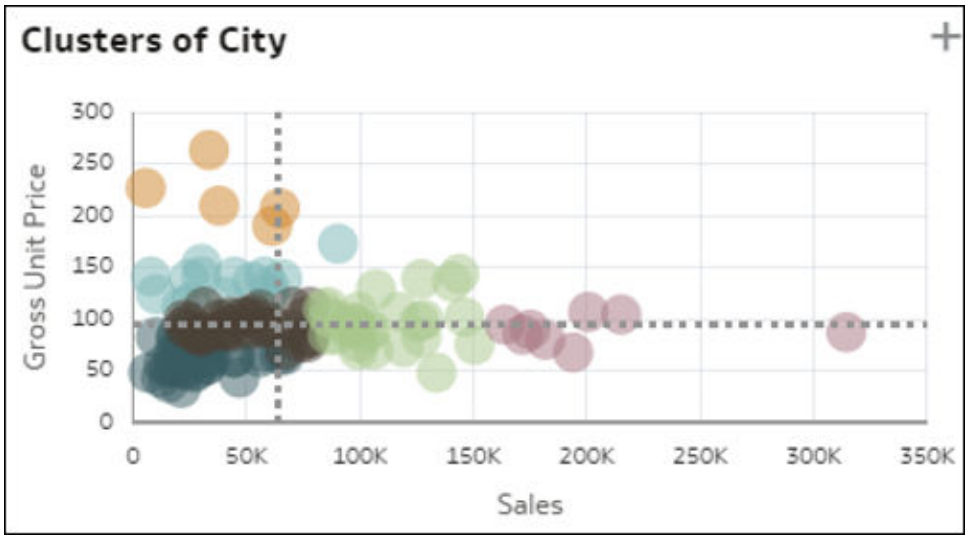
- **Pareto** - This Pareto chart visualization shows every member of a dimension (medium cardinality) ordered by decreasing value of a measure. Each bar represents this measure for a member, and the line represents the cumulative percentage of the measure value (summing up to 1.0 = 100%) as each member of the dimension is added cumulatively. A Pareto chart helps focus interest on the areas that offer the greatest relative value or frequency.



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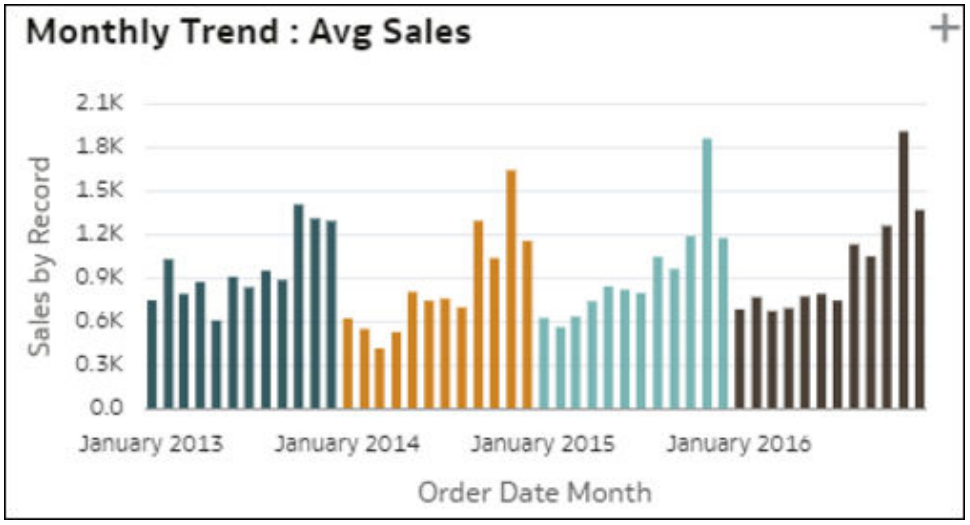
- **Scatter Plots and Clusters** - The scatter plot chart visualization shows all members of a dimension (medium cardinality) on a grid with two distinct measures from your data for the axes. Each measure is graduated by average unit value. The spread among all these records and the potential outliers represent interesting insights into your dimension members. This chart gives you a quick insight into how well the two metrics correlate with each other on B1 members, and lets you easily understand which members fall in which quadrant. A variant of the scatter plot shows an automatic clustering of your records into six coherent groups.

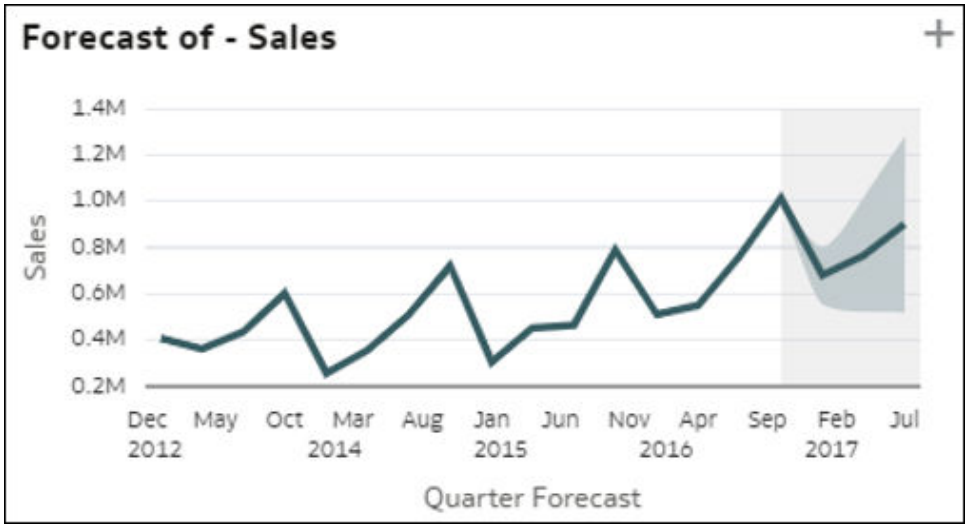




- **Simple Trending Bar Charts** - This visualization represents the trended evolution of a measure over a time column in your dataset. It can reveal interesting trending patterns such as growth or decline. The measure can be a metric from your dataset, a count of records, or an average value of a metric per record. The same insight can also display with an additional forecast line on the right side of the chart.

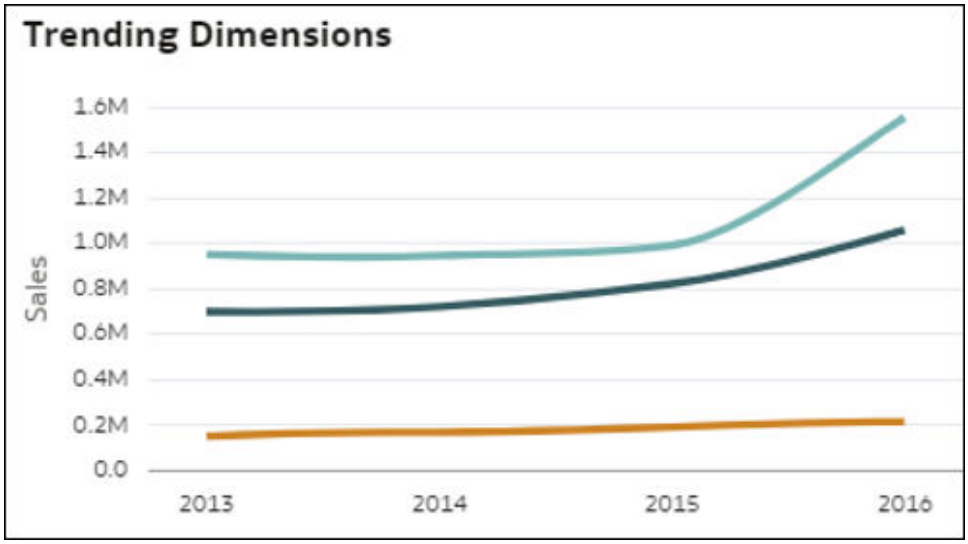
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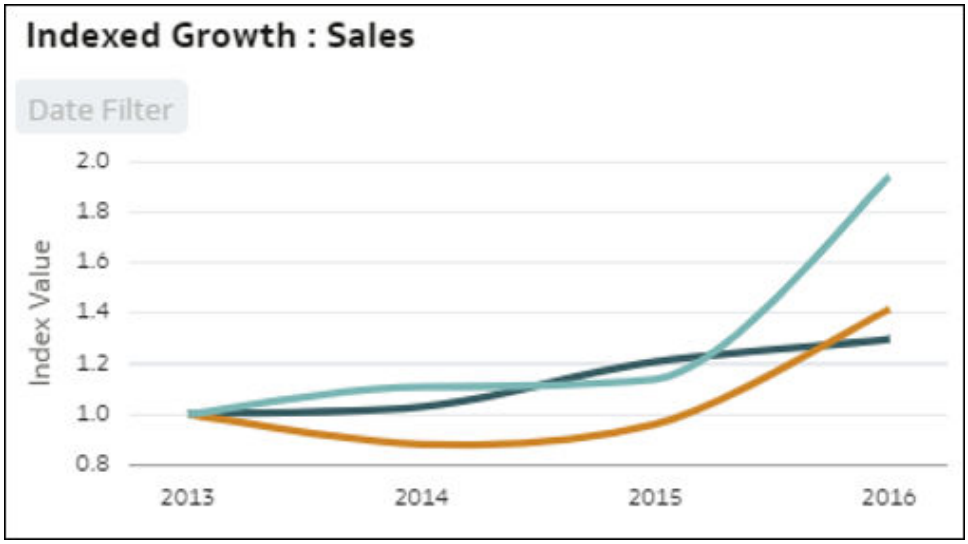


- **Comparative Trending by Dimension** - This visualization compares how a measure value has trended over time for each member of a dimension in your data. Each line in this chart shows the evolution of a measure for a given member of the dimension. The growth or decline in measure value may not be consistent across all members in the dimension, which could be an interesting insight: Which member trends differently from the others?

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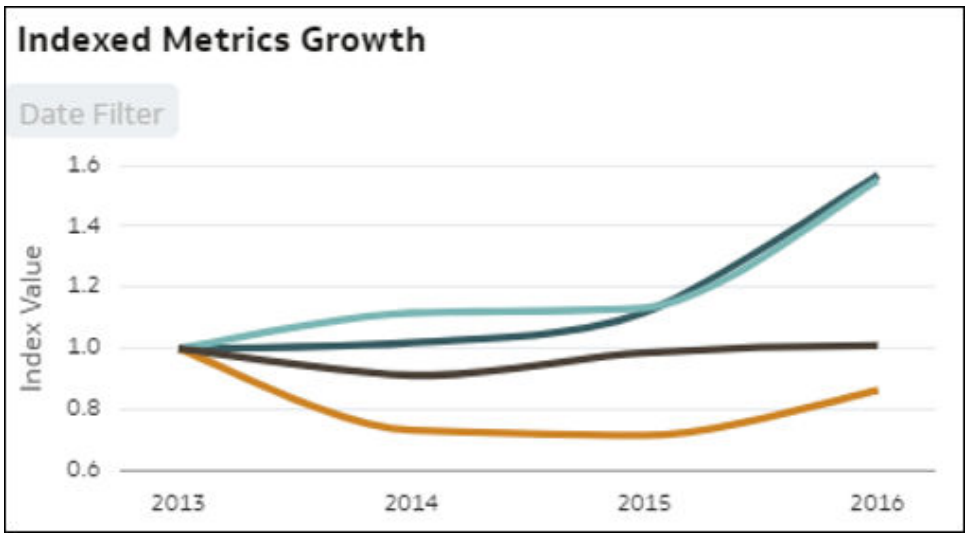


- **Comparative Indexed Trending** - This visualization compares relative growth of a measure over time for each member of a dimension column in your data. Each line represents a member of the dimension, with a base index value of 1.00 set at an initial time period. The evolution over time shows the relative value in the following periods compared to the index value 1.00 in the initial period. Using indexing instead of absolute values lets you make a fair comparison of various trends as the lines show true relative evolution, properly comparing growth of all members with each other. When looking at absolute values of the metrics instead of indexed values, discrepancies in values often make it impossible to properly compare growth or decline. Using indexes helps you understand actual relative behavior.

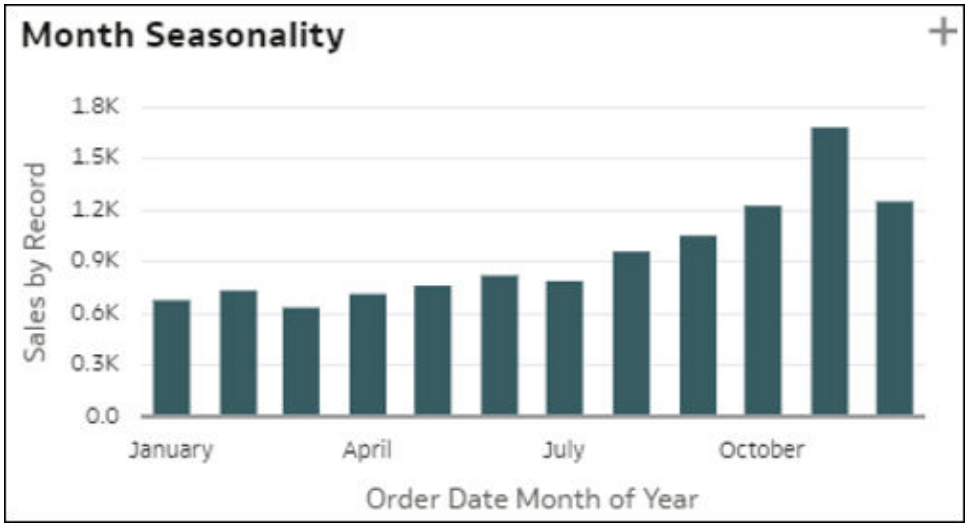


- **Indexed Trending by Measures** - This visualization compares the relative evolution of several measures in the dataset over time. The line chart visualizes the indexed value of various metrics in the dataset over time, with each line representing a measure. Using indexing instead of absolute values lets you make a fair comparison of various trends, as looking directly at the absolute values of the metrics often makes it impossible to properly compare growth or decline. The starting index value (1.00) is set for all metrics at an initial time period, and the line shows the relative evolution of each metric compared to its starting point in the chart (Index).

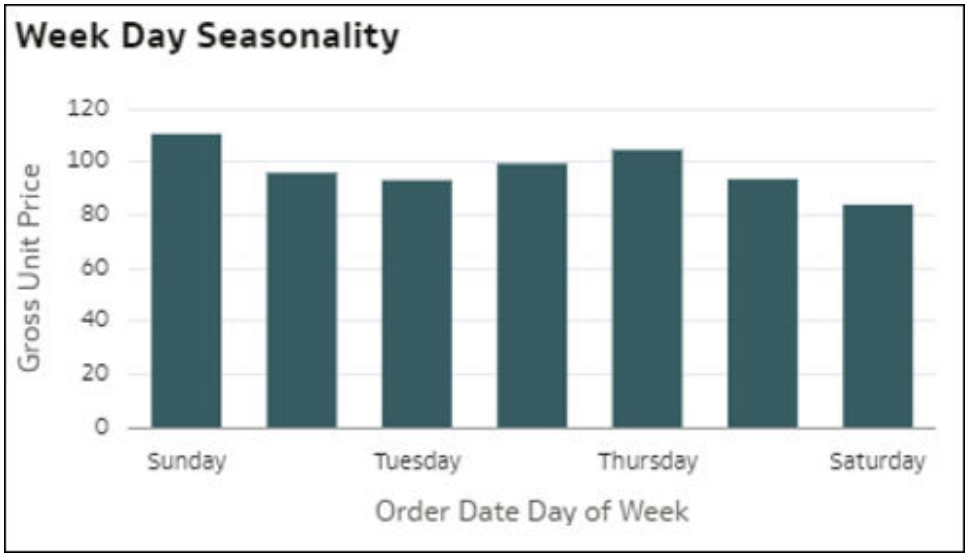
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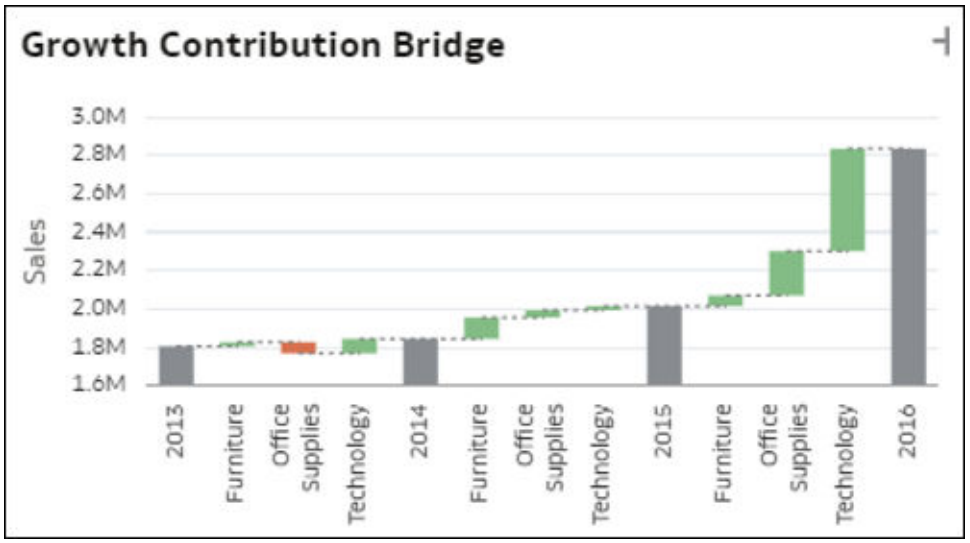
- **Seasonalities** - The bars in this visualization represent the distribution of a measure by Month-of-year, Day-of-month, or Day-of-week of a time object in your dataset. This gives you an indication of the possible seasonality of the ratio value over months. Seasonality charts are useful for identifying recurring patterns in data over specific periods. This can be crucial for understanding how measure values fluctuate seasonally.



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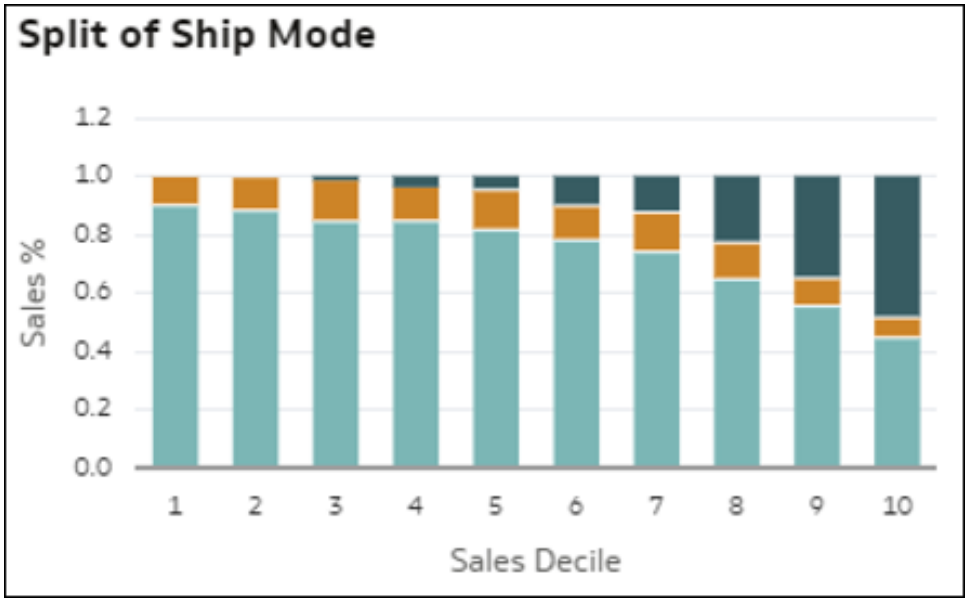


- **Members Contribution Bridge** - This bridge chart shows the contribution of each member of a dimension in your dataset to the variation of a measure value over time. It helps you understand which members were the biggest contributors to a variation over a period of time, for an increase or decrease. Each gray bar in the chart represents the total value of a measure for a period of T1. The green or red bars in between two periods indicate which members increased or decreased, and therefore how they contributed to the overall variation.

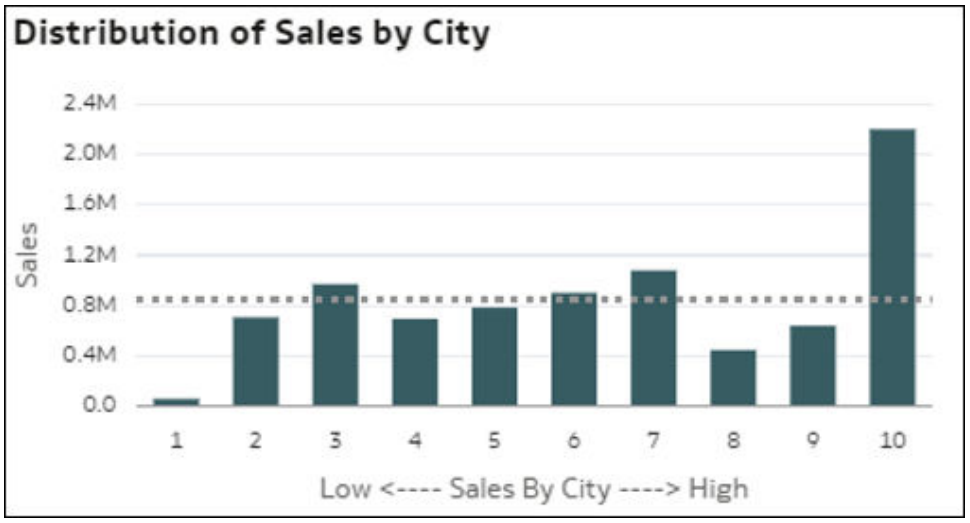


- **Dimension Members Split (Mix) vs. Measure Value** - This visualization helps you understand the mix (split) of all the members of a dimension in your data as the value of a measure grows. The bars represent relative values of the measure: Decile 1 = low measure value by record (first 10% records), Decile 2 = second 10%, up to Decile 10 = high measure value by record. In each bar, colors show the proportion (percent of total) of each member of the dimension in the total value of the measure, for that decile. This helps identify that the structure of the members mix changes as the measure value changes.

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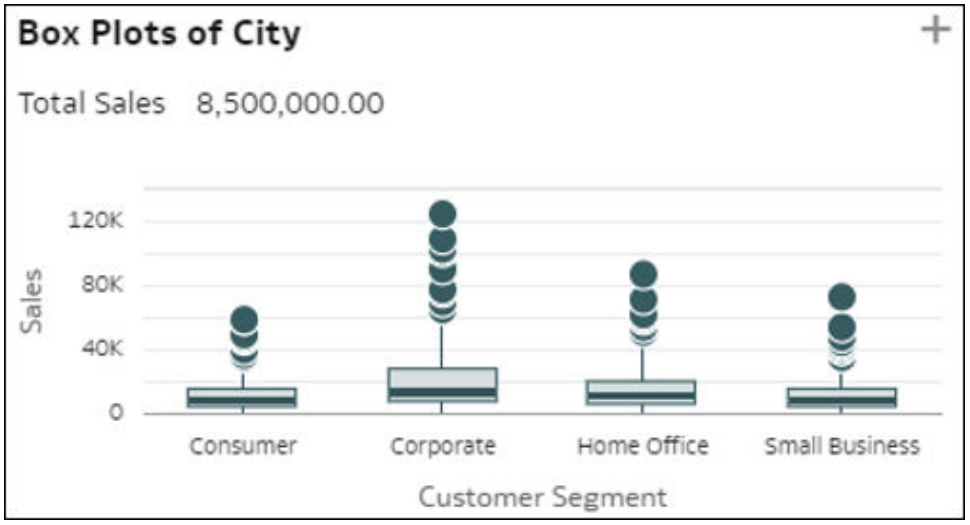


- **Histogram of a Measure by Record Bins** - This visualization shows how a measure distributes by the bins of another metric. The bars in the chart show the aggregation of the measure, and each bar represents a bin for a measure: Bin 1 = low measure value by record and Bin 10 = high measure value by record.

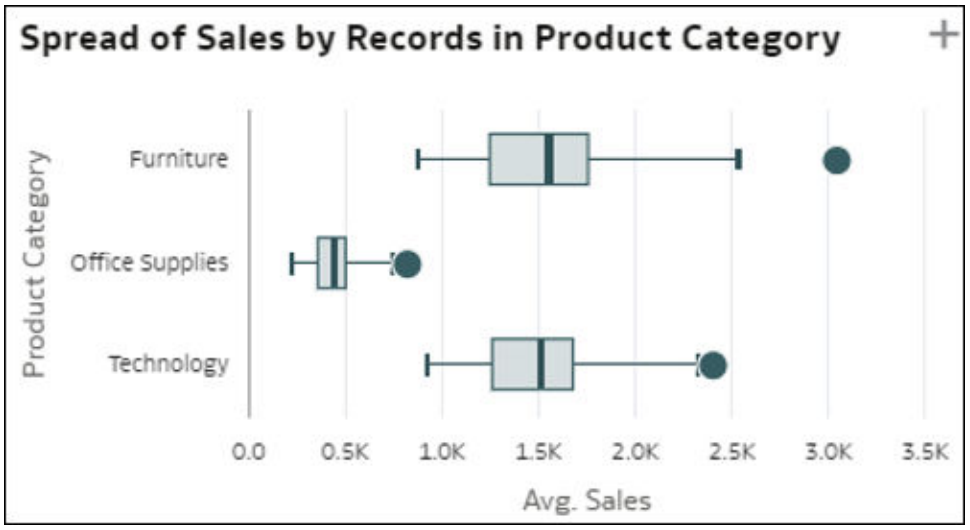


- **Dimension Members Boxplot** - This boxplot visualization compares the spread of individuals in a dimension D1 (medium cardinality) in your data (dots) with the value of a measure in your data, and is represented by each member of the other dimension D2 in your data (bars). Each vertical bar in the boxplot represents a member of D2, and each dot in a bar is a single D1 member, with the y-axis showing its measure's average unit value. Each bar represents three values for this member of D2: the first quartile value at the bottom of the bar, the average value in the middle of the bar, and the third quartile at the top. This visualization helps you understand the spread of records in a D1 dimension and compare differences in that spread with members of a D2 dimension.

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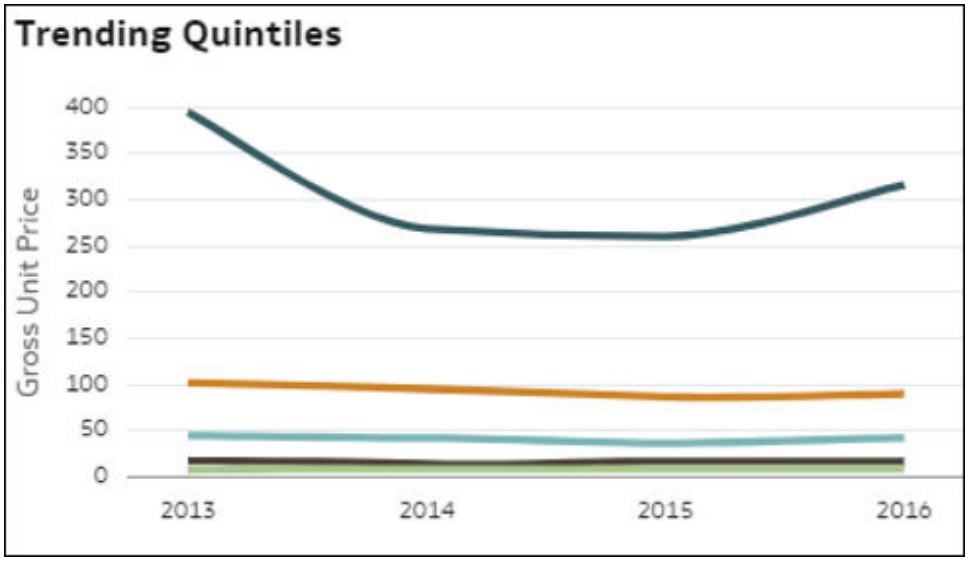


- **Spread of Record Values By a Dimension** - This chart visualization shows the dispersion (spread) of records on value of a measure, for each of the members of a dimension (bars). The x-axis shows the average value of the measure by record. The dots in each of the bars represent random groups of granular records from the dataset. This visualization helps you understand how the spread may vary between different members of a dimension (different horizontal bars on the visualization).



- **Quintiles Trend Comparison** - This visualization compares how each of the 20% groups of records in the data (sorted by the value of a measure) from toppers to bottomers (quintiles) have trended over time for their measure value. Was the growth or decline consistent among the top and bottom groups or not? For which population group is the measure trending different? Each line in the chart is a quintile showing the trending over time of M1 value. Quintiles are groups of 20% of the dataset records ordered by decreasing measure value: records with top 20% value, followed by the next 20%, and so on.

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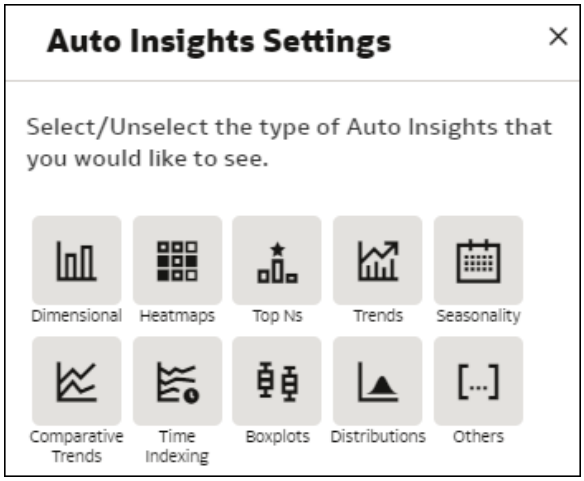
Interact with Auto Insights to Focus on What You're Interested In

Auto Insights enable content authors to directly adjust the AI algorithms and focus them only on specific types of insights or specific columns from the dataset.

Auto Insights User Settings

Click **Insight Settings** in the top right of the Auto Insights panel. A dialog is displayed, offering two types of settings:

- **Select the insights type**
  At the top of the Settings panel, you see a set of 10 icons listing the types of insights that Auto Insights can generate. Each of these types represents a specific type of analysis to conduct on your dataset. Select or deselect types of insights by clicking various icons and then clicking **Apply**. Auto Insights take this choice into account in the new run and only search for insights from the types you selected. By default, all possible types are selected.



Some insights display only if specific columns exist in your dataset. Even if you've selected all the icons, they may still not be displayed because your dataset (or your selected columns) doesn't include the required column types. For example, time-related insights display only if a time column exists in your selection. As another example, heatmaps

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require at least two dimensions in their definition, so if only one dimension is present, no heatmaps are displayed.

- **Select which column from the dataset to include in Auto Insights**
  By default, Auto Insights automatically identify which columns from your dataset deliver the most valuable insights. This initial column selection process is based on internal algorithms, but you can override the initial choice of columns and instead select specific columns to be used by Auto Insights. The Auto Insights visualization ranking algorithms can consume up to 11 distinct columns from any dataset at once:

  – **Measures** - Up to three distinct measures can be used each time you run Auto Insights. If no metrics columns are selected, Auto Insights focus on insights counting records in your dataset.

  – **Generalized Calculations** - This setting indicates that Auto Insights also calculate a row counter metric (counting the number of records) to find insights about. If you're not interested in seeing insights about counting the number of rows, deselect that option.

  – **Time Attributes** - Only one time attribute is supported at a time when you run Auto Insights. Select one date type column in your data. If you have no time dimension selected, Auto Insights won't show the time-related insights type.

  – **Small Size Attributes** - These are low cardinality attribute columns, that is, columns that hold a small number of distinct values, for example, less than 10 distinct values. These attributes are useful to represent high-level aggregated insights and analyses. You can select up to five of these attributes at once in a single Auto Insights run.

  – **Medium Size Attributes** - These are attribute columns that hold up to a moderate number of distinct values, for example, up to 200 distinct values. These columns are useful to represent data in scatterplots or boxplots. You can select up to two of these attributes at once in a single Auto Insights run.

  – **Excluded Columns** - These columns have been identified as not friendly for Auto Insights visualization types, for example: columns with very high cardinality, such as row ID, or columns with a very high proportion of empty values. If you represent these columns directly in visualizations, you might not be able to extract easily readable insights. Specific aggregation rules (count or count distinct) may also be a reason for a column to be excluded.

  Look through the column settings and compose a meaningful selection of columns for your business case, then click **Apply**. The insight ranking artificial intelligence engine runs and quickly returns a series of insights ordered by their probability of showing interesting value. As you select more and more columns to include in the Auto Insights algorithm, you reduce the probability of seeing insights about all these columns at once. Only the top meaningful insights are shown in the panel, based on the algorithm's probability of interest. If you select many columns in the settings, it's unlikely that all of them will be part of the selected insights. On the contrary, if you select only a few columns, you increase the probability of seeing insights specifically for those columns in the panel.

  The selection that you make for a given dataset remains in the system memory the next time you open that dataset, so you don't need to select the same objects all over again.

Custom Calculations and Other Column Limitations

Workbook custom calculations don't display as choices for Auto Insights selections. In order to run Auto Insights on a specific custom formula, you need to build the formula at the data-preparation level. That is, by editing the dataset definition in Oracle Analytics and adding a calculated column there. These custom calculated objects are then included in Auto Insights scoring, just like any other columns in the dataset.

Some column types aren't yet supported by Auto Insights, such as metrics with count or count distinct aggregation rules, or columns of the Geometries data type in Oracle Analytics.

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Refresh Auto Insights to Include Filters

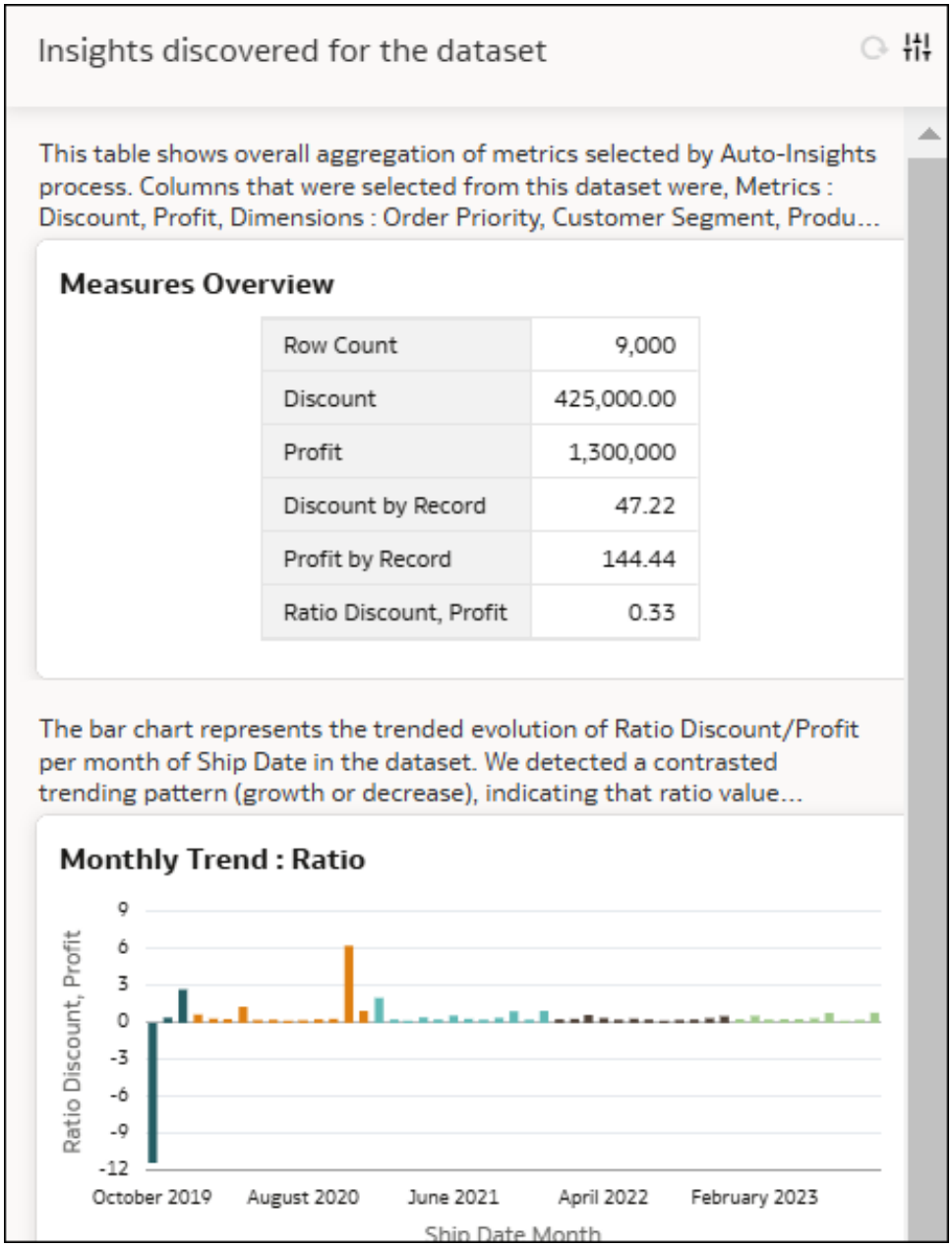
When you add filters to your workbook or make new selections for existing filters, you can refresh Auto Insights to see updated insights that take into account the new filters and filter selections.

Auto Insights considers filters in the filter bar, dashboard filters, and visualization filters. For more information about filters, see Filter Data.

If you add one of these updated insights to your canvas and it has a custom calculation that also uses the filter, the calculation appears under My Calculations in the Data panel with (Filtered) in front of its name.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click **Auto Insights** to review the insights currently available for the dataset.

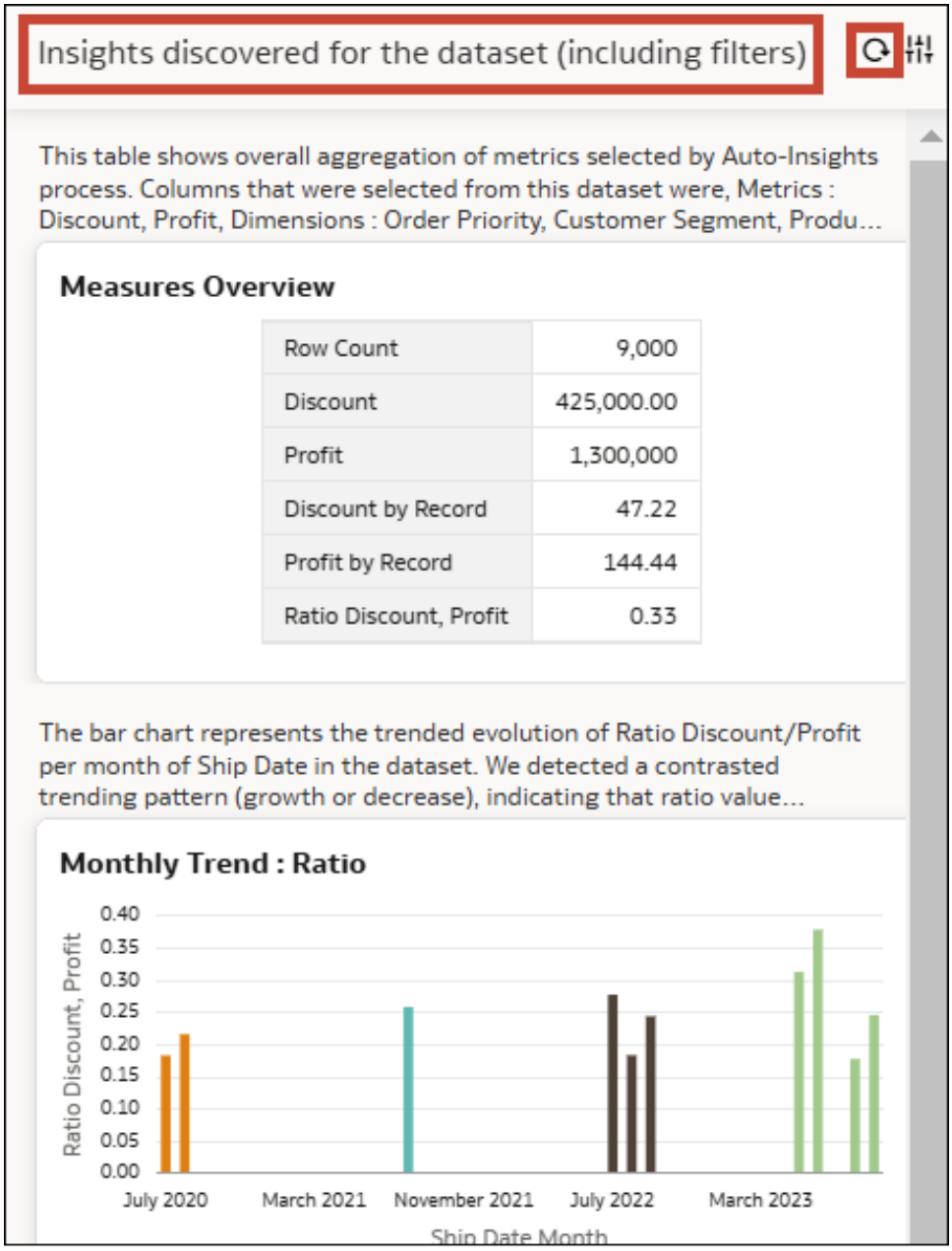
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3. Close the Insights panel.
4. On your canvas, update the selections for an existing filter or add a new filter, then click **Auto Insights** .

   The **Refresh** icon beside **Insight Settings** is now available.
5. Click **Refresh**. The text at the top of the panel changes to indicate that the insights discovered include filters.

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Administration and Limitations

Auto Insights are on by default and run when you upload and save your dataset. You can refresh or disable them if required. There are some limitations on the datasets supported by Auto Insights in Oracle Analytics.

When Do Auto Insights Run and How Do You Refresh or Disable Them?

Auto Insights start running on datasets when the datasets are added to Oracle Analytics and saved. It typically takes a minute or two to complete before the Auto Insights icon turns yellow. The algorithms also recalculate every time the dataset structure is edited, for example, if you edit a column in the dataset (such as by changing the name, changing an aggregate rule, or hiding a column), or if you resave the dataset. You can manually initiate a refresh of Auto Insights in two ways:

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- Edit the settings in the Insights panel, and click **Apply**. This refreshes the most interesting insights with the new settings. See the previous paragraph.
- Turn Auto Insights off and then back on in the dataset Inspect menu. This forces a complete refresh of the Auto Insights results and recalculates a new set of statistics on the dataset. This is a deeper refresh than the settings update suggested in the previous bullet and can take a few minutes to complete, depending on the size of the dataset.

For information about refreshing Auto Insights to include filter changes, see Refresh Auto Insights to Include Filters.

Auto Insights are turned on by default. The administrator controls the use of Auto Insights in your instance by setting an option in the Performance and Compatibility Options of the administration console. You can turn Auto Insights on and off for a dataset by displaying the Inspect menu and deselecting the **Insights** option on the first page of the dialog. Turning Auto Insights back on recalculates statistics on the dataset.

Supported Dataset Types and Known Limitations

Oracle Analytics generates insights for all datasets that contain less than 300 million cells (where the number of cells is calculated as the number of columns multiplied by the number of rows). Datasets larger than 300 million cells aren't currently supported. Additionally, the following types of datasets are unsupported:

- Multidimensional sources such as Essbase, Oracle Planning and Budgeting Cloud Service, and Analytic Views
- Subject Areas or Local Subject Areas

You can use multi-table datasets if you set the **Preserve Grain** option on the Fact Table in the model. Setting this option indicates which table acts as the fact table when multiple tables are joined in a model. Set the **Preserve Grain** option by right-clicking the table in the data model.

If you have a dataset of an unsupported type, you can generate an extract of these datasets and create a file-based or table-based dataset in Oracle Analytics, then run Auto Insights on them.

Auto Insights display text descriptions of insights and calculations in English.

After you refresh the Insights panel, if there are complex filters applied in the workbook, Auto Insights may not render certain types of visualizations.

Use Explain to Understand Your Data

In Oracle Analytics, gain insights into your data using Explain.

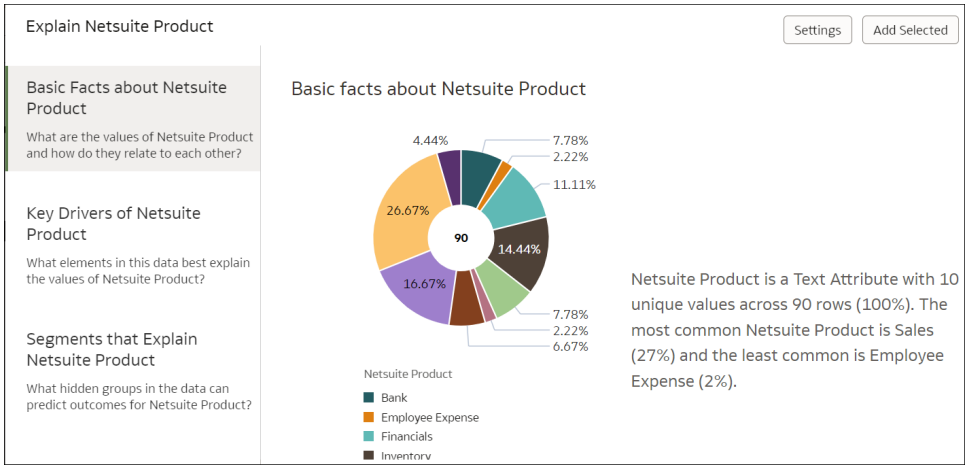
Topics:

- What is Explain?
- Quick Start with Explain
- Use Explain to Get Immediate Descriptive Insights Into Your Data
- Use Explain to Identify the Drivers of Your Selected Column
- Use Explain to Identify the Most Significant Segments of Records In Your Dataset
- Use Explain to Identify Anomalies Among Records In Your Dataset

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What is Explain?

In Oracle Analytics, Explain provides advanced insights about any specific column that you select from your dataset. Explain analyzes data from the selected column (target column) in relation to other columns in the dataset and generates specific types of insights about it.



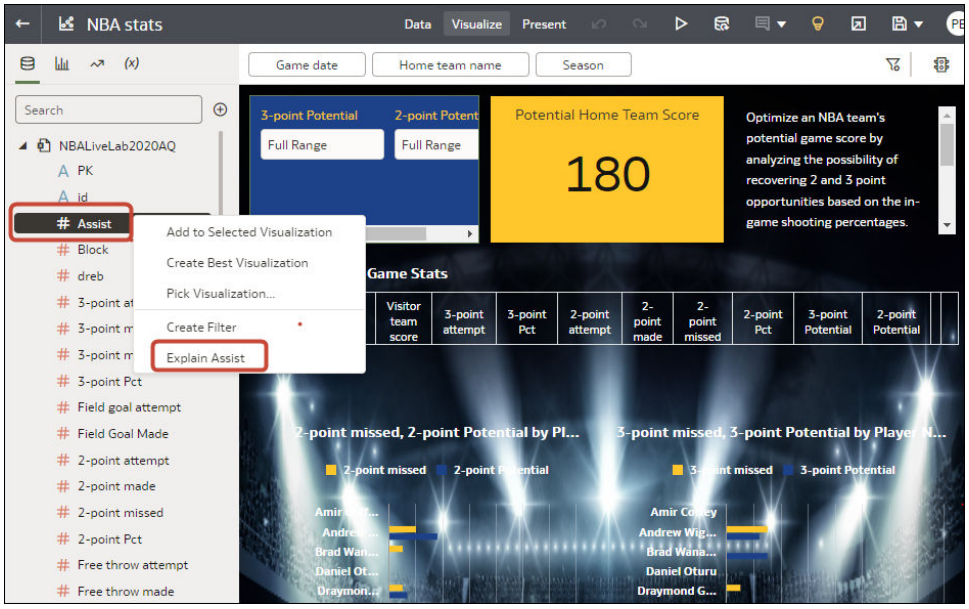
- Basic facts: shows a visualization and series of descriptive statistics about the selected column.
- Key Drivers: shows which other columns in the rest of the dataset are the most significant drivers of the selected column.
- Segments: shows whether there are segments of records in the whole dataset that show a particular unusual distribution for the selected column.
- Anomalies: shows intersections in the dataset that behave differently than expected.

You can use Explain to identify correlations or interesting segments in the data and quickly understand a new dataset. Explain uses statistics and machine learning algorithms to generate fast and powerful insights about your data. It then creates corresponding visualizations to present insights, each of which you can add to your workbook's canvas using a single click. Explain is a very useful starting point for data analysts to dive into the details for a specific column in their data, or confirm an expected behavior or relationship between various columns in the data.

Quick Start with Explain

In Oracle Analytics, right-click a target column and select **Explain**. Oracle Analytics analyzes that column against various other columns available in the dataset (contributing columns) and generates insights.

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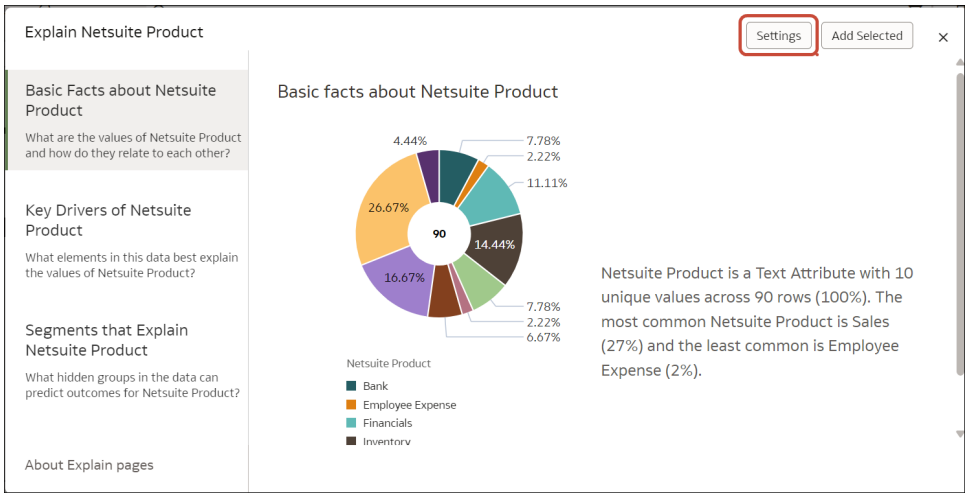


About the Columns You Can Target Explain On

Explain works with any target column of the attribute type or measure type in your dataset (except dates and times). When you run Explain on a target column of the metric type, the results you get depend on the aggregation rule set for this target measure column. If your target measure has an average aggregation rule, Explain computes Key Drivers on that column, but not if you're running Explain on a Sum column. If you intend to use a calculated column as a target, you must create that custom calculation in the dataset preparation phase in Oracle Analytics. Custom calculations created in the dataset preparation phase are available as targets for Explain algorithms.

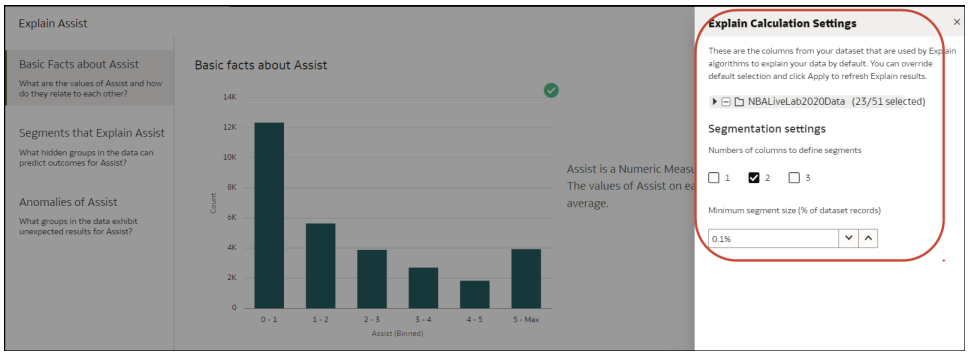
Interact with Explain

Once the Explain panel is displayed, algorithms automatically identify the most interesting columns from your dataset to use for explaining your target column. It's possible that not all columns from your data are being used. You can also add or remove columns by clicking **Settings** to change the settings.

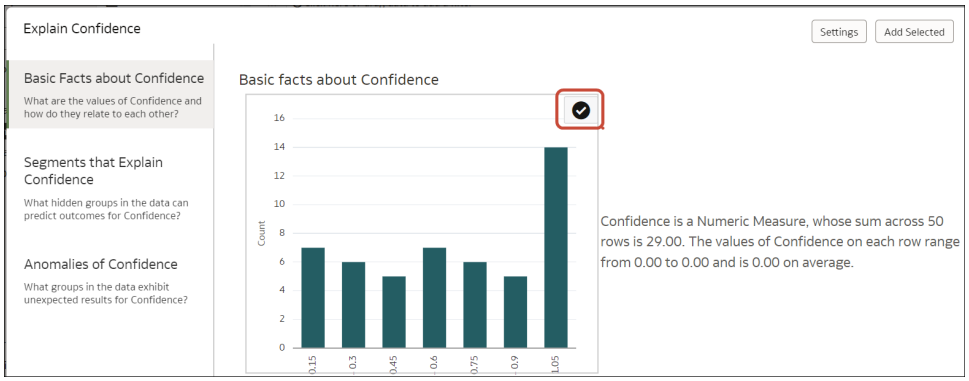


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In the Settings dialog, expand the dataset folder and select the columns you want Explain to use when analyzing your target column.



As you browse visualizations on a tab, you can highlight the check mark by hovering over the top right of each data visualization. This icon lets you select the ones you want to add to your own canvas. Once done, click **Add Selected** at the top right of the window to automatically add the selected visualizations to your canvas.



Supported Dataset Types and Known Limitations

Explain operates on any type of dataset except:

- Multidimensional sources such as Essbase, Oracle Planning and Budgeting Cloud Service, and Analytic Views
- Subject Areas or Local Subject Areas

You can use multi-table datasets if you set the **Preserve Grain** option on the Fact Table in the model. Setting this option indicates which table acts as the fact table when multiple tables are joined in a model. Set the **Preserve Grain** option by right-clicking the table in the data model. If you're using a multi-table dataset with the **Preserve Grain** option on, Explain considers the entire data model to explain the target column you have selected. If the **Preserve Grain** option is not set, Explain only considers the table that the target column you've clicked belongs to.

If you have a dataset of an unsupported type, you can generate an extract of these datasets and create a file-based or table-based dataset in Oracle Analytics, then run Explain on them.

Explain displays text descriptions of the results in English.

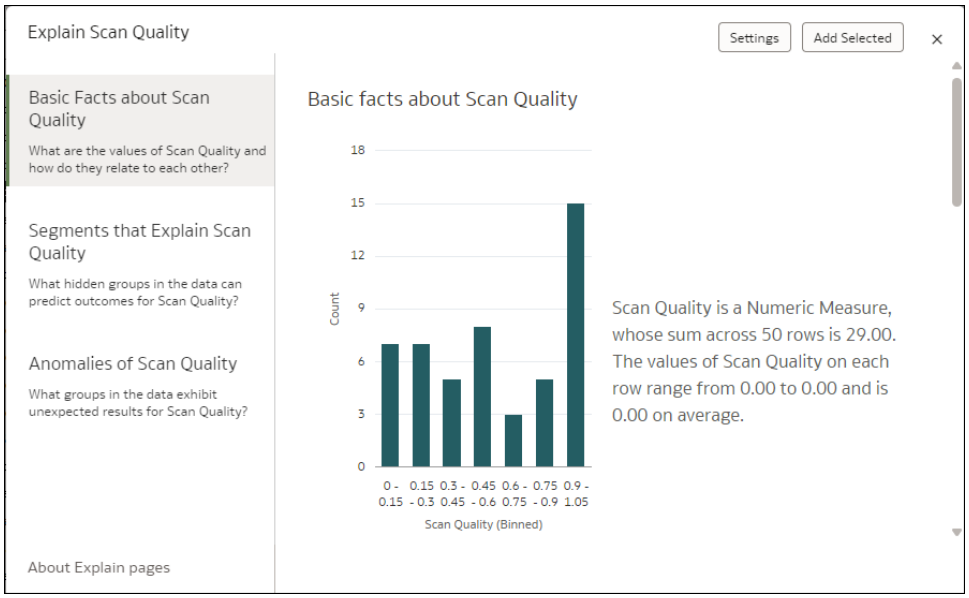
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Use Explain to Get Immediate Descriptive Insights Into Your Data

In Oracle Analytics, right-click a column in your dataset and select **Explain**. The Explain window defaults to the Basic Facts tab.

If You're Explaining a Measure Column

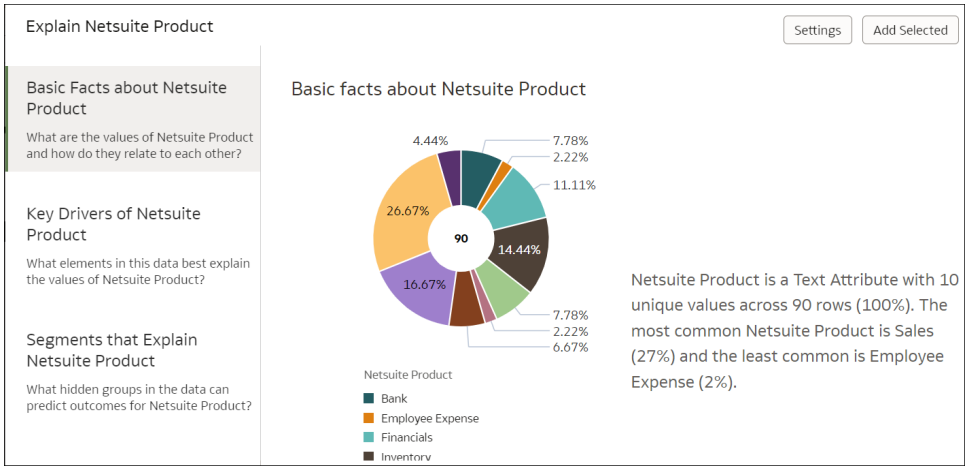
The Basic Facts page displays a histogram of your measure values indicating how records in your dataset distribute against values for this measure. A description next to the visualization summarizes the number of rows in your data as well as the total and average value of the measure. If you scroll down the page, you can see different visualizations displaying breakdowns of your target measure value against every attribute column in your dataset.



If You're Explaining an Attribute Column

At the top of the Basic Facts page, a pie chart displays the distribution of your dataset records between the different member values of your target attribute. This provides a quick glimpse into how your records distribute for the attribute you selected, and which are the most and least frequent. The paragraph next to the pie chart gives a high-level description of how many rows are in your dataset. It also indicates how many distinct values your target attribute holds and the most and least common values.

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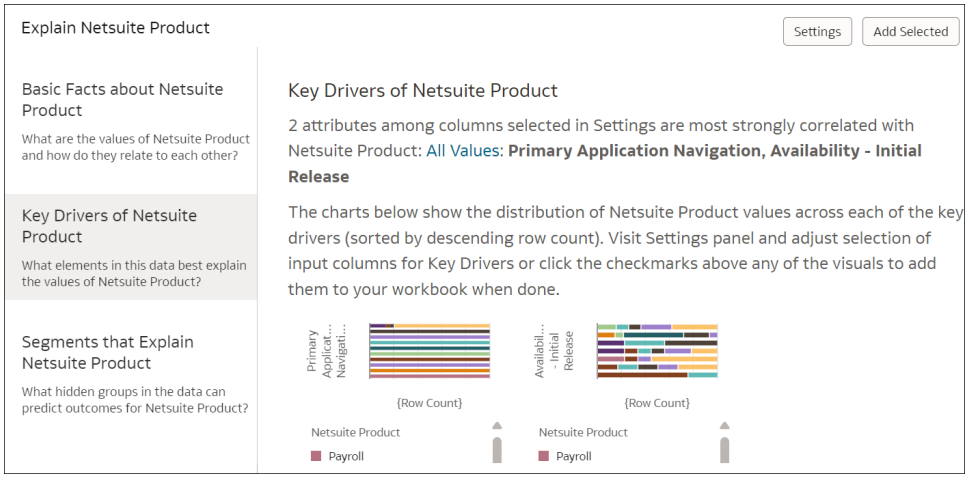
As you scroll down the Basic Facts page, you can see different charts indicating how each measure in your data distributes against the values of the attribute you selected. Click **Settings** on the top right of the screen to change which measures are displayed in this descriptive statistics page.

Use Explain to Identify the Drivers of Your Selected Column

In Oracle Analytics, right-click a target column in your dataset, select **Explain**, then select the Key Drivers tab.

If You're Explaining a Measure Column

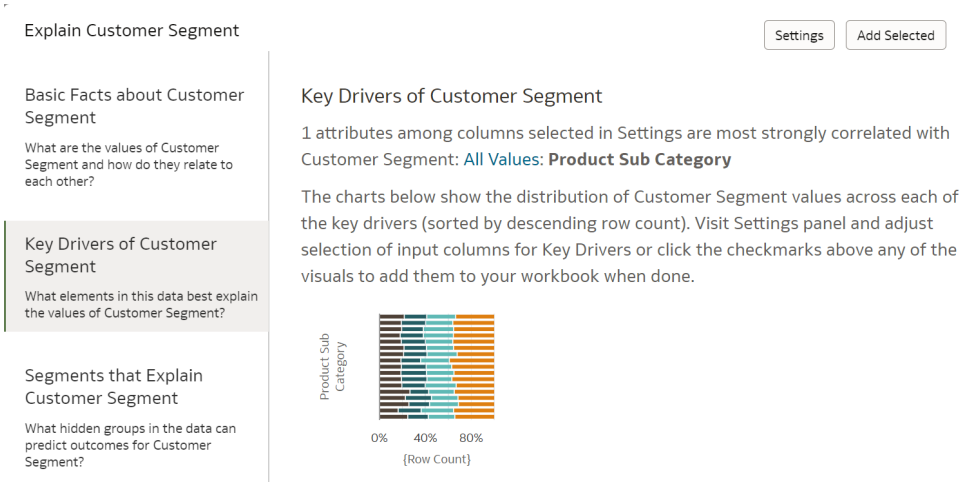
The Explain results depend on the aggregation rule of the selected column. If the measure has an additive aggregation rule (for example, sum), the Key Drivers tab isn't displayed. In order to see the Key Drivers tab you first need to set the aggregation rule to Average for your measure. This can be done in Oracle Analytics data preparation. When your measure has an aggregation rule of Average, the Key Drivers tab is displayed by Explain. The Key Drivers tab displays attribute columns that have the highest correlation with the value of your target measure. In other words, it indicates which columns in the dataset are the most significant drivers for the value of that measure.



If You're Explaining an Attribute Column

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Once the Explain window opens, click the Key Drivers tab (left of the window). This tab displays visualizations indicating the various columns that are the most significant in driving values from the attribute you targeted, meaning columns from your dataset that have the highest correlation with the value of your target attribute. A paragraph at the top lists these key driver columns. You can also reduce the scope of the key drivers by selecting only a specific value of your attribute column (drop down in the paragraph). If you leave All Values selected by default, then the visualizations indicate key drivers for all values of your target attribute.



Use Explain to Identify the Most Significant Segments of Records In Your Dataset

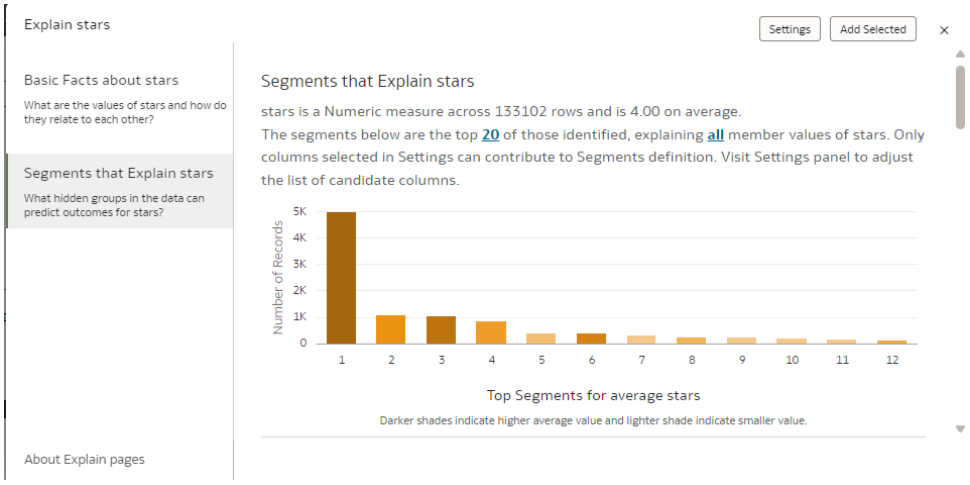
In Oracle Analytics, right-click a target column in your dataset, select **Explain**, then select the Segments tab. Within seconds, you can see a list of segments, each represented as a single bar in the top bar chart.

Segments are groups of records in your dataset which the Explain algorithm identified as having different values to the overall dataset average for the target column. The detailed results differ for measures and attributes.

If You're Explaining a Measure Column

For measures, the Explain segmentation algorithm looks for groups of records in your dataset for which the average value is significantly different from the whole dataset average value. For example, if your target measure is Age and the average age for the whole dataset is 23, then a segment might be a group of records in your data where the age is 55, significantly higher that the whole dataset average. A single segment is defined by a few filters in the dataset that identify a group of records with an unusual average value for the column being explained. For example, the filters might be City and Job Type.

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The vertical bar chart at the top indicates the size of each segment in the number of records (height of the bar), while the density of color indicates how far the segment average value is from the whole dataset average value.

The bullet charts at the bottom of the panel each represent a single segment in detail. Descriptions indicate the average measure value for a segment (the target measure), the total number of records in a segment, and the criteria defining a segment. On the chart, the bubble size represents the number of records in the segment, while the color and the position on the x-axis represent how far the average value of the segment is from the average value of the whole dataset (dotted line). You can hover over the chart to see the tooltip that displays these details. You can also adjust the sorting of all these segments, or you can display the list of the detailed segments as a table by editing the panel sorting or panel visualization type on top right of the panel.

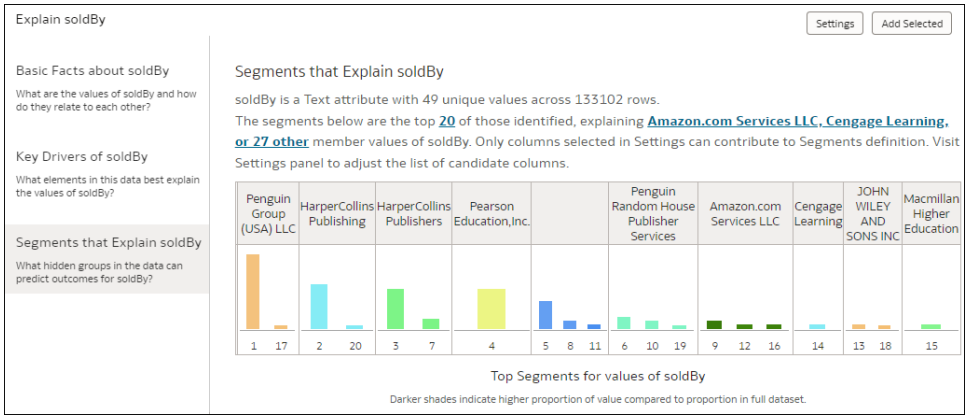
If you're interested in a segment, click the segment to add it to your workbook canvas. When you add a segment to your workbook canvas:

- A table visualization is created with the count of rows in the segment and outside the segment.
- A custom calculation defining In or Out of the segment is created, which can be used to aggregate any measure in your dataset by this criteria. This object can also be used as a powerful filter for your canvas, showing how the records in a segment compare with those outside of it.

If You're Explaining an Attribute Column

If your target is an attribute, in your overall data each distinct value of that attribute gathers a given proportion of records. For example, a column with two values Yes or No, might have 20% of Yes and 80% of No. The segment algorithm identifies groups of records in your data for which these proportions significantly vary from the average distribution. For example, Segment 1 might be a group of records in your data where Yes is 55% (instead of 20% for the whole dataset), and No is 45% (instead of 80% for the whole dataset). A single segment is defined by a few filters in the dataset that identify a group of records with an unusual distribution for the column being explained. For example, Segment 1 might be defined as all records in a given city and of a given age value.

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Explain scans your data and identifies many different segments. These are non-cumulative, that is, it's possible that a given record may belong to two distinct segments. The vertical bar chart at the top indicates the size of each segment in the records (height of the bar), whereas the color of the bar indicates the member value being analyzed. You can filter out specific member values by clicking the hyperlink in the text at the top of the page.

The horizontal bar charts at the bottom of the panel each represent a single segment in detail. Descriptions indicate the member value (for example, Yes or No) being analyzed, the total number of records in that segment, and the criteria defining the segment. The chart then represents the proportion of this value in the segment (colored zone) compared to the average proportion for the whole dataset (dotted line). You can hover over the chart to see the tooltip that displays this information in greater detail. You can also sort the segments and change how they are listed by editing the panel sorting or panel visualization type on the top right of the panel.

If you're interested in a segment, click the segment to add it to your workbook canvas. When you add a segment to your workbook canvas:

- A table visualization is created with the count of rows in the segment and outside the segment.
- A custom calculation defining In or Out of the segment is created, which can be used to aggregate any measure in your dataset by this criteria. This object can also be used as a powerful filter for your canvas, showing how records in a segment compare with those outside of it.

Use Explain to Identify Anomalies Among Records In Your Dataset

In Oracle Analytics, right-click a target column in your dataset, select **Explain**, then select the Anomalies tab. Within seconds, you can see a list of anomalies, each represented as a single bar in the top bar chart.

Explain considers the attribute and date columns and identifies intersections of two or three attribute columns where the value of a measure is different to the logically expected value (regressions). The detailed results differ for measures and attributes.

If You're Explaining a Measure Column

The Anomalies tab analyzes combinations of attributes from the dimensions selected in Settings, and identifies intersections where measure values are different to the values expected by regression algorithms. A description next to the visualization summarizes the combination of attributes identified as anomalous. The visualization underneath shows the gap between actual value of the measure (bar) versus the regression expected value (flat lines).

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You can add the chart to your canvas and leverage it as is. You can also manually visualize the combination that was identified as an outlier.

If You're Explaining an Attribute Column

The Anomalies tab analyzes combinations of attributes from the dimensions selected in Settings and identifies intersections where the number of records is different to the number expected by regression algorithms. You can display a drop down hyperlink in the overhead text at the top of the tab showing which value of your selected attribute is displayed. Further down the page, the text above each visualization describes the combination of attributes identified as anomalous. The visualization shows the gap between the actual number of records for that intersection (bar), versus the regression expected number (flat lines). You can add the chart to your canvas and leverage it directly as is.

Use Contextual Insights to Understand Your Data

The topics in this section show you how to use Contextual Insights for selected data points in a workbook's visualizations. Contextual Insights are available to all users.

Topics:

- What Are Contextual Insights?
- Enable and Configure Contextual Insights for a Visualization
- Explore Contextual Insights for a Visualization
- Understand Visualizations Generated by Contextual Insights
- Add a Contextual Insights Visualization to a Watchlist
- Dataset Support and Limitations for Contextual Insights

What Are Contextual Insights?

When you look at a canvas in a workbook, you might want to analyze specific data points in a visualization and gain more insights about the data within a specific context.

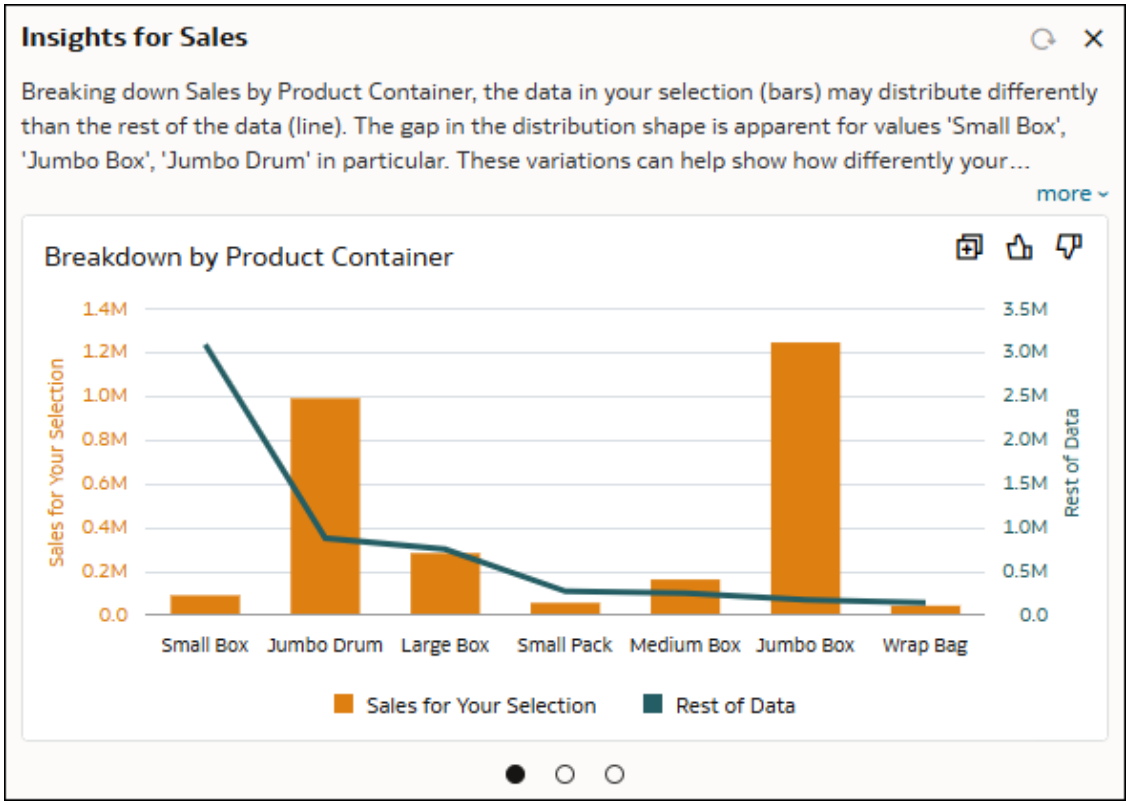
In Oracle Analytics, you can quickly access meaningful insights about specific data selections in any visualization using AI-driven contextual insights.

Contextual insights compare selected data points in a visualization with the rest of the data to generate dimension breakdowns, trending charts, and other visualizations. These insights help to highlight how your selection behaves compared to the rest of the data in the visualization, and can reveal high contrasts.

Oracle Analytics provides up to three insights at a time, but you can expand into additional insights. When you remove an insight, another one is provided, if available. You can also add these insights to a watchlist to easily refer to them later.

Oracle Analytics provides a description above each insight to help you understand them. This description is also available in the tooltip that displays when you hover over the auto-generated visualization, either in the dialog or in a watchlist.

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Enable and Configure Contextual Insights for a Visualization

As a content author, you can enable Contextual Insights for individual visualizations on a canvas and specify which columns the algorithm uses to generate the insights.

The Explain Visualization property is turned off by default when you create a new visualization. You can enable it for most visualization types, with the exception of Tile, Map, and Correlation Matrix. Once the property is switched on, users can explore the auto-generated insights.

You can also specify which columns you want the AI algorithm to consider when generating insights. You do this by adding them to the Related Columns section of the Grammar panel for your visualization. Before you allow others to explore the Contextual Insights generated from your selections, take some time to review the insights yourself and make adjustments as needed.

The Contextual Insights algorithm evaluates the related columns and identifies the ones that show the highest contrast between the data you selected and the rest of the data in the visualization.

You can add up to 30 related columns. These columns can be attributes, metrics, date and time columns, or calculations, however the algorithm only uses those it considers eligible. For example, only calculations that use simple functions such as string or cast functions are considered. If you add multiple date columns, only the first is considered.

For XSA datasets (Non Subject Area-based sources), Contextual Insights automatically identifies the most appropriate columns to use to generate the insights. However, Oracle recommends that you add relevant columns to yield meaningful insights. For subject areas, you must add related columns to generate Contextual Insights for visualizations using data from those subject areas.

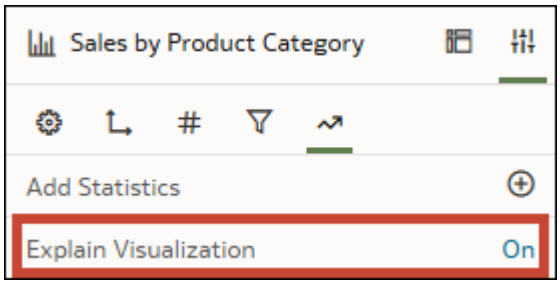
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Enable Contextual Insights for a Visualization

As a content author, enable Contextual Insights for a visualization.

Contextual Insights are turned on for end users in Present. To turn them off, see Specify the Workbook Visualization Actions in Present and deselect **Explain Visualization**.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In Visualize, click a visualization.
3. Click **Properties** to open the Properties pane, and then click **Analytics**.
4. Click the **Explain Visualization** field and select **On**.



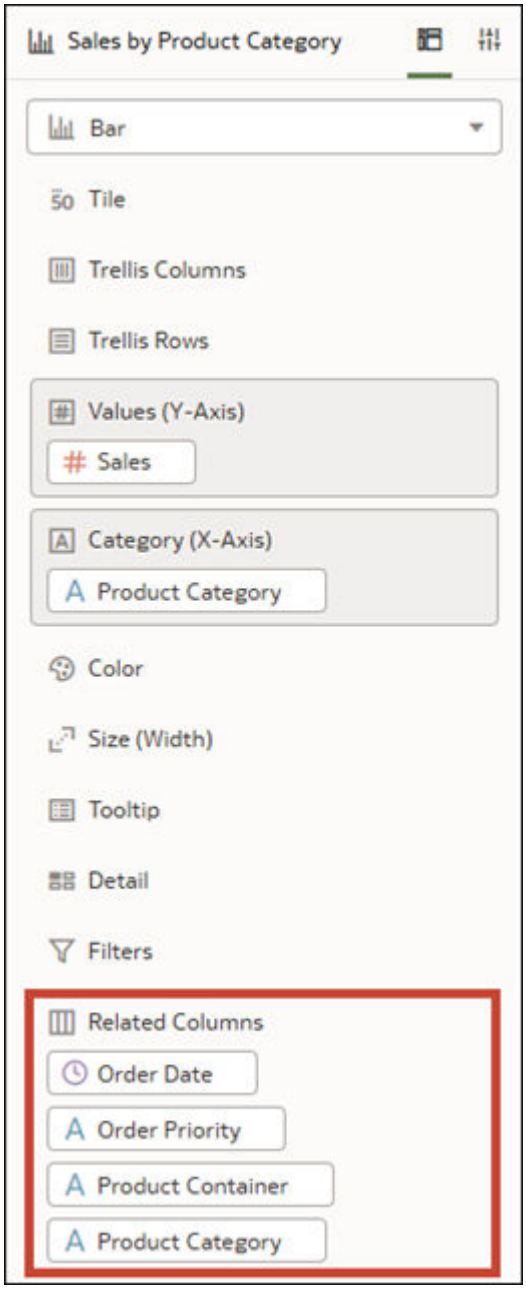
5. Click **Save**.

Configure Contextual Insights for a Visualization

As a content author, specify which columns you want the Contextual Insights algorithm to consider when generating insights for a visualization.

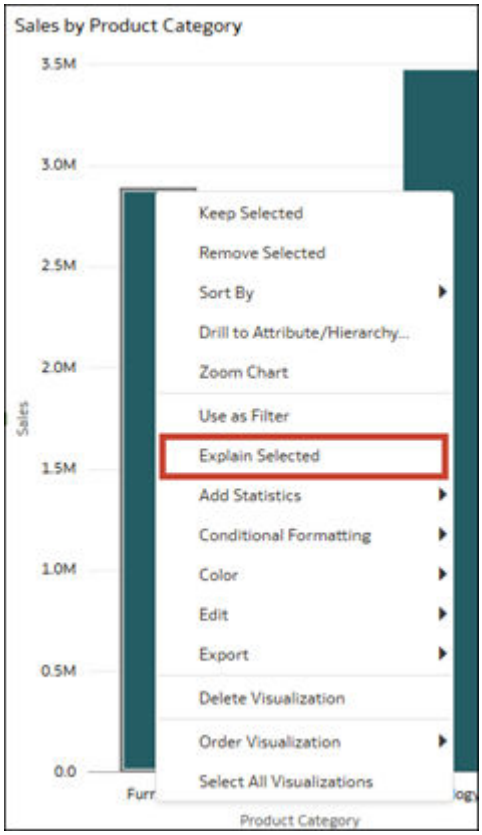
1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In Visualize, click a visualization.
3. Click **Grammar** to open the Grammar pane and scroll to **Related Columns**.
4. From the Data pane, drag the columns you want Contextual Insights to use to **Related Columns**.

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5. Click **Save**.
6. To test that Contextual Insights work as intended, select one or more data points in the visualization, right-click, and then click **Explain Selected**.

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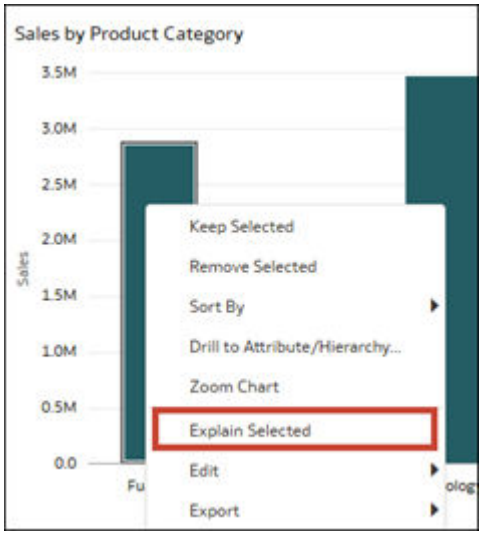
Explore Contextual Insights for a Visualization

Use Contextual Insights to compare specific data selections with the rest of the data in a visualization.

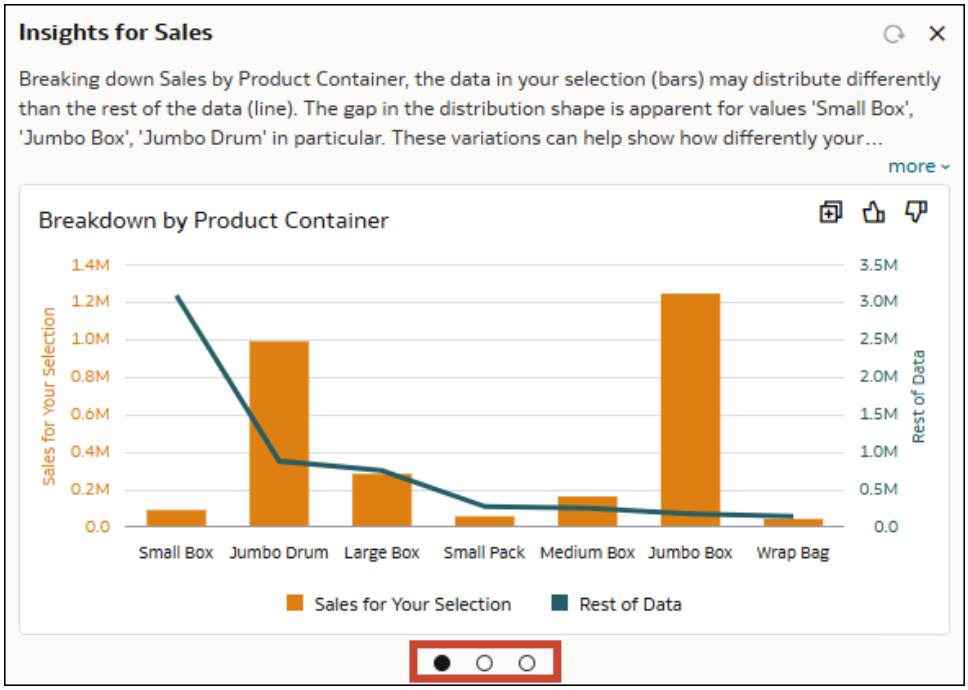
Contextual Insights remembers your insight selections while you are signed in. If you sign out of Oracle Analytics and sign back in, Contextual Insights shows you the default insights generated by the algorithm.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click one or more data points in a visualization to select them, then right-click and click **Explain Selected**.

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3. In the dialog, browse through the insights.



4. Like or reject the insights generated for you.
   a. Hover over a visualization in the dialog.
   b. Click **Like Insight** to keep the insight.
   c. Click **Dismiss Insight** to remove the insight.

      After you dismiss an insight, Contextual Insights shows you the next available insight.

      If you invoke Contextual insights on the same data point, you won't see insights that you previously dismissed.
5. Select a different data point in the visualization and generate new insights.

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a. With the dialog open, select a different data point in the visualization on the canvas.

b. Click the Refresh icon to get insights for the new data point that you selected.

6. Apply filters and refresh the insights.

a. With the dialog open, add a filter to the canvas or visualization.

b. Click the Refresh icon to get insights that take the filters into account.

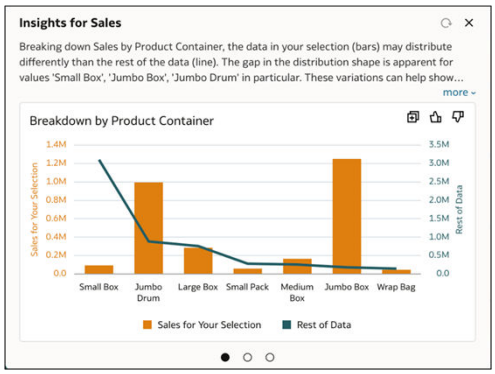
Understand Visualizations Generated by Contextual Insights

The Contextual Insights algorithm generates three types of visualizations by leveraging the related columns.

To generate these insights, the algorithm selects a subset of related columns that show the highest contrast between your selection and the rest of the data. The order in which the insights are displayed depends on the data. In each insight, your selection appears in orange while rest of data appears in blue.

- **Breakdown by attribute** - These dual-axis visualizations provide a breakdown of your metric across various members of a selected attribute in your data. The bars represent the breakdown of the selected data and the line represents the breakdown of the remaining data. The overall shape of the distribution helps you quickly see which members in your selection contrast significantly with the rest of the data. The members are sorted from highest to lowest based on the rest of the data.

  For example, this insight breaks down sales by product container. The description provided indicates that in the case of the Small Box product container, the selected data has significantly lower sales when compared to the rest of the data. It also points out that the Jumbo Drum and Jumbo Box product containers for the selected data have much higher sales than the rest of the data.



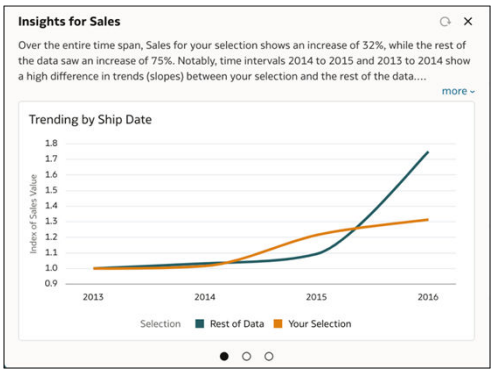
- **Trending** - Trending visualizations compare the relative growth of a metric over time for your selection and the rest of the data using lines to show the evolution of each. The algorithm uses the first date column that appears in the Related Columns section of the Grammar panel.

  Each line starts with a base index value of 1.00 set at the initial time period. The evolution of the metric over time shows the relative value in the following periods compared to the index value of 1.00 in the initial period. When looking at absolute values for the metric, discrepancies in values make it difficult to properly compare any growth or decline over time.

  For example, this insight shows the trend in sales by ship date. The description provides additional insights about the overall performance of sales over time. The description also

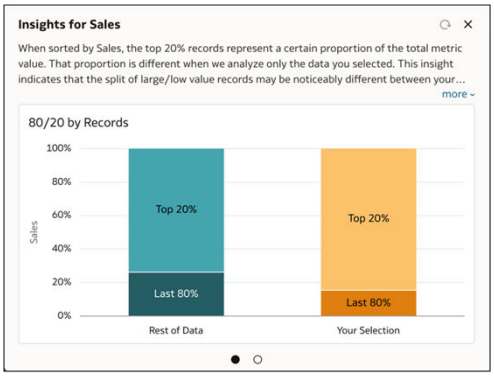
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highlights the intervals in the data where there's a significant difference in the trend between your selection and rest of the data, in this case, 2014 to 2015.



- **80/20** - This type of visualization shows what proportion of your metric value consists of the top 20% of the records and what proportion consists of the bottom 80% of the records when data is ordered by your metric. The visualization also shows the same for the rest of the data. This is computed at the most granular level of data in your source visualization.

  For example, this insight shows the 80/20 proportions, sorted by sales, using two bars: the first for the rest of the data and the second for your selection. The description highlights the fact that the proportion is noticeably different between the two.



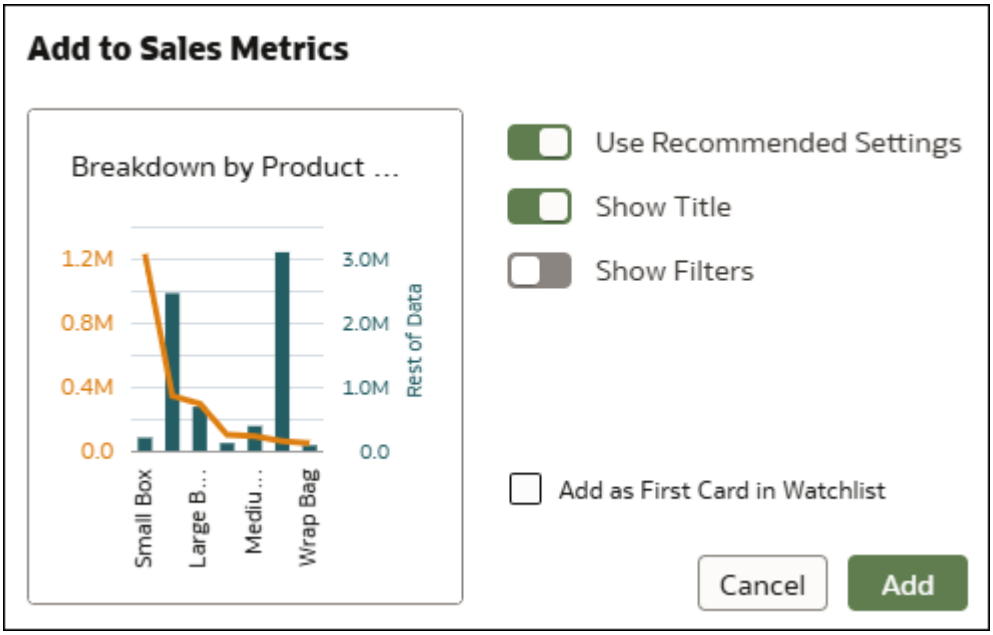
Add a Contextual Insights Visualization to a Watchlist

You can add visualizations generated by Contextual Insights to a watchlist to access the insights from the Featured Watchlists area on your Home page.

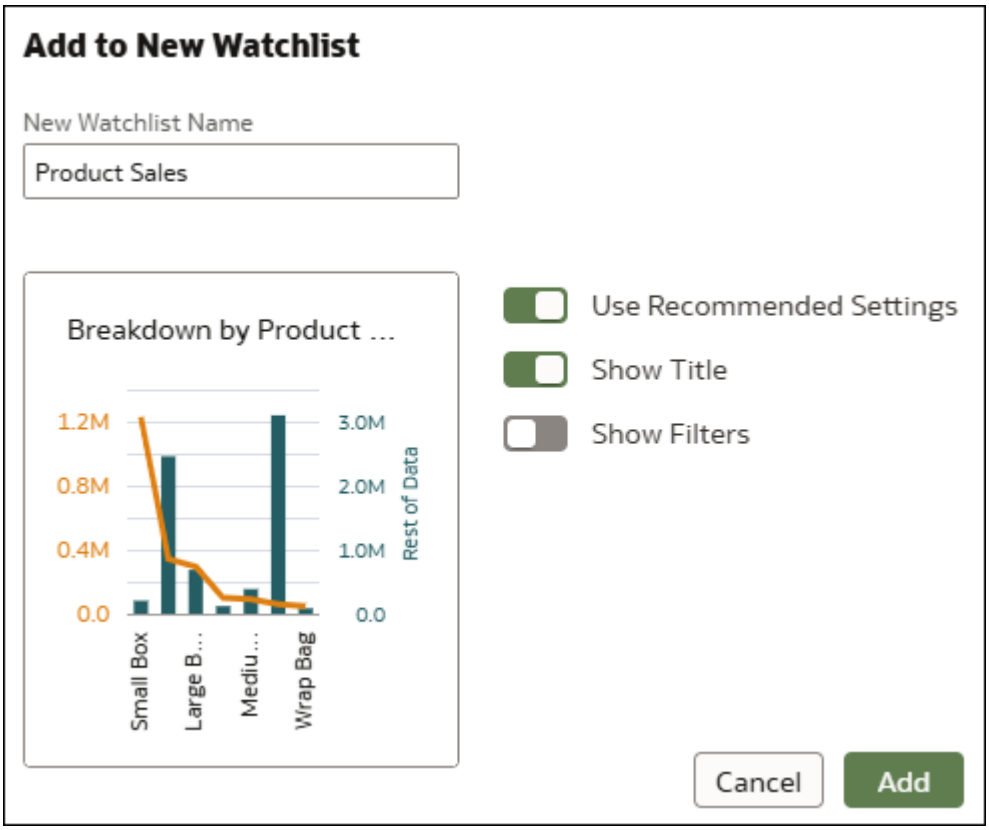
The Add to Watchlist option is available to everyone who uses Contextual Insights. You don't need special permissions or workbook settings to use this feature.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Click one or more data points in a visualization to select them, then right-click and select **Explain Selected**.
3. In the Contextual Insights dialog, hover over the visualization of the insight you want to add to a watchlist and click **Add to Watchlist** .
4. Do one of the following:
   - If a watchlist exists, click the watchlist name in the list, then click **Add**.

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- If a watchlist doesn't exist, click **New Watchlist**, enter a new watchlist name, and click **Add**.



Dataset Support and Limitations for Contextual Insights

This topic describes the datasets supported for Contextual Insights and the existing limitations.

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- **Multidimensional data sources** - Contextual Insights aren't supported for multidimensional sources such as Essbase, Oracle Planning and Budgeting Cloud Service, and Analytic Views.
- **Multi-table datasets** - You can use multi-table datasets if you set the **Preserve Grain** option on the Fact Table in the model. Setting this option indicates which table acts as the fact table when multiple tables are joined in a model. Set the **Preserve Grain** option by right-clicking the table in the data model.
- **Hierarchical columns** - Attributes added as related columns that have a hierarchical relationship with an attribute in your visualization are filtered out by the Contextual Insights algorithm. In some cases, the algorithm may not be able to detect this relationship and this could lead to trivial insights showing empty visualizations.
- **Related columns for subject areas** - For visualizations using data from a subject area, if you've added related columns but are unable to see any contextual insights, you can reduce the number of related columns to less than six and retry.
- **Language** - Contextual Insights display text descriptions of insights and calculations in English.

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11

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
- Switch to Use Another Map Layer
- 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
- Use Geometry Data Type Columns in Visualizations

About Map Backgrounds

You can enhance map visualizations in workbooks by adding and maintaining map backgrounds.

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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.

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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**.

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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.

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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.

Video

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 default storage 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.

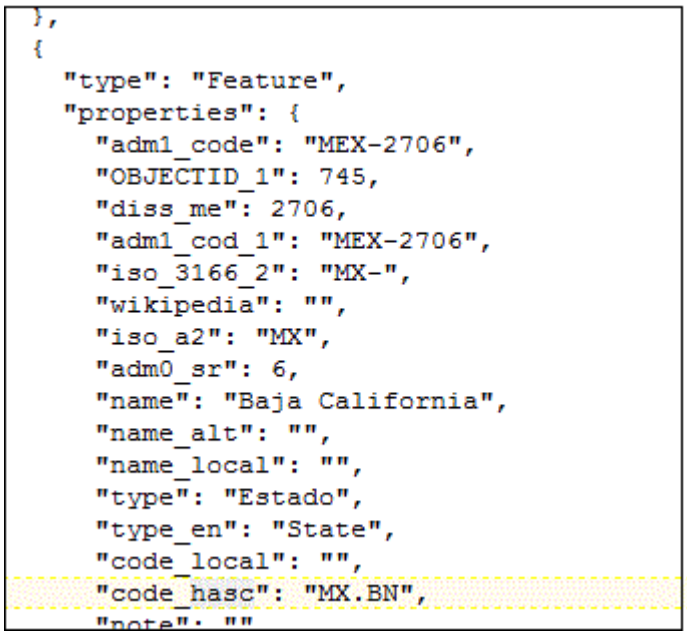
- Map layer files containing polygons with 12 or more decimal points might reduce in size by 50%.
- Map layer files that contain point geometries might reduce in size by 15-20%.

If preferred, you can compress your map layer files before you upload them to Oracle Analytics using tools such as mapshaper.org.

The overall external cloud storage limit for GeoJSON files is 50 GB.

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.

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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, in the **Data Layers** tab, 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 100 MB).

   Custom layers that use the Line String geometry type aren't fully supported. The Color and Size section on the Visualization Grammar pane doesn't apply to line geometries.
5. Click **Open** to display the Map Layer dialog.
6. Optional: If you want to significantly expand storage capacity beyond the limits of internal storage, click **Advanced**, and select the **External** Storage Type.

   External storage requires no configuration or additional resource.
7. In the **General** tab enter a **Name** and an optional **Description**.
8. 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.

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9. Click **Save**. 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:

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- **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.

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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.

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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**.

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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.

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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.

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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.

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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.

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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, as an administrator you can hide or display map layers and backgrounds for users.

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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, as an administrator 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.

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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**.

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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 or Oracle Analytics is restarted. This is because the refresh or restart 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**.

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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 or Oracle Analytics is restarted. This is because the refresh or restart 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:

- Press **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**.

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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 Geometry Data Type Columns in Visualizations

Oracle Analytics supports the geometry data type which lets users visualize and work with geometry columns and layers in visualizations.

Content authors can use the geometry data type in their workbooks.

Topics:

- About the Geometry Data Type
- About the Business Value of the Geometry Data Type
- Work with Geometry Data Type Columns
- Work with Geometry Data Layers and Layer Properties
- Work with Background Map Layers and Geometry Data Type Layer Properties
- Work with Toggle Off, Toggle On, and Legends for Geometry Data Type Layers
- Work with the Selection Tool for Geometry Data Type Layers
- Work with the Information Option for Geometry Data Type
- About Calculations that Require Only One Geometry Column
- About Calculations that Require Two Geometry Columns
- What Are the Limitations of the Geometry Data Type?
- What Are the Performance Considerations for the Geometry Data Type?

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- List of Oracle Spatial Calculations

About the Geometry Data Type

Oracle Analytics automatically recognizes geometry columns from Oracle databases and CSV files, so you can easily import and connect to spatial data.

A geometry data type in Oracle Analytics can represent a wide range of spatial shapes, including points, polygons, and lines, enabling detailed and dynamic geographic visualizations. You can use Geometry data types for visualizing data on maps or as inputs for advanced spatial calculations, enabling detailed spatial analysis.

Geometry columns are special first-class objects in Oracle Analytics that you can use for the following operations:

- To create map visualizations
- In custom calculations for spatial measurements and correlations (either on a canvas or in a data flow)
- As part of custom SQL sourcing (meaning that you can create a dataset using Spatial SQL defined through the Manual SQL query mode)

When you use a geometry column many other operations are disabled or extremely limited. You can't use geometry columns as filters in a workbook or as components (visualization definition grammar) in any visualizations other than maps. You can’t set the geometry data type manually on a data column, it must be recognized as a geometry data type when importing as a dataset.

About the Business Value of the Geometry Data Type

You can easily use Geometry columns from Oracle databases and CSV files, so that you can easily import and connect to spatial data.

Accelerate Map Design and Visualization

You can quickly visualize geographic information by dragging and dropping geometry columns onto a canvas where the shapes render automatically as a map visualization, without having to manually set up any map layers. Spatial data objects, whether sourced directly from an Oracle database or a CSV file, are effortlessly rendered in Oracle Analytics as maps, allowing you to quickly create dynamic spatial insights. This native feature boosts visual performance and ensures the smooth and responsive rendering of spatial data objects.

Optimize Map Layer Maintenance

In scenarios where geometry definitions frequently change—such as delivery routes, flood zones, or custom sales regions—using the geometry data type ensures that maps in Oracle Analytics are automatically updated with the latest shape information. There’s no need to preconfigure or ensure a specific map layer exists in your Oracle Analytics environment, the geometry data automatically shows in a map visualization. There’s also no need to manually update any data or map layers to reflect changes, as the maps dynamically adjust by querying the updated geometry data. This eliminates extra maintenance of data layers or map layers and ensures that maps always display the most current data.

Support Spatial Calculations

You can compute calculations to perform spatial measurements using the geometry data type. Spatial calculations enable you to calculate the area and length of geometry shapes, measure distances between two geographic data types (assuming proper joining is defined), determine

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spatial relationships, and perform condition-based calculations that return true or false. These calculations help you analyze geographic data more effectively, leading to powerful spatial data-driven decisions.

Work with Geometry Data Type Columns

Oracle Analytics supports the geometry data type which lets users visualize and work with geometry columns.

Content authors can use the geometry data type in their workbooks.

Topics:

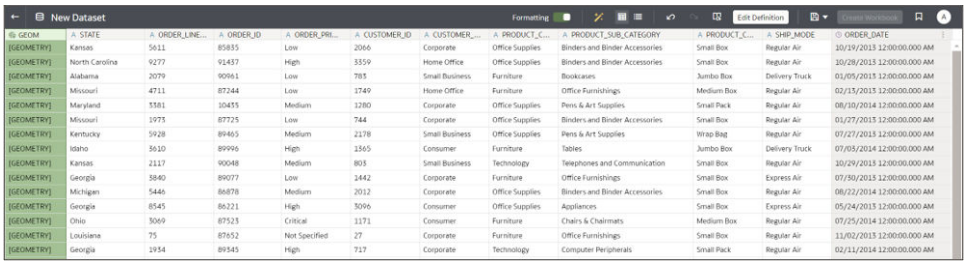
- Prepare Geometry Columns for Visualizing Maps
- Add Geometry Columns to a Workbook
- Visualize Geometry Column Data

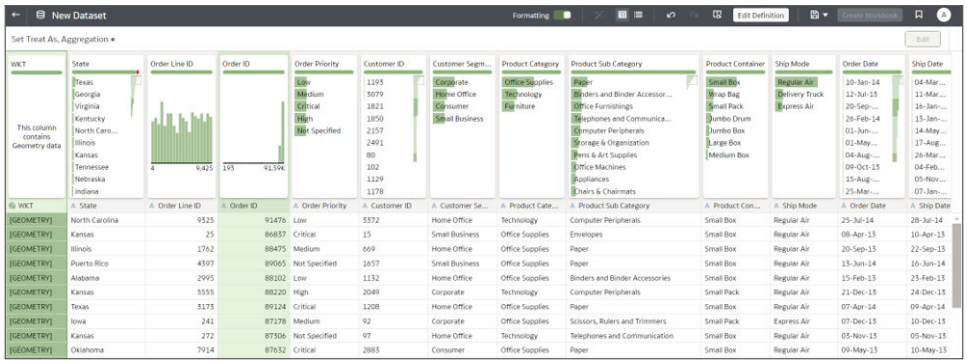
Prepare Geometry Columns for Visualizing Maps

You can prepare and connect to geometry data types in Oracle Analytics from either an Oracle database, using the Spatial Data Object Geometry data type (SDO.Geometry), or a CSV file.

The CSV source data must include geometry data in the Well-Known Text (WKT) format to be recognized by Oracle Analytics. For data sourcing from an Oracle database, you use a direct connection or through a semantic model. The value stored in geometry columns appears as [GEOMETRY] and can only be used in map visualizations or custom calculations.

1. On the Home page, click **Create**, and then click **Dataset**.
2. In the Create Dataset dialog, select an already configured connection to an Oracle database which has the SDO.Geometry column, or select a CSV file with a WKT column.





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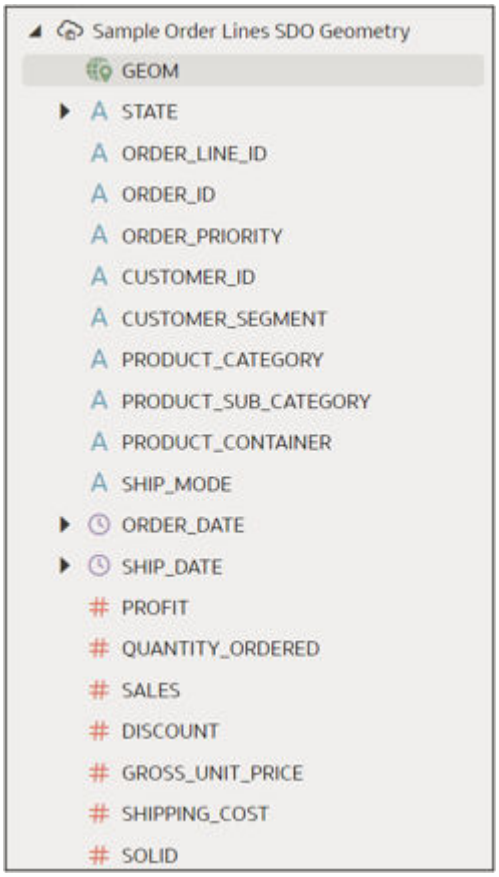
Joins between geometry columns from two different datasets aren't supported. For use cases where you need to relate between the geometry columns, you must create and establish a distinct join using existing columns.

Add Geometry Columns to a Workbook

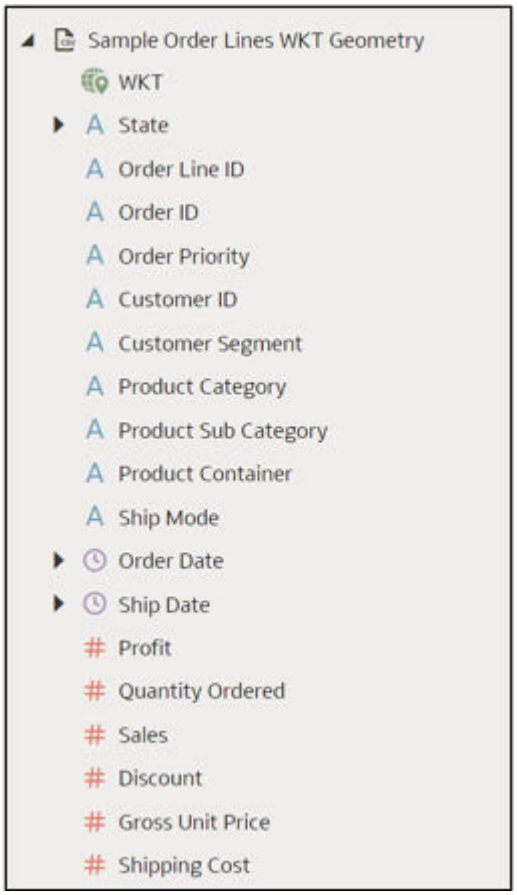
You can start visualizing shapes from a geometry column by using a dataset that holds geometry data.

A geometry column can be consumed from a dataset created based on a SDO.Geometry data type from an Oracle database or a Well-Known Text (WKT) format from a CSV file.

1. On the Home page, click the **Create**, and then click **Workbook**.
2. In the Add Data dialog, click a dataset with a geometry column , then click **Add to Workbook**.



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3. Click **Save**.

   After you add the dataset to your workbook, you simply drag and drop the geometry column, for example WKT, onto the Visualize canvas to start to create visualizations.

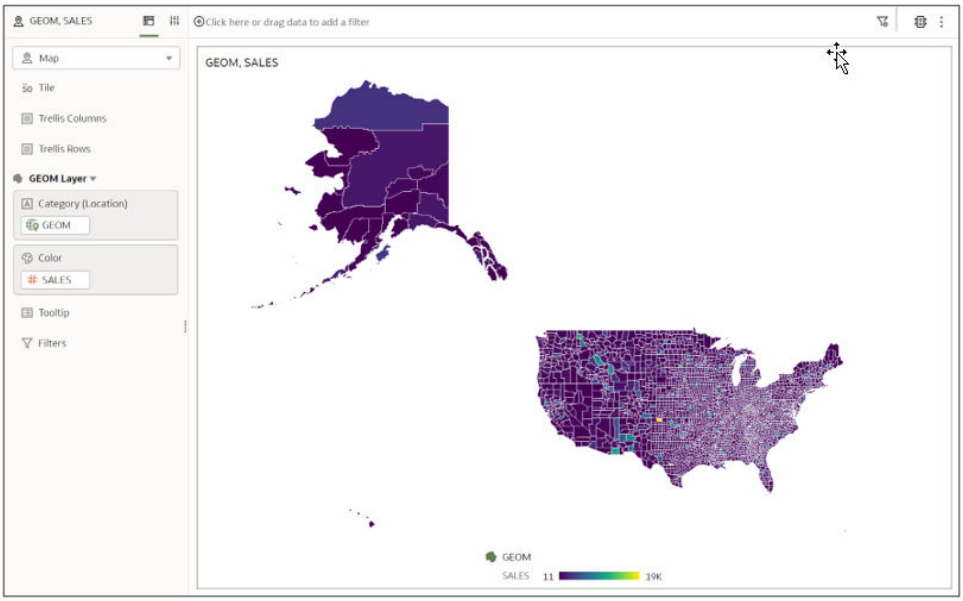
Visualize Geometry Column Data

You can use the geometry column to start building a visualization.

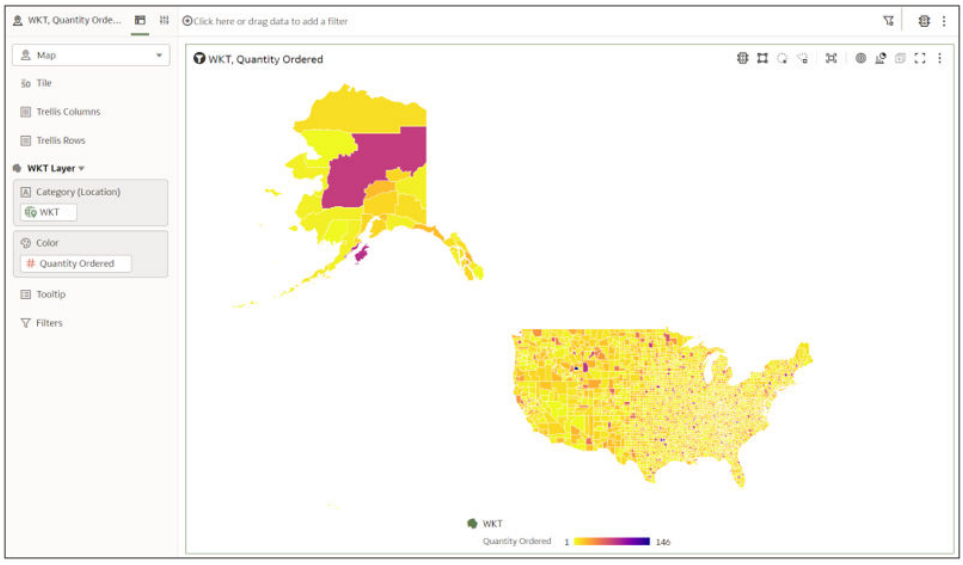
- In the Data panel, locate the geometry column and drag it to the Visualize canvas.

  This is an example of a geometry data type column from an Oracle database visualizing the shape of US Counties with the metric Sales for Color.

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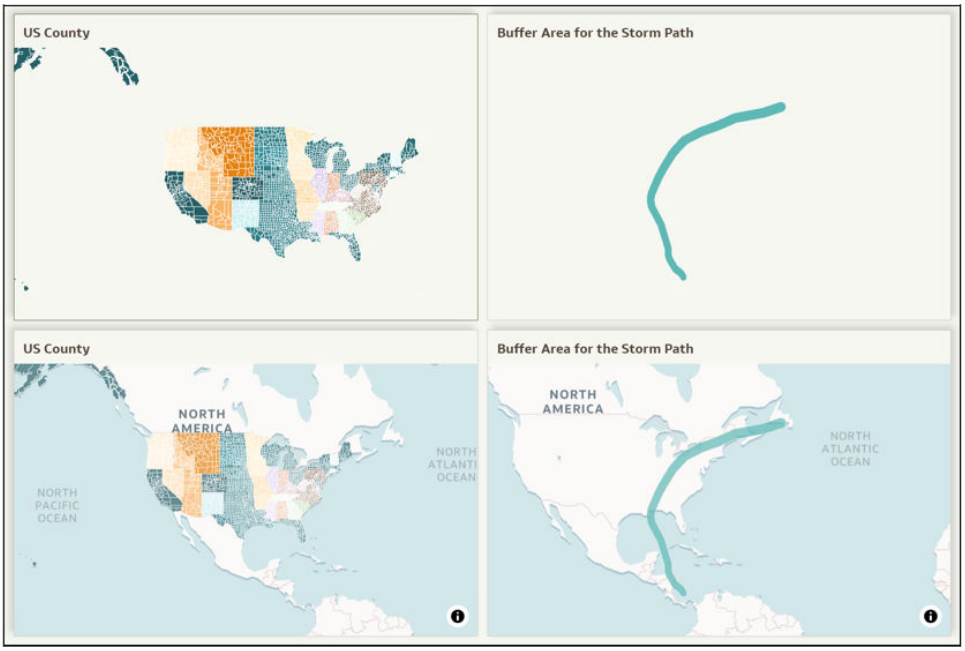
This is an example of a geometry data type WKT column from a CSV file visualizing the shape of US Counties with the metric Quantity Ordered for Color.



By default, the map visualization renders without any background map layer. If required, you can overlay the map shape on a background map layer.

This is an example of US Counties and the buffer area from a storm path visualized with no background layer in the top row of the figure, and with the Oracle DataViz map background layer in the bottom row of the figure

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Work with Geometry Data Layers and Layer Properties

You can make changes to geometry data layers and layer properties.

Topics:

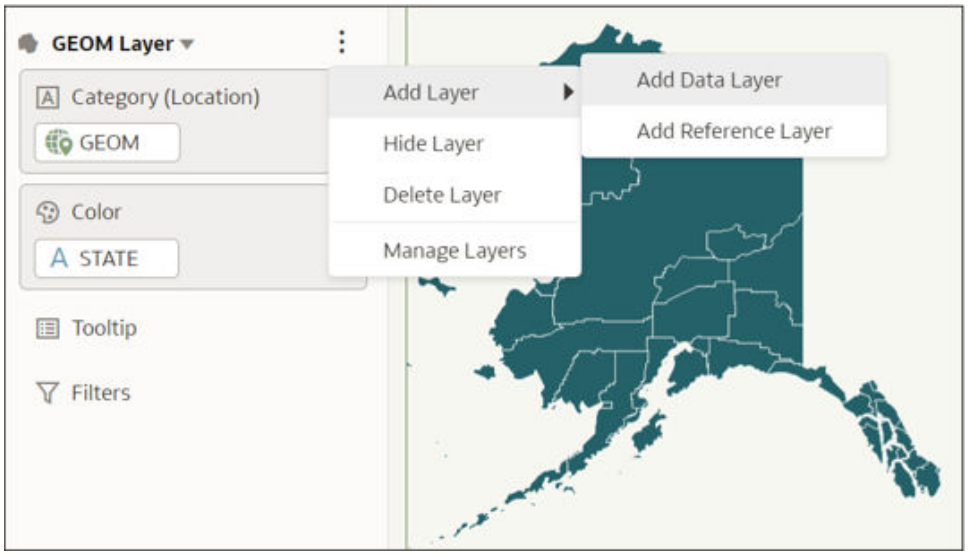
- Overlay Multiple Data Layers with Geometry Columns
- Adjust the Size of a Geometry Data Layer
- Change the Colors of Geometry Shapes
- Order the Geometry Layers

Overlay Multiple Data Layers with Geometry Columns

You can add geometry columns to multiple data layers.

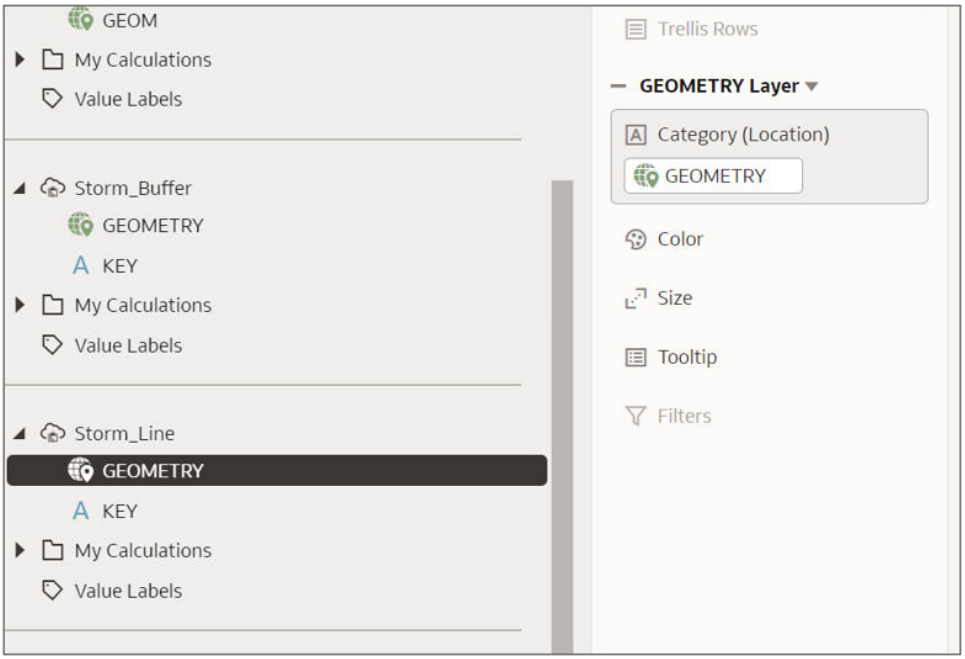
1. In the Grammar pane, click **Layer Options** for an existing layer, click **Add Layer**, and then select **Add Data Layer**.

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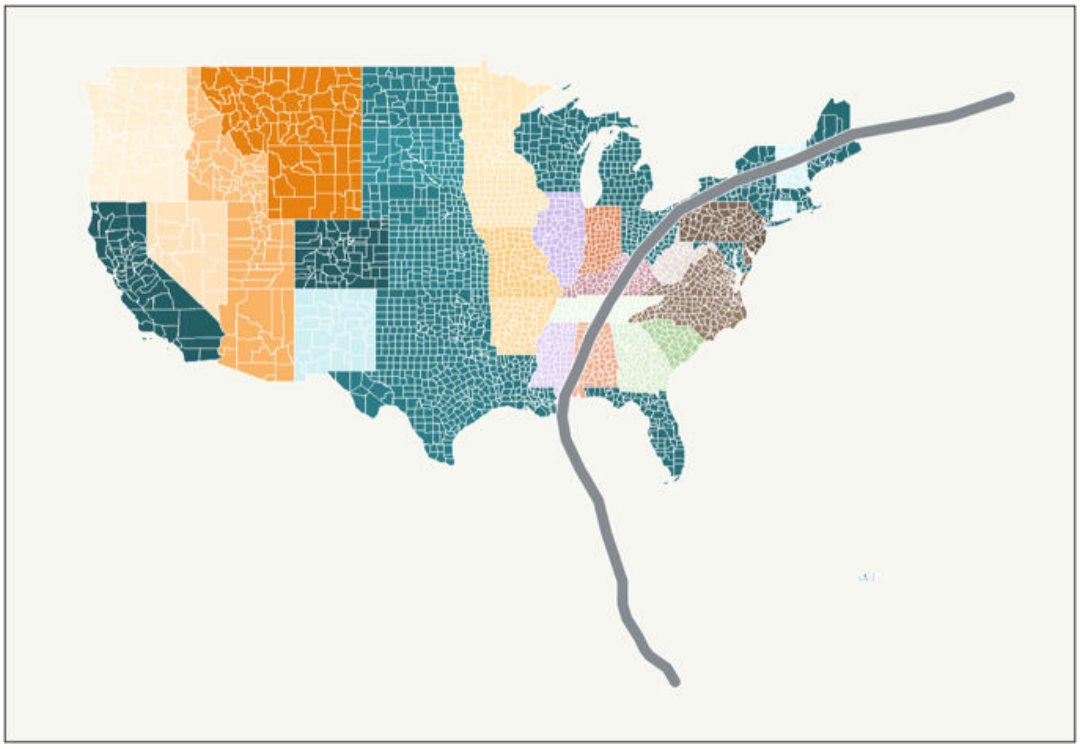
Note that geometry columns can be used only in a data layer. If you need to use them in a reference layer, you must generate a GeoJSON file to support that reference layer.

2. In the Data pane, locate the dataset from which the new layer needs to be overlaid and drag the geometry column to the new data layer.



This example visualizes the new data layer over the existing one and shows how the Storm Line layer is added on top of US Counties.

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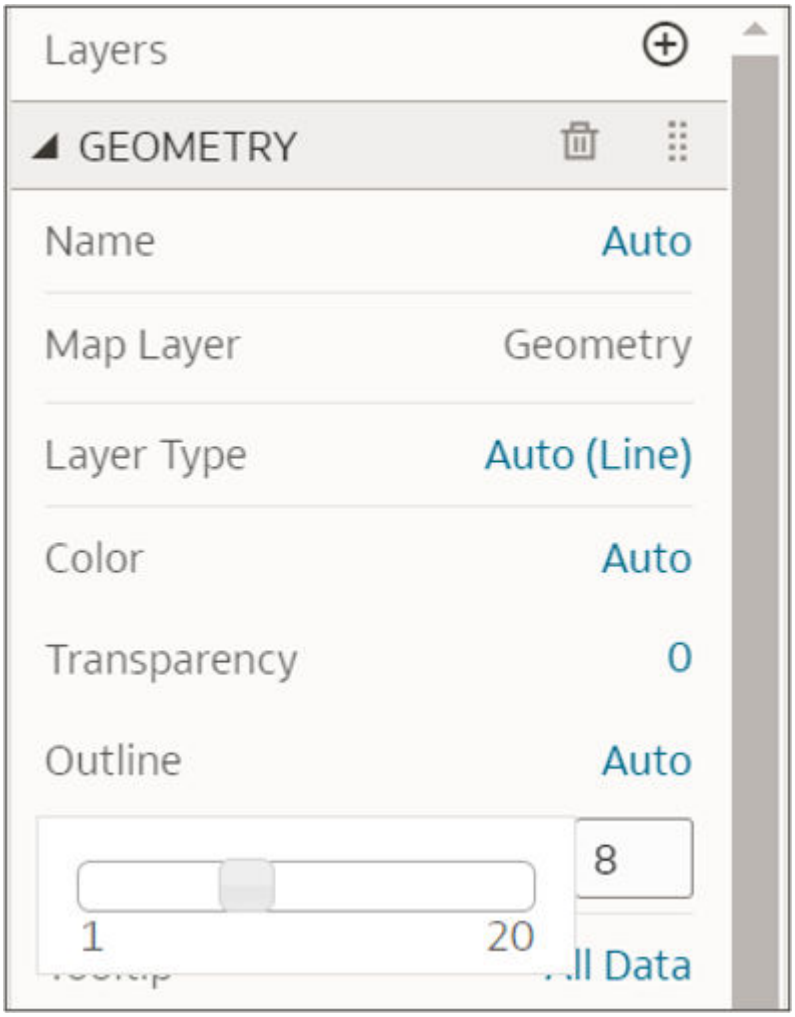


Adjust the Size of a Geometry Data Layer

If your geometry data layer is a line or a point you can adjust the size of the data layer.

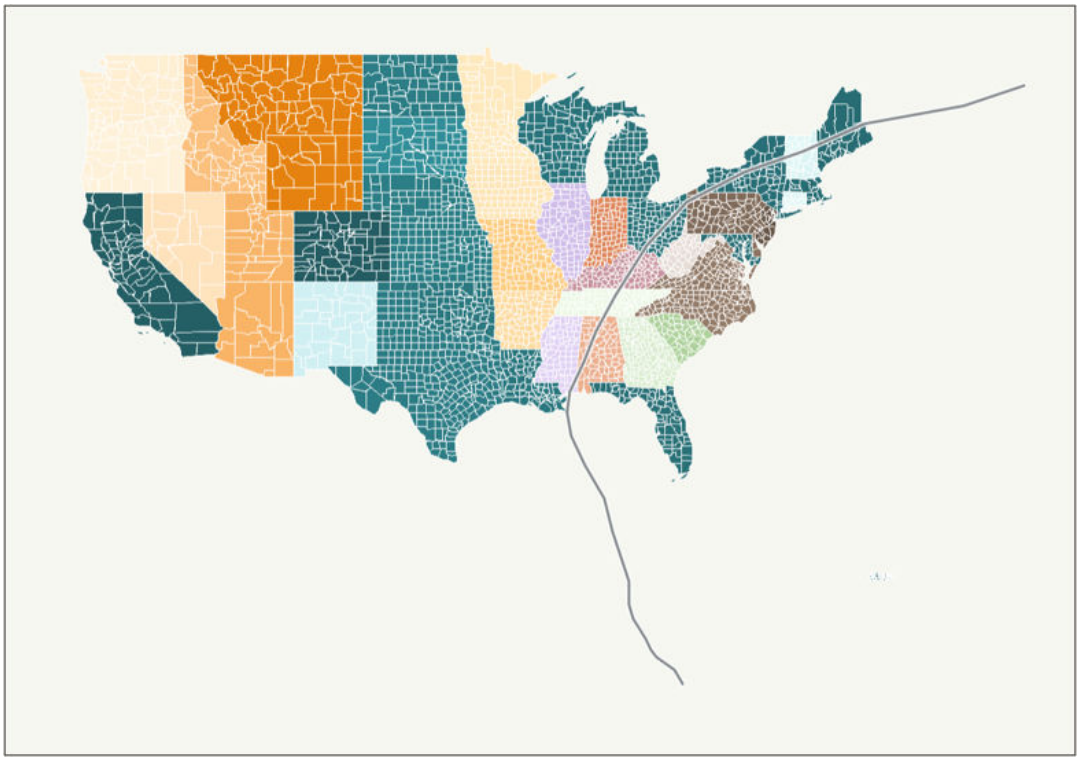
1. In the Properties pane, click **Layers**, and then locate and expand the layer you want to adjust the size for.
2. Click the **Size** field and use the slider to adjust the size.

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This example shows how the size of a geometry line layer representing a storm line is now adjusted in the visualization. The point size is adjusted to the value of 2.

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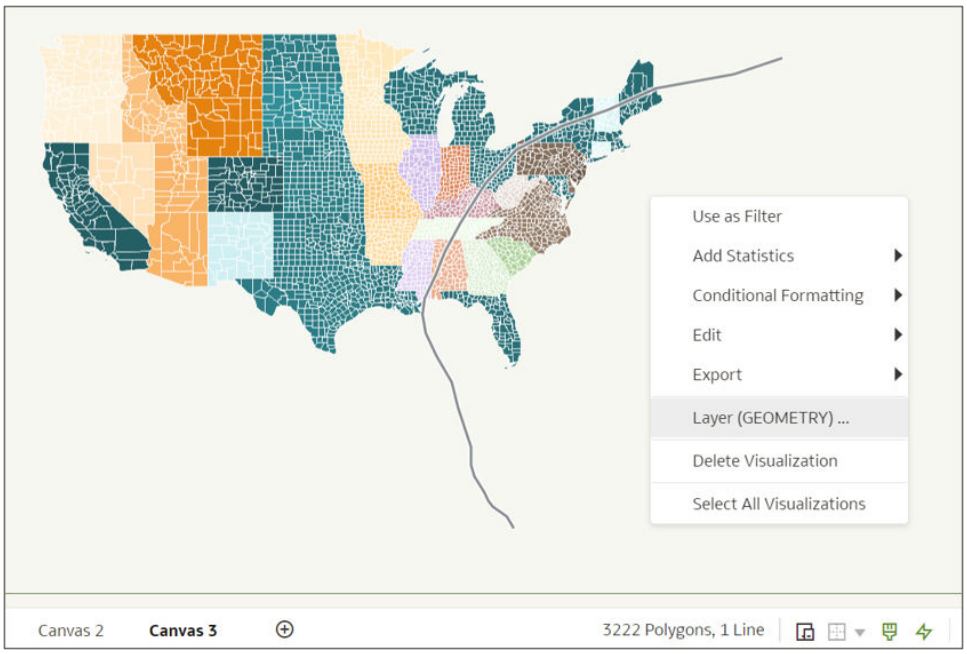


Change the Colors of Geometry Shapes

You can change the colors of geometry shapes when no default colors are specified in the Grammar pane.

1. Right-click a map visualization and select **Layer**.

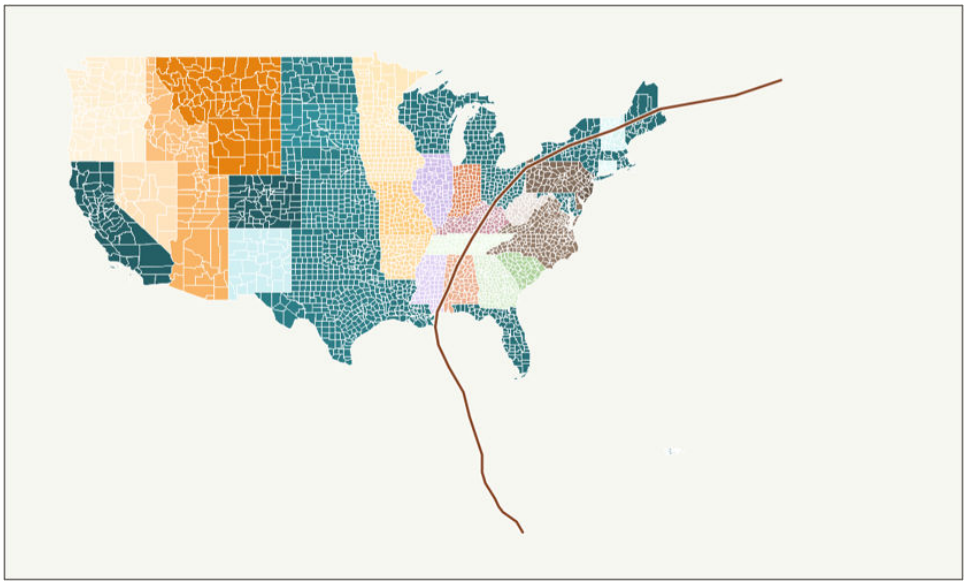
   This example shows how to adjust the color for the storm line overlaid on top of US Counties.



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2. Select a color, and then click **OK**.

   This example shows the Storm Line is now red.

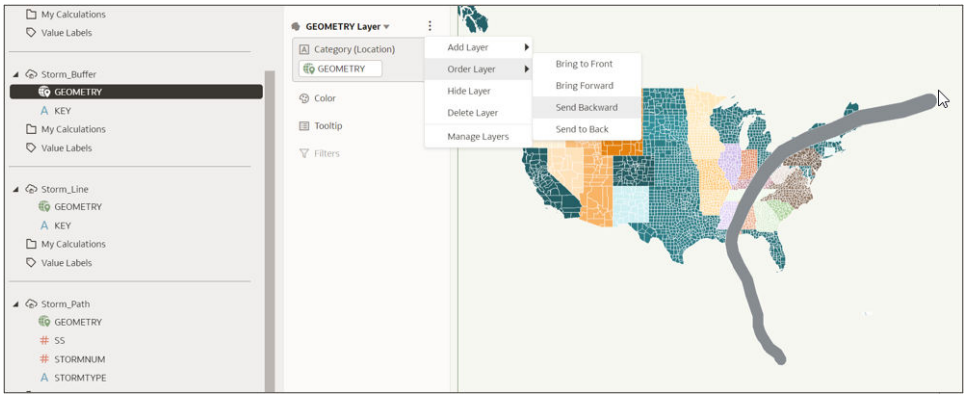


Order the Geometry Layers

You can order geometry layers if there are multiple layers to be overlaid.

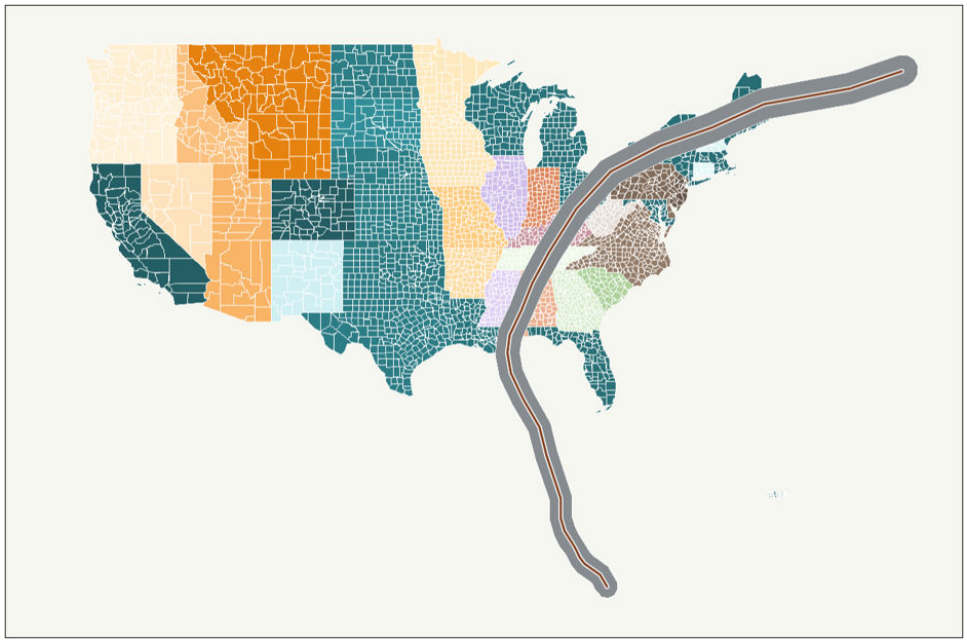
1. In the Grammar pane, click **Layer Options** for an existing layer, and then click **Order Layer**.
2. Click **Send Backward**. The new layer is sent backwards behind the previous layer, and the previous layer moves in front of the latest layer added

   This example shows how a new layer called Storm Buffer is added on top of an existing layer which has the geometry column from a layer called Storm Line. Since it's overlaid on top of an existing layer, the Storm Line layer is no longer visible



This example shows the map layers for US Counties, Storm Line, and Storm Buffer in the right order.

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Work with Background Map Layers and Geometry Data Type Layer Properties

You can make changes to background map layers and geometry layer properties.

Topics:

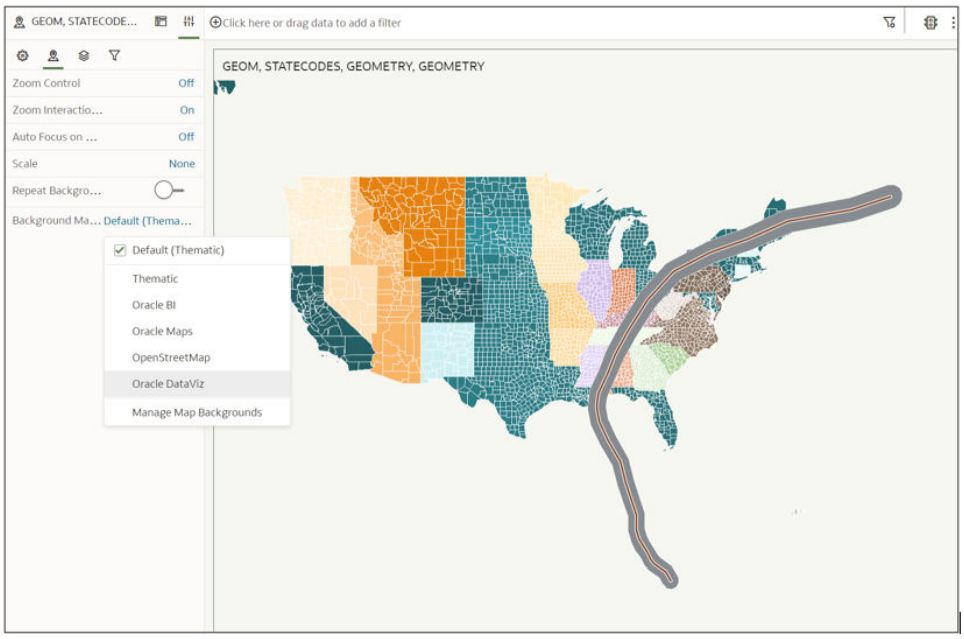
- Apply a New Background Map Layer for Geometry Data Type Layers
- Modify Properties of Each Geometry Data Type Layer
- Create a Unique Name for Each Geometry Data Type Layer

Apply a New Background Map Layer for Geometry Data Type Layers

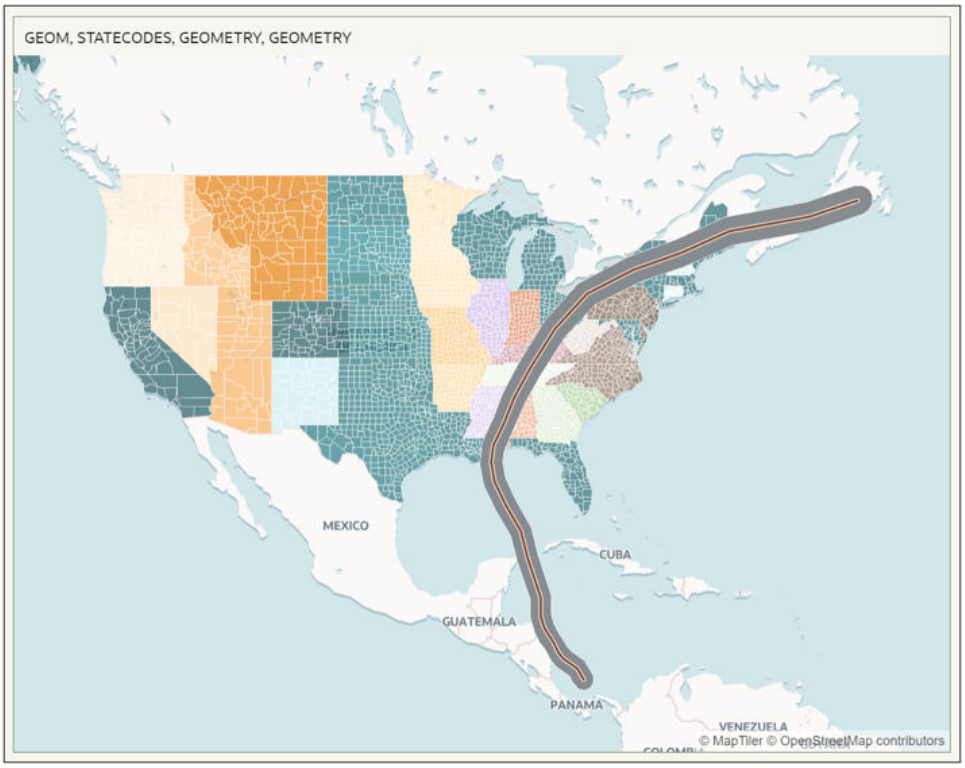
You can apply a new background map layer for all of the geometry data type layers.

1. In the Properties pane, click **Map**.
2. Click **Background Map** and select a layer.

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This example shows the Oracle DataViz background map layer applied to the visualization.



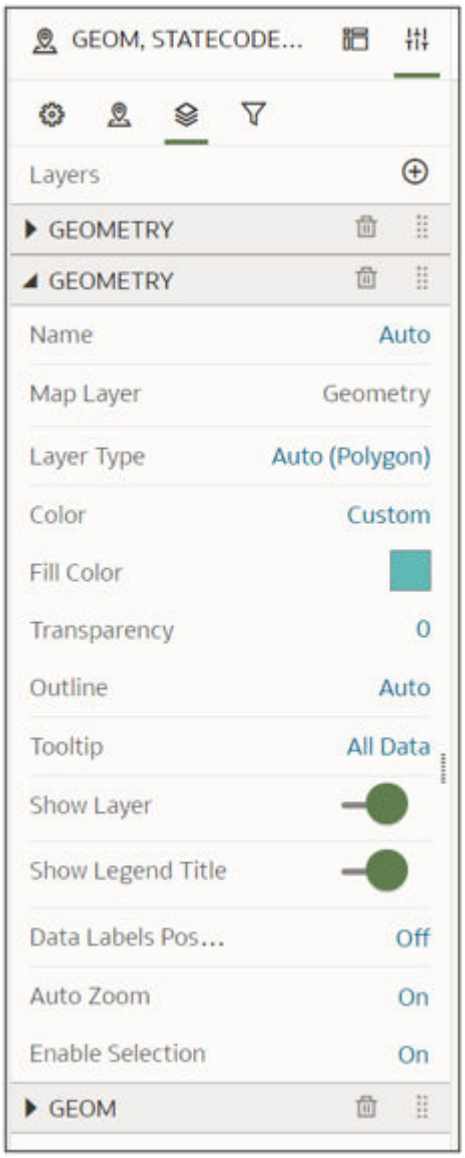
Modify Properties of Each Geometry Data Type Layer

You can still make changes to the layers by modifying the properties of each geometry data type layer.

1. In the Properties pane, click **Layers**, and expand the geometry data type layer you want to modify.

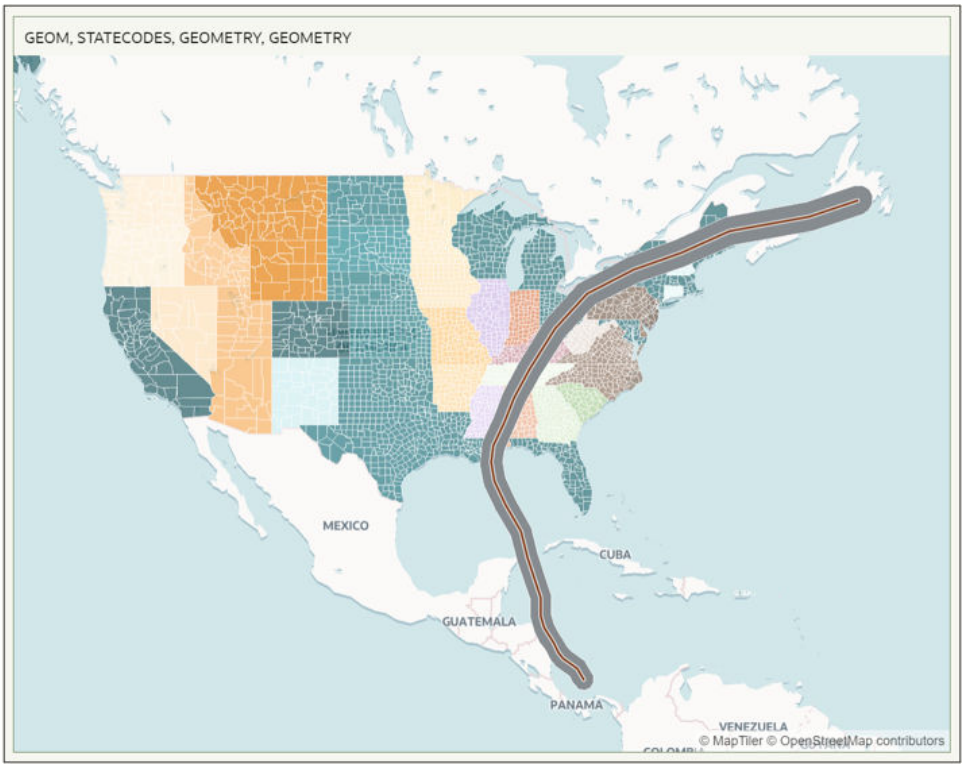
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2. Click **Color** and select .**Custom**.
3. Click **Fill Color** and choose a color.

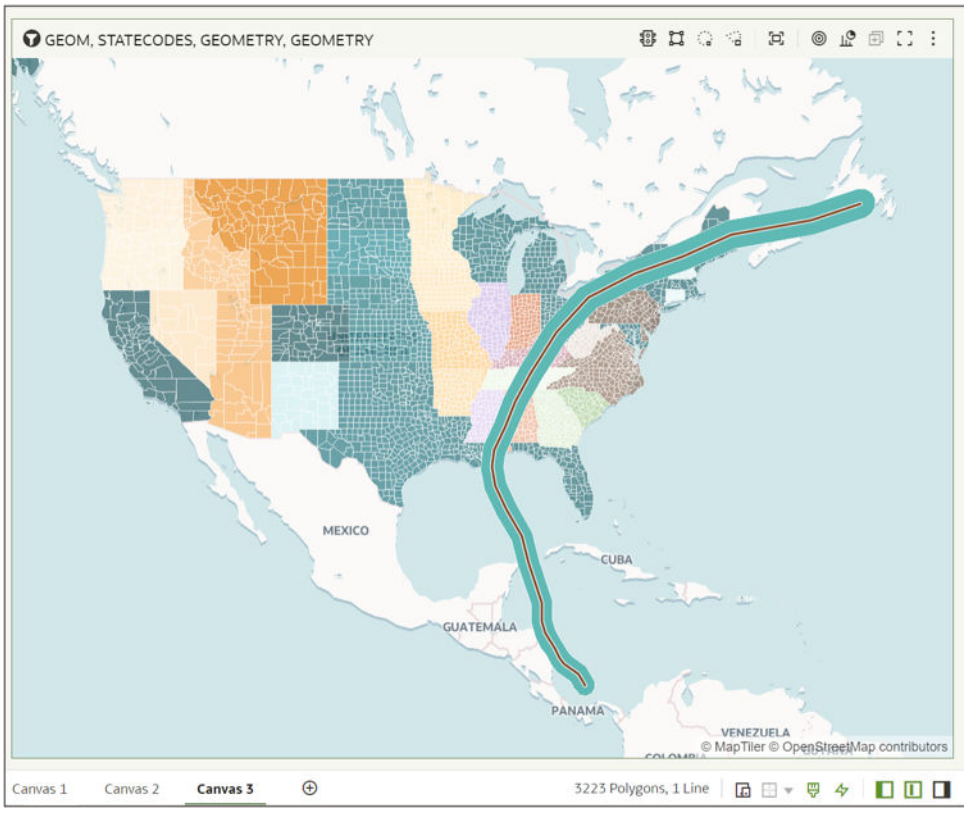


This example shows the Storm Buffer layer with the new color.

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You can see the statistics on how many shapes are used in the visualization at the bottom of the Visualize page. Example shows that there are 3,223 polygons and one line used as part of all the data layers in the map

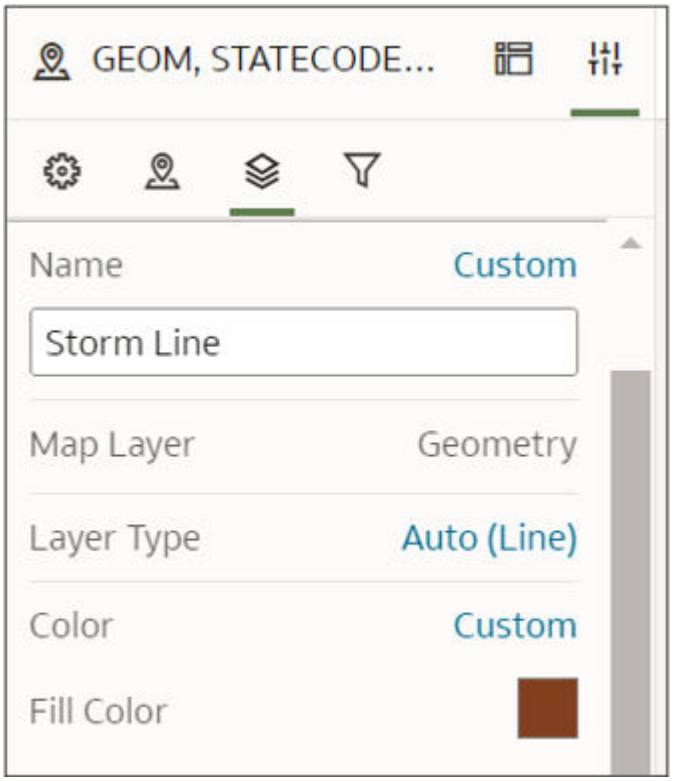


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Create a Unique Name for Each Geometry Data Type Layer

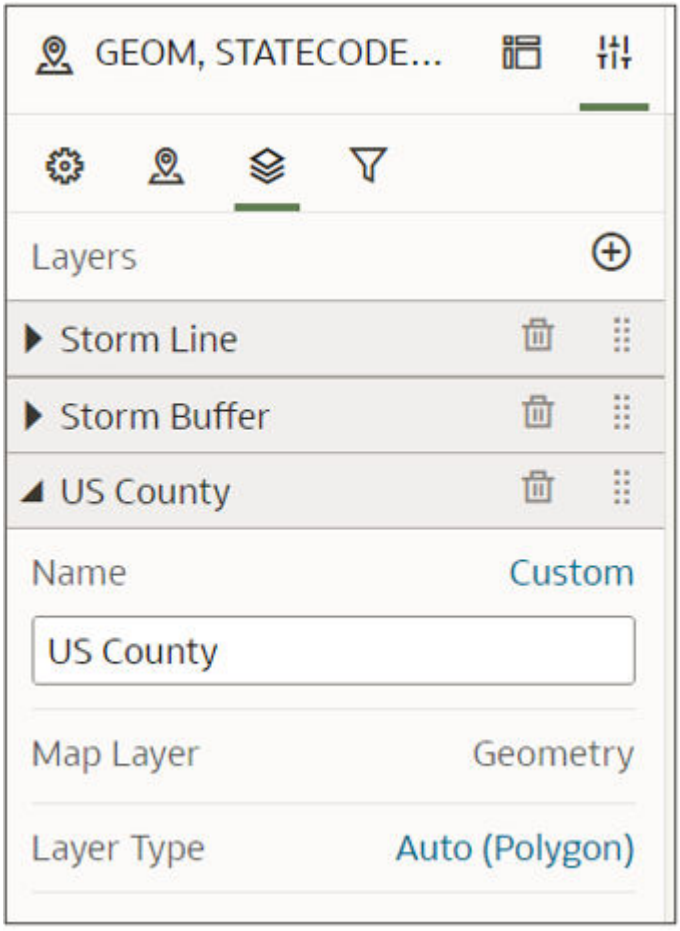
You should always create a unique name for each geometry data type layer.

1. In the Properties pane, click **Layers**.
2. Click **Name**, choose **Custom**, and enter a name for the layer.



This example shows the custom names given for all the data layers.

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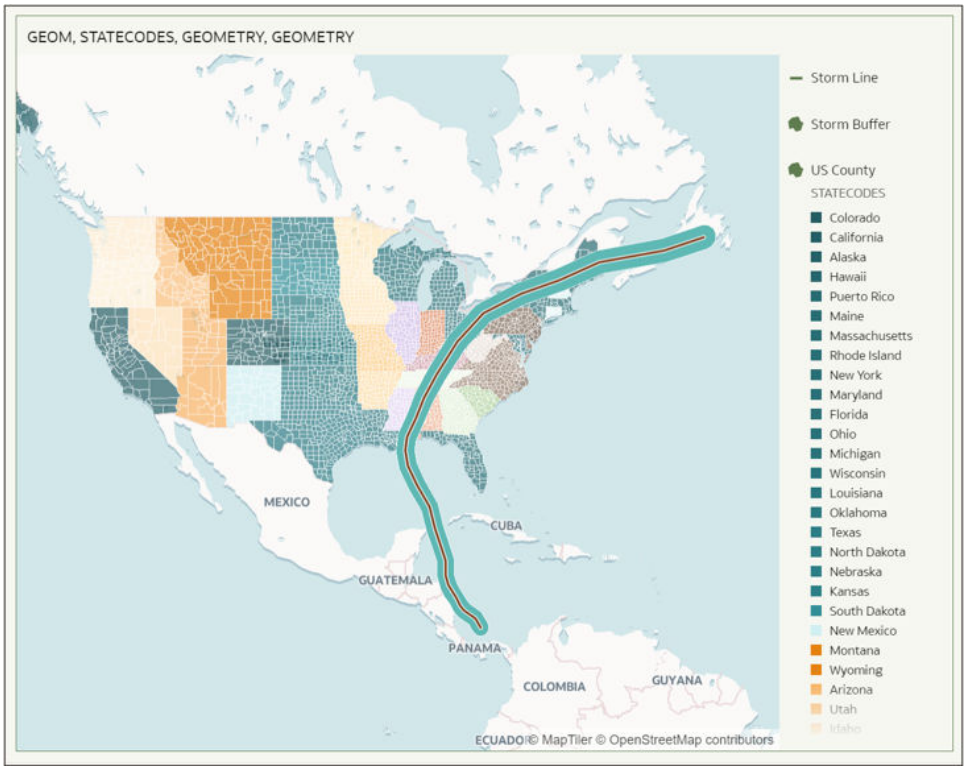
Work with Toggle Off, Toggle On, and Legends for Geometry Data Type Layers

You can toggle the geometry type data layers on and off when the map legend is enabled.

1. In the Properties pane, click **General**, and check the **Legend Position** field. The legend displays by default.

   This example shows the legend and layer names for the map visualization.

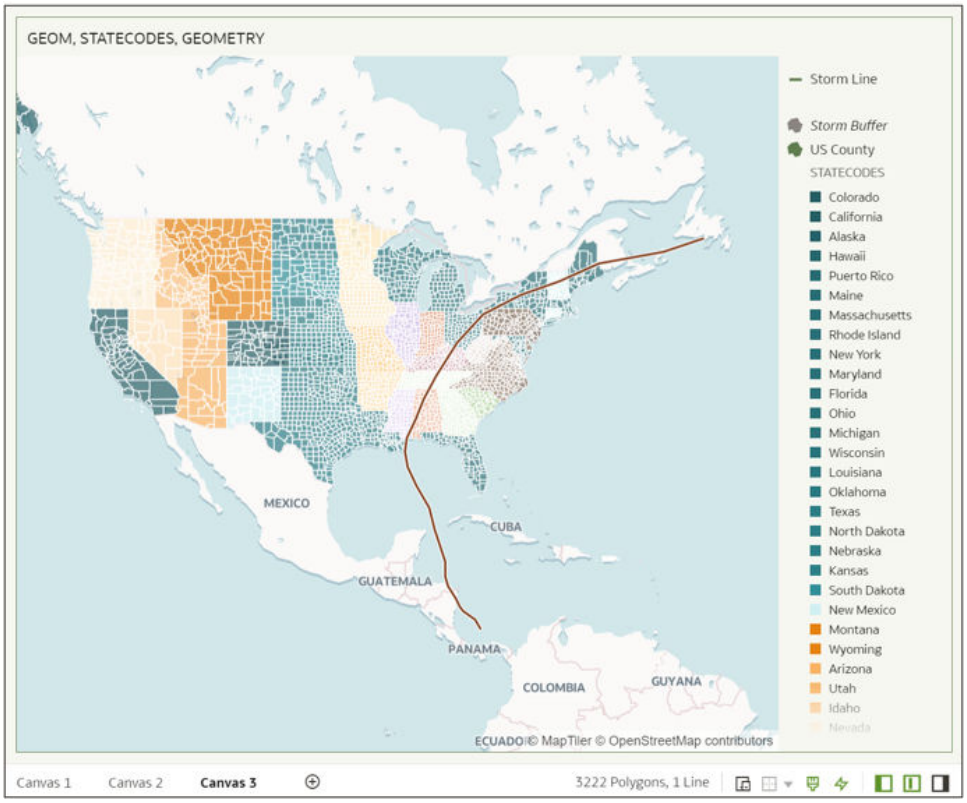
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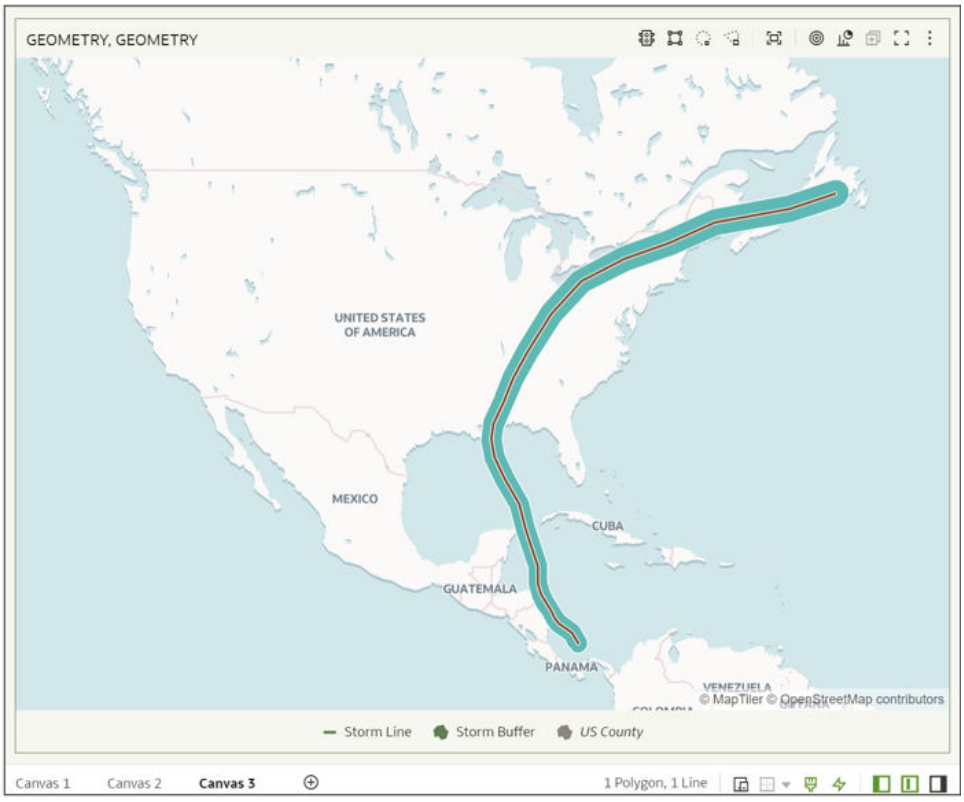
2. In the map legend, click a data layer to toggle it on or off.

   This example shows the Storm Buffer data layer toggled off, and Storm Line with US County data layers toggled on. Statistics now shows 3,222 Polygons and one Line. One Polygon for the Storm Buffer is now excluded from the visualization.

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This example shows the US County data layer toggled off, and Storm Line with Storm Buffer data layers toggled on. Statistics now shows one Polygon and one Line. 3,222 Polygons for the US County data layer are now excluded from the visualization.



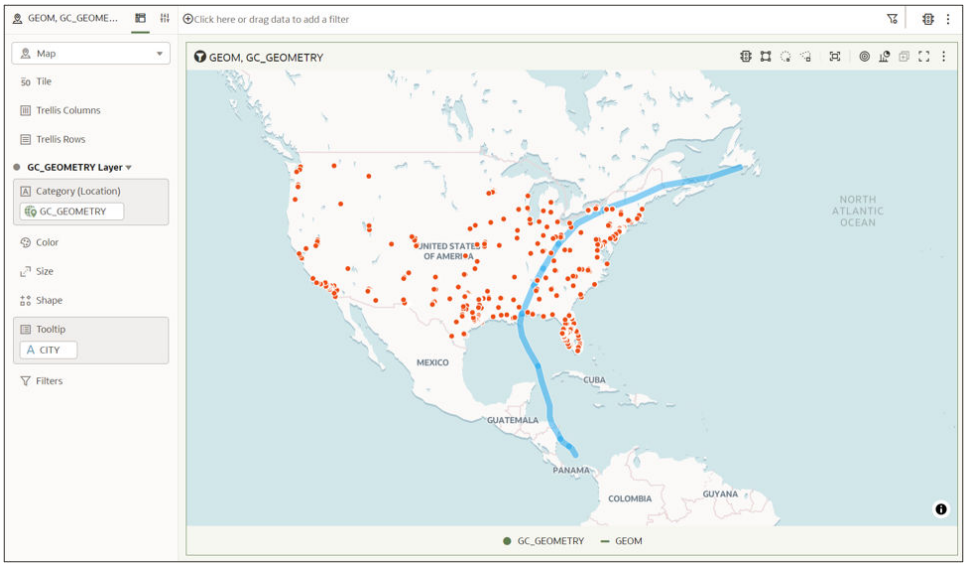
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Work with the Selection Tool for Geometry Data Type Layers

You can use the Selection tool to interact with geometry data type map layers.

You can only select content based on geometry columns if an attribute ID column (for example the name of the shape, or its ID), is added to the map visualization. For example, the Keep Selected and Remove Selected options are only available once an attribute is added as a Color, Tooltip, or Shape.

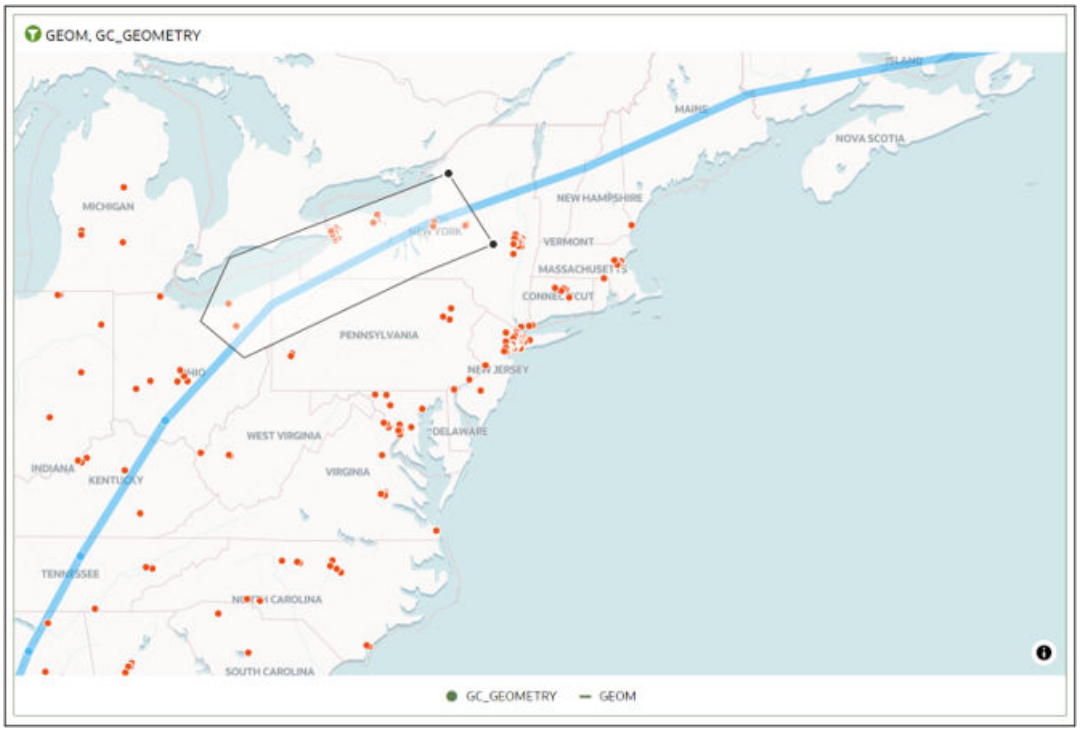
This example shows the Storm Line layer and a layer with assets in different cities. City as an attribute column is used as a tooltip here to enable the Keep Selected and Remove Selected options.



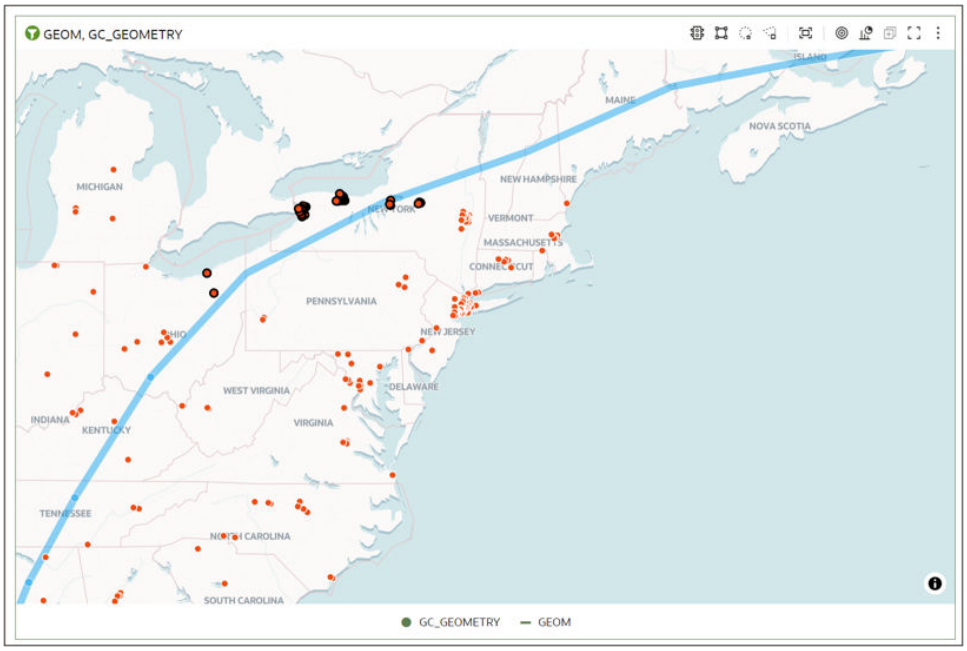
1. Hover over the top right of the map visualization and locate the options for selection: Rectangle, Radial, and Polygon  .
2. Click an option to select it, then drag and draw a custom selection area on top of the data layer.

   This example shows how a Polygon selection is used and enables users to draw and select specific attributes.

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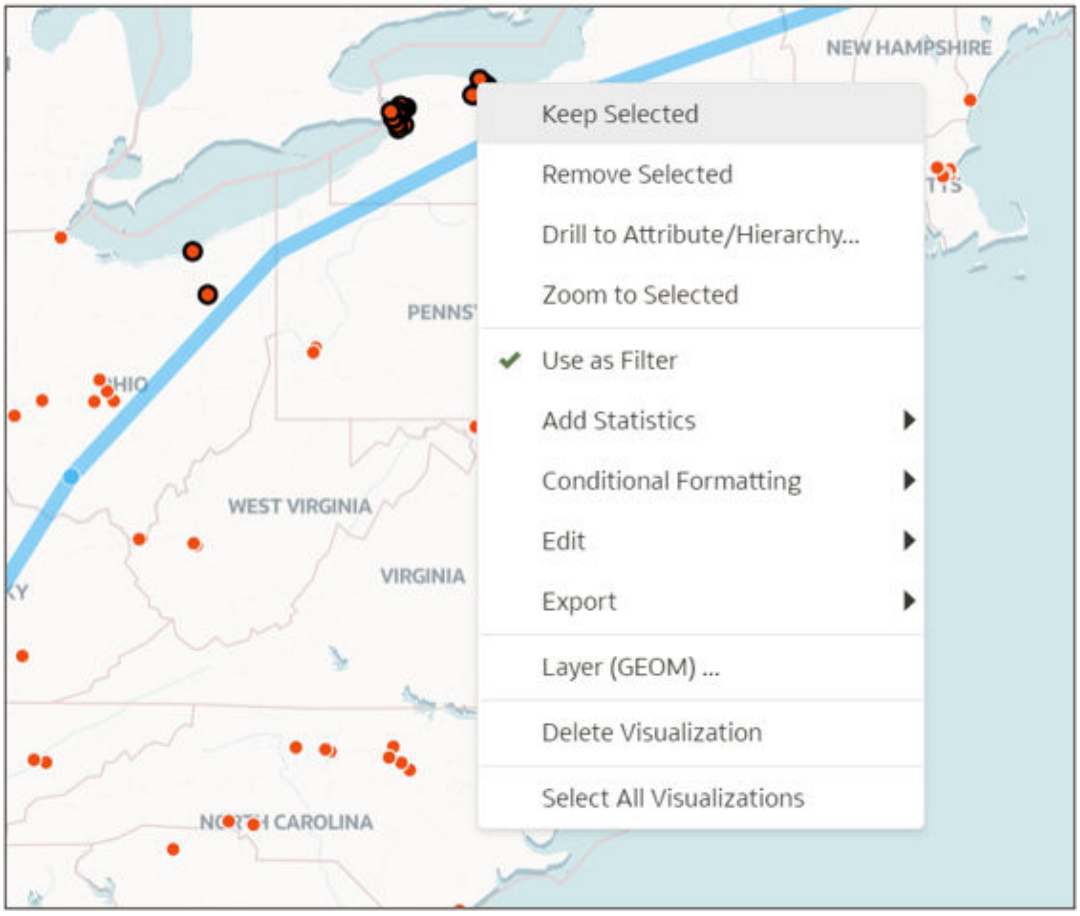


This example shows how selected locations are highlighted once the polygon drawing is released.

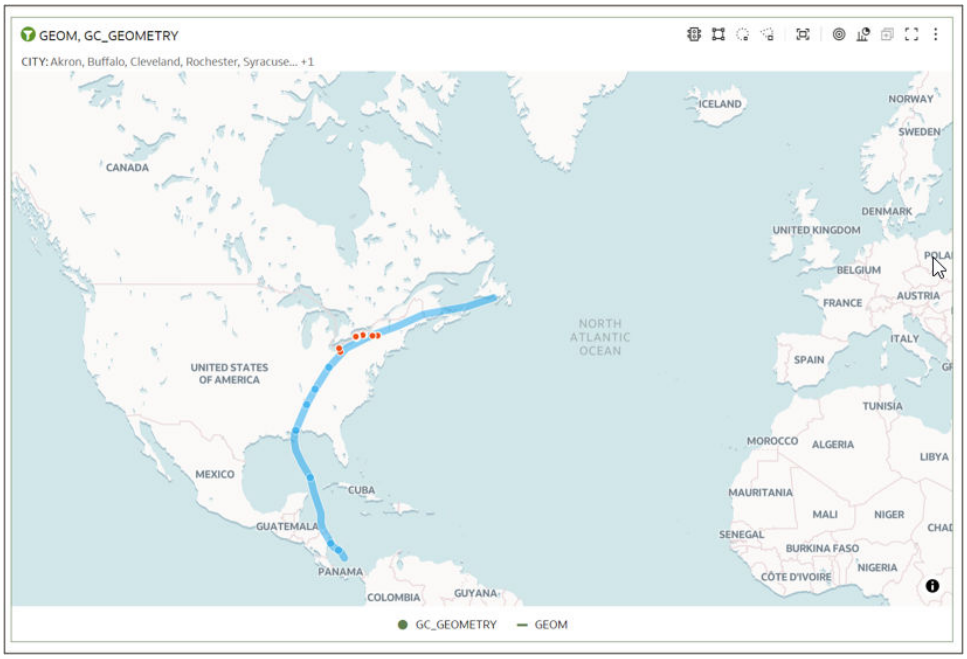


This example shows how users can interact with the custom selection by either keeping the selection or removing the selection.

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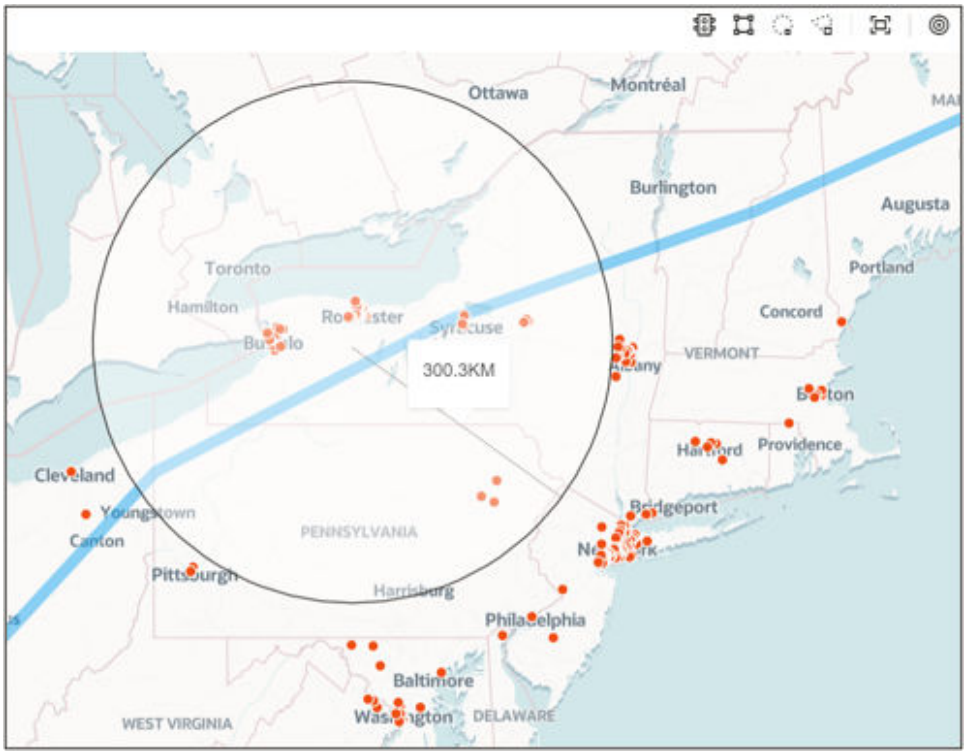


This example shows how the option Keep Selected keeps only the filtered members

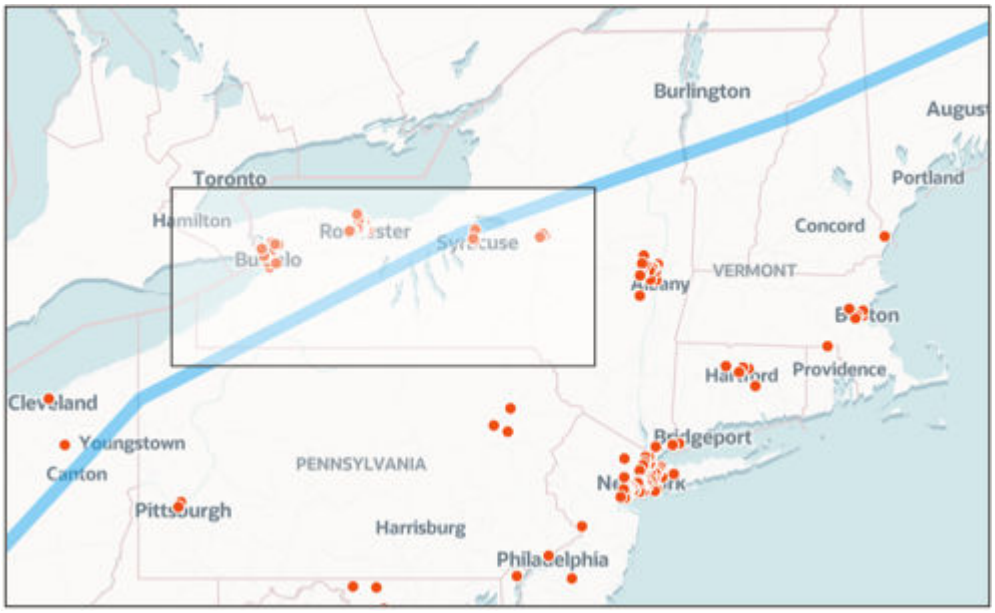


This example shows the Radial selection.

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This example shows the Rectangle selection.



Work with the Information Option for Geometry Data Type

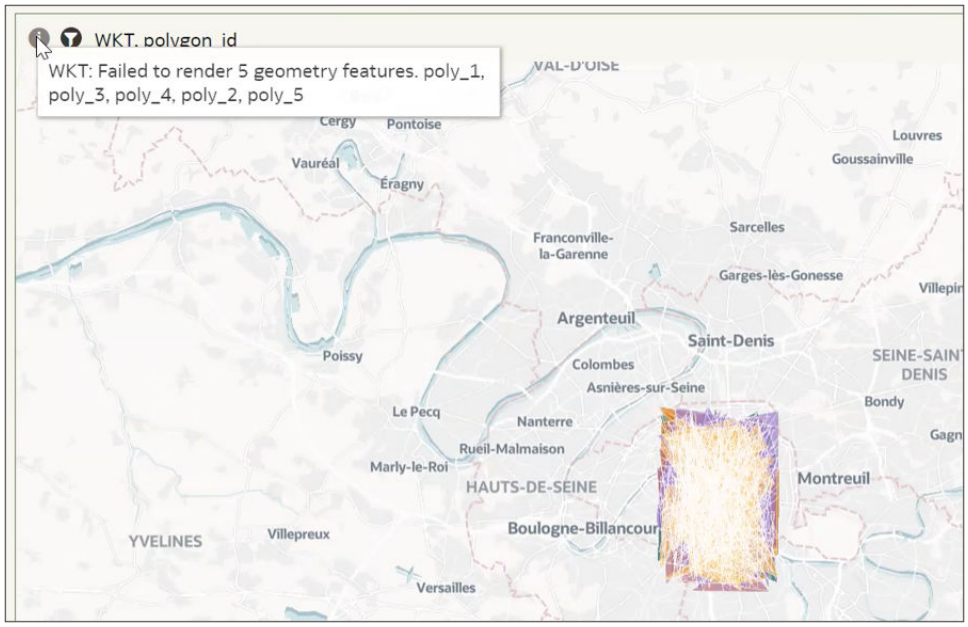
You can use the Information option with a map visualization tool to get information about geometry shapes that may not be displayed on the map.

For example, shapes or polygons that are greater in size than 128 KB (per record) aren't displayed in the map visualization. In this case, the Information icon (ℹ) appears toward the

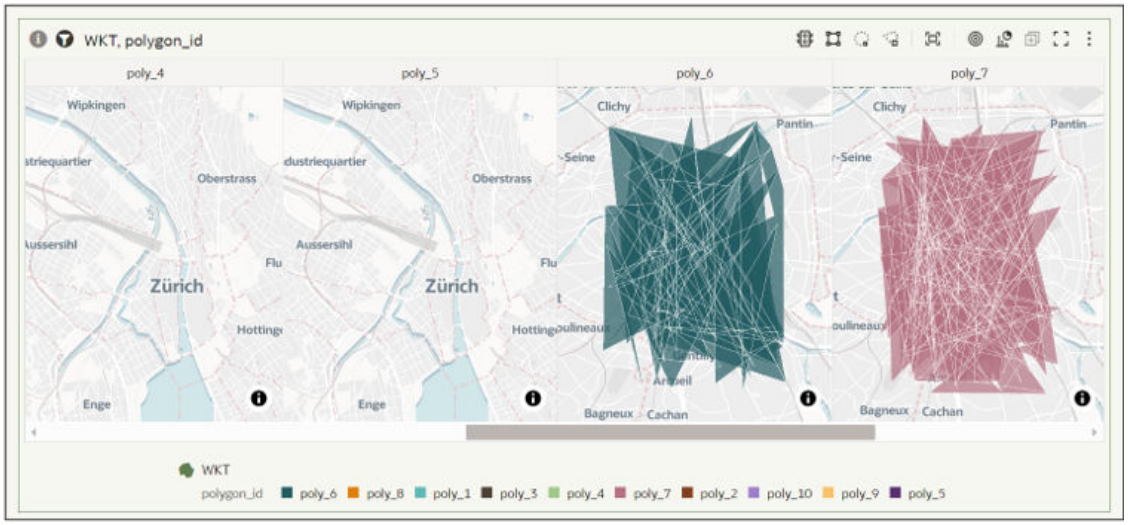
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bottom right of the map visualization. When you click the icon, its color changes from grey to green ( ) and turns on the Information option near the map visualization title. When you hover over this option, you can see which shapes don't render as part of the layer. The information displayed is more detailed if the attribute ID column is part of the map visualization (as a tooltip, color, or shape).

This example shows how the Information option provides more information on shapes that have issues, or that didn't render.



In this example the polygons are shown in a Trellis Column, and polygons poly_4 and poly_5 aren't displayed due to shape size beyond 128 KB, whereas poly_6 and poly_7 are displayed since the shape size is within 128 KB.



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About Calculations that Require Only One Geometry Column

You can create calculations that use only one geometry column.

Topics:

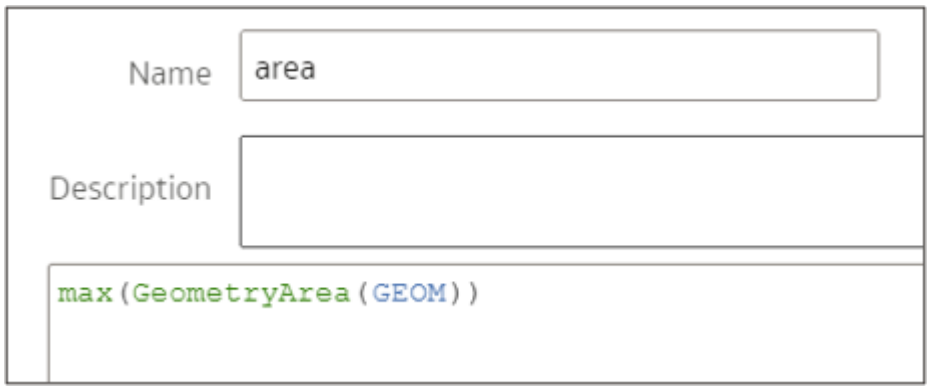
- Calculate the Area of a Geometry
- Calculate the Length of a Geometry

Calculate the Area of a Geometry

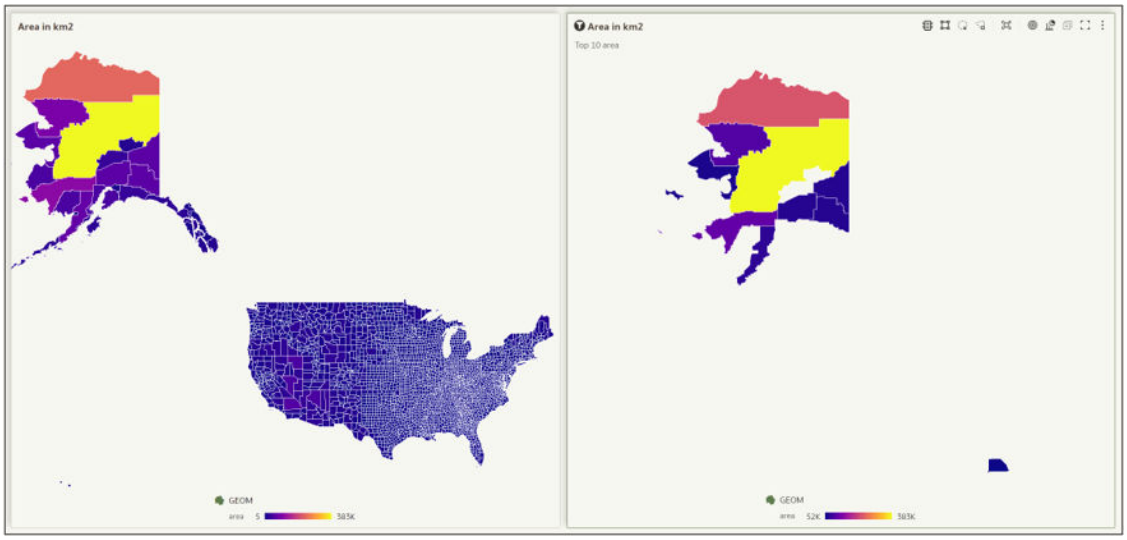
You can calculate the area of a geometry using one column.

Use the function GeometryArea() to calculate the area that a shape occupies.

This example shows an aggregate function max() applied on the GeometryArea() calculation.



This example shows how Top 10 counties in US based on area is visualized alongside all counties colored by the calculated area.



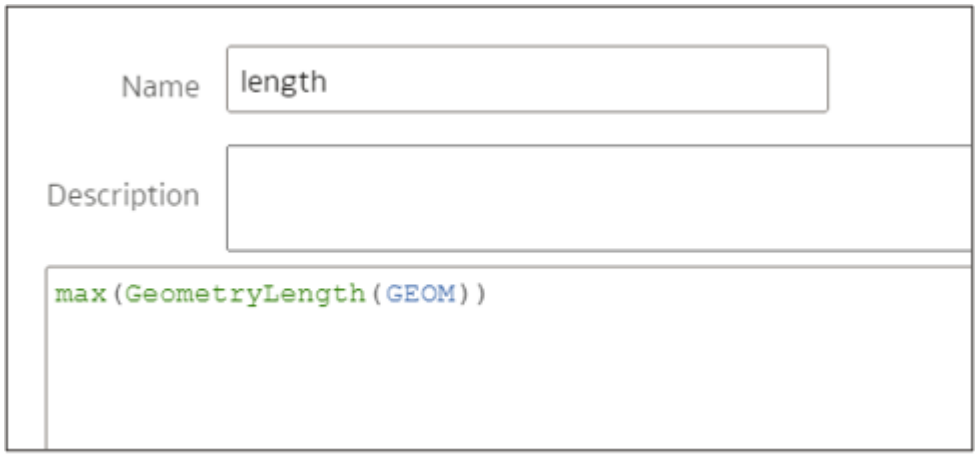
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Calculate the Length of a Geometry

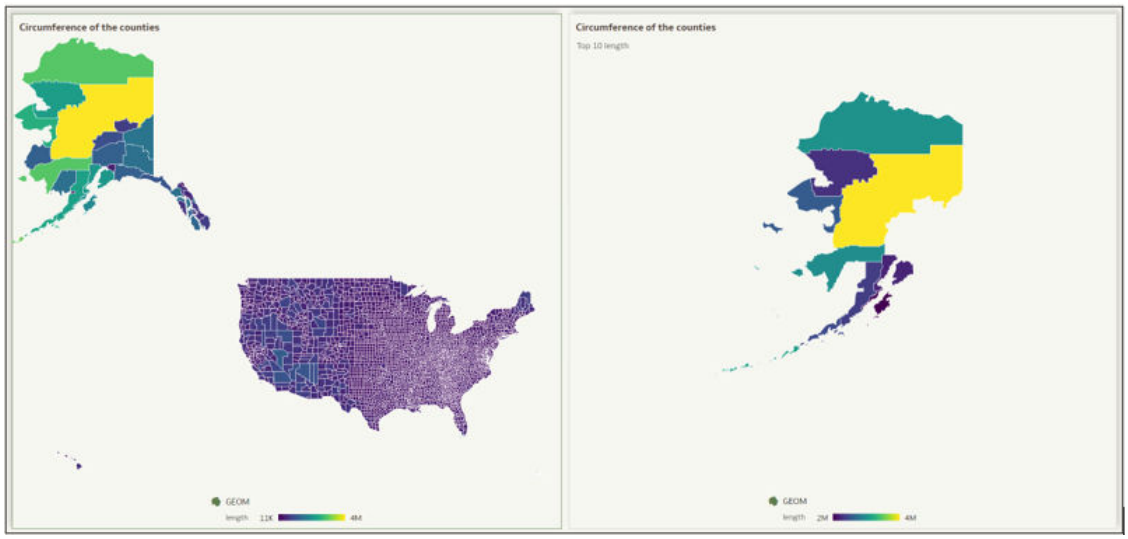
You can calculate the length of a geometry using one column.

Use the function GeometryLength() to calculate the length that a shape occupies.

This example shows the aggregate function max() applied to the GeometryLength() calculation.



This example shows the visualization on the right selecting top 10 counties based on GeometryLength() alongside all counties colored by length of the shape.



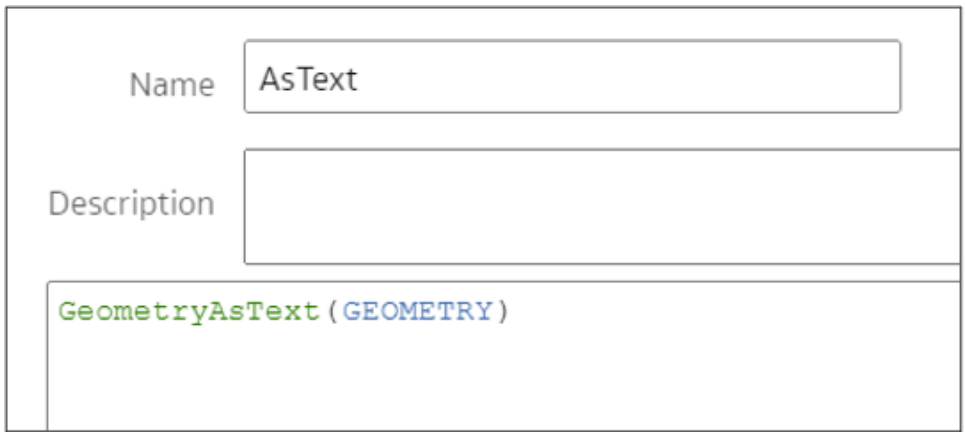
Generate a Spatial Data Object Definition in Standard Text Format

You can use the function GeometryAsText() to convert the longvarbinary values of the geometry column into Well-Known Text (WKT) format.

The function GeometryAsText() is also useful to troubleshoot when a specific shape isn't being represented in the visualization.

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This example shows the usage of GeometryAsText().



This example shows the standard format of the Storm Buffer geometry column.



You can also use standard calculation functions along with GeometryAsText(). For example, you can use the string function Length() to calculate the size of a shape, which is useful when identifying if a shape is beyond the acceptable limit of 128 kilobytes.

Usage: `Length(GeometryAsText(Geometry_Column))` returns the size of the geometry shape in bytes.

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About Calculations that Require Two Geometry Columns

You can create calculations that use two geometry columns.

Topics:

- Calculate the Distance Between Two Geometry Data Types
- Relate Two Geometry Data Types
- Determine if Two Geometry Data Types Are Within a Specific Distance

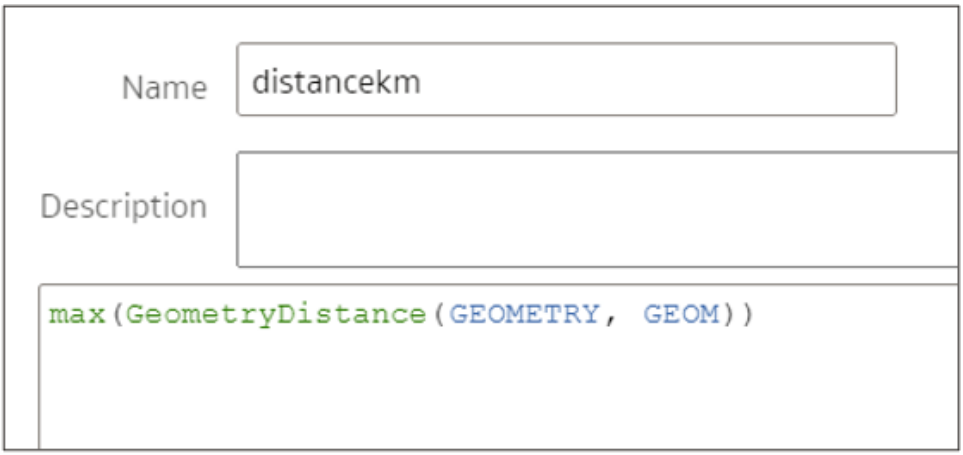
Calculate the Distance Between Two Geometry Data Types

You can use the function GeometryDistance() to calculate the distance between two shapes.

If your data holds two geometry columns in different datasets, then this function requires you to properly join the two datasets so that all geometry records inter-relate (mimicking a spatial join). It's advisable to establish the join while you prepare and create the dataset, and avoid blending the columns within the workbook canvas as an ad hoc mashup. It's critical that you always consume these joins with some filter value on one side of the join. Either design the dataset with an embedded filter value, or design the canvas with an explicit filter value when using these in advanced geometry calculations. A good practice is to always filter the values while using calculations like GeometryDistance, GeometryRelate, and GeometryWithinDistance.

Usage: `GeometryDistance(geometry_column1,geometry_column2)`.

This example shows an aggregate function max() applied on the GeometryDistance() calculation.



This example shows a join defined between two different database tables when you create the dataset.

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Relate Two Geometry Data Types

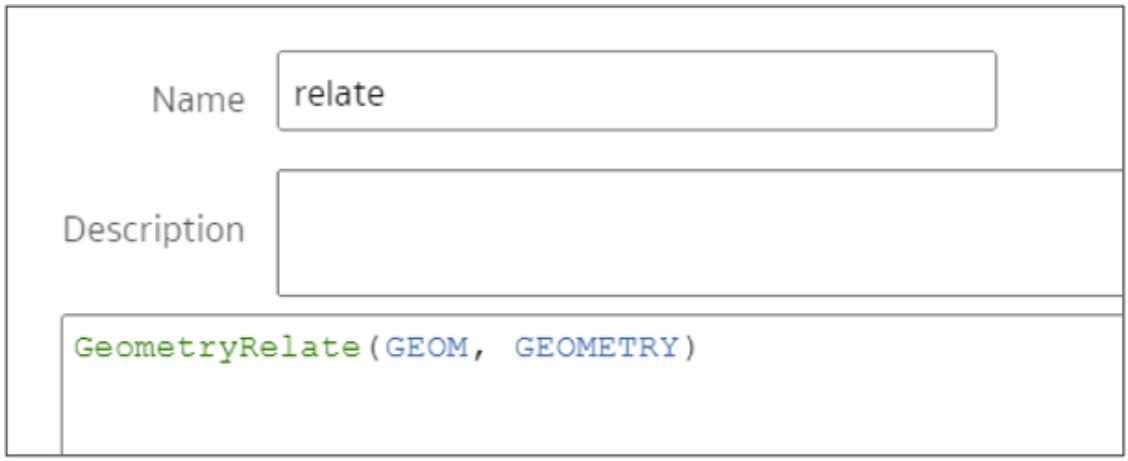
You can use the function GeometryRelate() to determine whether one shape is related to another shape.

A shape from one geometry column can be inside, outside, adjacent inside, adjacent outside, or touching another shape from a different geometry column. The shapes are categorized as Inside, Outside, or Touch. This function may require a Cartesian join.

Usage: `GeometryRelate(geometry_column1,geometry_column2)`.

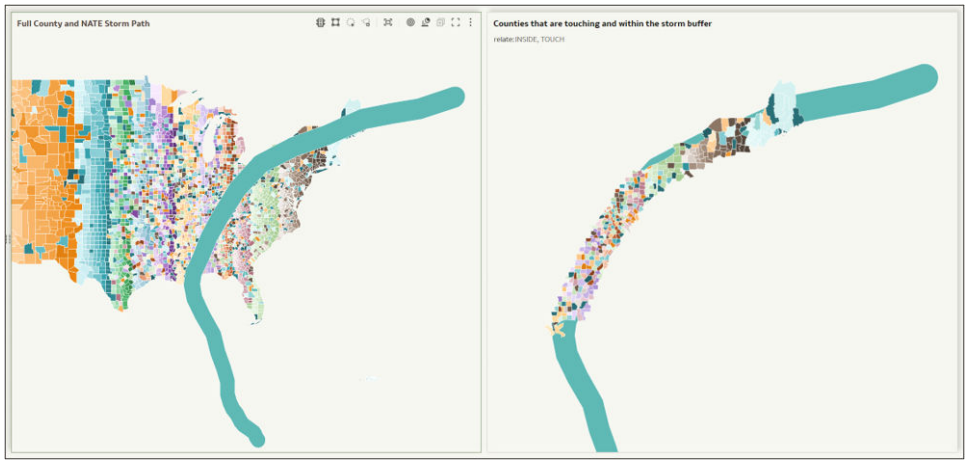
This example shows the usage of the GeometryRelate() calculation.

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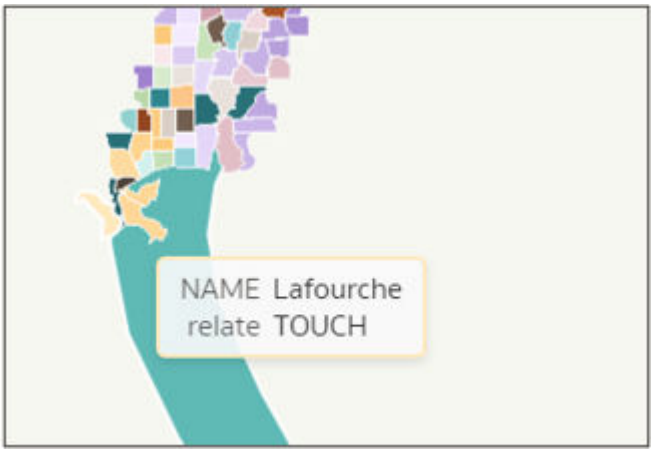


The sequence in which the geometry columns are selected within the GeometryRelate() calculation has a direct impact on the result in which shapes are identified as relating to each other.

This example shows the visualization on the right relating all the counties that are touching the storm buffer or inside the storm buffer for potential impact.

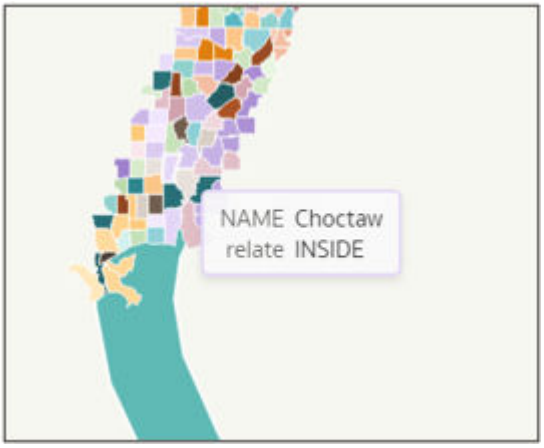


This example shows shapes from US counties that are touching the storm buffer shape, calculated using the GeometryRelate() calculation.



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This example shows shapes from US counties that are inside the storm buffer shape, calculated using the GeometryRelate() calculation.



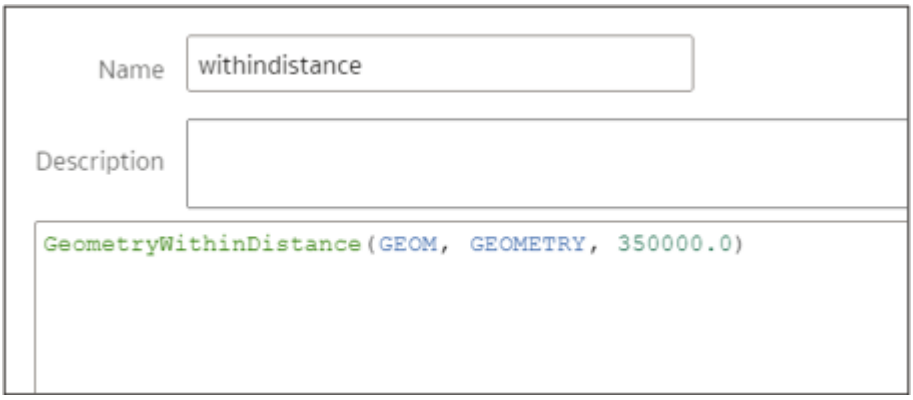
Determine if Two Geometry Data Types Are Within a Specific Distance

You can use the function GeometryWithinDistance() to determine whether two shapes are within a specified distance of each other.

Based on the calculation, this function returns a True or a False as the result, and you can design visualizations based on the result. This function may require a Cartesian join. The sequence in which the geometry columns are selected within the calculation has a direct impact to the result.

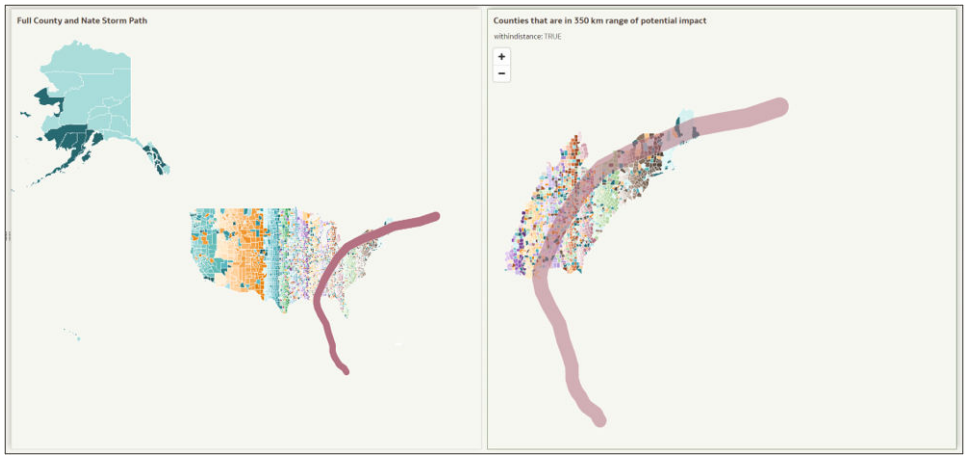
Usage:
`GeometryWithinDistance(geometry_column1,geometry_column2,distance_in_meter)`.

This example shows the usage of the GeometryWithinDistance () calculation with two geometry columns within a numerical value of 350,000 meters or 350 kilometers.

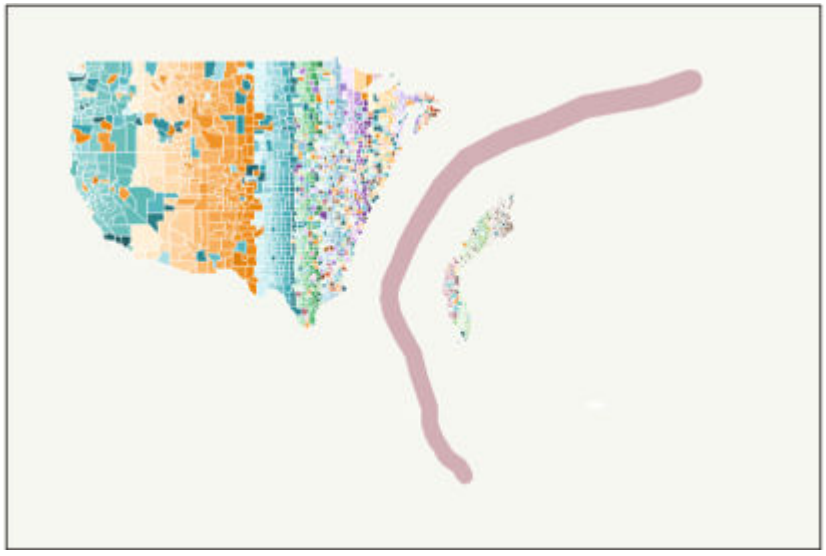


This example shows the visualization on the right with all US Counties within a 350 kilometer range of the storm buffer. Only those counties that return the result as True are filtered and shown.

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This example shows all the US Counties that return False and hence don’t have any direct impact from the storm.



What Are the Limitations of the Geometry Data Type?

The geometry data type offers exciting possibilities for map-based visualizations and advanced spatial analysis. While there are some limitations to the geometry data type, understanding them helps you make the most of its capabilities.

Limitations with the geometry data type columns:

- Geometry columns can't be:
  - Used as joins between database tables
  - Used as objects to drill on
  - Dragged into any Filter grammar field
  - Used to pass context in a custom data action
  - Clicked to filter a selection of shapes
  - Rendered in maps on mobile devices

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  - Used in advanced analytics functions like Forecasting, Clustering, Outlier/Non-Outlier, Reference Line, and Trend Line
- Geometry columns:
  - Can only be placed in the Category grammar field for a map visualization. The content of a geometry column is only valid when used in a map or as an argument for a spatial calculation
  - Are only valid when used in a map, or as an argument for a spatial calculation
- Geometry data have limitations for use in data flows.
- Spatial joins or joins between geometry data types from different database tables or datasets aren't supported.
- Geometry data type records must each be under 128 kilobytes. If a record in a data source has a geometry expression where the size is above 128 kilobytes, the projection for this record doesn't show on a map.
  - For example, suppose a table contains data about US states. The table has 50 rows, each containing a geometry data type column with the polygon representing the state shape. Assume one of the states has a very high resolution for its border definition, and the size of the geometry object string for this state amounts to more than 128 kilobytes. Now suppose Oracle Analytics creates the dataset, and queries made to the dataset honor every single column from the dataset. If geometries are projected on a map, then only 49 states are shown on the map. The state that's larger than 128 kilobytes isn't shown on the map, and a warning displays in the dialog for the Information icon on the map.
    If the size of a geometry shape is over 128 kilobytes, then you can try these alternative workarounds:
    * Simplify the definition of the polygon (reduce the number of points to delimit the polygon), and therefore reduce its technical storage.
    * Split the polygon into two or more distinct polygons to break down the size of each piece.
- Oracle Analytics supports 2-D map coordinate systems only. Any known coordinate system defined in the data source is projected to WGS 84 (EPSG 4326).
- File-based data sources containing geometry data must be Text/CSV files with the Geometry field expressed as Well-Known Text (WKT) formats. WKT is a text markup language for representing vector geometry objects. It can represent distinct geometry objects such as Points, MultiPoints, LineString, Polygons, and MultiPolygons. WKT format syntaxes such as GeometryCollection or FeatureCollection aren't supported.
- Files with the GeoJSON format with geometry data aren't supported for importing as datasets with geometries in Oracle Analytics. In order to create a dataset with a geometry column, you must first convert GeoJSON files into CSV with WKT geometry formats, or load them into an Oracle database with the SDO.Geometry format.

What Are the Performance Considerations for the Geometry Data Type?

The geometry data type has some performance considerations that you should understand to help you make the most of its capabilities.

You should consider the following performance considerations for the Geometry data type:

- **Physical size of the data retrieved by the map**
  - For large datasets with many distinct geometry records, the performance when rendering a map visualization might be impacted by the size of the geometry data that

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transits over the network to the browser in which Oracle Analytics is running. The performance is a combination of how many distinct geometries are represented on the map, and the average size (in kilobytes) of each geometry. As the map visualization builds, it fetches the geometry definitions through the network for each distinct shape on the map, and for each distinct layer. Very large lists of geometries take longer to render when geometries have a very fine definition (large average size).

  - **Mitigation** Avoid using too many geometries in a map. Even if the system supports up to 125,000 geometries, using too many can cause the map to render slowly. If you do need to show many shapes at once, filter specific areas so that users can display one area at a time.

- **Spatial Cartesian joins**
  - Spatial calculation functions such as GeometryDistance, GeometryRelate, and GeometryWithinDistance, may require you to have two joined datasets. These functions might require a many to many join type in order to compute every pair of geometries in your data. You must design this modelling with care to minimise the impact on query performance.
  - **Mitigation**
    * Use a data model, and most importantly, data filtering on geometry records to avoid Cartesian joining effects.
    * When using a database, spatial calculations ship down the function to the database and let Oracle Analytics retrieve the results of the calculation. When you optimize performance, try to ensure this function-shipping is happening properly. There may be cases where other calculations are added (in data flows or workbooks) that prevent Oracle Analytics from pushing down the work to the database. In the context of troubleshooting performance, it's important to check the context that allows function shipping.

List of Oracle Spatial Calculations

You can use this list of spatial functions from the Oracle Analytics Calculation Library when you work with the geometry data type.

Spacial Function	Syntax	Description
GeometryArea	GeometryArea(shape_expr)	Calculates the area that a shape occupies.
GeometryLength	GeometryLength(shape_expr)	Calculates the circumference of a shape.
GeometryAsText	GeometryAsText(shape_expr)	Converts the longvarbinary values of the geometry column into Well-Known Text (WKT) format, a standard format for representing geometry objects.
GeometryDistance	GeometryDistance(shape_expr1,shape_expr2)	Calculates the distance between two shapes.
GeometryRelate	GeometryRelate(shape_expr1,shape_expr2)	Determines whether one shape is inside another shape.
GeometryWithinDistance	GeometryWithinDistance(shape_expr1, shape_expr2,distance_expr)	Determines whether two shapes are within a specified distance of each other.

Descriptions of the arguments that you can use with the geometry data type:

- **shape_expr** - Represents any valid geometry column or shape expression.
- **shape_expr1,shape_expr2** - Represents any valid geometry column or shape expression.
- **distance_expr** - Represents any expression that evaluates to a numeric value in meters.

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12

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. You can use actions to connect to canvases, external URLs, Oracle Business Intelligence Publisher reports, and use 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
- 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
- Create Data Actions in Visualizations Embedded in External Containers
- Execute Data Actions that Contain Embedded Content

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.

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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.

LiveLabs Sprint

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.

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- **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.

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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.

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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.

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- **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.

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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.

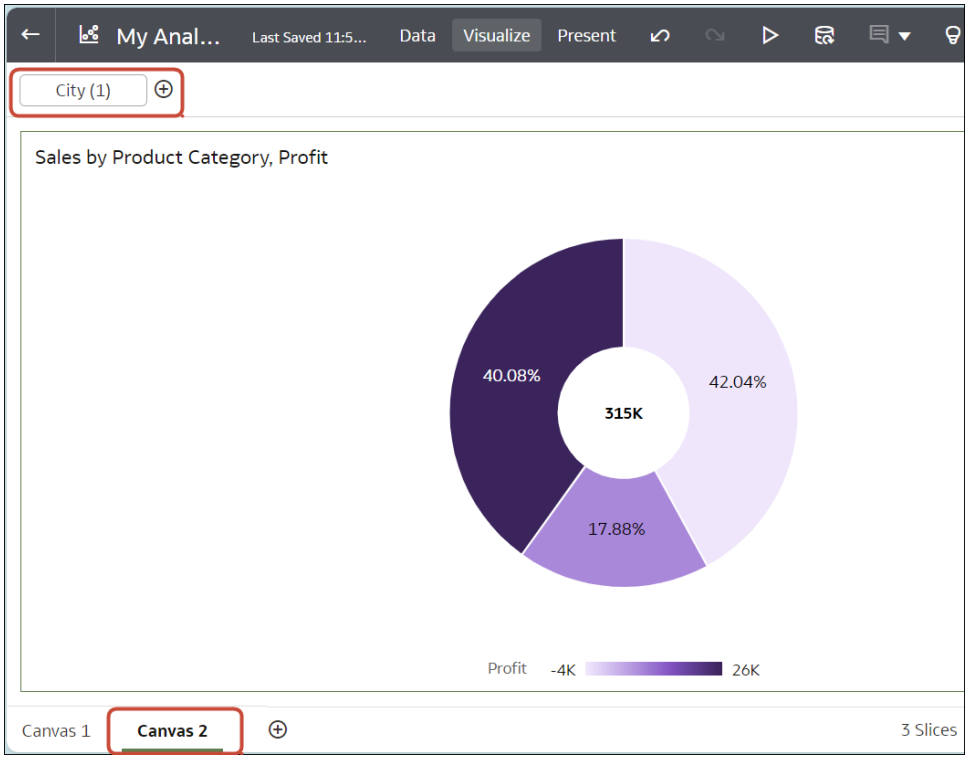
   If a data action is anchored to multiple columns, make sure that you select data elements from all of the columns to display the data action in the context menu. See Tips on Using Data Actions.
3. In the context menu, click the data action that you want to invoke.



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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 vizualization filters.

These are use case scenarios logic for data action filter values:

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- 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

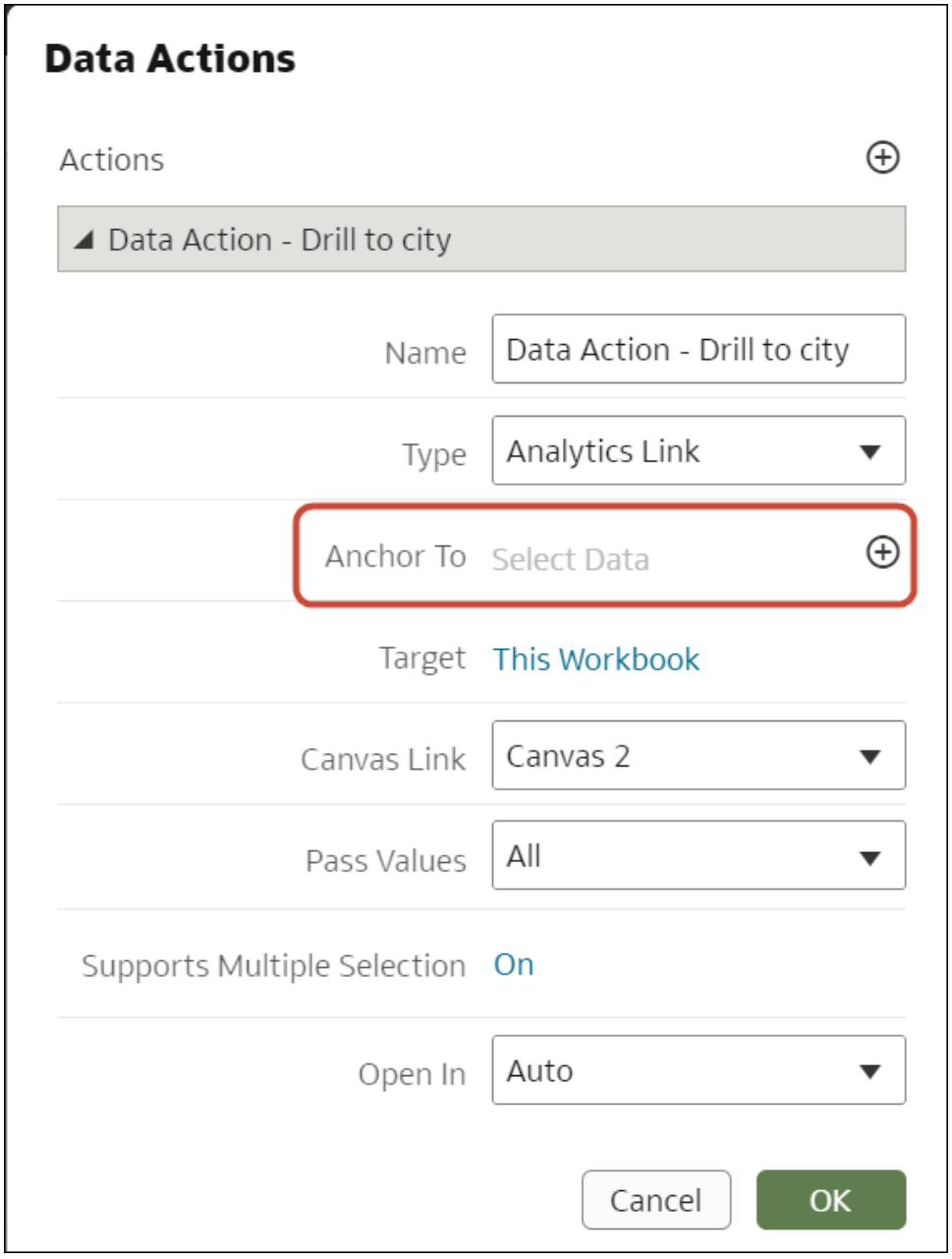
Get the most from using data actions in workbooks using these tips.

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.

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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".

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General Tips

- Don't anchor data actions to measure columns or hidden columns.

Create Data Actions in Visualizations Embedded in External Containers

You can embed visualizations in external containers, for example, an HTML page or consumer's application page, and you can include data actions in the visualization. An embedded data action enables interacting with the embedded visualization in the external container. You can retrieve a set of data elements used in a visualization from an external container. You can add any number of embedded data actions.

The Publish Event enables external applications to receive the set of data element values in the selected visualization, known as the visualization context. The set of data element values in the selected visualizations mustn't be measure columns or hidden columns.

The event name is provided in the external container and is passed when you publish the context event. The context is the set of data element values at a selected location in the visualization. If the data action is used across multiple workbooks or multiple data elements in a workbook, you can provide a unique event name for easier tracking. For example, if you entered `DV Embedded Content DA1` as the action name, then in the **Event Name** field, you might enter `Event from DA1` to indicate which data action the event comes from.

Note the following when you enter **Pass Values**:

- Use **All** to dynamically determine the intersection of the cell that you click, for example, "Product and Year", and passes those values to the target.
- Use **Anchor Data** to ensure 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.

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- Use **None** to open the page (URL or canvas) but doesn't pass any data. For example, you might want to navigate to www.oracle.com without passing any context.
- Use **Custom** to specify a custom set of columns to pass.

Note the following when you select **Supports Multiple Selection**:

- **On** - Invokes the data action when one or more data points are selected.
- **Off** - Invokes the data action 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.

After saving the workbook, you can embed the workbook in external containers. The external container shows the embedded visualizations. When you right-click the visualization and it includes applicable data actions, they're displayed in the visualization in a drop-down menu. If you click an embedded data action, it determines the context information for the visualization and passes that information to the navigation action service to process it. The navigation service raises an event with the context payload information. You can subscribe to this event to receive the payload in the event callback and use the payload in other areas.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. In the workbook, click **Menu**, and select **Data Actions**.
3. Click **Add Action**. In New Data Action, go to **Name** and enter a name.
4. Click **Type** and select **Publish Event**.
5. Click **Add Data** or **Select Data** in the **Anchor To** field, and select one or more data elements that you want to pass values when the data action is applied.
6. Enter an **Event Name**.
7. Click the **Pass Values** field and select which values you want the data action to pass to the consumer.
8. 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).
9. Click **OK** to save.

Execute Data Actions that Contain Embedded Content

Follow the information described here to learn about embedding and executing data actions in a visualization within external containers such as an HTML page or an application web page.

> **Note**
>
> The examples in this section apply to embedded data actions when the embedding application doesn't use Oracle JET technology. See:
>
> - Embed Oracle Analytics Content into an Application That Doesn't Use Oracle JET
> - Create Data Actions in Visualizations Embedded in External Containers

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Executing Data Actions

When you click a Publish Event data action, it determines the context information for the visualization and passes that information to the navigation action service to process it. The service process for the navigation action raises an event called “oracle.bitech.dataaction” with the context payload information. You can subscribe to this event and receive the payload in the event callback, and you can make further use of the payload as required.

The following visualization shows the revenue in Dollars for lines of business, for example Communication, Digital, Electronics, across organizations, for example Franchises Org, Inbound Org, International Org.

	Franchises Org. 1- Revenue	Inbound Org. 1- Revenue	International Org. 1- Revenue	Production Org. 1- Revenue	Subcontracted Org. 1- Revenue	Subsidiaries Org. 1- Revenue
Communication	1,945,442.17	3,205,196.75	2,072,118.69	1,970,055.76	1,311,952.23	2,596,174.23
Digital	1,057,904.94	1,458,738.42	915,528.97	1,140,216.00	721,805.34	1,319,910.88
Electronics	1,948,769.52	2,849,051.48	1,772,490.57	2,027,938.13	1,298,795.50	2,502,014.97
Games	2,459,631.95	3,697,414.06	2,318,144.51	2,595,862.48	1,651,129.01	3,163,713.44
Services	1,232,145.16	2,104,468.29	1,289,809.63	1,222,054.29	829,583.58	1,650,876.93
TV	2,054,249.30	3,296,097.36	2,091,426.20	2,103,728.80	1,408,666.46	2,716,894.00

Event and Payload Format and Context

The following example demonstrates publishing an event when the embedded data action is invoked by one or more data cells that have been right-clicked and the data action selected from the menu that’s displayed in the embedded workbook.

The examples below are from a JSON file, for example, `obitech-cca/cca/component.json`.

Event Format

```
"events": {
   "oracle.bitech.dataaction": {
      "description": "Generic DV Event published from an embedded data
visualization.",
      "bubbles": true,
      "cancelable": false,
      "detail": {
         "eventName": {
         "description": "The name of the published BI Event",
         "type": "string"
      },
      "payload": {
         "description": "The payload contains context and related information
to the event published",
         "type": "object"
      }
   }
}
```


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Payload Format

```
{"context":[
   "or": [
      "and":[
         {"contextParamValues":[...],
          "contextParamValuesKeys":[...],
          "colFormula":"...",
          "displayName":"...",
          "isDoubleColumn":true/false,
          "dataType":"..."
         }
      ]
   ]
 ]
}
```

Passing a single value for a single column in the Pass By Context

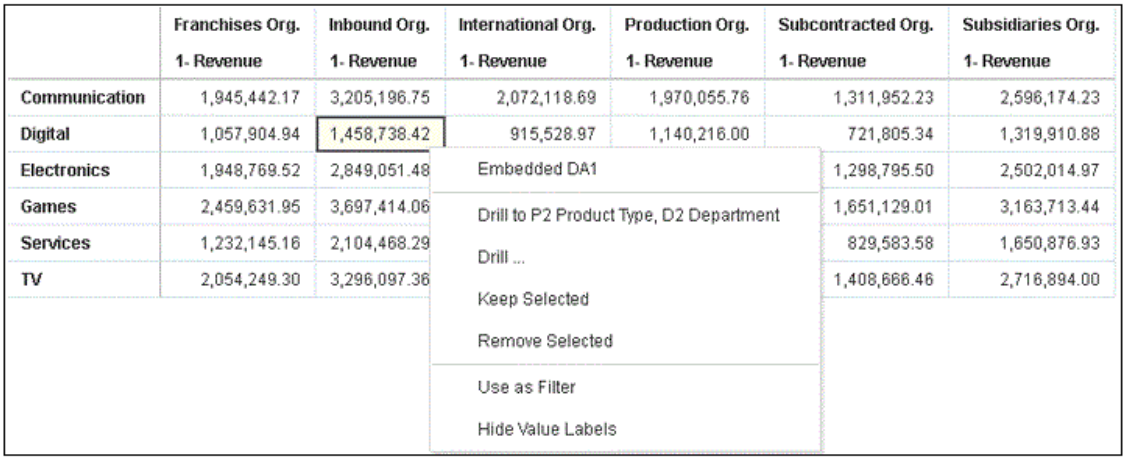
In this example, when you click a column cell, the object with the context information about the column is passed to the external container. In this case, the organization name is passed.

```
{
   "context": [
      {
         "contextParamValues": [
            "Inbound Org."
         ],
         "contextParamValuesKeys": [
            "Inbound Org."
         ],
         "colFormula": "\"A - Sample Sales\".\"Offices\".\"D3
Organization\"",
         "displayName": "D3  Organization",
         "isDoubleColumn": false,
         "dataType": "varchar"
      }
   ]
}
```

Passing a single value for each column in the Pass By Context

In this example, when you click a column cell, for example, Inbound Org, and Digital products, what gets passed when you click the Embedded DA1 menu option to select the embedded action is the revenue value in Dollars for the selected line of business and organization. For example, the revenue for Digital products from the Inbound Org is passed, which is $1, 458,738.42 in this example.

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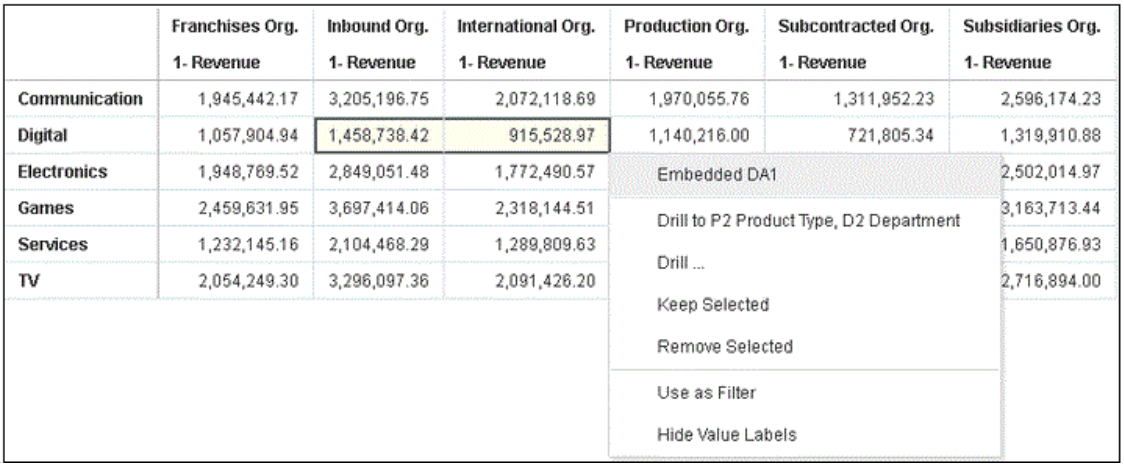



```
{
   "context": [
      {
         "contextParamValues": [
            "Digital"
         ],
         "contextParamValuesKeys": [
            "Digital"
         ],
         "colFormula": "\"A - Sample Sales\".\"Products\".\"P3  LOB\"",
         "displayName": "P3  LOB",
         "isDoubleColumn": false,
         "dataType": "varchar"
      },
      {
         "contextParamValues": [
            "Inbound Org."
         ],
         "contextParamValuesKeys": [
            "Inbound Org."
         ],
         "colFormula": "\"A - Sample Sales\".\"Offices\".\"D3
Organization\"",
         "displayName": "D3  Organization",
         "isDoubleColumn": false,
         "dataType": "varchar"
      }
   ]
}
```

Passing multiple values in the Pass By Context

In this example, when you click two row cells (for example Inbound Org and International Org for Digital products) and click the Embedded DA1 menu option to select the embedded action, what gets passed is the revenue value in dollars for the two selected cells for organization and lines of business. For example, clicking the revenue for Digital products from the two selected organizations (Inbound Org and International Org) passes the values $1, 458,738.42, and $915,528.97.

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	Franchises Org. 1- Revenue	Inbound Org. 1- Revenue	International Org. 1- Revenue	Production Org. 1- Revenue	Subcontracted Org. 1- Revenue	Subsidiaries Org. 1- Revenue
Communication	1,945,442.17	3,205,196.75	2,072,118.69	1,970,055.76	1,311,952.23	2,596,174.23
Digital	1,057,904.94	1,458,738.42	915,528.97	1,140,216.00	721,805.34	1,319,910.88
Electronics	1,948,769.52	2,849,051.48	1,772,490.57			2,502,014.97
Games	2,459,631.95	3,697,414.06	2,318,144.51			3,163,713.44
Services	1,232,145.16	2,104,468.29	1,289,809.63			1,650,876.93
TV	2,054,249.30	3,296,097.36	2,091,426.20			2,716,894.00


```
{
   "context": [
      {
         "or": [
            {
               "and": [
                  {
                     "contextParamValues": [
                        "Digital"
                     ],
                     "contextParamValuesKeys": [
                        "Digital"
                     ],
                     "colFormula": "\"A - Sample Sales\".\"Products\".\"P3
LOB\"",
                     "displayName": "P3  LOB",
                     "isDoubleColumn": false,
                     "dataType": "varchar"
                  },
                  {
                     "contextParamValues": [
                        "Inbound Org."
                     ],
                     "contextParamValuesKeys": [
                        "Inbound Org."
                     ],
                     "colFormula": "\"A - Sample Sales\".\"Offices\".\"D3
Organization\"",
                     "displayName": "D3  Organization",
                     "isDoubleColumn": false,
                     "dataType": "varchar"
                  }
               ]
            },
            {
               "and": [
                  {
                     "contextParamValues": [
                        "Digital"
                     ],
```


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```
                     "contextParamValuesKeys": [
                        "Digital"
                     ],
                     "colFormula": "\"A - Sample Sales\".\"Products\".\"P3
LOB\"",
                     "displayName": "P3  LOB",
                     "isDoubleColumn": false,
                     "dataType": "varchar"
                  },
                  {
                     "contextParamValues": [
                        "International Org."
                     ],
                     "contextParamValuesKeys": [
                        "International Org."
                     ],
                     "colFormula": "\"A - Sample Sales\".\"Offices\".\"D3
Organization\"",
                     "displayName": "D3  Organization",
                     "isDoubleColumn": false,
                     "dataType": "varchar"
                  }
               ]
            }
         ]
      }
   ]
}
```

Use these steps to view event payloads using Chrome browser tools.

1. In Chrome, right-click and select **Inspect Source**.
2. In the **Sources** tab, right-click the line `console.log("To view the payload, add a breakpoint on this line and use the browser tools debugger") ;` and select **Add breakpoint**.
   When the event data action is invoked from the embedded canvas, a payload entry will appear in the **Scope** section on the right-hand pane of the browser tools.
3. Right-click on the payload entry and select **Store as global variable**.
   The global variable can be viewed within the **Console** tab and expanded to view details of the payload.

Example of an HTML Page with Visualization that Receives Events

The following sample code illustrates how to define an event listener for an analytics event data action. You must update the analytics instance and embedded path to the workbook in this code sample. The workbook must have an event data action defined. The event that is being listened for is called `oracle.bitech.dataaction`. When the event has fired, a message is sent to the console.

```
<!DOCTYPE HTML>
<html dir="ltr">
   <head>
      <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
      <title>Oracle Analytics embed example to view data action event
payload</title>
```


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```
      <meta id="viewport" name="viewport" content="width=device-width,
initial-scale=1, minimum-scale=1.0, maximum-scale=1.0, user-scalable=no"/>
      <script src="https://<OAC-INSTANCE>.analytics.ocp.oraclecloud.com/
public/dv/v1/embedding/standalone/embedding.js" type="application/javascript">
      </script>

   </head>
   <body>
      <h1>Oracle Analytics embed example to view data action event
payload</h1>

      <div id="mydiv" style="position: absolute; width: calc(100% - 40px);
height: calc(100% - 120px)" >
         <oracle-dv project-path='<WORKBOOK-PATH-TO-EMBED>'
          active-page='insight'
          active-tab-id='snapshot!canvas!1'>
         </oracle-dv>
      </div>

      <script>
         requirejs(['knockout', 'ojs/ojcore', 'ojs/ojknockout', 'ojs/
ojcomposite', 'jet-composites/oracle-dv/loader'], function(ko) {
          ko.applyBindings();
         });

      </script>
      <script>
         var eventName = 'oracle.bitech.dataaction';
         var element = document.getElementById("mydiv");
         if (element) {
         var oEventListener = element.addEventListener(eventName, function
(e) {
         console.log("***** Payload from DV sent ***** ");
         console.log("eventName = " + e.detail.eventName);
         console.log("To view the payload, add a breakpoint on this line and
use the browser tools debugger") ;
         console.log("******************************** ");
         }, true);
         }
      </script>
   </body>
</html>
```

You can also modify the <script> section in the previous code sample to return the values of where the data action was invoked:

```
<script>
         var eventName = 'oracle.bitech.dataaction';
         var element = document.getElementById("mydiv");
         if (element) {
         var oEventListener = element.addEventListener(eventName, function
(e) {
         console.log("***** Payload from DV sent ***** ");
         console.log("eventName = " + e.detail.eventName);
         console.log("To view the payload, add a breakpoint on this line and
```


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```
use the browser tools debugger") ;
         console.log("******************************** ");

         var res = " Data Received from DV Content:    ";

       // Get the values of the row from where data action was invoked
           Object.keys(e.detail.payload.context).forEach(function(key) {
            res = res.concat(key);
            res = res.concat(" : ");
            var temp = e.detail.payload.context[key]["oValueMap"];
            var temp1 = Object.keys(temp)[0];
            res = res.concat(temp1);
            res = res.concat(" | ");
           });

          console.log("Data Action Row Context : " + res);

         }, true);
         }
      </script>
```


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13

Use Other Functions to Visualize Data

This topic describes other functions that you can use to visualize your data.

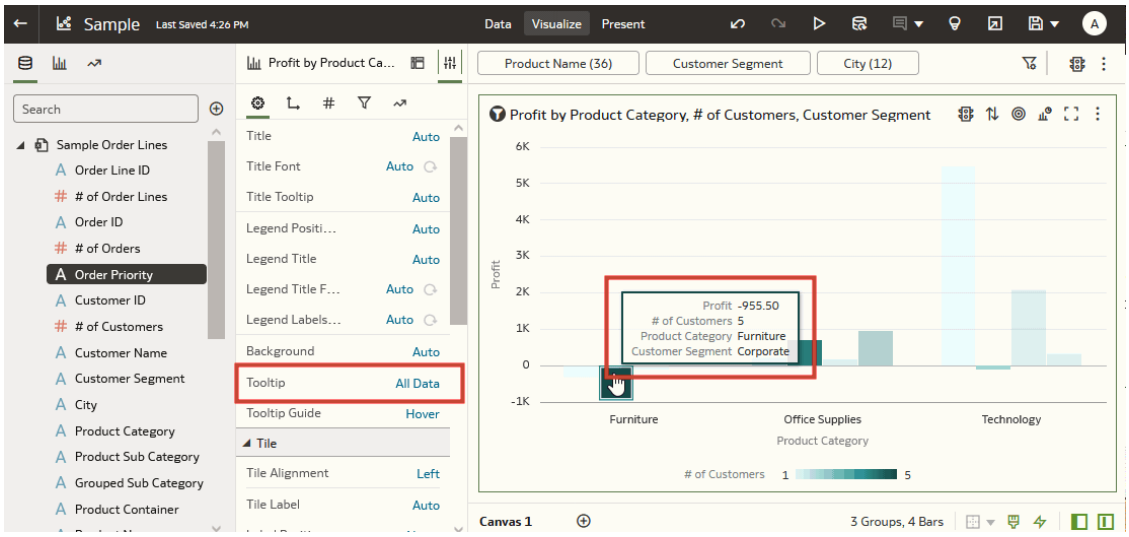
Topics:

- Identify Content with Tooltips
- Compose Expressions
- Use Data Actions to Connect to Canvases, External URLs, Oracle Analytics Publisher Reports
- 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).

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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.

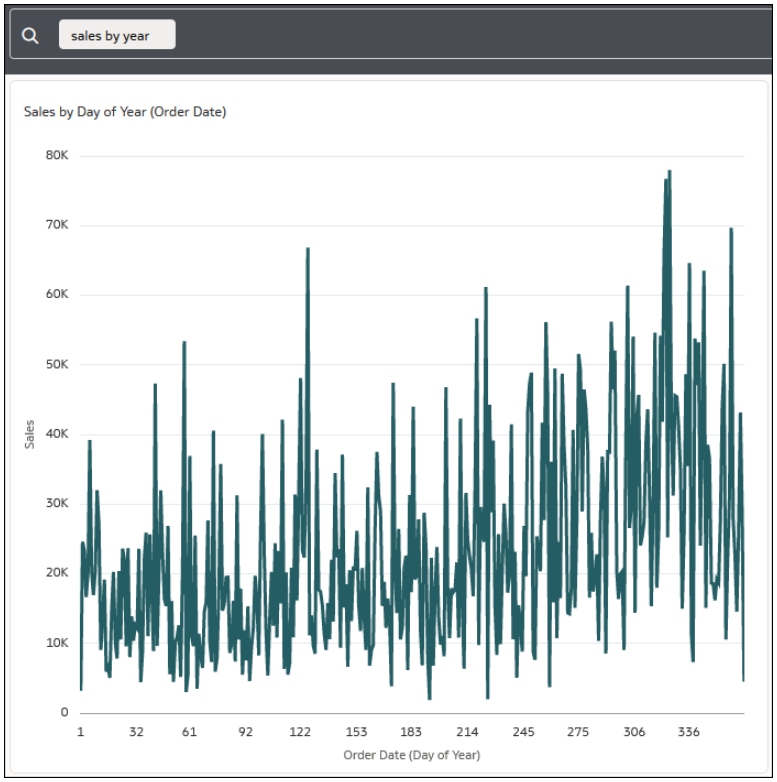
You must index your datasets before you or other users with access to them can use them to build visualizations from the Home page. See Index a Dataset.

You can certify datasets to ensure that their contents rank high in search results. See Certify a Dataset.

You can assign synonyms to dataset columns. Use synonyms that are familiar to user to ensure successful searches. See Specify Synonyms for Dataset Columns.

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**.

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3. Optional: In the visualization, click **Explore as Workbook** .

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.

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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**.
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.

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14

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

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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.

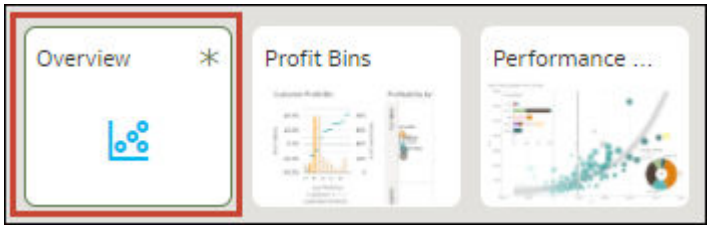
Manual Mode and How Canvases Synch

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.

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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.

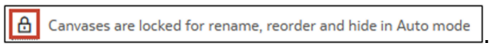
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Visualize Update	Present Auto Mode	Present Manual Mode
Add workbook filters	Filters are added as read-only.	Filters are added. You can change filter values, which makes the canvas out of synch with the Visualize canvas.
Delete workbook filters	Filters 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.

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.

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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

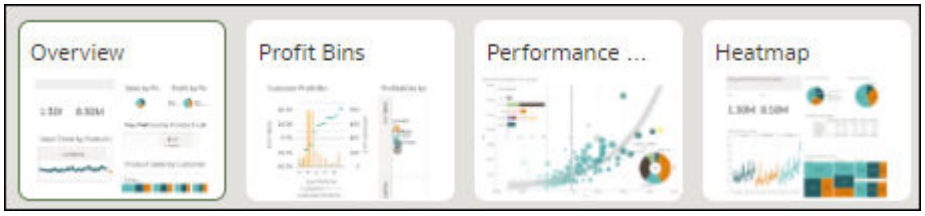
When working on the presentation flow in manual mode, you can change the order of the workbook's canvases.

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.

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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**.

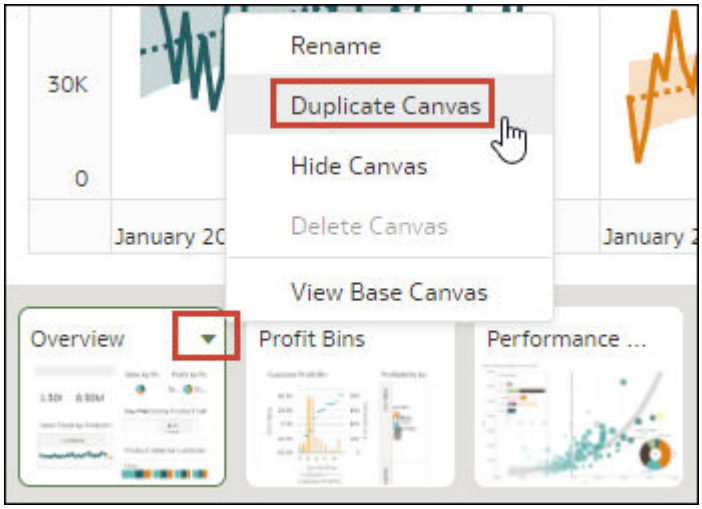
Duplicate a Canvas in Present

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 canvas.

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**.

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Remove a Duplicate Canvas in Present

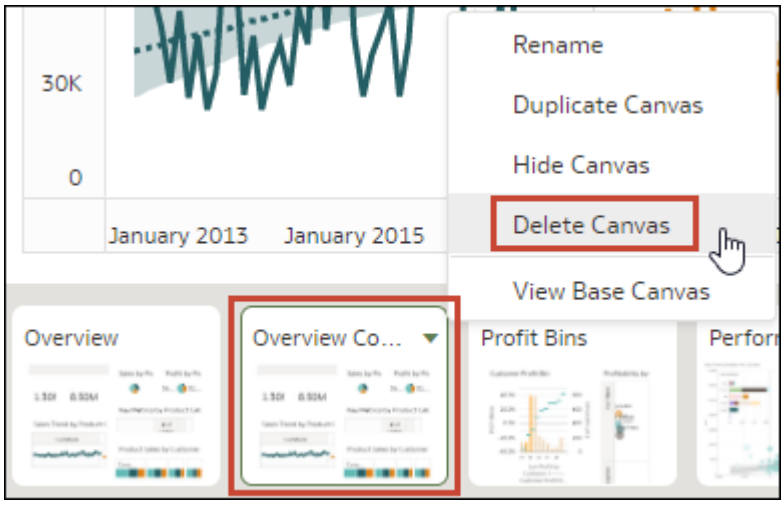
When working on the presentation flow in manual mode, you can delete any duplicate canvases from the presentation flow.

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**.

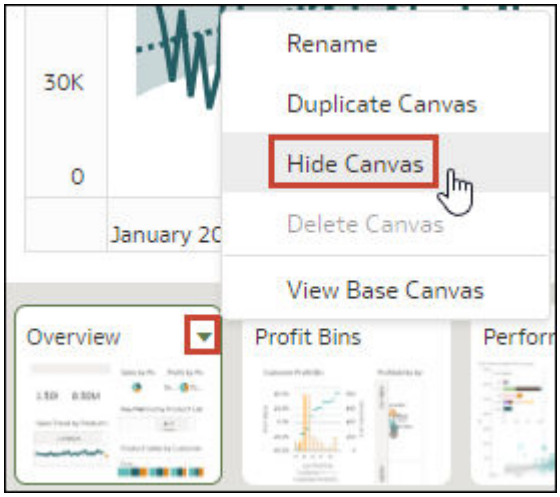
Hide a Canvas in Present

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.

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5. Click **Save**.

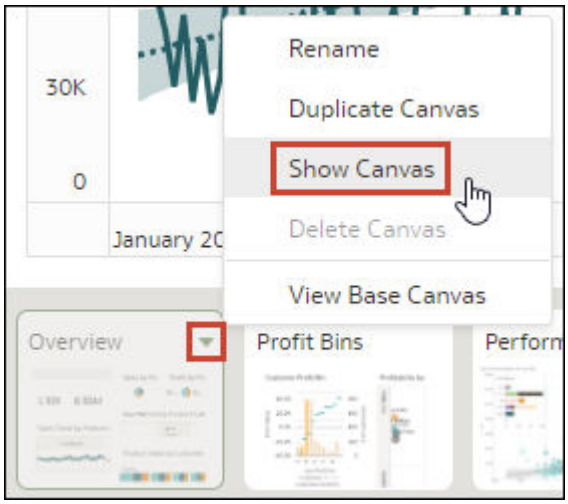
Display a Hidden Canvas in Present

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**.

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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 adjusts 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.

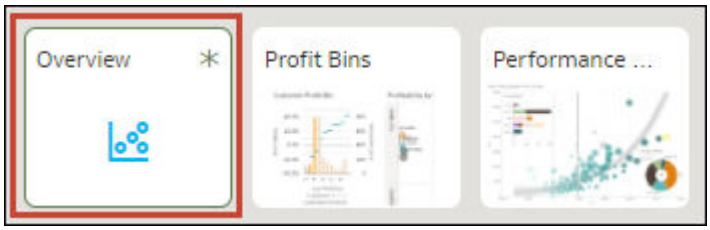
You can reset any canvas that displays an asterisk. The asterisk indicates that the canvas' layout adjustments or filter settings are out of synch with its base canvas in Visualize.

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.

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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

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Specify Workbook Canvas Navigation in Present

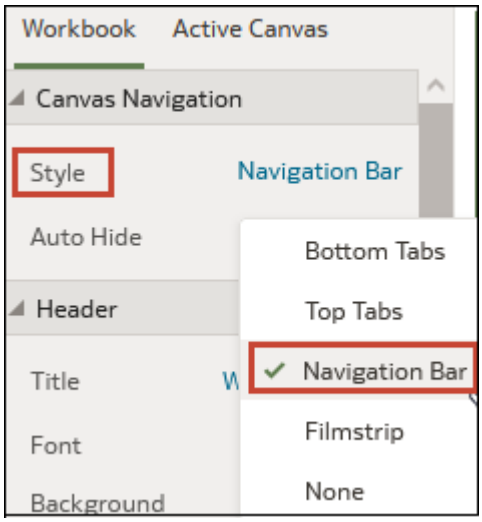
When you design a presentation flow, you can choose between navigation options to best fit how you want the end user to move between the workbook's canvases.

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 to 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**.

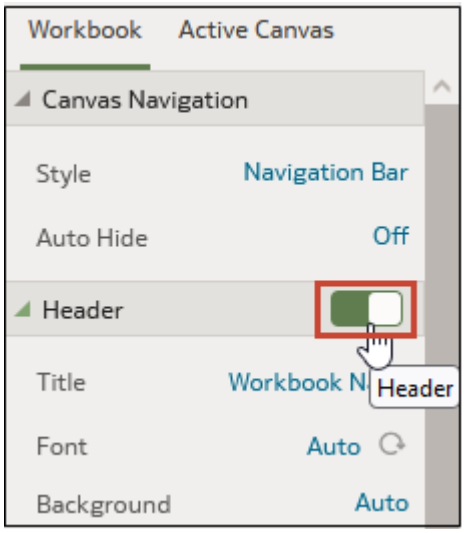
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Show or Hide the Workbook Header Bar in Present

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**.

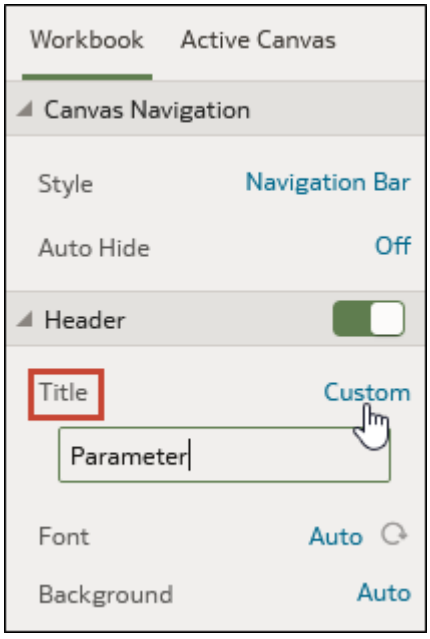
Modify the Workbook Header Title in Present

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.

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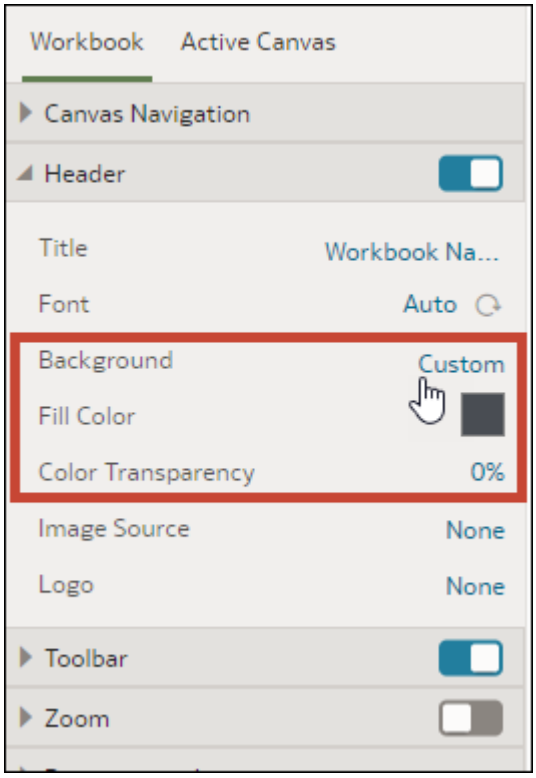
5. Optional: Click the **Font** field and specify the font style, font size, and any formatting that you want to use in the title, for example, bold or italic.
6. Click **Save**.

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**.

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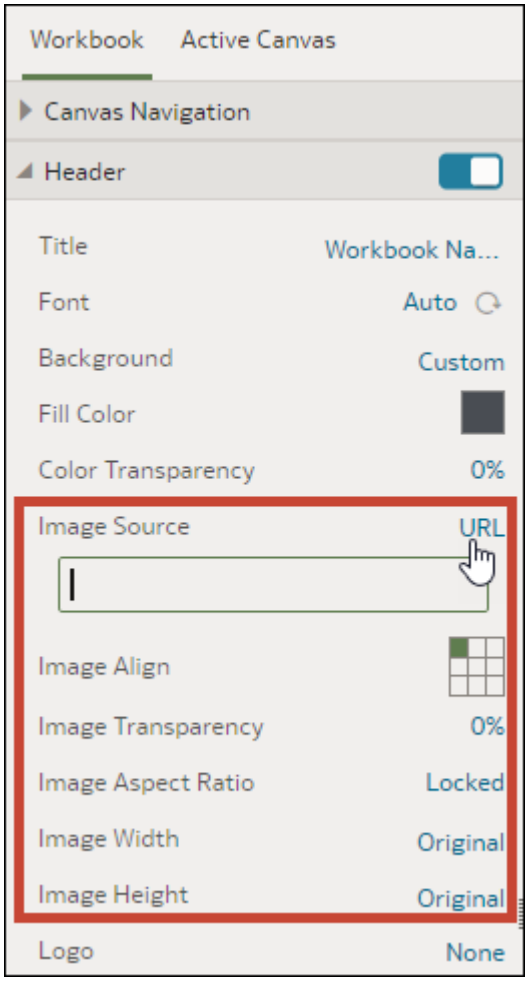
5. In the Header section, use the **Fill Color** and **Color Transparency** fields to specify how you want the header's background to display.
6. Click **Save**.

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.

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7. Click **Save**.

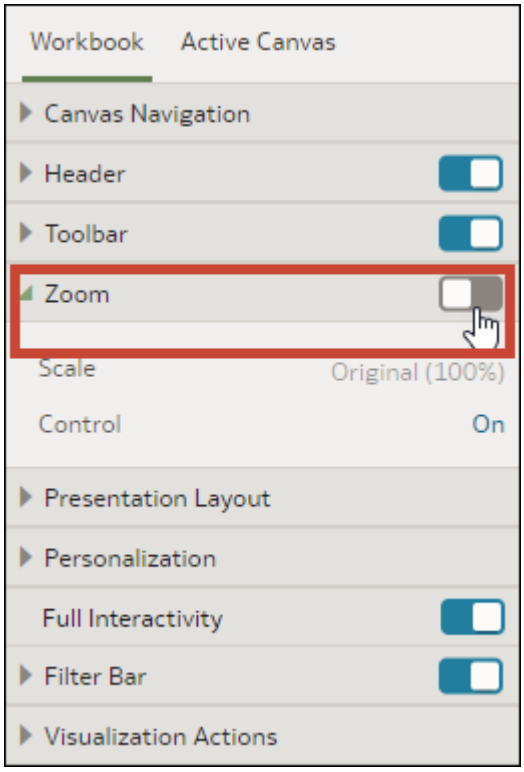
Show or Hide the Zoom Control in Present

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.

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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.

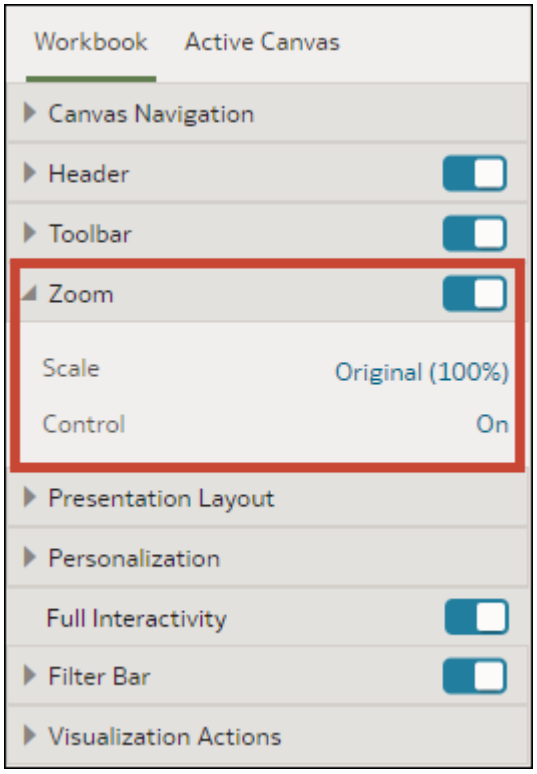
The Zoom/Layout controls button allows consumers to zoom in and out of the whole active canvas to best fit their screen. Although you set the control for the workbook, the zoom control is displayed only for canvases with the **Layout** canvas property set to **Freeform**.

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.

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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.

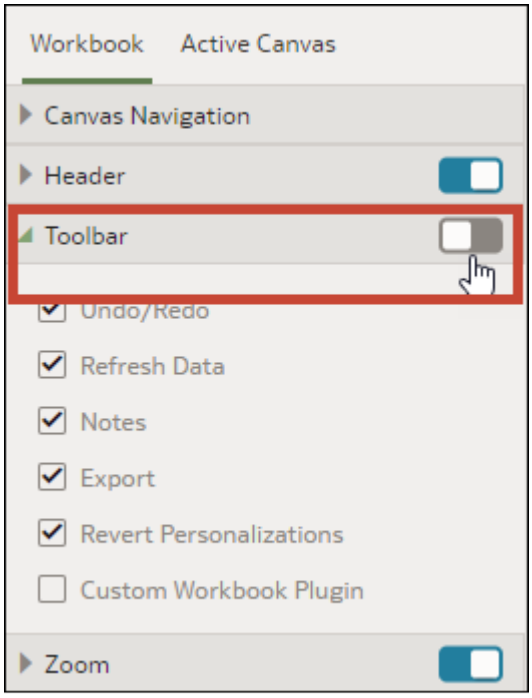
   Set this option to **Off** when your workbook contains many canvases and you want to use the Active Canvas option to display the zoom control on only a few canvases.
6. Click **Save**.

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.

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5. Click **Save**.

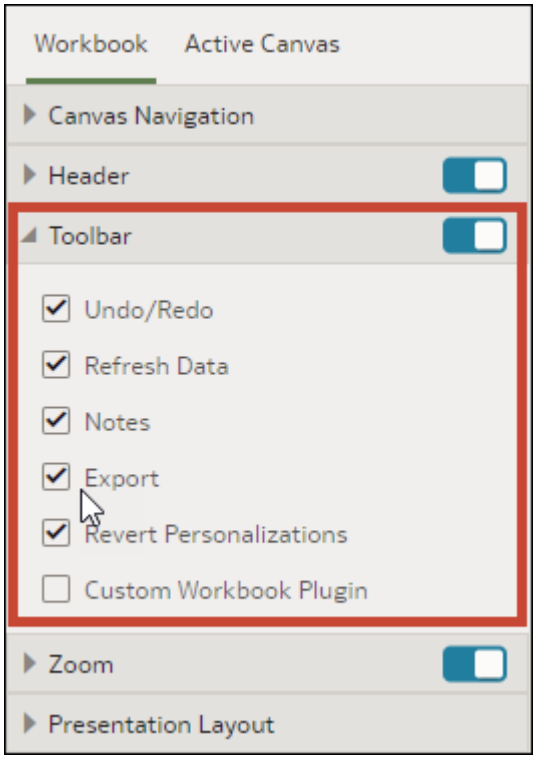
Select Workbook Toolbar Options in Present

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.

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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.

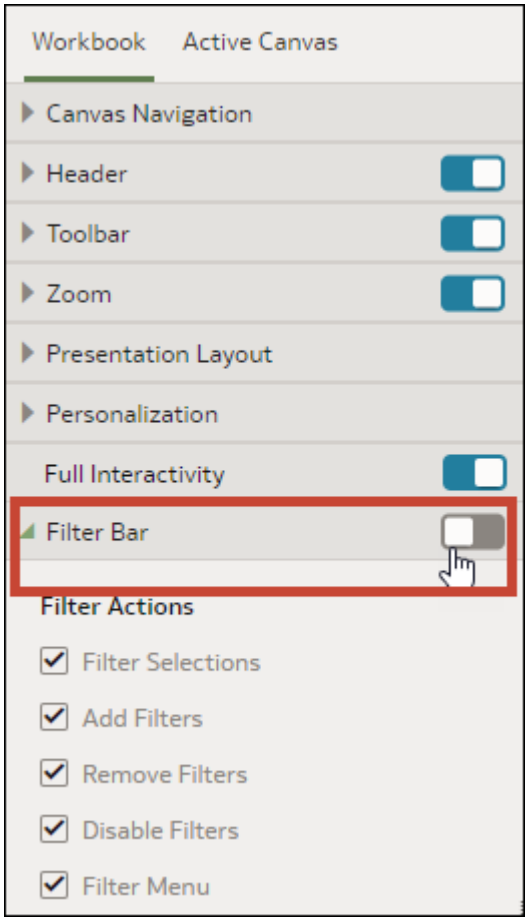
Showing the filter bar allows users to view, set, and modify any items in it, such as workbook and canvas filters, selection steps, or parameters. You can select values for items in the filter bar and then hide the filter bar so that the workbook includes specific data. Hiding the filter bar prevents users from changing the 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.

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5. Click **Save**.

Specify Workbook Filter Options in Present

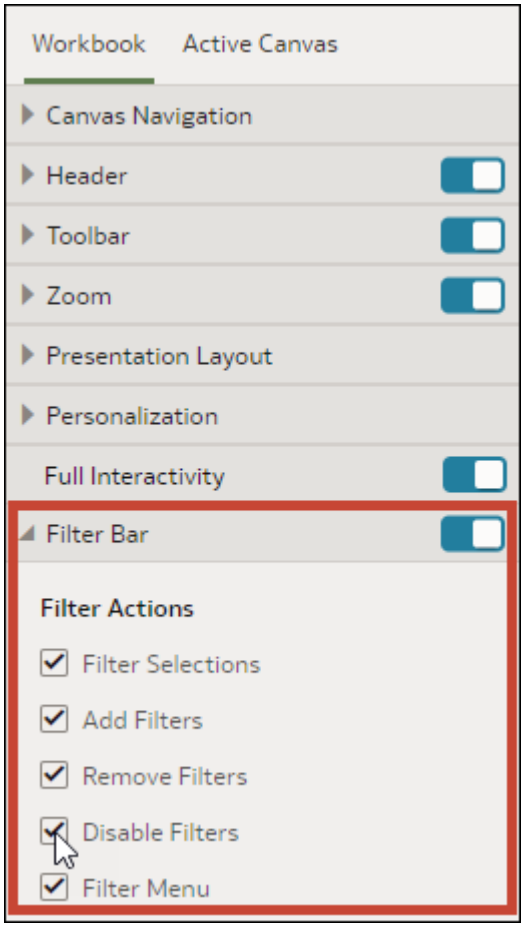
When you design a presentation flow, you can specify which options you want the user to have when using the workbook filter bar, for example, add filters or change filter values.

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.

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5. Click **Save**.

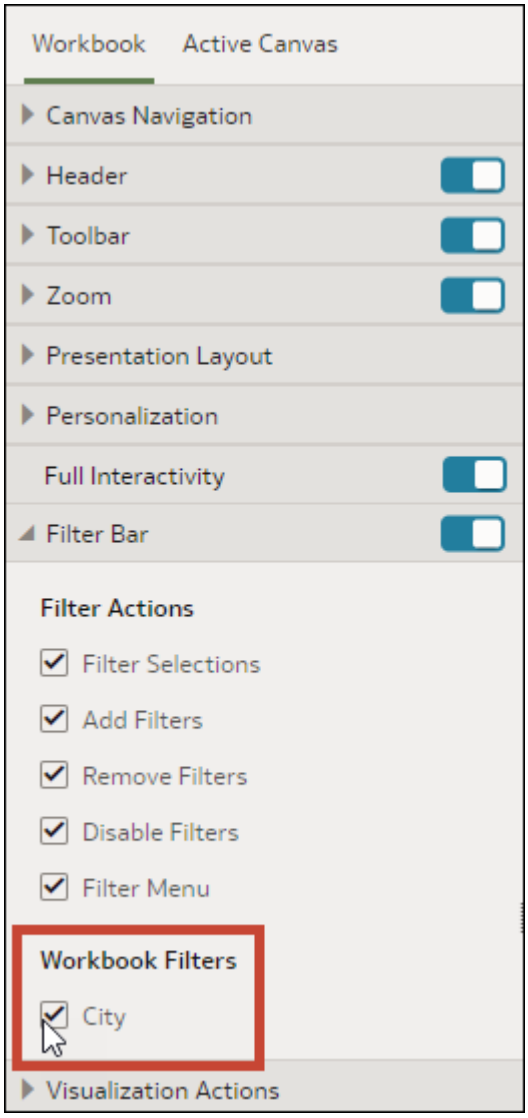
Show or Hide Workbook Filters in Present

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.

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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.

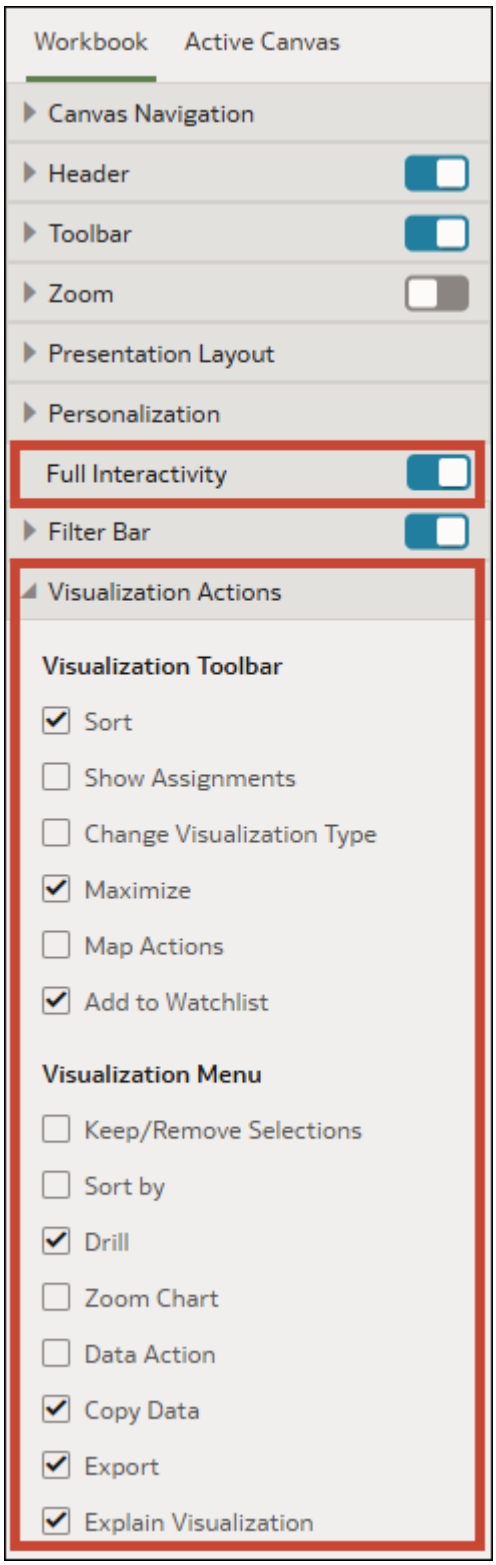
The visualization properties that you set on the **Workbook** tab are carried over to the Active Canvas' Visualization Actions properties. You can override the **Workbook** tab's visualization properties on any individual canvas. See Select Canvas Visualization Toolbar Options in Present .

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**.

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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.



5. Click **Save**.

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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.

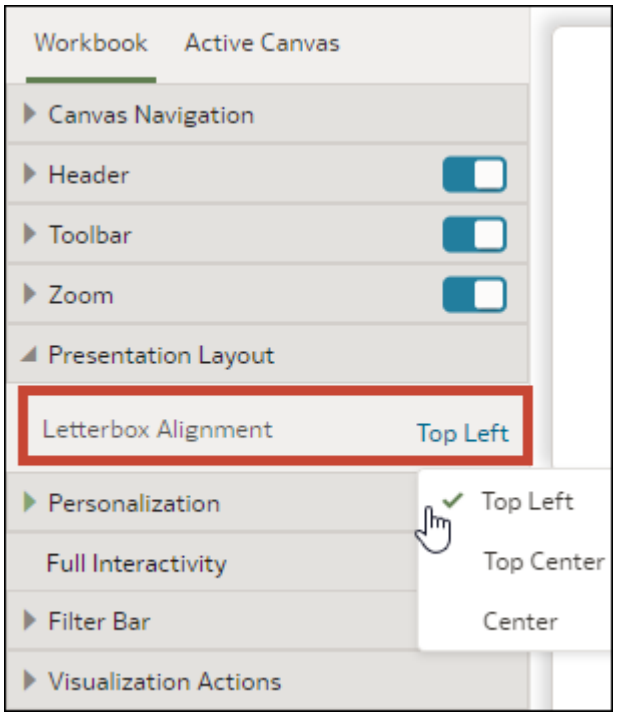
For example, if the workbook's canvases each contain one visualization, then you can choose **Center** to add white space around the visualizations to center them on the canvases.

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**.

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Turn On or Off All Workbook and Canvas Actions in Present

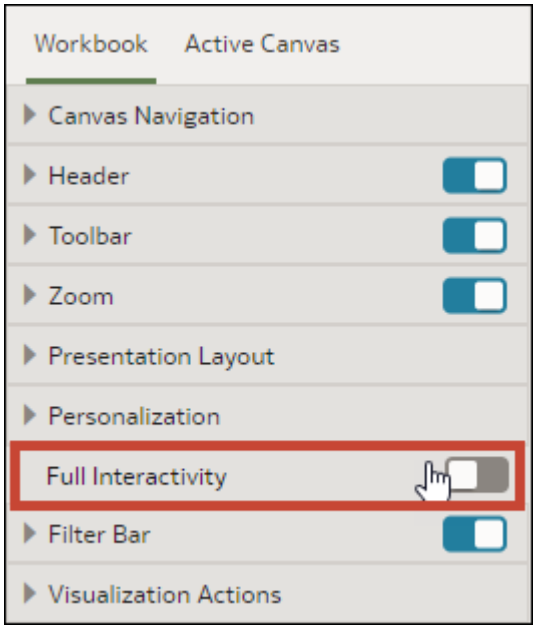
When you design a presentation flow, all filter bar and visualization actions are on by default. You can turn off and on actions individually, or use the **Full Interactivity** option to turn off or on all actions for the workbook's canvases.

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.

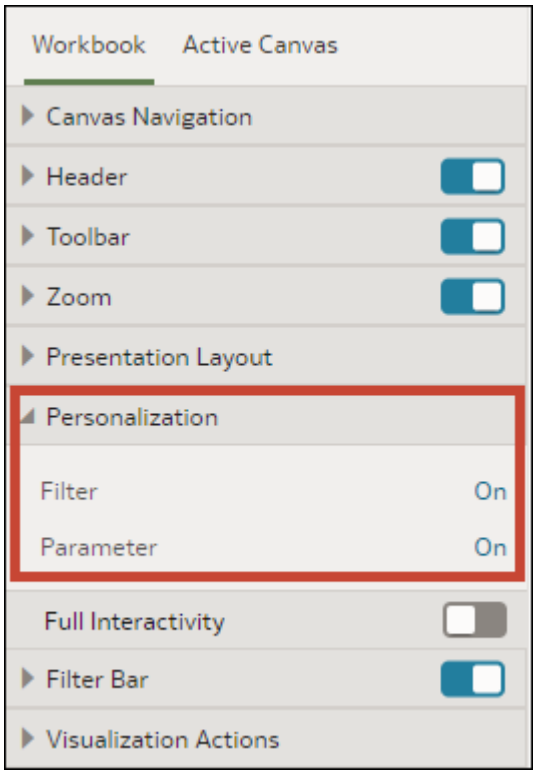
The personalization options are:

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- **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.

Your administrator can disable workbook personalization for the entire organization through system settings. In this case, you can't set personalization options for your workbook. See System Settings - Enable Personalization in Workbooks.

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

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- 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 bar options, for example, add filters or change filter values.

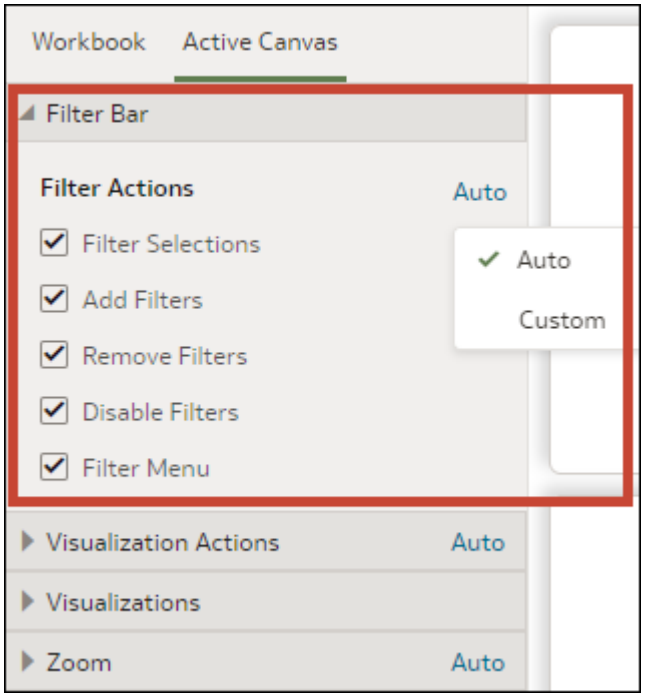
Showing the filter bar allows users to view, set, and modify any items in it, such as canvas filters, selection steps, or parameters. You can select values for items in the filter bar and then hide the filter bar so that the canvas includes specific data. Hiding the filter bar prevents users from changing the 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.

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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

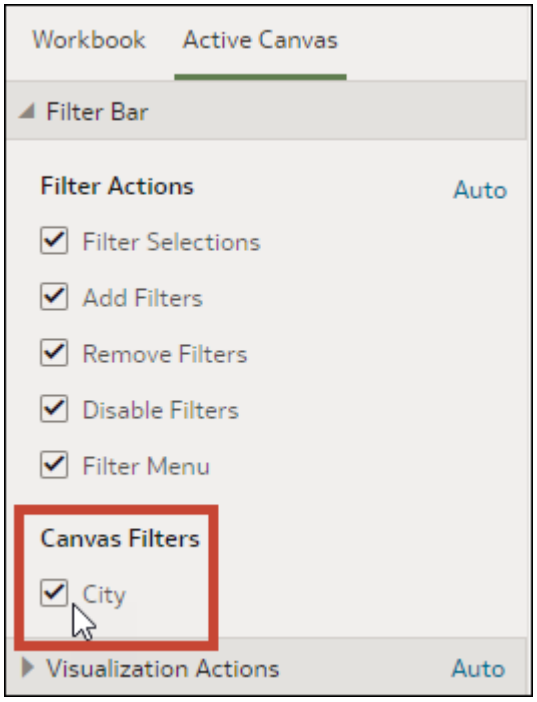
When you design a presentation flow, you can hide or show any individual canvas filters.

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.

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6. Click **Save**.

Select Canvas Visualization Toolbar Options in Present

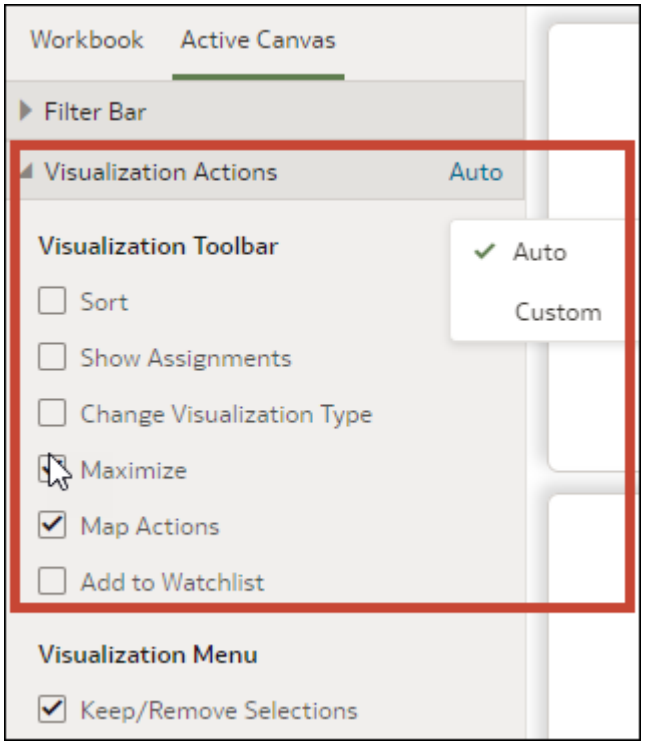
When you design a presentation flow, each canvas inherits the visualization toolbar options you set on the **Workbook** tab. You can use the **Active Canvas** tab to override the visualization toolbar options that are set for the workbook, for example Map Actions or Add to Watchlist.

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.

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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

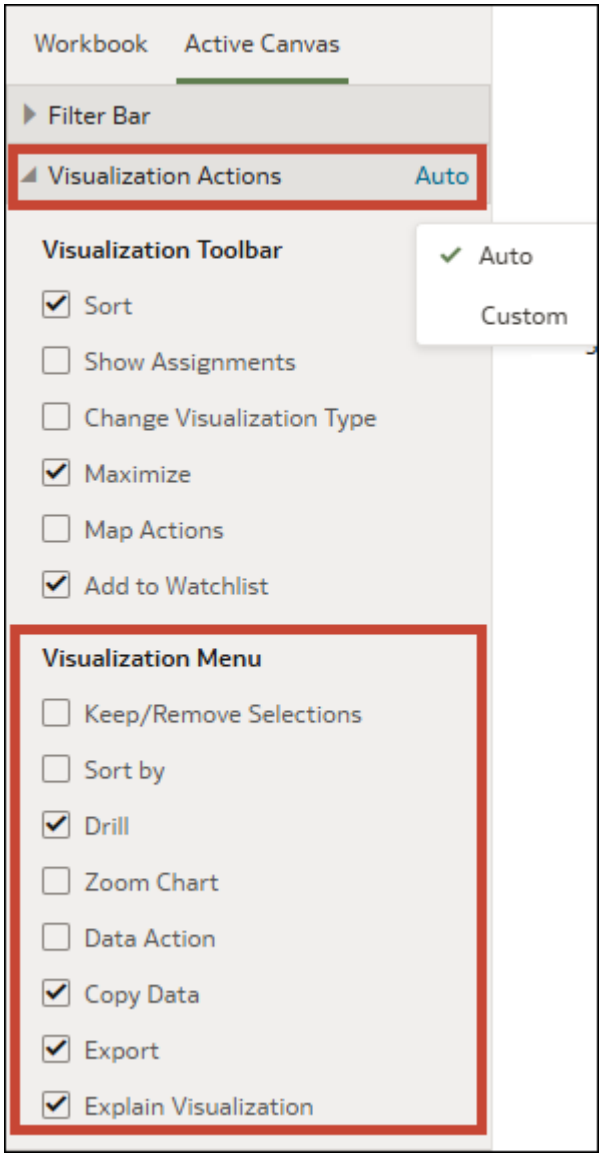
When you design a presentation flow, each canvas inherits the visualization menu options you set on the **Workbook** tab. You can use the **Active Canvas** tab to specify which visualization menu options you want to provide to the user, for example, drill or export.

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.

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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.

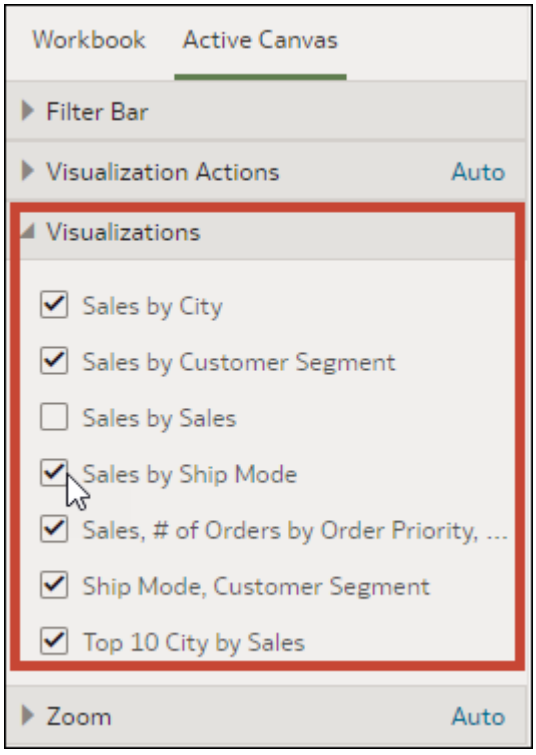
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The canvas' **Layout** property in Visualize determines if your canvas contains white spaces and overlaps when you hide or show visualizations. See About Moving or Hiding Visualizations on a Canvas in Present.

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

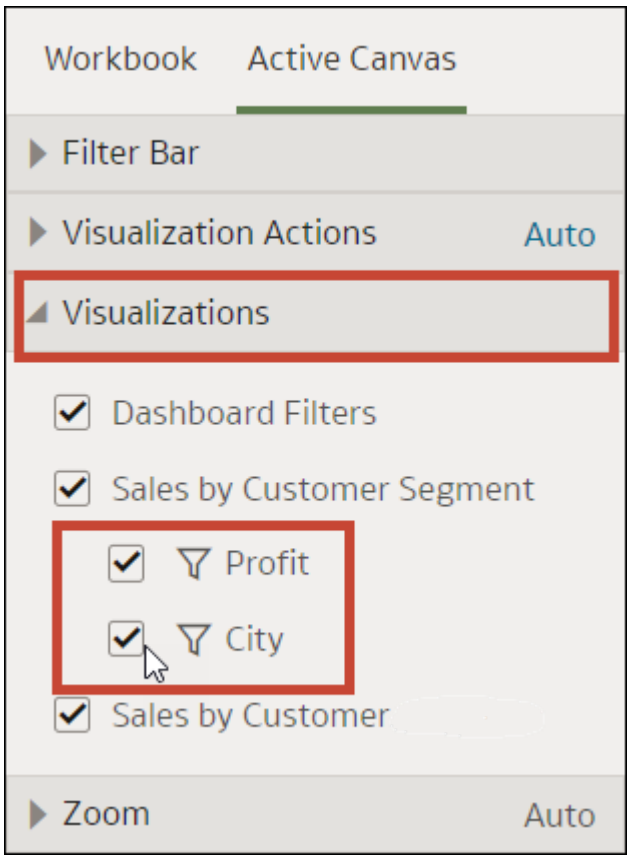
You can hide or display individual visualization filters for visualizations on a canvas depending on how you want your users to view and interact with the visualization.

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**.

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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**.

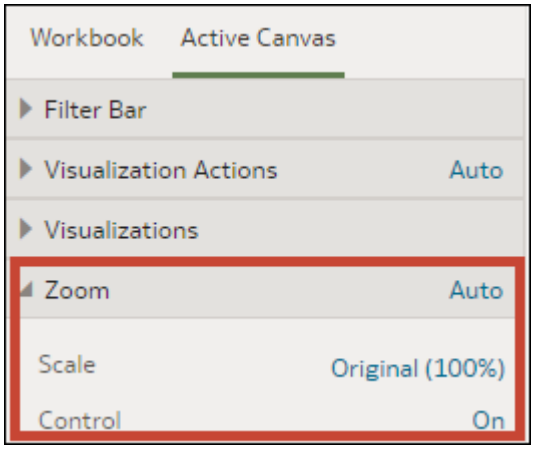
Specify Canvas Zoom Control Options in Present

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.

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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.



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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.

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15

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, Oracle Autonomous Data Warehouse, or Oracle Cloud Infrastructure (OCI). 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:

- What Machine Learning and Artificial Intelligence Services Does Oracle Analytics Support?
- 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
- Use Oracle Cloud Infrastructure Vision Models in Oracle Analytics
- Use Oracle Cloud Infrastructure Data Science Models in Oracle Analytics
- Use Oracle Cloud Infrastructure Language Models in Oracle Analytics
- Use Oracle Cloud Infrastructure Document Understanding Models in Oracle Analytics

What Machine Learning and Artificial Intelligence Services Does Oracle Analytics Support?

In Oracle Analytics, you can build machine learning and artificial intelligence into your applications without requiring data scientist expertise.

Oracle Analytics integrates with:

- Oracle Cloud Infrastructure Artificial Intelligence
- Oracle Cloud Infrastructure Data Science
- Oracle Cloud Infrastructure Functions
- Oracle Cloud Infrastructure Language
- Oracle Cloud Infrastructure Vision
- Oracle Database Machine Learning
- Oracle Database Advanced Analytics (Database analytics and Graph analytics)
- Oracle Autonomous Data Warehouse, for example, the AutoML capability.

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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

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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.

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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 Regression	Binary Classifier Multi-Classifier Numerical	-	Uses decision trees to predict both discrete and continuous values. Use with large datasets.
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.
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.

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Name	Type	Category	Function	Description
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-Classifier	GaussianNB	Probabilistic classification based on Bayes' theorem that assumes no dependence between features. Use when there are a high number of input dimensions.
Neural Network	Classification	Binary Classifier Multi-Classifier	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-Classifier 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.

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Name	Type	Category	Function	Description
SVM	Classification	Binary Classifier Multi-Classifier	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.

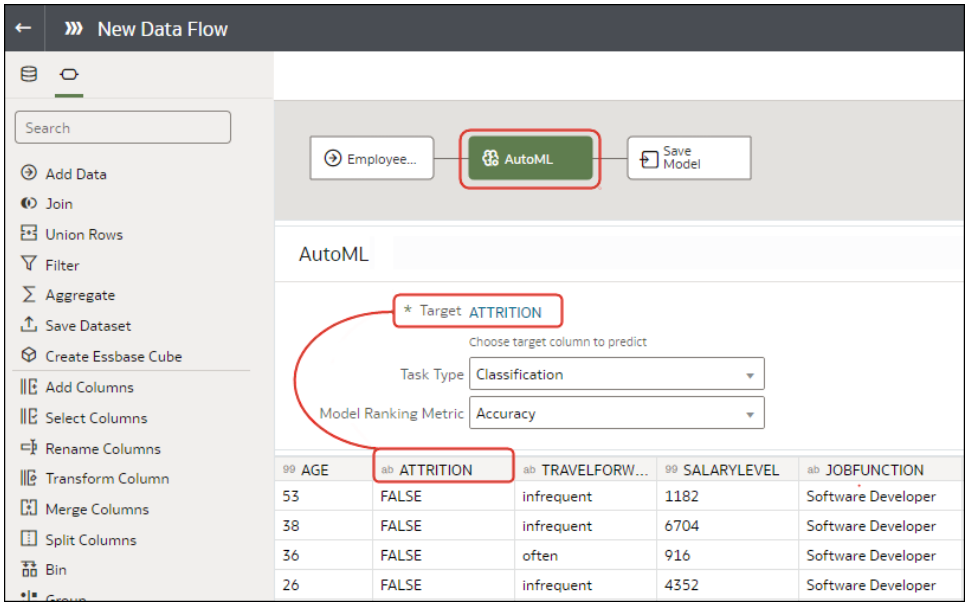
Before you start:

- 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.

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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 aand 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.

LiveLabs Sprint

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*.

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Oracle Analytics provides algorithms for numeric prediction, multi-classification, binary-classification and clustering.

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.

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 analzes 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.

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Step Name	Description
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.

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 menu icon for a training model and select **Inspect**.
3. Click the **Details** to view the model's information.

Assess a Predictive Model's Quality

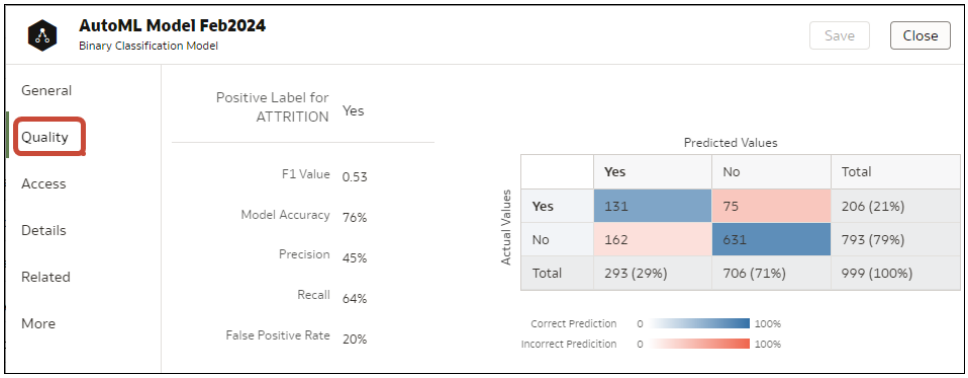
View information that helps you understand the quality of a predictive model. For example, you can review accuracy metrics like model accuracy, precision, recall, F1 value, and false positive rate.

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 menu icon for a training model and select **Inspect**.
3. Click the **Quality** tab to review the model's quality metrics and assess the model. For example, review the **Model Accuracy** score.

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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.

LiveLabs Sprint

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.

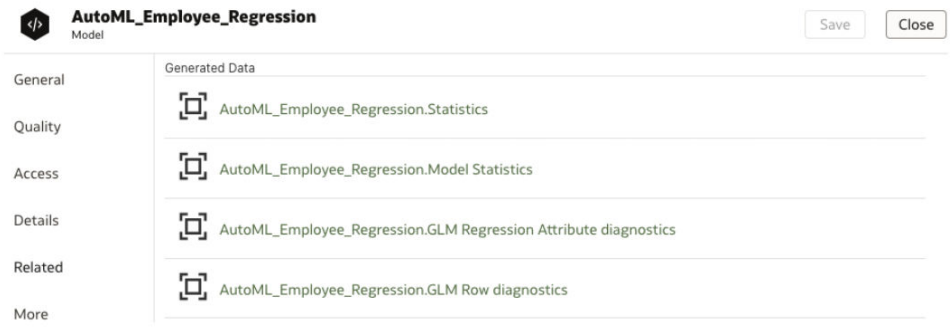
For example, you can open a Drivers dataset to discover which columns have a strong positive or negative influence on the model. By examining those columns, you find that some columns aren't treated as model variables because they aren't realistic inputs or that they're too granular for the forecast. 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.

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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

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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.

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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 Classificatin	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 Support Vector Machine
Multi Classification	Naive Bayes Neural Network Random Forest Support Vector Machine

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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 menu icon for a training model and select **Inspect**.
3. Click the **Related** tab to access the model's related datasets.
4. 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.

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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.

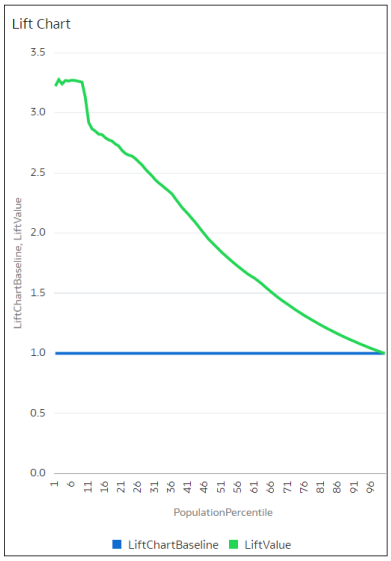
Topics:

- 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.



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Prequisites

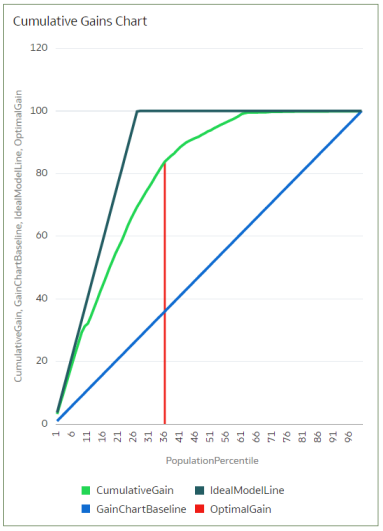
- Oracle Database or Oracle Autonomous Data Warehouse
- A classification model that includes prediction probability (for example, a multi-classifier model created using the Naive Bayes training script).
  You access existing predictive models in the Machine Learning area in Oracle Analytics.

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.



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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

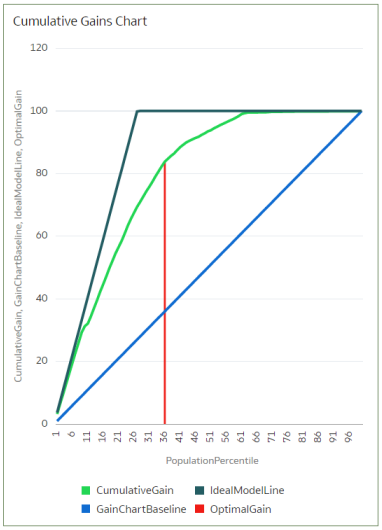
Use a chart to analyze statistics generated by machine learning classification models to determine the best model to use.

Before you start, apply a predictive model to your data and generate lift and gain statistics in a dataset.

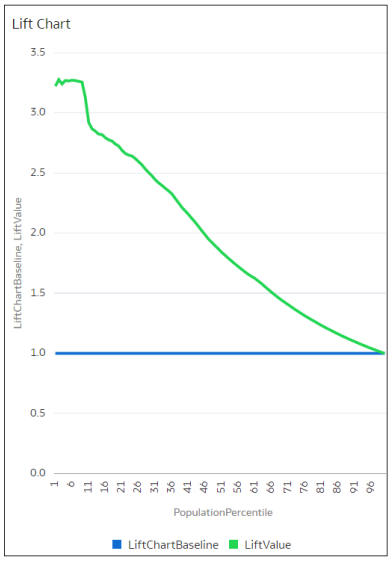
1. On the Home page, click **Create**, then click **Workbook**.
2. In **Add Dataset**, select the <*Data flow name*>_LIFT dataset that you generated in the previous task, then click **Add to Workbook**.
3. In the **Visualize** panel, select the statistics to analyze, then right-click and select **Pick 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.

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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

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How Can I Use Oracle Machine Learning Models in Oracle Analytics?

Oracle Analytics allows you to register and use Oracle machine leaning 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 Oracle Analytics user role and 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**.

   This option is available for users with the BI Service Administrator or DV Content Author role.

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.

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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:

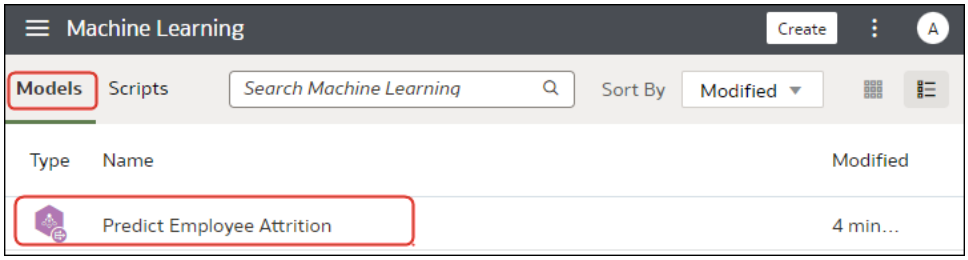
- View a Registered Model's Details
- What Are a Registered Model's Views?
- View a Registered Model's Views List

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.

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- 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$VCDT_TEST. The format used to generate view names is DM$V*Alphabet_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 12*c* 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.

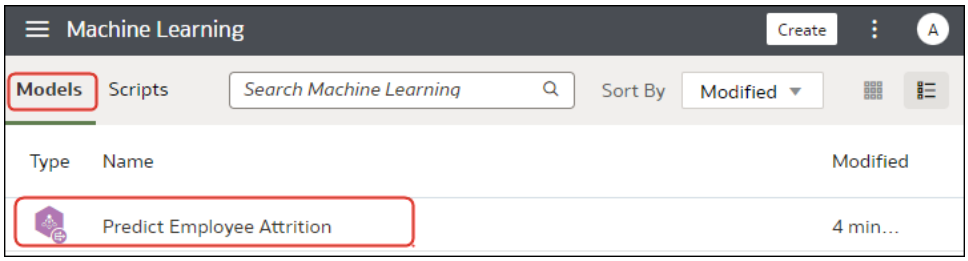
View a Registered Model's Views List

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 12*c* 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.

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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 12*c* 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.

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- 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.

Use Oracle Cloud Infrastructure Vision Models in Oracle Analytics

Use pretrained Oracle Cloud Infrastructure (OCI) Vision models to build image recognition and text recognition into your applications without machine learning (ML) or artificial intelligence (AI) expertise.

For example, when you use OCI pretrained Vision models, you can detect objects such as cars and faces in photographs and then blur the images to protect identities of the individuals.

Oracle Analytics supports these models:

- Image Classification.
- Image Face Detection.
- Image Text Detection.
- Object Detection.

Prerequisites:

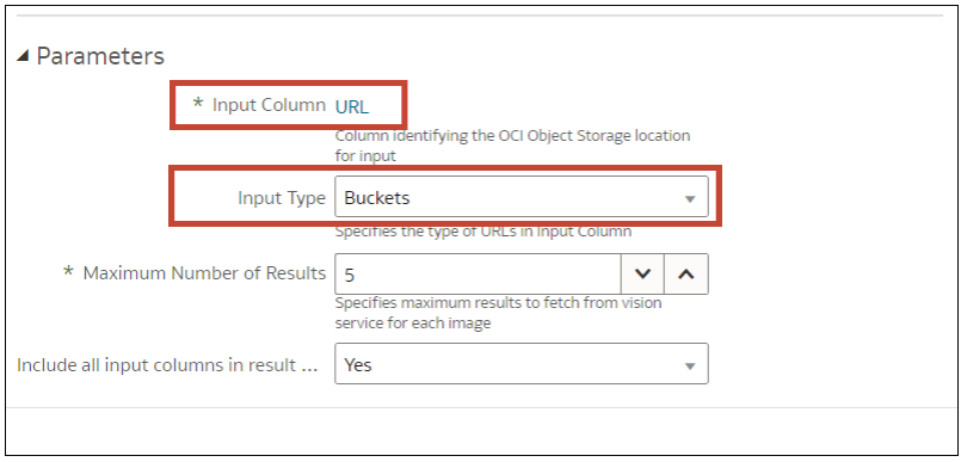
- See Integrate Oracle Analytics with Oracle Cloud Infrastructure Vision.

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- See Prepare Images for Analysis With an Vision Model.

> **Note**
>
> OCI face detection with Oracle Analytics can identify a maximum of 250 faces per image.

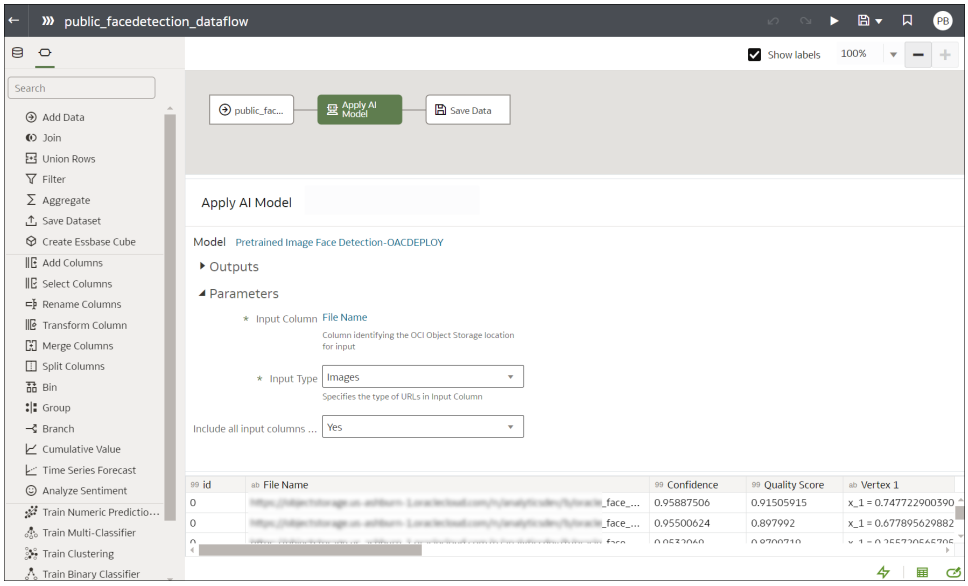
1. On the Oracle Analytics Home page, click **Create**, and then click **Data Flow**.
2. Select the prepared dataset and click **Add**.
3. From the Data Flow Steps pane, double-click **Apply AI Model**, and then select the model to use.
4. In Select AI Model, click a model, and then click OK
5. In Apply Model, expand **Parameters**. Click the **Input Column** link and select a column. From the **Input Type** list, select the type of URL in the Input Column.
   - If you're referencing your source images by bucket, in **Input Column** select **URL**, and in **Input Type** select **Buckets**.



   - If you're referencing your source images individually, in **Input Column** select **File Location**, and in **Input Type** select **Images**.

   See Parameter Options for Object Detection, Image Classification, and Text Detection Analysis Models.
6. Use the **Outputs** and **Parameters** options to configure the model (the options available depend on the model type; use the on-screen guidance).

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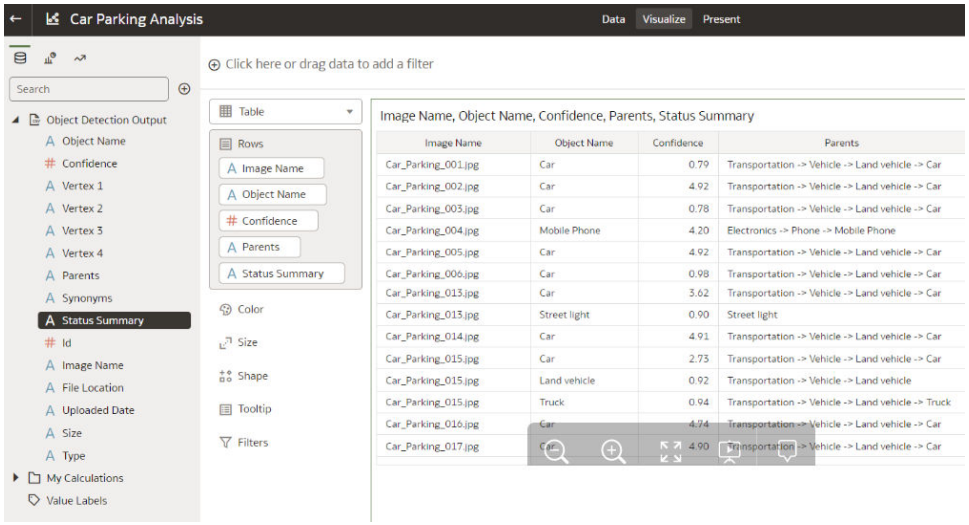
7. From the Data Flow Steps pane, double-click **Save Data**.
8. Enter a name for the dataset and select a location for saving the dataset.

   For example, you might call the dataset 'Car Parking Analysis Results'.
9. Click **Save**, enter a name for the data flow, and click **OK** to save the data flow.
10. Click **Run Data Flow** to analyze the images and output the results in a new dataset.
11. On the Oracle Analytics Home page, click **Data**, and open the dataset that you specified in Step 8.

    Use the dataset to analyze the results. See Output Data Generated for Face Detection, Object Detection, Image Classification, and Text Detection Analysis Models.

If you have fewer than 20,000 images, you can process them in a single data flow. If you have more than 20,000 images, create a separate data flow to process each bucket (that is, using a separate dataset for each bucket), and use a Sequence to sequentially process multiple data flows. After you've created multiple data flows, on the Oracle Analytics Home page, click **Create**, and then click **Sequence**.
To locate the generated dataset, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**.

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For more detail about the generated results, see Output Data Generated for Face Detection, Object Detection, Image Classification, and Text Detection Analysis Models.

Parameter Options for Object Detection, Image Classification, and Text Detection Analysis Models

When you invoke an OCI Vision model from a data flow in Oracle Analytics, you configure the model using parameters.

For example, you specify how the source dataset is configured (by bucket or by individual image). See Prepare Images for Analysis With an Vision Model.

Parameters

Parameter	Description
Input Column	Specifies the OCI Object Storage location for the images you're processing. • If you're referencing your source images by bucket, select **URL**. • If you're referencing your source images individually, select **File Location**.
Input Type	Specifies the type of URLs in input columns. • If you're referencing your source images by bucket, select **Buckets**. • If you're referencing your source images individually, select **Images**.
Maximum Number of Results	(Only for Object Detection and Image Classification) Specifies the maximum number of results (between 1 and 100) to fetch from the OCI Vision service for each image.
Include all input columns in result	Option to include all the input columns in the result.

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Output Data Generated for Face Detection, Object Detection, Image Classification, and Text Detection Analysis Models

When you analyze images using an OCI Vision model, the Oracle Analytics data flow generates data about the images. For example, each prediction has a confidence score and a status summary.

To locate generated datasets, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**.

Face Detection

Output Column	Type	Description
Confidence	Number	Specifies the confidence level of the prediction that the image contains a face.
ID	Number	Specifies a unique ID for each face identified in each image. For example, faces might have IDs 1.00, 2.00, and 3.00.
Image File from Bucket	String	Specifies the object storage URL of the image from the bucket specified. This column is included only when Input type is Bucket.
Left/Right Edge Of Mouth Landmark	String	Specifies the location of the edge of the mouth.
Left/Right Eye Landmark	String	Specifies the location of left and right eyes.
Line Vertex 1, Line Vertex 2, Line Vertex 3, Line Vertex 4	String	Specifies the location (x and y coordinates) of the face.
Nose Tip Landmark	String	Specifies the location of the tip of the nose.
Quality Score	String	Specifies the quality score that is determined by whether the face is clear and unobstructed.
Status Summary	String	Specifies a summary of the model's output, for example, "unsupported image type". This column is blank on successful output.

Image Classification

Output Column	Type	Description
Confidence	Number	Specifies the confidence score of the object detection on the scale of 0 to 1.
Image File from Bucket	String	Specifies the object storage URL of the image from the bucket specified. This column is included only when Input type is Bucket.
Object Name	String	Specifies the identified object's name.
Parents	String	Specifies the categorization of the identified object name.
Status Summary	String	Specifies a brief summary of the model's output, for example, "unsupported image type". This column is blank on successful output.
Synonyms	String	Not used.

Object Detection

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Output Column	Type	Description
Confidence	Number	Specifies the confidence score of the object detection on the scale of 0 to 1.
Image File from Bucket	String	Specifies the object storage URL of the image from the bucket specified. This column is included only when Input type is Bucket.
Object Name	String	Specifies the identified object's name.
Parents	String	Specifies the categorization of the identified object name.
Status Summary	String	Specifies the a brief summary of the model's output, for example, "unsupported image type". This column is blank on successful output.
Synonyms	String	Not used.
Vertex 1, Vertex 2, Vertex 3, Vertex 4	String	Specifies the highest points of the highlighted box surrounding an identified object. For example, x_1 = 0.001; y_1 = 0.0013333333333333333, and so on.

Text Detection

Output Column	Type	Description
Image File from Bucket	String	Specifies the object storage URL of the image from the bucket specified. This column is included only when Input type is Bucket.
Line Confidence	Number	Specifies the confidence score of the line of words detected on the scale of 0 to 1.
Line Vertex 1, Line Vertex 2, Line Vertex 3, Line Vertex 4	String	Specifies the vertices (x and y coordinates) of the highlighting box of the line, for example, x_1 = 0.001; y_1 = 0.0013333333333333333.
Line Words	String	Specifies the words detected and extracted as line.
Status Summary	String	Specifies brief summary of the model's output, for example, "unsupported image type". This column is blank on successful output.
Word	String	Specifies the words detected.
Word Confidence	String	Specifies the confidence score of the words detected on the scale of 0 to 1.
Word Vertex 1, Word Vertex 2, Word Vertex 3, Word Vertex 4	String	Specifies the points of a box surrounding an identified word. For example, x_1 = 0.001; y_1 = 0.0013333333333333333.

Use Oracle Cloud Infrastructure Data Science Models in Oracle Analytics

You can incorporate Oracle Cloud Infrastructure (OCI) Data Science models in Oracle Analytics to build machine learning (ML) into your applications without requiring ML expertise.

Topics:

- Apply an OCI Data Science Model to a Dataset

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Before you start, make sure that you've followed the prerequsites for Data Science integration, and registered the models in Oracle Analytics. See Prerequisites for Integrating OCI Data Science Models With Oracle Analytics and Make an OCI Data Science Model Available in Oracle Analytics.

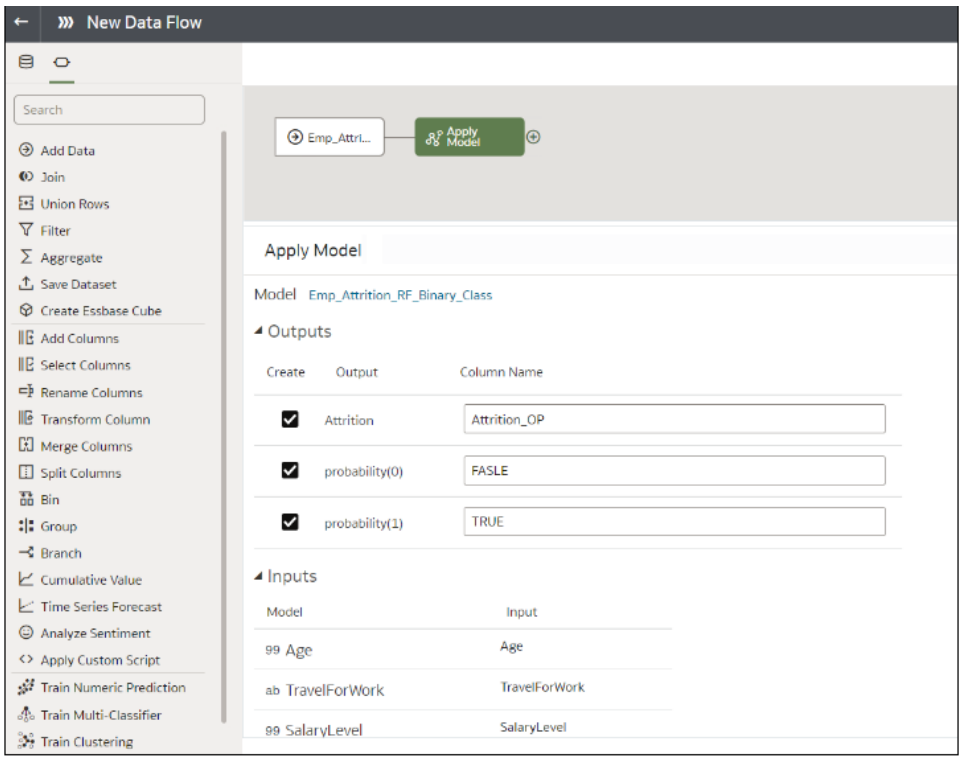
Apply an OCI Data Science Model to a Dataset

Apply an OCI Data Science model to a dataset in Oracle Analytics to analyze your data and store the results in another dataset. For example, with healthcare data, a predictive model can help you identify risk factors and predict the risk of patient readmission after discharge.

Prerequisites:

- Make sure that your Oracle Analytics instance is integration with OCI Data Science. See Integrate Oracle Analytics with Oracle Cloud Infrastructure Data Science.
- Register an OCI Data Science model in Oracle Analytics Cloud. See Make an OCI Data Science Model Available in Oracle Analytics.
- Prepare a dataset that contains the data that you want to analyze.

1. On the Oracle Analytics Home page, click **Create**, and then click **Data Flow**.
2. Select the dataset that you want to analyze, then click **Add**.
3. In the Data Flow editor, click **Add a step (+)**.
4. From the Data Flow Steps pane, double-click **Apply Model** to display the Select Model dialog.
5. Select a model, then click **OK**.
6. In the Apply Model dialog, configure the model using the settings under **Outputs** and **Inputs**.

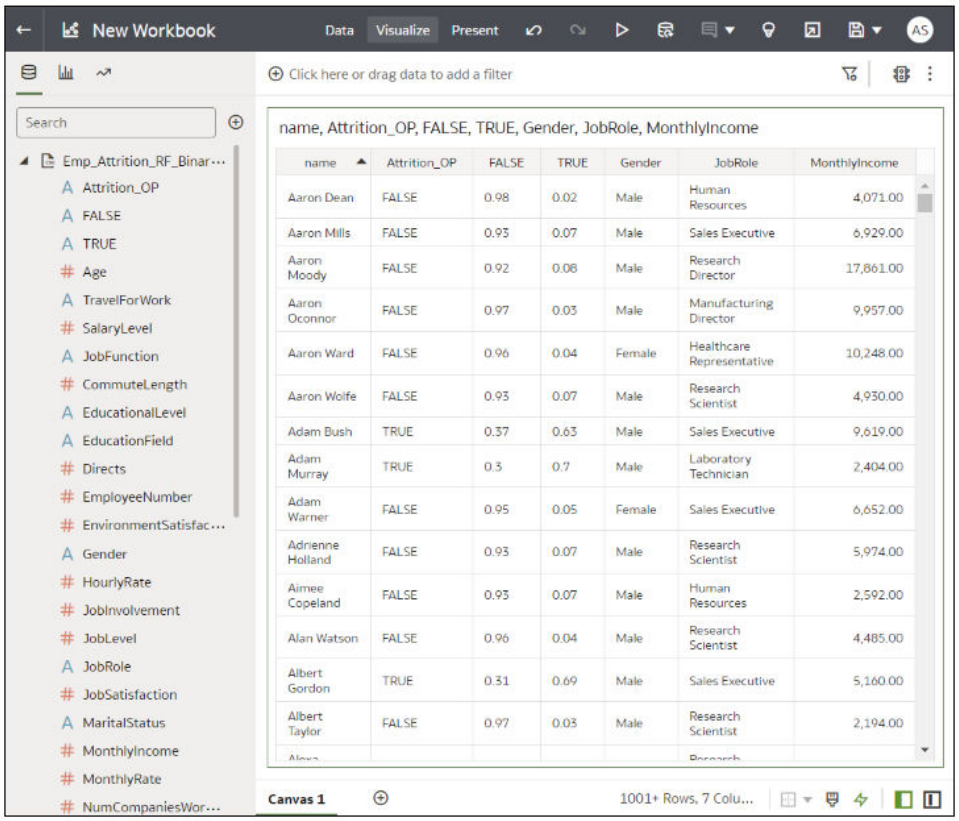


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7. In the data flow editor, click **Add a step (+)** and select **Save Data**.
8. Enter the name of the dataset in which to store the output results.

   For example, you might call the dataset 'Employee Attrition Results'.
9. In the **Save data to** field, specify the location for saving the output data.
10. Click **Save**, enter a name for the data flow, and click **OK** to save the data flow.
11. Click **Run Data Flow** to apply the Data Science model and save the results in the output dataset for further analysis.
12. When the data flow run completes, click **Navigator**, click **Data**, and then open the generated dataset from the Datasets page.

You can now visualize the data in a workbook.



Use Oracle Cloud Infrastructure Document Understanding Models in Oracle Analytics

Use pretrained and custom Oracle Cloud Infrastructure (OCI) Document Understanding models to build document classification and key value extraction into your applications without machine learning (ML) or artificial intelligence (AI) expertise. For example, you might use document classification to identify passports, driver licenses, receipts, or invoices.

Topics:

- Overview to Document Classification and Key Value Extraction
- Prepare Documents to Analyze with an OCI Document Understanding Model

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- Perform Document Classification and Key Value Extraction

Overview to Document Classification and Key Value Extraction

In Oracle Cloud Infrastructure (OCI), Document Understanding provides pretrained AI models that can extract text, tables, and other key data from document files. You perform document classification or key value extraction on a document, then use that extracted data as part of your analysis in Oracle Analytics.

Document Understanding also lets you create custom models for key value extraction and document classification.

In Oracle Analytics, you use data flows to apply the Document Understanding AI models to your data.

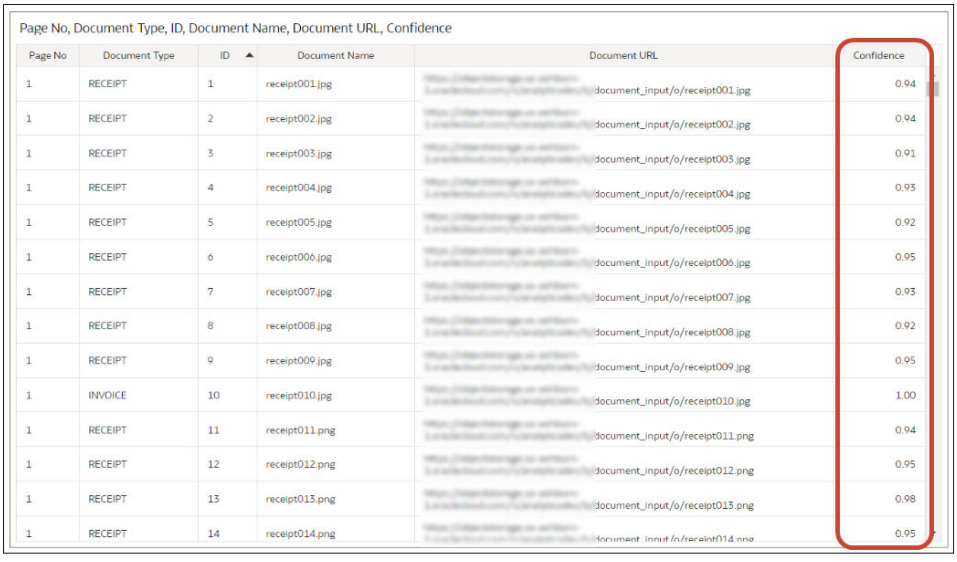
Oracle Analytics supports several pretrained and custom AI models available from Document Understanding:

- **Pretrained Models Supported in Oracle Analytics**
  - Document Classification
  - Key Value Extraction (for receipts, invoices, driver IDs, and passports)
- **Custom Models Supported in Oracle Analytics**
  - Custom Document Classification
  - Custom Key Value Extraction

You must set up and build custom models in OCI Console before you can use them in Oracle Analytics. First, you use OCI Data Labeling to create a good dataset that you can use to train the model and then you build your custom model. See OCI Document Understanding - Custom Models.

Example Output From a Document Classification Model

In this example, a data flow applies a pretrained document classification model to documents in JPG format to predict whether they are receipts, and outputs the analysis results to a dataset. The dataset includes a RECEIPT value for "Document Type", and a "Confidence" prediction level for each document.


Page No, Document Type, ID, Document Name, Document URL, Confidence

Page No	Document Type	ID	Document Name	Document URL	Confidence
1	RECEIPT	1	receipt001.jpg	[redacted]document_input/o/receipt001.jpg	0.94
1	RECEIPT	2	receipt002.jpg	[redacted]document_input/o/receipt002.jpg	0.94
1	RECEIPT	3	receipt003.jpg	[redacted]document_input/o/receipt003.jpg	0.91
1	RECEIPT	4	receipt004.jpg	[redacted]document_input/o/receipt004.jpg	0.93
1	RECEIPT	5	receipt005.jpg	[redacted]document_input/o/receipt005.jpg	0.92
1	RECEIPT	6	receipt006.jpg	[redacted]document_input/o/receipt006.jpg	0.95
1	RECEIPT	7	receipt007.jpg	[redacted]document_input/o/receipt007.jpg	0.93
1	RECEIPT	8	receipt008.jpg	[redacted]document_input/o/receipt008.jpg	0.92
1	RECEIPT	9	receipt009.jpg	[redacted]document_input/o/receipt009.jpg	0.95
1	INVOICE	10	receipt010.jpg	[redacted]document_input/o/receipt010.jpg	1.00
1	RECEIPT	11	receipt011.png	[redacted]document_input/o/receipt011.png	0.94
1	RECEIPT	12	receipt012.png	[redacted]document_input/o/receipt012.png	0.95
1	RECEIPT	13	receipt013.png	[redacted]document_input/o/receipt013.png	0.98
1	RECEIPT	14	receipt014.png	[redacted]document_input/o/receipt014.png	0.95

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Before you start:

- Ask your administrator to integrate your Oracle Analytics service with OCI Document Understanding. See Integrate Oracle Analytics with Oracle Cloud Infrastructure Document Understanding.
- In Oracle Analytics, create a connection to your OCI Document Understanding service. See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

Prepare Documents to Analyze with an OCI Document Understanding Model

You use buckets in OCI Object Storage to store the documents that you want to analyze, then create a dataset to access these documents in Oracle Analytics.

You typically store input documents and AI models in the *same* Oracle Cloud account (tenancy), which makes it easier to setup in Oracle Analytics.

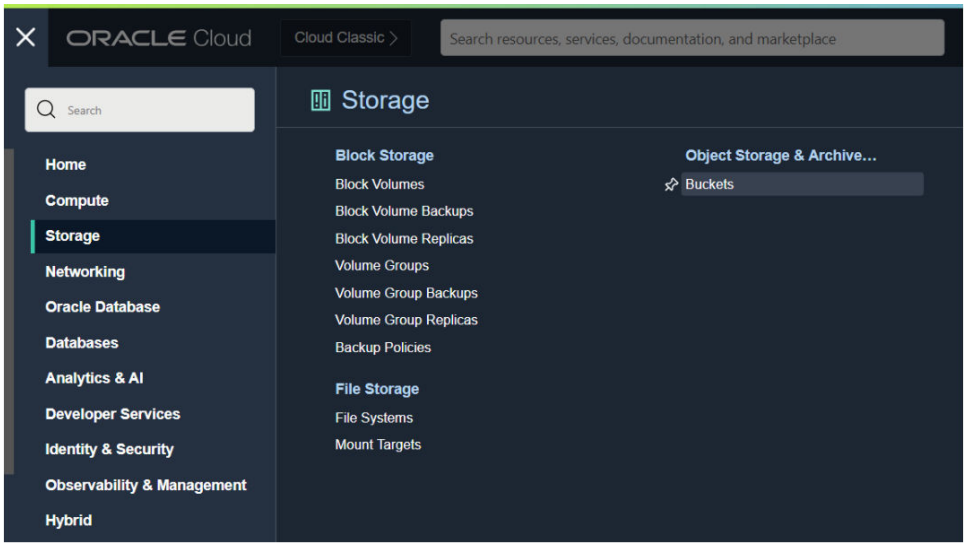
If your input documents and AI models are stored in *different* tenancies:

- Make sure that the visibility of the storage bucket containing your input documents is **public**. See Change the visibility of a bucket.
- Populate the input dataset for the data flow with individual document URLs instead of a single URL for the OCI bucket where documents are stored.

In a single run, Oracle Analytics data flows can process up to 10,000 documents for pretrained models and 2,000 documents for custom models. If you have more than the maximum number documents that can be processed in one run, in OCI's Object Storage & Archive Storage, create multiple buckets containing no more than the maximum number of documents in each one. Then, create a separate dataset and data flow for each bucket, and use a sequence to sequentially process the data flows.

You can use a private or public bucket that is accessible by the OCI user and that complies with OCI's generic limits on documents. See OCI documentation.

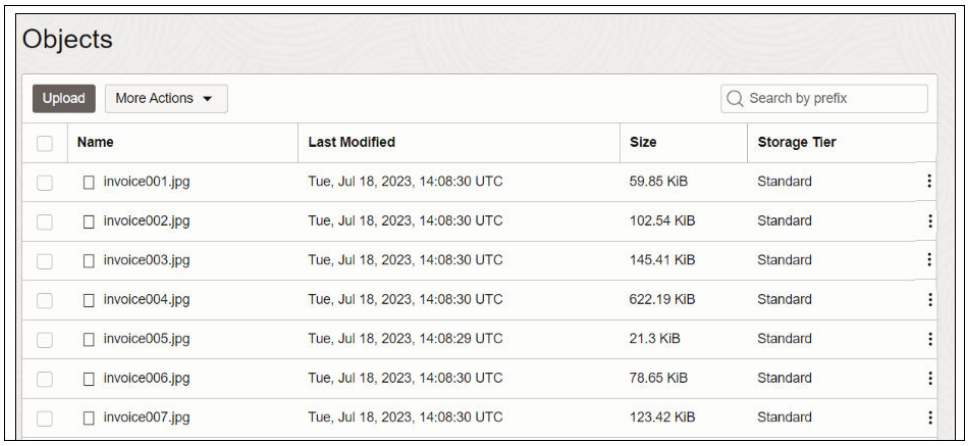
1. In OCI Console, navigate to **Object Storage & Archive Storage**, and create a bucket to store your documents.



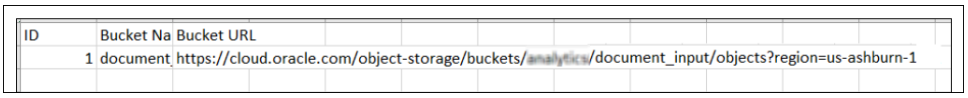
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2. In the **Object Storage & Archive Storage** area, click a bucket name, then under the **Objects** region of the page click **Upload** and upload your documents.

   Make sure that the bucket contains no extraneous files that you don't want to process. Oracle Analytics processes every file in the bucket.



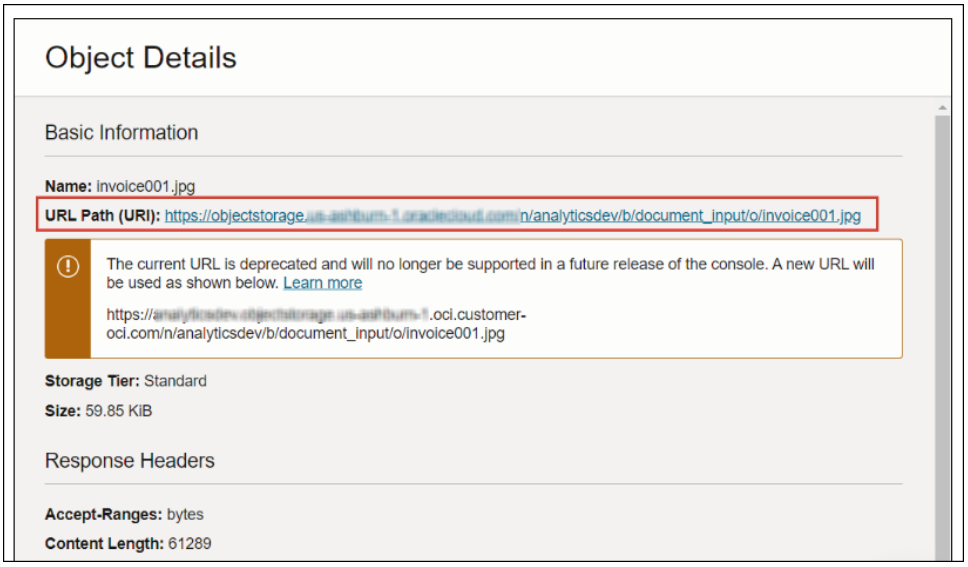
3. For each bucket, add the bucket URL to a comma-separated values (CSV) file.
   a. In Object Storage, select the bucket to display the documents in the Objects dialog.
   b. Copy the URL from the browser's URL bar.
   c. Create a CSV file with fields for `ID`, `Bucket Name`, and `Bucket URL`.
   d. Paste the bucket URL into the CSV file as the `Bucket URL` value.



   Alternatively, if your input documents and AI models are stored in *different* tenancies, add them individually to the CSV file.

   Create a CSV file with fields for `ID`, `Document Name`, and `Document URL`. For each document in Object Storage, click the ellipsis icon ⋮, and select **View Object Details**, and copy the **Name** value and **URL Path (URI)** value.

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Paste the Name value as Document Name, and paste the URL Path (URI) value as Document URL.

ID	Document	Document URL
1	receipt001	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt001.jpg
2	receipt002	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt002.jpg
3	receipt003	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt003.jpg
4	receipt004	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt004.jpg
5	receipt005	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt005.jpg
6	receipt006	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt006.jpg
7	receipt007	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt007.jpg
8	receipt008	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt008.jpg
9	receipt009	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt009.jpg
10	receipt010	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt010.jpg
11	receipt011	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt011.png
12	receipt012	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt012.png
13	receipt013	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt013.png
14	receipt014	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt014.png
15	receipt015	https://objectstorage.us-ashburn-1.oraclecloud.com/n/analyticsdev/b/document_input/o/receipt015.png

4. In Oracle Analytics, for each bucket that you're using to store your documents, click **Create**, then **Dataset**.
5. Upload the CSV file that you created in Step 3, and save the dataset.

   Repeat steps 4 and 5 for each bucket. If you have more than 10,000 documents, create multiple buckets of up to 10,000 documents and create a separate dataset for each bucket.

Perform Document Classification and Key Value Extraction

Use pretrained OCI Document Understanding models to build document classification and key value extraction into your applications without machine learning (ML) or artificial intelligence (AI) expertise. For example, you might use document classification to identify passports, driver licenses, receipts, and invoices.

Note: OCI Document Understanding currently supports only English. See Limits for Document Understanding.

If you have fewer than 10,000 documents for a pretrained model or 2,000 documents for a custom model, you can process them in a single data flow. If you have more than these limits,

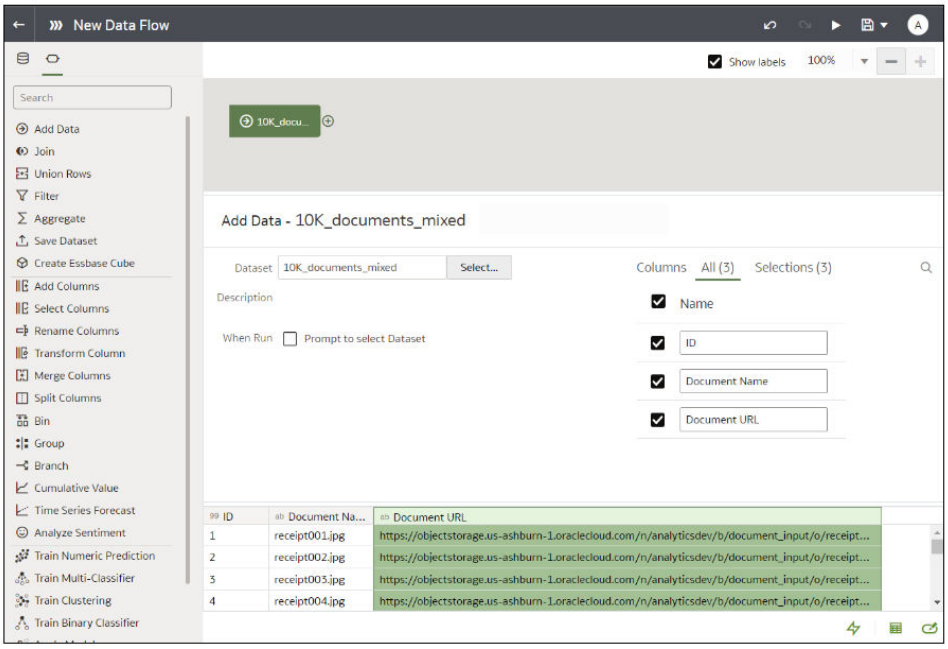
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then create a separate data flow to process each bucket (that is, using a separate dataset for each bucket), and use a Sequence to sequentially process the data flows. See Process Data Using a Sequence of Data Flows.

Prerequisites:

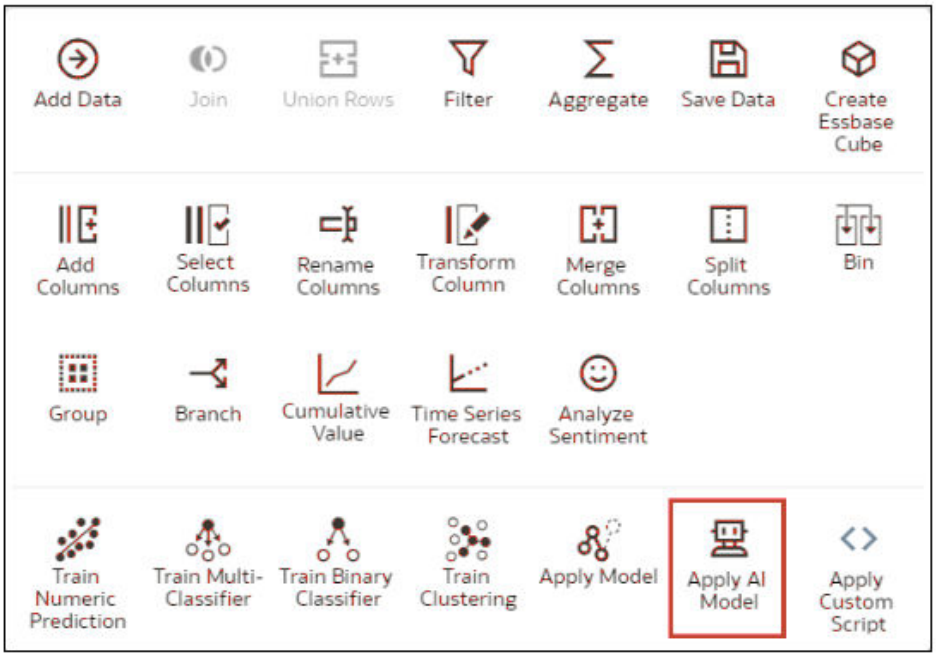
- Ask your administrator to make sure that your Oracle Analytics instance is integrated with OCI Document Understanding.
- Prepare a dataset that references the documents that you'd like to analyze and upload it to Oracle Analytics. See Prepare Documents to Analyze with an OCI Document Understanding Model.

1. On the Oracle Analytics Home page, click **Create**, and then click **Data Flow**.
2. Select the dataset linking to the documents you want to analyze, then click **Add**.



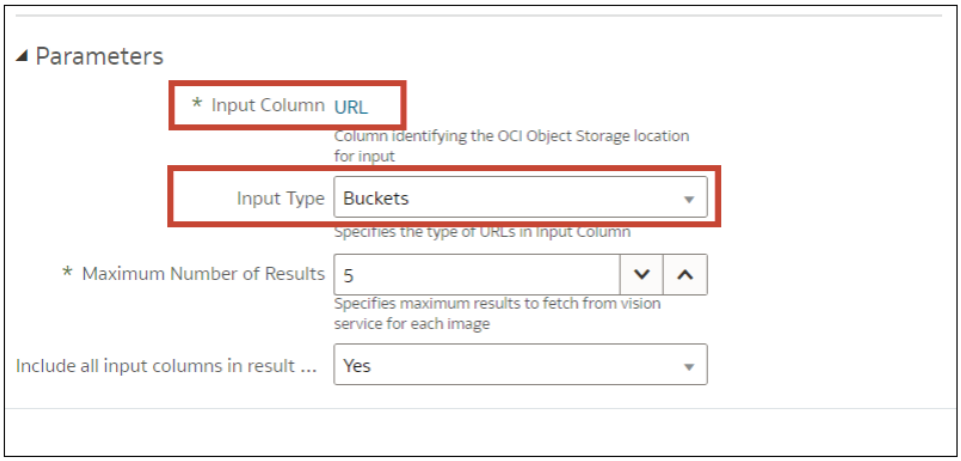
3. In the Data Flow editor, click **Add a step (+)**.
4. From the Data Flow Steps pane, double-click **Apply AI Model**, and then select the model to use.

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For example, you might select Pretrained Document Classification to identify passports.

5. In Apply AI Model, go to the Inputs section, and configure the **Input Column** and **Input Type** parameters.
   - If you're referencing your source documents by bucket, in **Input Column** select **URL**, and in **Input Type** select **Buckets**.



   - If you're referencing your source documents individually, in **Input Column** select **File Location**, and in **Input Type** select **Documents**.

   See Parameter Options for OCI Document Understanding Models .

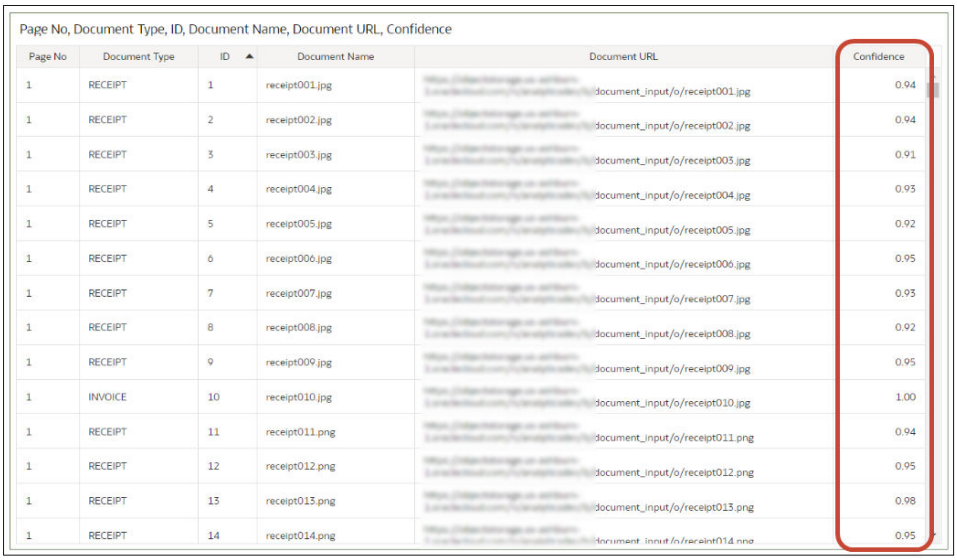
6. In the data flow editor, click **Add a step (+)** and select **Save Data**.
7. In **Name**, enter a name for the output dataset.

   For example, you might call the dataset 'Passport Identification Analysis Results'.
8. In the **Save data to** field, specify the location for output dataset.

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9. Click **Save**, enter a name for the data flow, and click **OK**.
10. Click **Run Data Flow**.

When the data flow completes the analysis, open the dataset that you specified in Step 7. To locate the generated dataset, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**.


Page No, Document Type, ID, Document Name, Document URL, Confidence

Page No	Document Type	ID	Document Name	Document URL	Confidence
1	RECEIPT	1	receipt001.jpg	document_input/o/receipt001.jpg	0.94
1	RECEIPT	2	receipt002.jpg	document_input/o/receipt002.jpg	0.94
1	RECEIPT	3	receipt003.jpg	document_input/o/receipt003.jpg	0.91
1	RECEIPT	4	receipt004.jpg	document_input/o/receipt004.jpg	0.93
1	RECEIPT	5	receipt005.jpg	document_input/o/receipt005.jpg	0.92
1	RECEIPT	6	receipt006.jpg	document_input/o/receipt006.jpg	0.95
1	RECEIPT	7	receipt007.jpg	document_input/o/receipt007.jpg	0.93
1	RECEIPT	8	receipt008.jpg	document_input/o/receipt008.jpg	0.92
1	RECEIPT	9	receipt009.jpg	document_input/o/receipt009.jpg	0.95
1	INVOICE	10	receipt010.jpg	document_input/o/receipt010.jpg	1.00
1	RECEIPT	11	receipt011.png	document_input/o/receipt011.png	0.94
1	RECEIPT	12	receipt012.png	document_input/o/receipt012.png	0.95
1	RECEIPT	13	receipt013.png	document_input/o/receipt013.png	0.98
1	RECEIPT	14	receipt014.png	document_input/o/receipt014.png	0.95

For more detail about the generated results, see Output Data Generated for OCI Document Understanding Models.

Parameter Options for OCI Document Understanding Models

When you invoke an OCI Document Understanding model from a data flow in Oracle Analytics, you configure the model using parameters.

For example, you specify whether the source dataset is configured to link to a bucket or to individual documents. See Prepare Documents to Analyze with an OCI Document Understanding Model.

Parameters for Document Classification models

Parameter	Description
Input Column	Specifies the OCI Object Storage location for the documents you're processing. • If you're referencing your source documents by bucket, select the column with bucket URLs. • If you're referencing your source documents individually, select the column with document URLs.
Input Type	Specifies the type of URLs in input columns. • If you're referencing your source documents by bucket, select **Buckets**. • If you're referencing your source documents individually, select **Documents**.
Maximum Number of Document Types	(Document Classification only) Specifies the maximum number of results (between 1 and 100) to fetch from the OCI Document Understanding service for each document.

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Parameter	Description
Include all input columns in result	Option to include all the input columns in the result.

Parameters for Key Value Extraction models

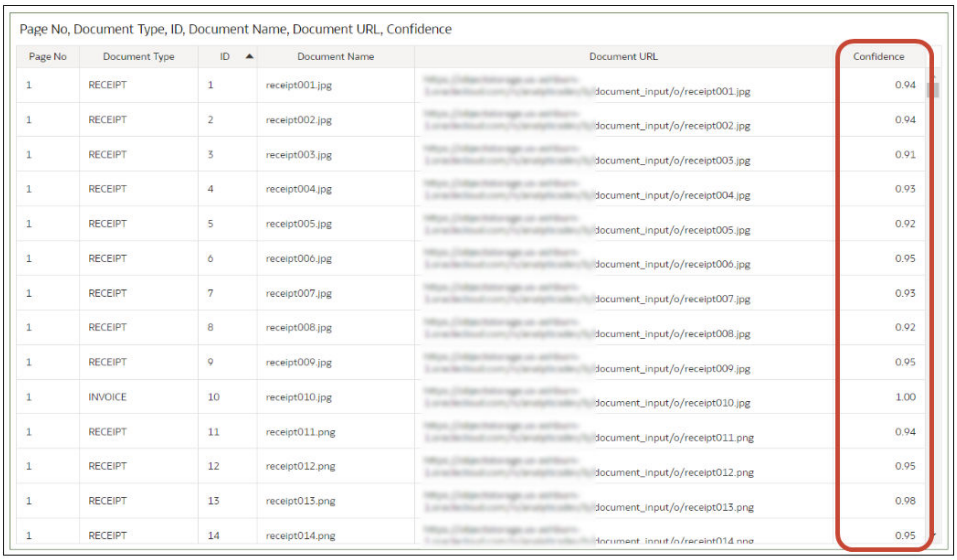
Parameter	Description
Input Column	Specifies the OCI Object Storage location for the documents you're processing. • If you're referencing your source documents by bucket, select the column with bucket URLs. • If you're referencing your source documents individually, select the column with document URLs.
Input Type	Specifies the type of URLs in input columns. • If you're referencing your source documents by bucket, select **Buckets**. • If you're referencing your source documents individually, select **Documents**.
Output Type	(Invoice and Receipts only) Specifies the set of columns to include in the output. For Receipts, Output Type can either be selected as Field Items or Line Items. Field Items are the common details such as merchant info, billing total, tax and so on. Line items are the details of purchased items. This option determines the output columns that're captured by the OCI Document Understanding service. For Invoices, Output Type can either be selected as Field Items or Line Items. Field Items are the common details such as customer details, Vendor details, billing total, tax and so on. Line items are the details of purchased items. This option determines the output columns that're captured by the OCI Document Understanding service.
Include all input columns in result	Option to include all the input columns in the result.

Output Data Generated for OCI Document Understanding Models

When you analyze documents using an OCI Document Understanding model, the Oracle Analytics data flow generates data about the documents and saves the results in a separate dataset.

To locate the generated dataset, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**, and open the dataset. For example, here's an output dataset generated using a document classification model. Here, "Document Type" is the predicted document type, and "Confidence" is the confidence level of the prediction.

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Page No, Document Type, ID, Document Name, Document URL, Confidence

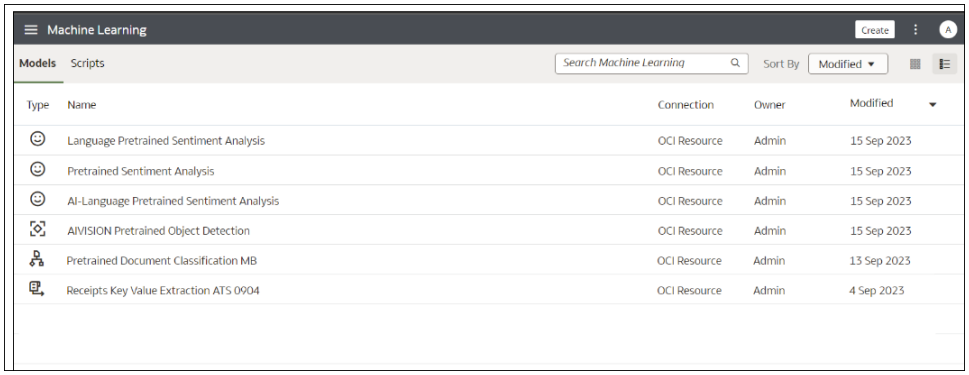
Page No	Document Type	ID	Document Name	Document URL	Confidence
1	RECEIPT	1	receipt001.jpg	[redacted]document_input/o/receipt001.jpg	0.94
1	RECEIPT	2	receipt002.jpg	[redacted]document_input/o/receipt002.jpg	0.94
1	RECEIPT	3	receipt003.jpg	[redacted]document_input/o/receipt003.jpg	0.91
1	RECEIPT	4	receipt004.jpg	[redacted]document_input/o/receipt004.jpg	0.93
1	RECEIPT	5	receipt005.jpg	[redacted]document_input/o/receipt005.jpg	0.92
1	RECEIPT	6	receipt006.jpg	[redacted]document_input/o/receipt006.jpg	0.95
1	RECEIPT	7	receipt007.jpg	[redacted]document_input/o/receipt007.jpg	0.93
1	RECEIPT	8	receipt008.jpg	[redacted]document_input/o/receipt008.jpg	0.92
1	RECEIPT	9	receipt009.jpg	[redacted]document_input/o/receipt009.jpg	0.95
1	INVOICE	10	receipt010.jpg	[redacted]document_input/o/receipt010.jpg	1.00
1	RECEIPT	11	receipt011.png	[redacted]document_input/o/receipt011.png	0.94
1	RECEIPT	12	receipt012.png	[redacted]document_input/o/receipt012.png	0.95
1	RECEIPT	13	receipt013.png	[redacted]document_input/o/receipt013.png	0.98
1	RECEIPT	14	receipt014.png	[redacted]document_input/o/receipt014.png	0.95

Document Classification

Output Column	Type	Description
Document Type	String	Identified document type. For example, receipt.
Confidence	Number	Confidence score of the prediction, on the scale of 0 - 1. For example, a score of 0.94 gives 94% confidence.
Page No	Number	Page number of the result.
Media Type	String	Media or file type of the document.
Status Summary	String	Brief summary of the model's output. This column is blank on successful output, or for unsuccesful output it indicates the issue (for example, unsupported file type).
Document URL	String	The object storage URL of the document from the bucket specified. This column is only populated when the **Input Type** option is set to bucket in the data flow step configuration.

Key value extraction

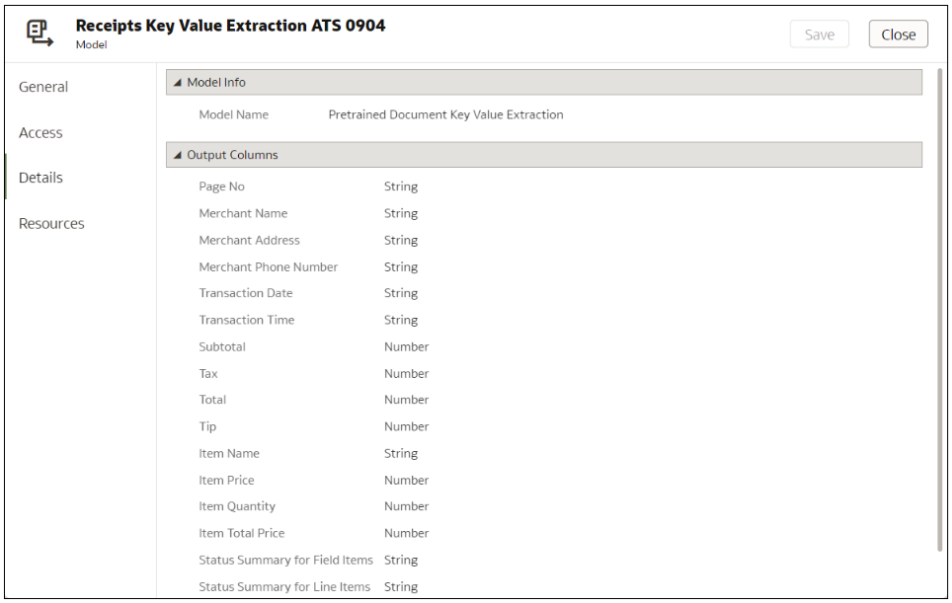
To review output columns for key value extraction models, from the Oracle Analytics home page, navigate to **Machine Learning**, then **Models**.



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Hover over a model, click **Actions**.

Click **Inspect**, then click **Details** to review the output columns that are generated for that type of model.



Click **Resources** to review and update the staging bucket compartment and the staging bucket.

Use Oracle Cloud Infrastructure Language Models in Oracle Analytics

Use Oracle Cloud Infrastructure (OCI) Language models to build key phrase extraction, sentiment analysis, classification, named entity recognition, language recognition, and obfuscation into your applications without requiring artificial intelligence (AI) expertise.

Topics:

- Apply an OCI Language Model to a Dataset
- Obfuscate Sensitive Data in a Dataset

Before you start, make sure that you've followed the prerequsites for Data Science integration, and registered the models in Oracle Analytics. See Prerequisites for Integrating OCI Language Models With Oracle Analytics and Make an OCI Language Model Available in Oracle Analytics.

Oracle Analytics supports these models:

- Custom Named Entity Recognition (uses asynchronous APIs)
- Custom Text Classification (uses asynchronous APIs)
- Key phrase extraction
- Language detection
- Name entity recognition
- Personal Identifiable Information (PII) identification

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- Sentiment analysis
- Text classification

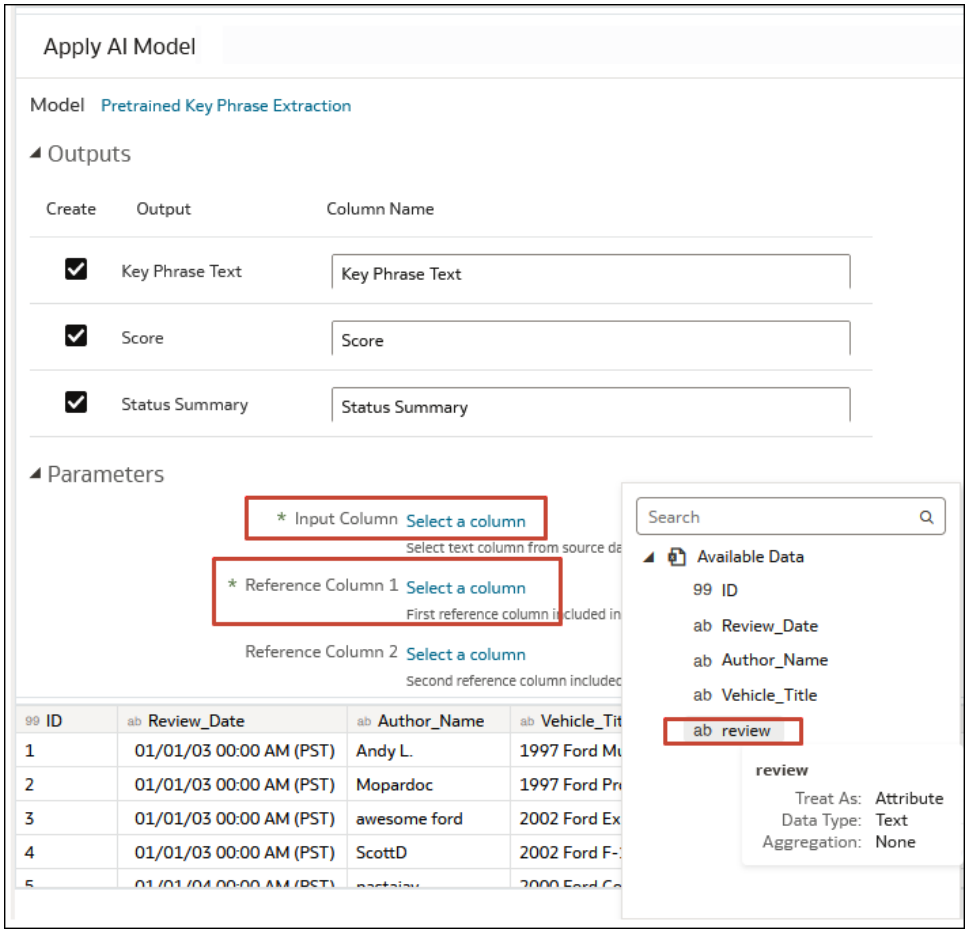
Apply an OCI Language Model to a Dataset

Apply an OCI Language model to a dataset in Oracle Analytics to analyze your data and store the results in another dataset. For example, with customer data, sentiment analysis can help you analyze customer reviews that they've typed into a feedback portal.

Prerequisites:

- Make sure that your Oracle Analytics instance is integrated with OCI Language. See Integrate Oracle Analytics with Oracle Cloud Infrastructure Language.
- Register an OCI Language model in Oracle Analytics Cloud. See Make an OCI Language Model Available in Oracle Analytics.
- Prepare a dataset that contains the data that you want to analyze.

1. On the Oracle Analytics Home page, click **Create**, and then click **Data Flow**.
2. Select the dataset containing the text you want to analyze, then click **Add**.
3. In the Data Flow editor, click **Add a step (+)**.
4. From the Data Flow Steps pane, double-click **Apply AI Model**, and then select the model to use.
5. In the Apply AI Model dialog, go to the Inputs section, and configure the parameters.



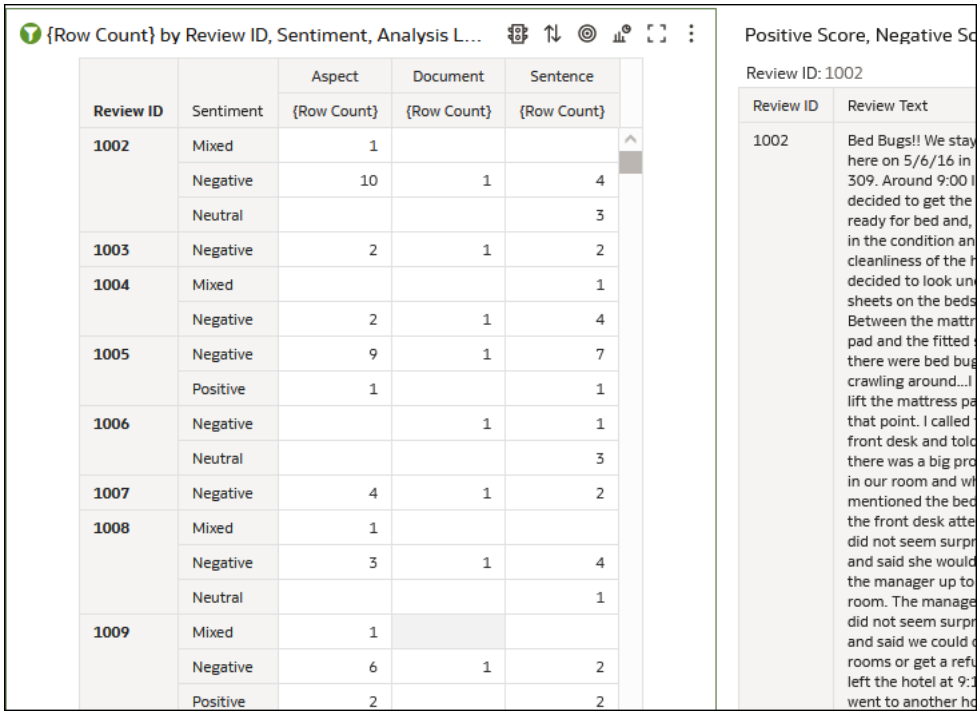
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At a minimum, configure **Input Column** and **Reference Column 1**.

You can optionally assign values to Reference Columns 2 and 3 to further enhance the output dataset. For example, you might select two additional columns from your source dataset that will included in the AI model output dataset.

6. In the data flow editor, click **Add a step (+)** and select **Save Data**.
7. Enter the name of the dataset in which to store the output results.
8. In the **Save data to** field, specify the location for saving the output data.
9. Click **Save**, enter a name for the data flow, and click **OK** to save the data flow.
10. Click **Run Data Flow** to analyze the images and output the results in a new dataset.

When the data flow completes the analysis, open the dataset that you specified in Step 7. To locate the generated dataset, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**

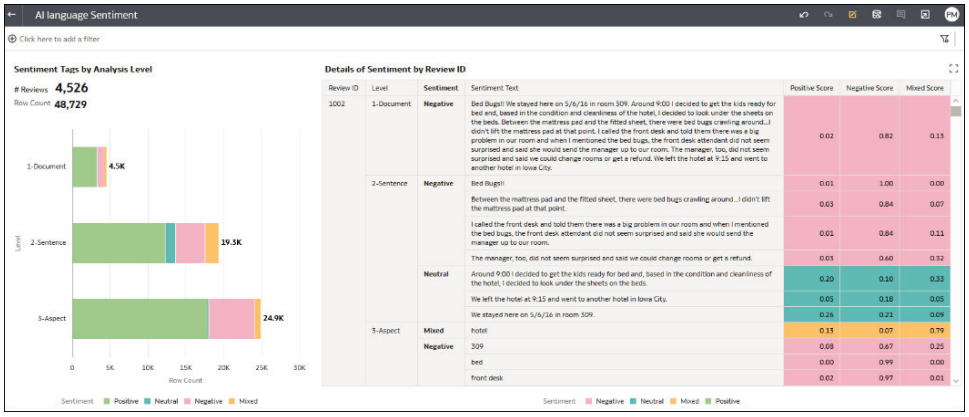


Review ID	Sentiment	Aspect {Row Count}	Document {Row Count}	Sentence {Row Count}
1002	Mixed	1		
	Negative	10	1	4
	Neutral			3
1003	Negative	2	1	2
1004	Mixed			1
	Negative	2	1	4
1005	Negative	9	1	7
	Positive	1		1
1006	Negative		1	1
	Neutral			3
1007	Negative	4	1	2
1008	Mixed	1		
	Negative	3	1	4
	Neutral			1
1009	Mixed	1		
	Negative	6	1	2
	Positive	2		2

.

You can now visualize the data in a workbook.

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Obfuscate Sensitive Data in a Dataset

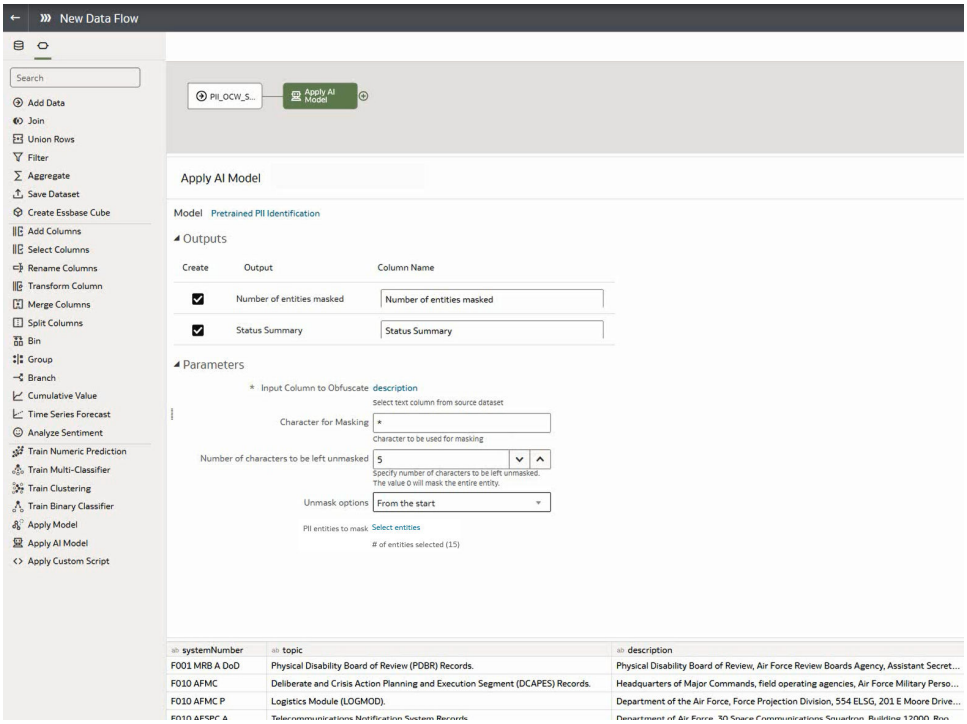
Apply a Personal Identifiable Information (PII) model to a dataset to mask or hide sensitive data in a dataset. For example, you might partially mask customer address details in a description column so that workbook users don't have access to customers' personal details.

Before you start, perform these prerequisite steps:

- Make sure that your Oracle Analytics instance is integrated with OCI Language. See Integrate Oracle Analytics with Oracle Cloud Infrastructure Language.
- Register an OCI Language model in Oracle Analytics Cloud. See Make an OCI Language Model Available in Oracle Analytics.
- Prepare a dataset that contains the data that you want to obfuscate.

1. On the Oracle Analytics Home page, click **Create**, and then click **Data Flow**.
2. Select the dataset containing the text you want to analyze, then click **Add**.
3. In the Data Flow editor, click **Add a step (+)**.
4. From the Data Flow Steps pane, double-click **Apply AI Model**, and then select the pretrained PII Identification model that is registered in your Oracle Analytics Cloud environment.

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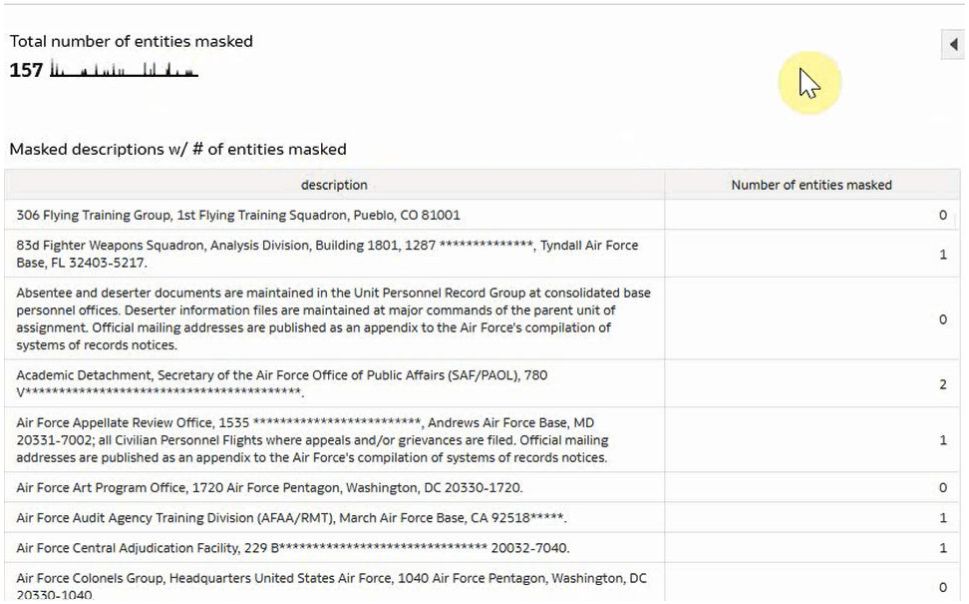


5. In the Apply AI Model dialog, in the Parameters section, configure these options:
   - **Input Column to Obfuscate** - Select the column containing the sensitive details that you want to mask or hide.
   - **Character for Masking** - Enter the character to use to obfuscate. For example, enter "*" to obfuscate data with an asterisk.
   - **Number of characters to be left unmasked** - Enter 0 to mask or hide all data, or enter a number of characters to leave visible. For example, enter "5" to leave the first five characters unchanged (if you choose **From the start** in **Unmask options**).
   - **Unmask options** - Specify where to start obfuscating. For example, from the start of address details.
   - **PII entities to mask** - Click **Select entities** to select or deselect entities to obfuscate. By default, all entities are obfuscated.
6. In the data flow editor, click **Add a step (+)** and select **Save Data**.
7. Enter the name of the dataset in which to store the output results.
8. In the **Save data to** field, specify the location for saving the output data.
9. Click **Save**, enter a name and description for the data flow, and click **OK** to save the data flow.
10. Click **Run Data Flow** to analyze the images and output the results in a new dataset.

When the data flow completes the analysis, open the dataset that you specified in Step 7. To locate the generated dataset, from the Oracle Analytics home page, navigate to **Data**, then **Datasets**.

You can now visualize the data in a workbook.

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Total number of entities masked

157

Masked descriptions w/ # of entities masked

description	Number of entities masked
306 Flying Training Group, 1st Flying Training Squadron, Pueblo, CO 81001	0
83d Fighter Weapons Squadron, Analysis Division, Building 1801, 1287 **********, Tyndall Air Force Base, FL 32403-5217.	1
Absentee and deserter documents are maintained in the Unit Personnel Record Group at consolidated base personnel offices. Deserter information files are maintained at major commands of the parent unit of assignment. Official mailing addresses are published as an appendix to the Air Force's compilation of systems of records notices.	0
Academic Detachment, Secretary of the Air Force Office of Public Affairs (SAF/PAOL), 780 V**********.	2
Air Force Appellate Review Office, 1535 **********, Andrews Air Force Base, MD 20331-7002; all Civilian Personnel Flights where appeals and/or grievances are filed. Official mailing addresses are published as an appendix to the Air Force's compilation of systems of records notices.	1
Air Force Art Program Office, 1720 Air Force Pentagon, Washington, DC 20330-1720.	0
Air Force Audit Agency Training Division (AFAA/RMT), March Air Force Base, CA 92518*****.	1
Air Force Central Adjudication Facility, 229 B********** 20032-7040.	1
Air Force Colonels Group, Headquarters United States Air Force, 1040 Air Force Pentagon, Washington, DC 20330-1040.	0

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16

Import, Export, and Share

These topics describe how to import, export, and share your workbooks and visualizations with other users.

Topics:

- Import a Workbook File
- Share a Workbook
- Share a Workbook URL with a Specific Canvas Selected
- Share a Workbook URL with Persisted Filter Values
- Export a Workbook or Folder as a File
- Export a Visualization
- Export Formatted Data from a Visualization to Excel
- Share a Visualization, Canvas, or Dashboard to Social Media
- Delete Links Shared on Social Media
- 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**.

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After the import is successful, open the workbook. See Edit a Data Source Connection.

Share a Workbook

You can share a workbook in Oracle Analytics with others by copying and sharing the workbook URL.

LiveLabs Sprint

You must save the workbook in a shared folder and grant appropriate privileges to the workbook.

How the workbook is displayed when the user opens it depends on the user's permissions and how the workbook was set up.

- If the shared workbook contains a dashboard and the user has read-only permissions, then the workbook's dashboard is displayed and the user can't access the workbook in the Visualize page.
- If the shared workbook is displayed as a presentation flow in the Present page, then how the dashboard and canvas preferences are set determines how the user can interact with the presentation flow or dashboard in Preveiw. See Open the Presentation Flow.
- If the workbook doesn't contain a dashboard and the user has read-only permission, then the workbook is displayed in the Visualize page. The user can change filter values, add filters, export, sort, and drill in the Visualize page.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Save the workbook to a shared folder.

   If you don't have a shared workbook folder, click **Save As**, **New Folder**, enter a name and click **Create**.
3. Grant roles to the shared workbook to enable users with the same roles to view or edit the workbook as appropriate.
   a. In the Home Page, click **Navigator**, and then click **Catalog**.
   b. Click **Shared Folders**, and then navigate to the shared workbook.
   c. Hover over the workbook, click **Actions**, and click **Inspect**.
   d. Click the **Share** tab.
   e. Add or edit roles as appropriate.

Role	Description
BI Consumer	Enables users with this role to view workbooks and control which filters they use.
BI Content Author	Enables users with this role to edit workbooks.

4. Copy the workbook URL and share with your users.

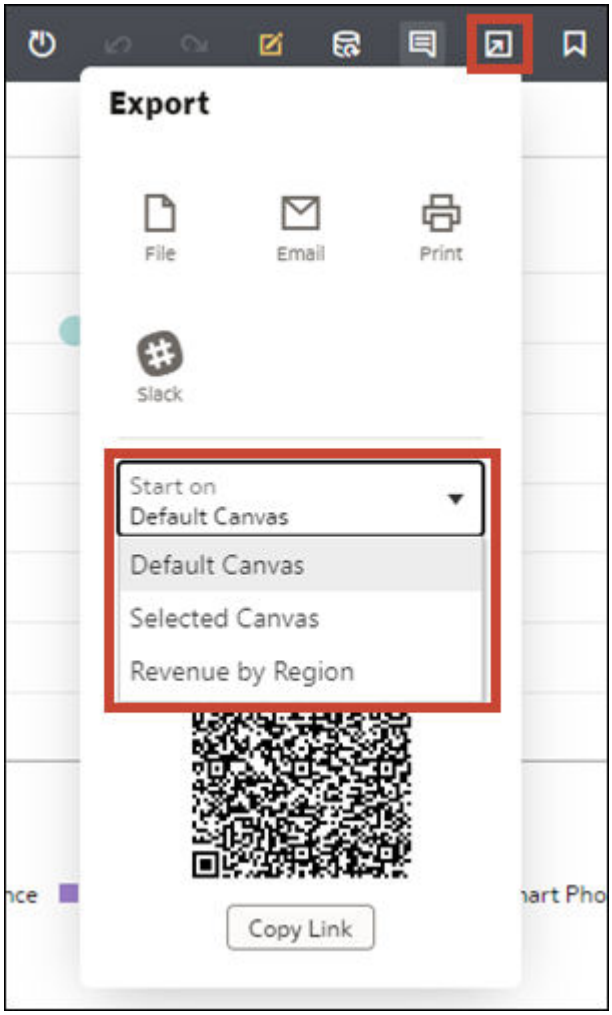
   Users can now access the workbook from the catalog.

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.

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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.

Share a Workbook URL with Persisted Filter Values

Create and share a workbook URL that persists selected filter values in a workbook.

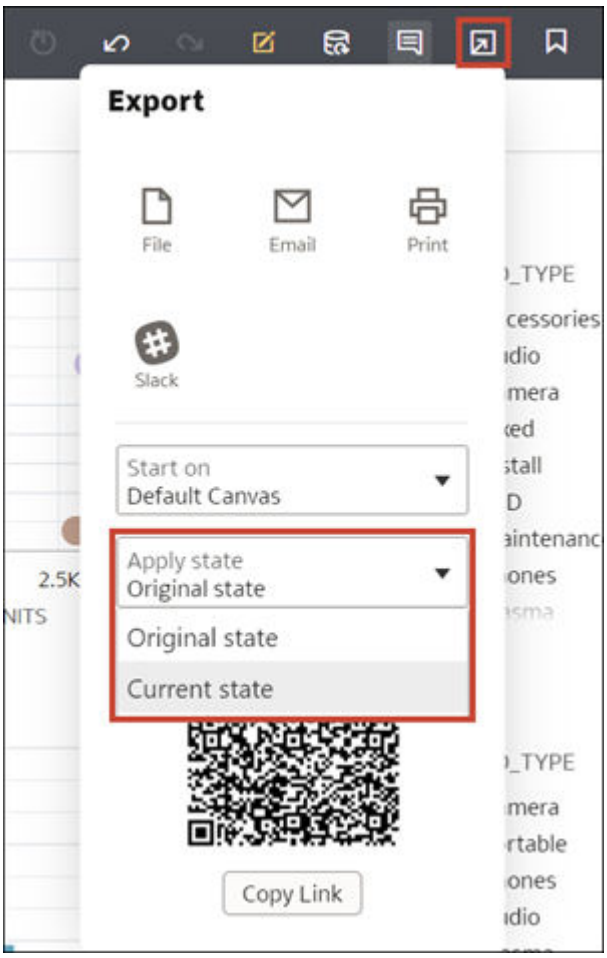
When you share the URL with other users, they can use it to view the workbook with your filter values already applied instead of selecting the values themselves.

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All dashboard filter and visualization filter selections are persisted, including parameters used as dashboard filter controls and parameters bound to dashboard or visualization filters. Filter selections made in the filter bar aren't persisted.

You can also specify which canvas displays when the user clicks the URL to open the workbook. See Share a Workbook URL with a Specific Canvas Selected.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. Select the filter values you want to persist when you create the URL.
3. Click the **Export** icon in the workbook toolbar.
4. From the **Apply state** list, select a state.
   - Use **Original state** to persist the filter values that were selected when you opened the workbook, before you made any new selections.
   - Use **Current state** to persist the filter values that are currently selected.



5. Click **Copy Link** and share the URL with other users.

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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. For **Name**, keep the default name or enter a new name for the export file (.DVA file).
4. Disable the **Include Data** option to exclude the data when sharing a workbook or folder.
5. 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.
6. 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.
7. Enable **Include Permissions** to include access permission details so that shared connections work when users import the workbook.
8. Click **Save**. Select a location for the file, and then click **Save**.

Export a Visualization

You can export visualizations in a variety of formats to view, store, and share with others.

You can export data from a visualization that's embedded in another application or web page. See About Embedding Oracle Analytics Content into Applications and Web Pages.

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.

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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, connection credentials, and access permissions. 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**.

Tips on Exporting Data in CSV Format

Here're some tips on getting the best results when exporting a visualization in CSV format.

Limit the amount of data to avoid export issues:

If your data exceeds the maximum number of rows allowed in an export (which includes displayed rows and hidden rows), apply filters to data in a canvas or visualization to reduce the amount of data being exported. For example, you might apply a filter to a visualiztion to display only data for the months January, February, and March to reduce the amount of data.

If export exceeds five minutes you might see errors such as "connection lost contact", "end-of-file on communication channel", "0 - error", or "error 500".

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.

In Oracle Analytics Server an administrator must enable this feature. See Enable Export Excel in Oracle Analytics Server.

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**.

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5. Click **Save**.
6. Select a location in your local file system to save the Excel file.
7. Click **Save.**

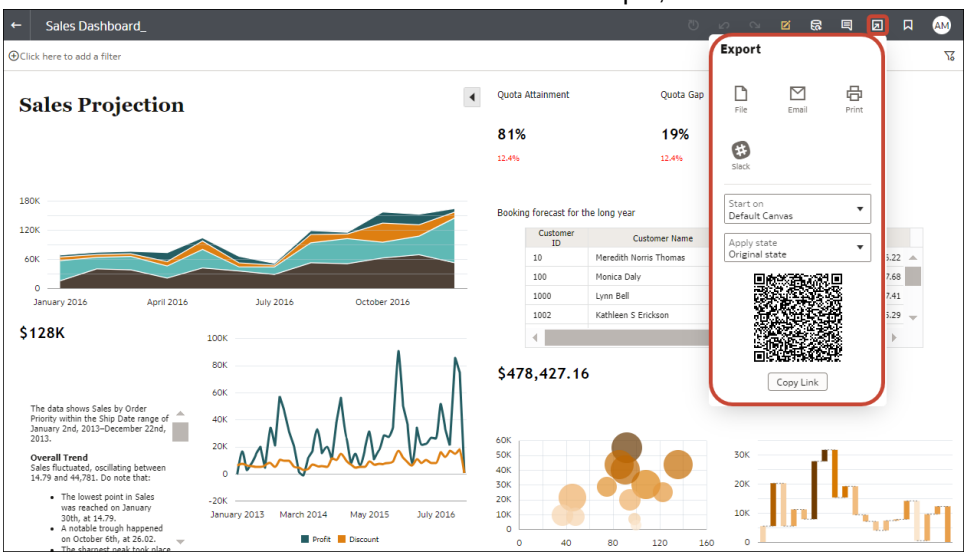
Share a Visualization, Canvas, or Dashboard to Social Media

You can share visualizations, canvases, or dashboards to social media channels such as Slack, X, or LinkedIn.

You can share to social media channels set up by your administrator. If you don't see the social media channel you'd like to share to, contact your administrator.

The links you share are listed on the Shared Links page in your user profile. Use the Shared Links page to manage your links. See Delete Links Shared on Social Media.

1. On the Home page, hover over a workbook, click **Actions**, then select **Open**.
2. On the Visualize or Present canvas, click the **Export** icon on the workbook toolbar, then click the icon for the social channel to use. For example, Slack.



3. Specify sharing options for the social channel.
4. Click **Send**.

Delete Links Shared on Social Media

You can view and delete the links to files that you shared to social channels such as Slack and X (formerly Twitter).

1. From the Home page, click the user profile icon.
2. In the User Profile page, click the **Shared Links** tab.
3. Review your list of shared file links. Delete links as needed.

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).

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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, and access permissions). 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.

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8. Click **Print**.

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Part III
Report Data

This part explains how to work with data reports.

Topics:

- Create Analyses
- View Data in Different Ways
- Build Dashboards
- Filter and Select Data for Analyses
- Prompt in Analyses and Dashboards
- Make Analyses Interactive
- Managing Content

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Create Analyses

This chapter describes how to create an analysis.

Video

Topics:

- Typical Workflow to Create Analyses
- Create Your First Analysis
- Set Properties for Columns
- Export Content from Analyses and Dashboards
- Edit Formulas or Calculated Measures
- Set Properties for Analyses
- Set Your Preferences
- Combine Subject Areas in Analyses
- Advanced Techniques: Import Formatting from Another Analysis
- Advanced Techniques: Format with HTML Tags
- Advanced Techniques: Combine Columns to Display Data Differently
- Advanced Techniques: Set Caching Options for Your Analysis
- Advanced Techniques: Examine the Logical SQL Statements for Analyses
- Advanced Techniques: Reference Stored Values in Variables
- Advanced Techniques: Issue Direct Database Requests

Typical Workflow to Create Analyses

Here are the common tasks to start creating analyses.

Task	Description	More Information
Create an analysis	Select and arrange columns that you want to use in an analysis.	Create Your First Analysis
Set properties for columns	Specify properties such as heading and value formats, display of data, and conditional formatting.	Set Properties for Columns
Work with the data in the analysis	Add formulas and calculated measures to the analysis.	Edit Formulas or Calculated Measures

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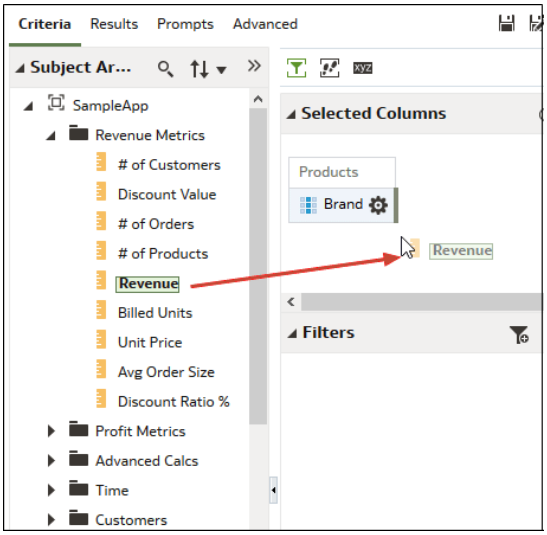
Task	Description	More Information
Affect the values of data in the analysis	Specify filters, selection steps, groups, and calculated items for the analysis.	Filter and Select Data for Analyses

Create Your First Analysis

You can quickly create an analysis to query against your organization's data. The analysis results help you answer your business questions. For example, you can create an analysis using the SampleApp subject area Brand and Revenue columns.

Video

1. On the Classic Home page, in the **Create** pane, click **Analysis**.
2. Use the Select Subject Area dialog to search for and select a subject area.
3. Add the columns that you want to include in the analysis by dragging and dropping them from the Subject Areas pane to any position within the Selected Columns pane. You can select multiple non-contiguous columns by using the Ctrl key, selecting each column to include, and then dragging the columns to the Selected Columns pane.



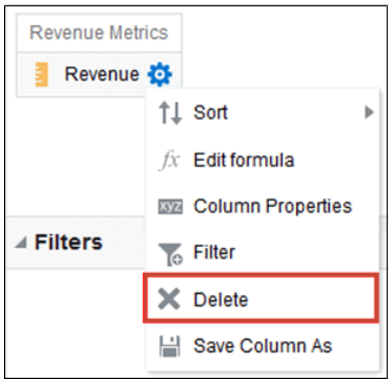
4. To change the column order, use the crosshairs on the column to drag and drop the column to a different position.



5. To save a column to the catalog, in the Selected Columns pane, click **Options** beside the column name, and click **Save Column As**.
6. In the Save As dialog, specify the folder, name, and description for the column and click **OK**.

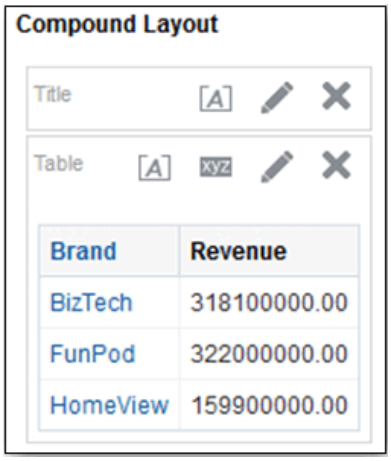
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7. To remove a column, in the Selected Columns pane, click **Options** beside the column name, and click **Delete**.



   To remove all columns, click **Remove all columns from criteria**. Note that there is no undo action available for this option. Instead of removing columns, you can hide the columns whose appearance adds no value to the analysis.

8. Click the Results tab to see the results of the analysis in a table or pivot table.



9. Click **Save Analysis** to display the dialog to save the analysis.
10. In the Save As dialog, select a folder, and specify a name, and optional description for the analysis.

    If you want others to be able to view the analysis, then save it in the shared folder area. If your analysis contains other objects, then you'll be prompted to assign access permissions to those objects.

    If you don't want anyone else but yourself to be able to view the analysis, then save it in `My Folders`.

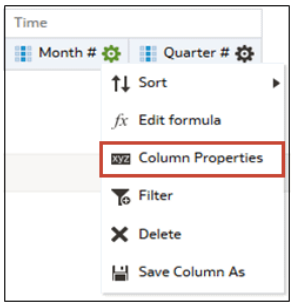
11. Click **Refresh** at the bottom of the pane to double-check that the analysis is listed under the folder in which you saved it.

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Set Properties for Columns

When you build an analysis, you can edit column properties to control the look and feel of the column. For example, you can specify that values in the Revenue column are displayed with two decimal places and a dollar sign.

1. Open the analysis for editing.
2. In the Selected Columns pane, click **Options** beside the column name, and then select **Column Properties**.



3. Specify how you want column values to be displayed.
4. Format column headings and custom text, and add data display conditions.
5. Specify what action you want to happen when a user clicks a column heading or value.
6. Set default column formatting.
7. Click **OK**.

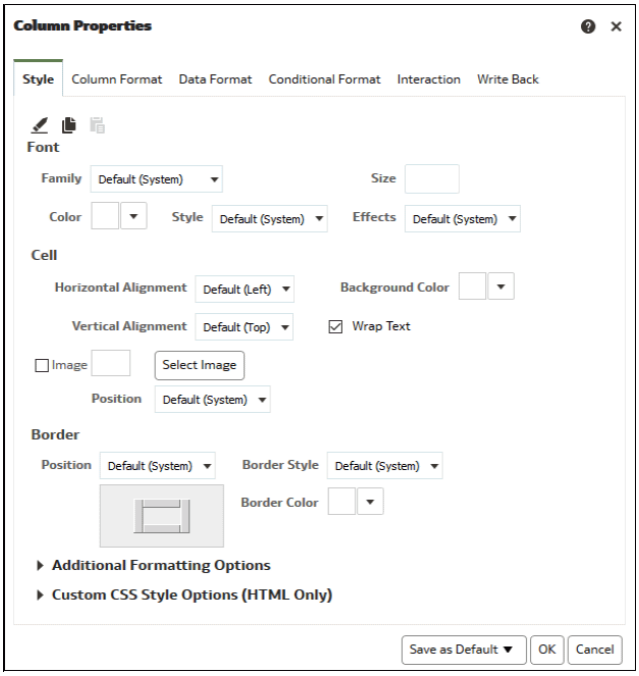
Apply Formatting to Content

You can apply basic formatting to values in many types of content including columns, views, and dashboard page sections.

For example, you might want region names in a column to be displayed as Arial 14 point and red. You might also want state names to be displayed as Calibri 12 point and blue.

1. In the Selected Columns pane, click **Options** beside the column name, and then select **Column Properties**.
2. Specify the style characteristics of the column such as font, cell alignment, and border.

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3. Click **OK**.

Format Columns

When you create an analysis, you can edit properties for columns to control their appearance and layout. You can also specify formatting to apply only if the contents of the column meet certain conditions.

For example, you can specify that values that exceed $1 million in the Revenue column are displayed with a green background.

1. In the Selected Columns pane, click **Options** beside the column name, and then select **Column Properties**.
2. In the Column Properties dialog, click the Column Format tab.
3. To hide the column in the analyses without affecting value aggregation, select the **Hide** check box.

   For example, you might want to build an analysis that includes only Illinois customers. You can hide the Customers.State column because you only added this column for filtering purposes.
4. To enter your own values in the **Folder Heading** and **Column Heading** fields, select **Custom Headings** . You can use these fields to reference variables and format the heading values. These values identify the column in the analysis.
5. If enabled and you have administrator privileges, you can customize headings with HTML markup, including JavaScript. Select **Custom Heading**, then select **Contains HTML Markup**, and then enter the HTML markup you want to apply.

   To enable this option, ask an administrator to set Allow HTML/JavaScript/CSS Content option in the Console (under **Security** in **Advanced System Settings**).
6. To affect the display of repeating data values for the column, select one of the **Value Suppression** options.

   When the same value occurs in multiple consecutive rows, you can specify to show that value only once.

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7. To override the default display of data for the column, click the Data Format tab.

   The options on the tab differ depending on the data type.

8. To specify if column values are displayed in a certain way based on certain criteria, click the Conditional Format tab. Conditional formats can include colors, fonts, images, and so on, for the data and for the cell that contains the data. You can't apply conditional formatting to the data cell background or font color in a heat matrix.

9. Click **Add Condition**, and then select a column.



10. Select an operator such as **is equal to / is in** or **is greater than**.

11. Specify a value for the operator by either entering a value directly (such as 1000000) or by selecting a value from the list.

12. Optional: Click **Add More Options** to add a variable to the condition.

13. Specify the formatting to apply when the condition is true.

14. Click **OK**.

Make Your Analyses Dynamic

You can specify what you want to happen when a user clicks a column heading or value in an analysis. For example, you could specify that when a user clicks the Product column value, it drills down into the data that was summed to create the column value.

Video

Topics:

- Add Interactivity to Analyses
- Make Interactions Available

Add Interactivity to Analyses

You can make views more interactive by adding interactions that are available to users who left-click in a view or right-click to display a popup menu. For example, you might specify the default primary interaction (the left-click action) for a geographical region column as **Drill**. This enables users to drill down to sub-regions.

For hierarchical data, the default left-click interaction is to drill down to detail in the data. You can add right-click options that display a web page or link to a view.

1. Open the analysis for editing.

2. In the Selected Columns pane, click **Options** beside the column name, and then select **Column Properties**.

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3. In the Column Properties dialog, click the Interaction tab.

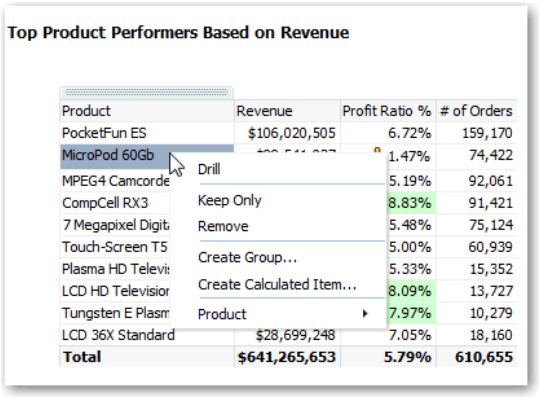
   You can specify interactions for the column heading and data values.

4. Click **Primary Interaction** next to **Column Heading** or **Value** and select the behavior you want. For example, select None to disable the action or select Drill to display more detail.

   - Use None to disable all interactions on the column.
   - Use **Drill** to display a deeper level of detailed content if the data is hierarchical. If no hierarchy is configured for the column, then drilling isn't enabled.
   - Use **Action Links** to opens a web page or navigates to supporting BI content.
   - Use **Send Master-Detail Events** to connect views so that one view drives changes in one or more other views.

5. Click **OK**.

   You can specify the interactions that are available at runtime when you right-click a dashboard column or data cell. Here's an example of the available interactions when you right-click a product name in the Products column. This column is in a Top Product Performers Based on Revenue table.



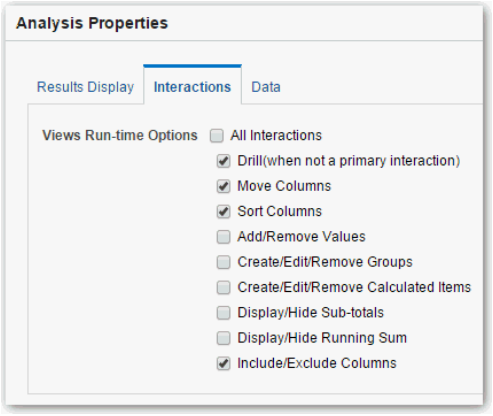
Of the selections shown, you can set **Drill**, **Create Group**, and **Create Calculated Item**.

Make Interactions Available

When you add interactions to analyses, you then make those interactions available to others in popup menus.

1. Open the analysis for editing.
2. Click either the Criteria tab or the Results tab.
3. Click **Edit Analysis Properties** on the toolbar.
4. Click the Interactions tab.

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5. Select the interactions that you want to make available for that analysis.
6. Click **OK**.

Set Default Formats for Your System

You can save system-wide default column formats when you have appropriate privileges. When you save a system-wide default, it provides users with a more consistent experience and saves them time when working with analyses.

For example, you might set Times New Roman as the system-wide default for text columns.

A best practice is to change the default value rather than overriding the default with specific values.

1. Open an analysis for editing.
2. In the Selected Columns pane, click **Options** beside the column name, and then select **Column Properties**.
3. In the Column Properties dialog, specify how you want columns to be formatted by default.
4. Click **Save as Default**.
5. Click **OK**.

Export Content from Analyses and Dashboards

You can export content from analyses and dashboards.

Topics:

- Export the Results of Analyses
- Export Dashboards and Dashboard Pages
- Tips for Exporting

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Export the Results of Analyses

You can export analyses results to various formats, including data and formatting in Microsoft Office Excel, Adobe PDF, and CSV formats, and various data-only formats (that is, with no formatting).

For example, you can export a Stock Control analysis, so that one of your suppliers can see the results in Microsoft Excel.

If you're exporting data with over one million rows, ask your administrator about the maximum number you're allowed to export.

1. Open the analysis for editing.
2. To export data and formatting, click **Export this analysis** then **Formatted**, and choose an output format.
3. To export just data, click **Export this analysis** then **Data**, and choose an output format.

Export Dashboards and Dashboard Pages

You can export an entire dashboard or a single dashboard page to Microsoft Excel 2007+. When you export dashboard content to Microsoft Excel, the state of the dashboard (such as prompts or drills) won't change.

For example, you can export the dashboard page that contains the Brand Revenue analysis. This enables brand managers to review this data in Microsoft Excel.

1. Open the dashboard or dashboard page that you want to export.
2. On the Dashboard page toolbar, click **Page Options**, select **Export to Excel**, and select either **Export Current Page** or **Export Entire Dashboard**.

   If you export an entire dashboard:

   - Each page is included on its own sheet in an Excel workbook.
   - Each sheet is given the name of its corresponding dashboard page.
3. Use the File Download dialog to open or save the dashboard or dashboard page as a spreadsheet file.

Tips for Exporting

Here are some tips on exporting data from analyses, dashboards, and dashboard pages.

- If you're exporting data with over one million rows, ask your administrator about the maximum number you're allowed to export.
- By default, the **Value Suppression** option in the Column Properties dialog:Column Format tab determines if the cells in tables or pivot tables that span rows and cells that span columns are repeated when exporting to Excel (rather than always repeated). Don't suppress values when exporting to Excel if those who use the Excel spreadsheets want to manipulate the data.
  - If **Value Suppression** is set to **Suppress**, then cells that span rows and cells that span columns aren't repeated. For example, in a table that has Year and Month values, Year is displayed only once for Month values. This value suppression is useful if you want to simply view data in Excel spreadsheets.

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  - If **Value Suppression** is set to **Repeat**, then cells that span rows and cells that span columns are repeated. For example, in a table that has Year and Month values, Year is repeated for all Month values.
- In PDF format, rows are split across page breaks rather than kept together.
- Action links aren't included in exported formats.
- When exporting to Excel, numbers and dates are exported in raw format with full number precision and format mask, rather than as a string in the data format specified.
- When exporting analysis results to formatted Excel spreadsheets, you can choose whether to export full precision values or export abbreviated values that display in a performance tile. In the Performance Tile Properties dialog, select the **Abbreviate Values** option, which determines the level of abbreviation used in the performance tile, that is, thousands, millions, and so on. To export abbreviated values to Excel, select the **Abbreviate in formatted Excel** option.
- While you can export directly to an Excel format, you might notice better performance during the export of large numbers of rows if you export first to CSV, and then import that file into Excel.

Edit Formulas or Calculated Measures

You can fine-tune the columns in an analysis by editing the formulas of columns or editing calculated measures.

Topics:

- Edit the Formula for a Column
- Edit Calculated Measures

Edit the Formula for a Column

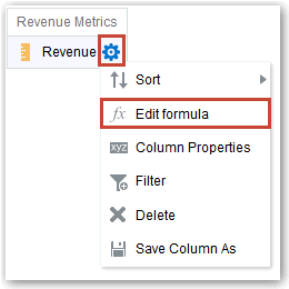
You can edit the formulas for attribute columns and measure columns when you specify the criteria for an analysis. This editing affects the column only in the context of the analysis and doesn't modify the formula of the original column in the subject area.

Video

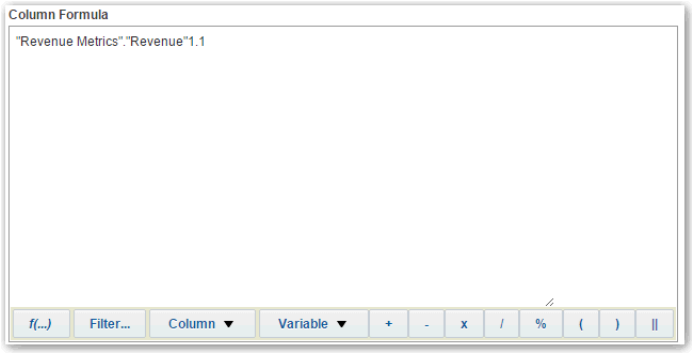
A column formula specifies what the column values represent. In its most basic form, such as "Revenue Metrics"."Revenue", a column takes the data from the data source as is. You can edit the formula to add functions, conditional expressions, and so on. This editing enables you to present analysis results in a variety of ways. For example, you can edit the formula of a Revenue column to display values after a 10% increase in revenue. You can do this by writing a formula that multiplies the Revenue column by 1.1.

1. Open the analysis for editing.
2. In the Selected Columns pane, click **Options** beside the column name, and then select **Edit Formula**.

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3. On the Column Formula tab of the Edit Column Formula dialog, enter a formula in the Column Formula pane.



By default, the name of the column on the Selected Columns pane is displayed in the Column Formula pane.

- Use the operator and character buttons on the bottom of the Column Formula pane to help build the formula.
- Use the **f(...)** button to display the Insert Function dialog that enables you to include a function in the column formula. For example, you can build a formula based on a SQL function, such as RANK("Sales Measures"."Dollars"). See Expression Editor Reference.
- Use the **Filter...** button to display the Insert Filter dialog that enables you to include a filter expression in the column formula. Start the filter expression with at least one measure column. Include a Boolean expression that contains no measure columns or nested queries.

  For example, you can build a formula that uses the SQL FILTER function to filter the data, such as FILTER("Sales Measures"."Dollars" USING ("Markets"."Region" = 'EASTERN REGION').
- Reference a column name in the formula using the form *Folder-Name*.*Column.Name*. If either the folder name or the column name includes non-alphanumeric characters (such as spaces or underscores), then enclose each name in double quotes. You can enclose the names in double quotes even if they have all alphanumeric characters.
- Use single quotes to include literals or constants that have a data type of string. For example, you can include constants such as ‘John Doe’ or ‘Best Selling Product’ in a formula.

4. Click **OK**. On the Results tab, the column displays its values with the formula applied.

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Brand	Revenue	Revenue*1.10
BizTech	318,100,000	349,910,000
FunPod	322,000,000	354,200,000
HomeView	159,900,000	175,890,000

Edit Calculated Measures

You can use calculated measures that are derived from other measures and created by using formulas.

For example, you might need to find the value after discounts are taken off the revenue. You create a calculated measure that subtracts the Discounted Amount from the Revenue value.

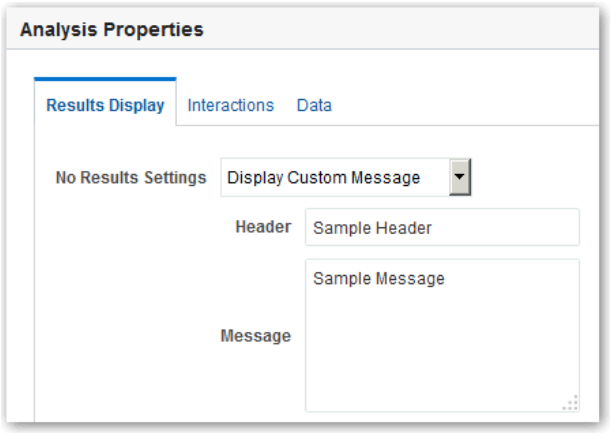
1. Open the analysis for editing.
2. On the Results tab, click **New Calculated Measure** on the toolbar to display the dialog.
3. If you have administrator privileges and want to customize folder and column headings with HTML markup, including JavaScript, select **Contains HTML Markup**, and then enter the HTML markup you want to apply. For examples, see Advanced Techniques: Format with HTML Tags.
4. Edit the formula for the calculated measure.
5. Click **OK**.

Set Properties for Analyses

You can set analysis properties to specify how results are displayed and how data is handled. You can also set which actions are available when users right-click in a pivot table, table, heat matrix, treemap, or trellis view.

For example, you can create a custom message for the Brand Revenue analysis. This message could display when a filter on the Revenue column is too restrictive and no results are displayed.

1. Open the analysis for editing.
2. In the Criteria tab toolbar or the Results tab toolbar, select **Edit Analysis Properties** to display the Analysis Properties dialog.

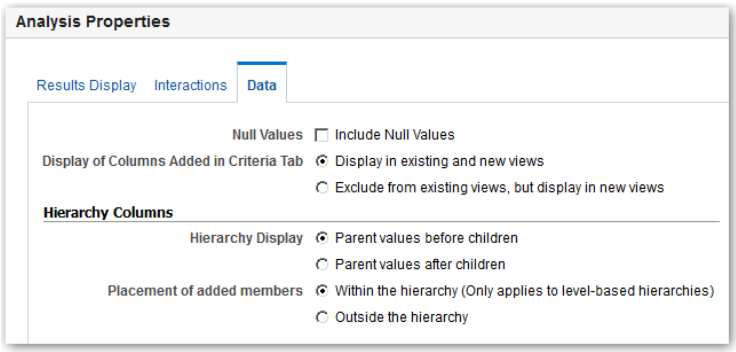


3. On the Results Display tab, select options to affect the display of results. For example, in the **No Results Settings** field, specify the default or custom message that displays if no results are returned when you run the analysis. You might see the message, for example, if

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you have a very restrictive filter placed on the columns in the analysis. You don't see the custom message if you simply create the analysis without including columns.

4. If you have administrator privileges and want to customize messages with HTML markup, including JavaScript, select **Display Custom Message** in the **No Results Settings** field, then select **Contains HTML Markup**, and then enter the HTML markup you want to apply.
5. In the dialog, click the Interactions tab.
6. Specify which actions (for example, **Drill**) are available when you right-click in a pivot table, table, graph, heat matrix, treemap, or trellis view.
7. In the dialog, click the Data tab.



8. Click **OK**.

Set Your Preferences

You can set account preferences to reflect where you live and to support how you work.

For example, you might select a specific Sales Dashboard as your starting page and Pacific Standard Time as your time zone. By specifying a starting page, you can start working with your dashboard right away.

1. In the Classic Home page, click **My Profile *username*** and select **My Account**.

   If you can't see **Signed In As**, first click **Open Classic Home** from the toolbar or navigator.
2. Use the tabs of the My Account dialog to specify preferences, such as your starting page, locale, and time zone.
3. Click **OK** to save your changes.

Combine Subject Areas in Analyses

You can combine multiple subject areas in an analysis.

Topics:

- About Cross-Subject Area Joins
- Create a Cross-Subject Area Analysis

About Cross-Subject Area Joins

You can create analyses that combine data from more than one subject area.

Review guidelines for creating these joins in My Oracle Support (Doc ID 1567672.1).

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> **Note**
>
> Use joins sparingly with cross subject areas as they can affect report performance.

Cross-subject area analyses can be classified into three broad categories:

- **Using common dimensions** - A common dimension is a dimensional attribute that exists in all subject areas in the analysis. These dimensions are considered common dimensions between subject areas and can be used to build a cross-subject area report.
- **Using common and local dimensions** - A local dimension is available only in one of the combined subject areas in a cross-subject area query.
- **Combining more than one result set from different subject areas** - You do this using set operators such as union, union all, intersection and difference.

Create a Cross-Subject Area Analysis

You can easily create an analysis using columns from multiple subject areas.

When you create a cross-subject area analysis, you must include a measure from each subject area to support the join if it uses a local dimension. You can hide the measure in the results if you don't want it to appear in your analysis. Note that the subject areas have to be from the same Oracle Cloud application.

1. On the Home page, click **Create** and then click **Analysis**.
2. In the Select Subject Area dialog, search for and select a subject area.
3. In the **Criteria** tab, expand the dimensions and add a column to the analysis
4. In Subject Areas, click **Add/Remove Subject Areas**.
5. To save a column to the catalog, in the Selected Columns pane, click **Options** beside the column name, and click **Save Column As**.
6. In the Subject Area region of the Criteria tab, expand the dimensions and add a column to the analysis.
7. If the column is a local dimension, add a measure from the subject area.

   In any join query, you must add at least one measure from all subject areas involved, otherwise unexpected results or errors might occur.
8. If you want to hide the measure in your analysis, select its **Column Properties**, and in the **Column Format** tab of the Column Properties dialog, select **Hide** and click **OK**.
9. If you're using a local dimension, in the **Advanced** tab, navigate to **Advanced SQL Clauses**, and select **Show Total value for all measures on unrelated dimensions**, then click **Apply SQL**.
10. Click the **Results** tab to see the analysis results.
11. Click the **Criteria** tab again to return to the analysis definition.

Advanced Techniques: Import Formatting from Another Analysis

You can quickly format new or existing analyses by importing the format of a saved analysis and its views. Most people don’t need to perform this task.

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For example, suppose you applied different colors to the Store, City, and Product columns of the Last Year's Brand Revenue analysis. You can apply the same colors to the This Year's Brand Revenue analysis by importing the column color format.

- To import formatting to all views in an analysis, click **Import formatting from another analysis** in the Compound Layout toolbar.
- To import formatting just to the view you're editing, click **Edit View**, then click **Import formatting from another analysis**.

Formatting is applied slightly differently depending on whether you import formatting applied to columns, views, or view containers in the Compound Layout.

About Applying Formatting from Columns

Applying formatting from columns works best for views when the saved analysis has the same number of columns as the target analysis.

For a single column, formatting is applied to all columns in the tables, pivot tables, and trellises of the target analysis.

For multiple columns, formatting is applied from left to right for column headings and values. If there are fewer columns in the saved analysis than in the target analysis, the format of the last column in the saved analysis is repeated in the subsequent columns of the target.

For example, suppose the saved analysis contains four columns in the following color order: red, green, blue, yellow. When applied to the six columns in the target analysis, the color order would be: red, green, blue, yellow, yellow, yellow.

About Applying Formatting from Views

When you import the format of one type of view, that format gets applied to all the views of the same type in the target analysis.

For example, suppose you import the custom formatting of a table to a target analysis containing three tables. The custom format gets applied to all three.

About Applying Formatting from Containers

In the Compound Layout, you can specify formatting properties for view containers, including background color, borders, and padding.

When you import container formatting, the views in the target analysis inherit the exact container formatting properties as the views in the saved analysis.

However, the layout of the views in the two analyses don’t have to be exactly the same. If the target analysis contains more views than the source analysis, the extra views also inherit the imported formatting.

For example, suppose that a saved analysis contains two tables that are stacked on top of each other in one layout column and that the target analysis contains four tables divided between two layout columns. When you import the formatting, the two tables in each of the first and second layout columns of the target analysis inherit the formatting.

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Import Formatting from a Saved Analysis to a Target Analysis

You can import formatting from one analysis to another.

For example, suppose you have an analysis that contains one column to which you have applied formatting, such as font family, horizontal alignment, and background color. You can save the analysis and apply the same formatting to all the columns in another analysis.

1. Open the analysis for editing.
2. Display the target analysis in the Results tab, or edit the view.
3. Click **Import formatting from another analysis** on the toolbar.
4. In the Select Analysis dialog, navigate to the saved analysis.
5. Click **OK**.

Advanced Techniques: Format with HTML Tags

If enabled and you have administrator privileges, then you'll see the option **Contains HTML/JavaScript/CSS Markup** on some dialogs.

> **Note**
>
> Administrators must enable the Allow HTML/JavaScript/CSS Content option in the Console (under **Security** in **System Settings**).

This option allows you to format content with valid HTML markup, including JavaScript, and CSS. If you include additional formatting, prefix the HTML markup with "@". Devices that don't support custom formatting just ignore markup after "@" and display the content without formatting .

For example, this HTML markup sets the width and height of a column in tables and pivot tables. The prefix @[html] means to apply HTML.

```
@[html]<span style="width:200px; height:50px>@</span>
```

The **Contains HTML/JavaScript/CSS Markup** option is available wherever you can apply formatting:

- For analyses:
  - In the analysis editor.
  - In the Analysis Properties dialog.
  - In the Column Properties dialog.
  - In the New Calculated Measure dialog.
- For dashboards:
  - In the Dashboard Properties dialog.

Here are some examples. If you find an example that is similar to what you want to do, copy and paste the example and tailor it to your needs.

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HTML Element	Usage Notes and Examples

Text	Any HTML tags can be used to control the format of the text. For example:
	• To center the text in the section:
	`<CENTER>Centered Text</CENTER>`
	• To make the text bold:
	`<B>Bold Text</B>`
	• To set font size and color:
	`<FONT SIZE="4" COLOR="red">Red Text</FONT>`
	You can also combine tags for additional effects:
	`<CENTER><B><FONT COLOR="red">Bold Centered Red Text</FONT></B></CENTER>`

JavaScript	Use self-contained scripts supported by the browser. Paste or type the script into the HTML text window, including the begin and end tags `<script>` and `</script>`. Specify JavaScript in the opening `<SCRIPT>` tag: `<SCRIPT LANGUAGE="javascript">` .

Advanced Techniques: Combine Columns to Display Data Differently

You can combine columns based on set operations such as Union or Intersect. By combining columns, you create a column for displaying the data in a different way.

For example, you can combine a Region column with a City column and create a column named Regions and Cities.

The analysis must meet certain criteria if you want to use set operations:

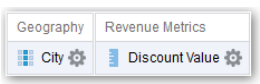
- The number and data types of the columns must be the same.
- You can't use hierarchical columns, selection steps, or groups when you combine criteria.

1. Open the analysis for editing.
2. On the Criteria tab of the analysis editor, in the Selected Columns pane toolbar, click **Combine results based on union, intersection, and difference operations**.

   The Set Operations area is displayed in the Selected Columns pane. Boxes with a dotted line border indicate columns that you must combine with other columns in the analysis.



3. In the Subject Areas pane, select the columns to combine with the original columns. Note that the dotted line borders and contents have been replaced.



4. In the Result Columns area on the Set Operations pane, click on the **Union** button and select a set operation.

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- Use **Union** to specify that only nonduplicate rows from all columns are returned.
- Use **Union All** to specify that rows from all columns, including duplicate rows, are returned.
- Use **Intersect** to specify that only rows common to all columns are returned.
- Use **Minus** to specify that only rows from the first column that aren't in the second column are returned.

5. Click the **Result Columns** link. The Selected Columns pane shows the newly combined columns.
6. To rename the heading of the column:
   a. Click the **Options** button for the column.
   b. Select **Column Properties**.
   c. Select **Column Format**.
   d. Ensure that **Custom Headings** is selected.
   e. In the **Column Heading** box, enter the new heading.
   f. Click **OK**.
7. Click the Results tab to view the columns in a table view.

Advanced Techniques: Examine the Logical SQL Statements for Analyses

You can examine the logical SQL code to see the XML code and logical SQL statement that's generated for an analysis. If you're logged into Oracle Analytics with administrator privileges, you can optionally create an analysis based on that SQL statement using the Advanced tab of the analysis editor or using the **Create Analysis from Simple Logical SQL** option.

When you create an analysis using this method, the list of subject areas isn't displayed in the left-hand pane. Instead you see the message Invalid Subject Area displayed. The removal of the list of subject areas ensures that the changes made to the logical SQL code are honored.

Before using the Advanced tab, keep in mind that this tab is only for advanced users and developers who have the appropriate responsibilities to access the Advanced tab. You must understand advanced SQL statements and have expertise working with the metadata for analyses. You must also understand the content and structure of the underlying data sources.

1. Open the analysis for editing.
2. Click the Advanced tab of the analysis editor.
3. Use the read-only box in the SQL Issued area to examine and copy the SQL statement that's used for executing the analysis.
4. Click **New Analysis** to create an analysis based on the SQL code.

   You must be logged into Oracle Analytics with administrator privileges to see the **New Analysis** option.

Advanced Techniques: Set Caching Options for Your Analysis

You can specify whether cached data is displayed in your analysis if it's available.

1. Open the analysis for editing.

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2. Click the Advanced tab of the analysis editor.
3. Use the **Bypass BI Presentation Services Cache** option to specify a caching policy.

   Clear this option to improve performance by displaying cached data if it's available. Cached data might be stale if the source data changes rapidly. Select this option to always pull fresh data from the data source, even if cached data is available in the system cache. The analysis might take longer to display if it contains a large amount of data.

Advanced Techniques: Reference Stored Values in Variables

You might want to create an analysis whose title displays the current user's name. You can do this by referencing a variable.

You can reference several different types of variable in your analyses, dashboards, and actions: *session*, *semantic model (repository)*, *presentation*, *request*, and *global*. Content authors can define presentation, request, and global variables themselves but other types (session and semantic model (repository) are defined for you in the semantic model.

Note: Oracle Analytics doesn't support the variables :user and :password in data source connection credentials.

Type of Variable	Defined in	Defined by	More Information
Session • System • Nonsystem	Semantic model	Data model authors	About Session Variables
Semantic Model (Repository) • Dynamic • Static	Semantic model	Data model authors	About Semantic Model (Repository) Variables
Presentation	Prompts for analyses and dashboards	Content authors	About Presentation Variables
Request	Prompts for analyses and dashboards	Content authors	About Request Variables
Global	Analyses	Administrators	About Global Variables and Create Global Variables

About Session Variables

Session variables are initialized when a user signs in.

These variables exist for each user for the duration of their browsing session and expire when the user closes the browser or signs out. There are two types of session variable: system and non-system.

System Session Variables

There are several system session variables that you can use in your reports and dashboards.

The system session variables have reserved names so you can't use them for any other kind of variable.

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System Session Variable	Description	Example SQL Query Value (Variable dialog)
PORTALPATH	Identifies the default dashboard a user sees when they sign in (they can override this preference after signing in).	To display 'mydashboard' when a user signs in: `select '/shared/_portal/mydashboard' from dual;`
TIMEZONE	Specifies the default time zone for a user when they sign in. A user's time zone is typically populated from the user's profile. Users can change their default time zone through preferences (My Account).	To set the time zone when a user signs in: `select '(GMT-08:00) Pacific Time (US & Canada)' from dual;`
DATA_TZ	Specifies an offset from the original time zone for data. This variable enables you to convert a time zone so that users see the appropriate zone.	To convert time data to Eastern Standard Time (EST): `select 'GMT-05:00' from dual;` This example means Greenwich Mean Time (GMT) - 5 hours
DATA_DISPLAY_TZ	Specifies the time zone for displaying data.	To display Eastern Standard Time (EST): `select 'GMT-05:00' from dual;` This example means Greenwich Mean Time (GMT) - 5 hours

Non-System Session Variables

The non-system session variables are named and created in your semantic model.

For example, your data modeler might create a SalesRegion variable that initializes to the name of a user's sales region when they sign in.

About Semantic Model (Repository) Variables

A semantic model (repository) variable is a variable that has a single value at any point in time.

Semantic model (repository) variables can be static or dynamic. A static semantic model (repository) variable has a value that persists and doesn't change until the administrator changes it. A dynamic semantic model (repository) variable has a value that is refreshed by data returned from queries.

About Presentation Variables

You create a presentation variable when creating a column prompt or a variable prompt.

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Type	Description
Column prompt	A presentation variable created as part of a column prompt is associated with a column, and the values that it can take come from the column values. To create a presentation variable as part of a column prompt, in the New Prompt dialog, you must select **Presentation Variable** in the **Set a variable** field. Enter a name for the variable in the **Variable Name** field.
Variable prompt	A presentation variable created as part of a variable prompt isn't associated with any column, and you define the values that it can take. To create a presentation variable as part of a variable prompt, in the New Prompt dialog, you must select **Presentation Variable** in the **Prompt for** field. Enter a name for the variable in the **Variable Name** field.

The value of a presentation variable is populated by the column or variable prompt with which it was created. That is, each time a user selects one or more values in the column or variable prompt, the value of the presentation variable is set to the value or values that the user selects.

About Request Variables

A request variable enables you to override the value of a session variable but only for the duration of a database request initiated from a column prompt. You can create a request variable as part of the process of creating a column prompt.

You can create a request variable as part of the process of creating one of the following types of dashboard prompts:

- A request variable that is created as part of a column prompt is associated with a column, and the values that it can take come from the column values.

  To create a request variable as part of a column prompt, in the New Prompt dialog, you must select **Request Variable** in the **Set a variable** field. Enter the name of the session variable to override in the **Variable Name** field.

- A request variable that is created as part of a variable prompt isn't associated with any column, and you define the values that it can take.

  To create a request variable as part of a variable prompt, in the New Prompt dialog (or Edit Prompt dialog), you must select **Request Variable** in the **Prompt for** field. Then enter a name of the session variable that you want to override in the ***Variable Name*** field.

The value of a request variable is populated by the column prompt with which it was created. That is, each time a user selects a value in the column prompt, the value of the request variable is set to the value that the user selects. The value, however, is in effect only from the time the user presses the **Go** button for the prompt until the analysis results are returned to the dashboard.

Certain system session variables (such as, USERGUID or ROLES) can't be overridden by request variables. Other system session variables, such as DATA_TZ and DATA_DISPLAY_TZ (Timezone), can be overridden if configured in Model Administration Tool.

Only string and numeric request variables support multiple values. All other data types pass only the first value.

About Global Variables

A global variable is a column created by combining a specific data type with a value. The value can be a Date, Date and Time, Number, Text, and Time.

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The global variable is evaluated at the time the analysis is executed, and the value of the global variable is substituted appropriately.

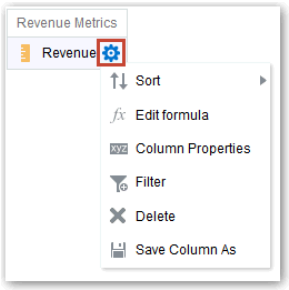
Only users with the BI Service Administrator role can manage (add, edit, and delete) global variables.

You create a global value during the process of creating an analysis by using the Edit Column Formula dialog. The global variable is then saved in the catalog and made available to all other analyses within a specific tenant system.

Create Global Variables

You can save a calculation as a global variable then reuse it in different analyses.

1. Open the analysis for editing.
2. In the Selected Columns pane, click **Options** beside the column name.



3. Select **Edit Formula** to display the Column Formula tab.
4. Click **Variable** and select **Global**.
5. Click **Add New Global Variable**.



6. Enter the value for the **Name**. For example, gv_region, date_and_time_global_variable, or rev_eastern_region_calc_gv.

   The name for a global variable must be fully qualified when referencing the variable, and therefore is prefixed by the text "global.variables". For example, a global variable set to calculate revenue is displayed in the Column Formula dialog as follows:
   `"Base Facts"."1- Revenue"*@{global.variables.gv_qualified}`
7. Enter values for the **Type** and **Value**.
   - If you're selecting "Date and Time" as the data type, then enter the value as in the following example: `03/25/2004 12:00:00 AM`
   - If you're entering an expression or a calculation as a value, then you must use the Text data type, as in the following example: `"Base Facts"."1- Revenue"*3.1415`
8. Click **OK**. The new global variable is added to the Insert Global Variable dialog.

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9. Select the new global variable that you just created, and click **OK**. The Edit Column Formula dialog is displayed with the global variable inserted in the Column Formula pane. The **Custom Headings** check box is automatically selected.
10. Enter a new name for the column to which you have assigned a global variable to reflect the variable more accurately.
11. Click **OK**.

Syntax for Referencing Variables

You can reference variables in analyses and dashboards.

How you reference a variable depends on the task that you're performing. For tasks where you're presented with fields in a dialog, you must specify only the type and name of the variable (not the full syntax), for example, referencing a variable in a filter definition.

For other tasks, such as referencing a variable in a title view, you specify the variable syntax. The syntax that you use depends on the type of variable as described in the following table.

Type	Syntax	Example
Session	@{biServer.variables['NQ_SESSION.*variablename*']} where *variablename* is the name of the session variable, for example DISPLAYNAME.	@{biServer.variables['NQ_SESSION.SalesRegion']}
Semantic Model (Repository)	@{biServer.variables.*variablename*} or @{biServer.variables['*variablename*']} where *variablename* is the name of the variable, for example, prime_begin	@{biServer.variables.prime_begin} or @{biServer.variables['prime_begin']}

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Type	Syntax	Example
Presentation or request	@{variables.*variablename*}[*format*] {*defaultvalue*} or @{*scope*.variables['*variablename*']} where: *variablename* is the name of the presentation or request variable, for example, MyFavoriteRegion. (optional) *format* is a format mask dependent on the data type of the variable, for example #,##0, MM/DD/YY hh:mm:ss. (Note that the format isn't applied to the default value.) (optional) *defaultvalue* is a constant or variable reference indicating a value to be used if the variable referenced by *variablename* isn't populated. *scope* identifies the qualifiers for the variable. You must specify the scope when a variable is used at multiple levels (analyses, dashboard pages, and dashboards) and you want to access a specific value. (If you don't specify the scope, then the order of precedence is analyses, dashboard pages, and dashboards.) When using a dashboard prompt with a presentation variable that can have multiple values, the syntax differs depending on the column type. Multiple values are formatted into comma-separated values and therefore, any format clause is applied to each value before being joined by commas.	@{variables.MyFavoriteRegion} {EASTERN REGION} or @{dashboard.MyFavoriteRegion} {EASTERN REGION} or @{dashboard.variables['MyFavoriteRegion']} or (@{myNumVar}[#,##0]{1000}) or (@{variables.MyOwnTimestamp}[YY-MM-DD hh:mm:ss]{}) or (@{myTextVar}{A, B, C})
Global	@{global.variables.*variablename*} where *variablename* is the name of the global variable, for example, gv_region. When referencing a global variable, you must use the fully qualified name as indicated in the example. The naming convention for global variables must conform to ECMA Scripting language specifications for JavaScript. The name must not exceed 200 characters, nor contain embedded spaces, reserved words, and special characters. If you're unfamiliar with JavaScripting language requirements, consult a third party reference	@{global.variables.gv_date_n_time}

You can also reference variables in expressions. The guidelines for referencing variables in expressions are described in the following topics:

- Session Variables
- Presentation Variables
- Semantic Model (Repository) Variables

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Session Variables

You can use the following guidelines for referencing session variables in expressions.

- Include the session variable as an argument of the VALUEOF function.
- Enclose the variable name in double quotes.
- Precede the session variable by NQ_SESSION and a period.
- Enclose NQ_SESSION in double quotes.
- Enclose both the NQ_SESSION portion and the session variable name in parentheses.

For example:

```
"Market"."Region"=VALUEOF("NQ_SESSION"."SalesRegion")
```

Presentation Variables

You can use the following guidelines for referencing presentation variable in expressions.

When referencing a presentation variable, use this syntax:

@{*variablename*}{*defaultvalue*}

where *variablename* is the name of the presentation variable and *defaultvalue* (optional) is a constant or variable reference indicating a value to be used if the variable referenced by *variablename* isn't populated.

To type-cast (that is, convert) the variable to a string or include multiple variables, enclose the entire variable in single quotes, for example:

```
'@{user.displayName}'
```

If the @ sign isn't followed by a {, then it's treated as an @ sign. When using a presentation variable that can have multiple values, the syntax differs depending on the column type.

Use the following syntax in SQL for the specified column type in order to generate valid SQL statements:

- Text — (@{*variablename*}['@']{'*defaultvalue*'})
- Numeric — (@{*variablename*}{*defaultvalue*})
- Date-time — (@{*variablename*}{timestamp '*defaultvalue*'})
- Date (only the date) — (@{*variablename*}{date '*defaultvalue*'})
- Time (only the time) — (@{*variablename*}{time '*defaultvalue*'})

For example:

```
'@{user.displayName}'
```

Semantic Model (Repository) Variables

You can use the following guidelines for referencing semantic model (repository) variables in expressions.

- Include the variable as an argument of the VALUEOF function.
- Enclose the variable name in double quotes.

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- Refer to a static semantic model (repository) variable by name.
- Refer to a dynamic semantic model (repository) variable by its fully qualified name.

For example:

```
CASE WHEN "Hour" >= VALUEOF("prime_begin") AND "Hour" < VALUEOF("prime_end") THEN
'Prime Time' WHEN ... ELSE...END
```

Advanced Techniques: Issue Direct Database Requests

You can create and issue a direct request to the back-end database using a connection pool and a database-specific SQL statement, if the administrator has granted you the appropriate privileges

You can also review and change the result columns of the database request by changing the SQL statement. After making the changes and retrieving the required results, you can incorporate the results into dashboards and agents.

Topics:

- Privileges Required for Direct Database Requests
- Create and Execute Direct Database Requests

Privileges Required for Direct Database Requests

Administrators can use the Manage Privileges page in the Classic Administration page to view and set access permissions for direct database requests.

To create and issue a direct database request, you must have been granted the following privileges:

- Edit Direct Database Analysis - You can create and edit direct database requests.
- Execute Direct Database Analysis - You can issue direct requests and see the results

Oracle recommends that you keep the default privileges because they're optimized for Oracle Analytics. Editing privileges might cause unexpected behavior or access to features.

Create and Execute Direct Database Requests

You can create a direct request to the database from the Classic home page.

Security rules for data are bypassed and can't be applied when creating direct database requests.

1. On the Classic Home page, in the **Create** pane, click **Analysis** (or click **New** and select **Analysis**).
2. In the Select Subject Area dialog, click **Create Direct Database Query**.
3. In the Criteria tab, enter a connection pool and a query statement.
   - Use **Connection Pool** to specify the name of the connection pool to use for the query.
   - Use **SQL Statement** to specify the database-specific SQL statement for retrieving data from the database.
4. Click **Validate SQL and Retrieve Columns** and review the retrieved columns in the Results Columns field.

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5. Click the **Results** tab to issue the request and see the results. The Results Columns field sometimes doesn't display any columns, because the SQL statement you provided in the Criteria tab retrieved no data from the database.

There are some functions you can't perform in analyses whose columns originated from direct database requests:

- Select columns in the Subject Areas pane, because you aren't working with columns from a semantic model.
- Create groups or selection steps for this analysis.
- Specify conditional formatting for the columns.
- Sort the values in the retrieved columns using the **Sort Ascending** and **Sort Descending** options in the column header of a pivot table, table, or trellis view.

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18

View Data in Different Ways

This chapter describes how views enable you to view data in different ways.

The result of an analysis is represented visually in a view. Depending on your needs and preferences, you can use different types of views to view the same data in different ways.

Topics:

- Typical Workflow to View Data in Different Ways
- About Views
- Add Views
- Edit Views
- Edit Various Types of Views
- Graph Data in Analyses
- Save Views
- Rearrange Views
- Refresh the Results in Views
- Print Views
- Change Print Options for Views
- Preview How Views Are Displayed on Dashboards
- Remove Views
- Sort Values in Views
- Clear Sorts in Views
- Drill in Results
- Resize Rows and Columns in Views
- Suppress Null Values in Views
- Assemble Views for Display
- Link Views in Master-Detail Relationships
- Modify the Layout of Data in Views
- About Drop Targets in the Layout Pane

Typical Workflow to View Data in Different Ways

Here are the common tasks to start adding views to analyses to view data in different ways.

Task	Description	More Information
Create an analysis	Select and arrange columns that you want to use in an analysis.	Create Your First Analysis

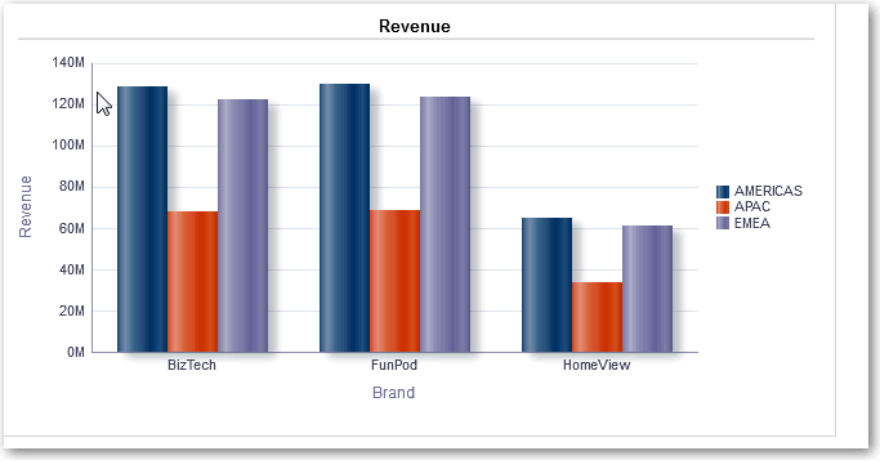
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Task	Description	More Information
Add a view	Add views to an analysis to visualize data in different ways.	Add Views
Edit a view	Use the editor that is available for each type of view to edit that view.	Edit Views
Remove a view	Delete a view from a compound layout or from an analysis.	Remove Views
Save a view	Save a view by saving the analysis.	Save Views
Print a view	Print a single view or group of views in printable HTML or printable PDF.	Print Views
Visualize your data	Visualize data in your analysis.	Visualize Data in an Analysis

About Views

A view is a visual representation of the results of an analysis. Views give you different ways of looking at your data to help you discover patterns, trends, outliers, and other interesting characteristics.

You can add a variety of views to the results, such as graphs and pivot tables that allow drilling down to more detailed information, such as explanatory text, filter controls, and more. This example shows the results of a revenue analysis displayed in a bar graph view.



This table describes the view types that you can use to present your data (if you have the required privileges).

View Name	Description
Column Selector	Adds a column selector in the results. A column selector is a set of drop-down lists that contain pre-selected columns. Users can dynamically select columns and change the data that is displayed in the views of the analysis.
Filters	Displays the filters in effect for an analysis. Filters, like selection steps, allow you to constrain an analysis to obtain results that answer a particular question. Filters are applied before the query is aggregated.

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View Name	Description
Funnel	Displays results as a three-dimensional graph. Typically, funnel graphs represent data that changes over time. For example, funnel graphs are often used to represent the volume of sales over a quarter. In funnel graphs, the thresholds indicate a percentage of the target value, and colors provide visual information for each stage. You can click one of the colored areas to drill down to more detailed information.
Graph	Displays numeric information on a background, called the graph canvas. When precise values are needed, graphs should be supplemented with other data displays, such as tables.
Gauge	Displays a single data value on a background, called the gauge canvas. Due to its compact size, a gauge is often more effective than a graph for displaying a single data value. A gauge view might consist of multiple gauges in a gauge set. For example, if you create a gauge view to show the sales data for the last twelve months, the gauge view consists of twelve gauges, one for each month. If you create one to show the total sales in the US, then the gauge view consists of one gauge.
Heat Matrix	Displays a two-dimensional depiction of data in which values are represented by a gradient of colors. Heat matrixes structure data similarly to pivot tables in that they are formed by grouping rows and columns.
Legend	Adds a legend to the results, which enables you to document the meaning of special formatting used in results, such as the meaning of custom colors applied to gauges.
Map	Displays results overlain on a map. Depending on the data, the results can be overlain on top of a map as formats such as images, color fill areas, bar and pie graphs, and variably sized markers.
Narrative	Displays the results as one or more paragraphs of text. You can type in a sentence with placeholders for each column in the results, and specify how rows should be separated.
Performance Tile	Displays a single piece of aggregate data. Performance tiles use color, labels, and limited styles to show status and use conditional formatting of the background color or measure value to make the tile visually prominent. For example, if revenue isn't tracking to target, the revenue value may appear in red.
Pivot Table	Pivot tables structure data like standard tables, but can display multiple levels of both row and column headings. Unlike regular tables, each data cell in a pivot table contains a unique value. They are ideal for displaying a large quantity of data, for browsing data hierarchically, and for trend analysis.
Table	Display data organized by rows and columns. Tables provide a summary view of data and let you see different views of data by dragging and dropping rows and columns.
Ticker	Displays the results as a ticker or marquee, similar in style to the stock tickers that run across many financial and news sites on the Internet. You can control what information is presented and how it scrolls across the page.
Title	Displays a title, a subtitle, a logo, a link to a custom online help page, and timestamps to the results.
Treemap	Displays hierarchical data by grouping the data into rectangles (known as tiles). Treemaps display tiles based on the size of one measure and the color of the second measure. Treemaps are limited by a predefined area and display two levels of data. They are similar to a scatter plot graphs in that the map area is constrained, and the graph allows you to visualize large quantities of data and quickly identify trends and anomalies within that data.

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View Name	Description
Trellis	Displays a type of graph view that displays a grid of multiple graphs, one in each data cell. A trellis view can be simple or advanced. A simple trellis displays a core inner graph multiplied across row sets and column sets, displaying many small multiples that are ideal for comparing and contrasting. An advanced trellis displays a grid of small spark graphs that are ideal for monitoring trends and spotting patterns in a dataset.
Selection Steps	Displays the selection steps in effect for an analysis. Selection steps, like filters, allow you to obtain results that answer particular questions. Selection steps are applied after the query is aggregated. See Edit Selection Steps.
Static Text	Adds static text in the results. You can use HTML to add banners, tickers, ActiveX objects, Java applets, links, instructions, descriptions, graphics, and so on, in the results.
View Selector	Adds a view selector in the results. A view selector is a drop-down list from which users can select a specific view of the results from among the saved views.

Add Views

By default when you create an analysis, you see either a table or pivot table view, depending on the columns that you selected. You can add other views to the analysis that let you visualize the data in different ways.

For example, you can analyze trends for your Sales Forecast analysis by creating a new view and selecting **Recommended Visualization** and the **Analyzing Trends** option.

1. Open the analysis for editing.
2. On the Results tab, click **New View** , and select a view type. 
3. To format the container for the views in the analysis, click **Format Container**.
4. Complete the fields in the Format Container dialog to specify options such as alignment, colors, and borders.
5. Click **OK**.
6. Click **Save Analysis**.

Edit Views

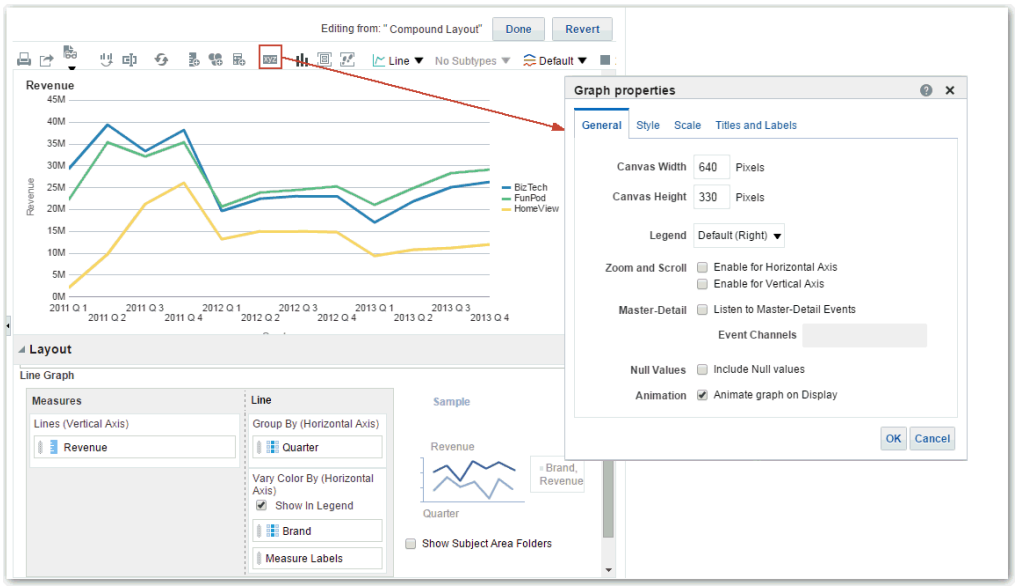
Each type of view has its own editor. The editors include both common functionality across views and view-specific functionality.

For example, you can edit a graph in a Brand Revenue analysis in the Graph editor to show the legend.

The following procedure provides general information on editing views.

1. Open the analysis for editing.
2. Click the Results tab.
3. To edit the view, click **Edit View**.
4. In the view editor (such as the Graph editor) make the appropriate edits, such as showing the legend.

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5. Click **Done**.
6. Save the view. Click **Save Analysis** or **Save As** in the toolbar of the Results tab.

Edit Various Types of Views

This topic identifies additional information for editing various types of views.

Topics:

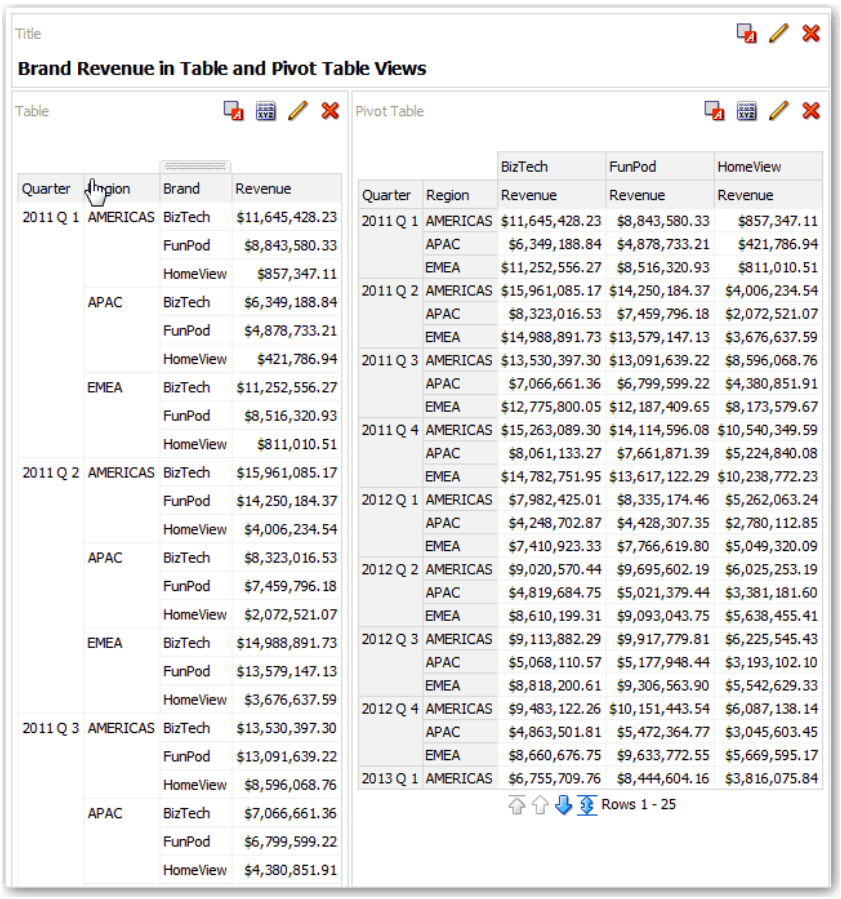
- Edit Table and Pivot Table Views
- Edit Performance Tile Views
- Edit Treemap Views
- Edit Heat Matrix Views
- Edit Trellis Views
- Edit Gauge Views
- Edit Map Views
- Edit Narrative Views
- Edit Non-Data Views

Edit Table and Pivot Table Views

Tables and pivot tables are commonly used views, and you can edit them in similar ways to display data the way you want.

For example, you can edit a pivot table in an analysis by moving the Brand column to the row edge to display its corresponding Revenue data for each Quarter and Region. You could also display the same data in a more conventional way by adding a table next to the pivot table in a compound layout, as shown below.

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1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties** on the table you want to edit.
4. Edit the table properties.
5. Click **OK**.
6. Click **Edit View** to display the Table View editor.
7. For a pivot table view, click the **Graph Pivoted Results** button on the toolbar to display the results of the pivot table in a graph view, which is displayed alongside the pivot table.
8. Click **Done**.

Edit Performance Tile Views

Performance tile views focus on a single piece of aggregate data. They use color, labels, and limited styles to show status and use conditional formatting of the background color or measure value to make the tile visually prominent.

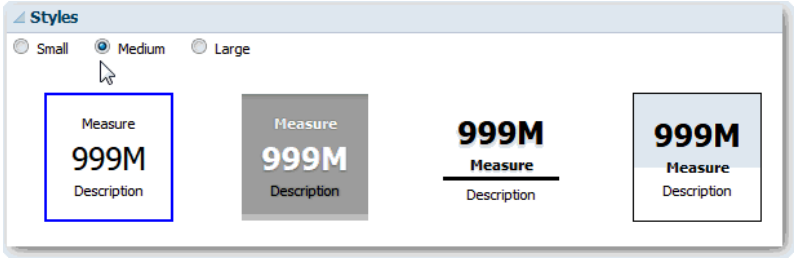
By default, the first measure in the analysis on the Criteria tab is selected as the performance tile measure. To ensure the correct measure value is displayed in the tile, set up aggregation and filters on the Criteria tab. To include additional performance tile views for each measure in an analysis, add a separate view for each measure.

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For example, you might want to edit a performance tile view to use Revenue as the measure. You can specify that the values and labels utilize the available space. This example shows performance tiles on a dashboard page.



1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties**. You can set the following properties:
   - The size of the tile — You can select predefined options **Small**, **Medium**, or **Large**, or you can select **Custom** and then set the height and weight in pixels. Other options allow you to autofit the tile to the value that is displayed.
   - The position of the tile — Options include **Fixed Position**, which sets (or “fixes”) the positions of the labels, meaning the label text is displayed in fixed positions (recommended for layouts with multiple performance tiles of the same size in a row) and **Utilize available space**, which evenly spaces the label text on the performance tile vertically. The label text utilizes all available space on the performance tile. Note that when you have multiple tiles placed beside each other, the labels might be displayed at different heights and look uneven based on the varying label content.
   - The use of abbreviated values — A performance tile can show a value using its measure's default formatting or the value can be abbreviated to the nearest thousand, million, and so on. For example, using abbreviated values, the default formatting of “123,456.50” would be displayed as “123K”. Select the **Abbreviate in formatted Excel** option if you want to display abbreviated values when you export analysis results to a formatted Excel spreadsheet.
   - The appearance of the tile, such as the background and border colors — Click the **Edit Conditional Formatting** link to apply conditional formatting to the tile.
4. Click **OK**.
5. Click **Edit View** to display the Performance Tile editor.
6. In the Styles pane, change the tile size to **Small**, **Medium**, or **Large**.



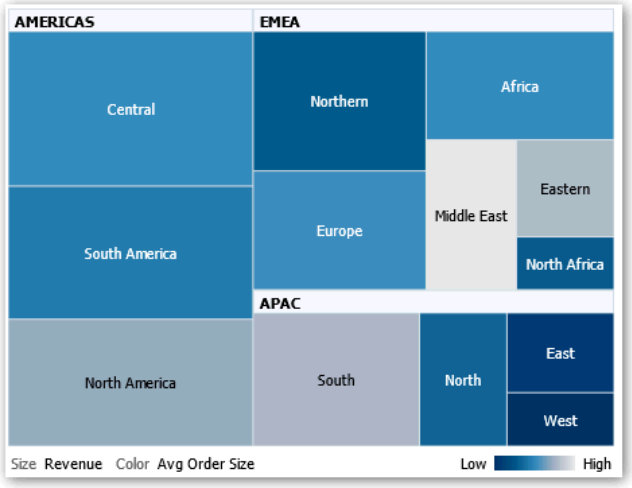
7. Select a themed (or stylized) tile located below the **Tile Size** option buttons to change the theme for the performance tile.
8. Click **Done**.

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Edit Treemap Views

Treemaps organize hierarchical data by grouping the data into rectangles (known as tiles). Treemaps display tiles based on the size of one measure and the color of the second measure.

The following figure shows an example of a treemap view. The country names are grouped by region and area. This treemap shows the correlation of revenue for a country (based on average order size) across different regions for an area.



By default, the first measure of the analysis in the Criteria tab is selected as the Size By measure, and the second measure is selected as the Color By measure. If there is only one measure in the analysis, this measure is the default for both Size By and Color By options. Additionally, the Style element defaults to Percentile Binning with "quartile" as the value for the number of bins.

Treemaps have the following characteristics:

- Tiles are colored by percentile bins or continuously.
- First Group By dimension is displayed as the group (header) label.
- The order of the Group By dimensions implies the nesting order within the treemap. The last dimension in the Group By is the lowest level and this dimension name is displayed as the tile label. If the label is too long to fit on the tile, then it’s truncated. Full values for the labels display in the tooltip.

1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties**. You can set properties such as the following ones:
    - The size of the treemap.
    - Whether a legend is to be displayed to show the continuous color variations or binning for the treemap tiles.
    - The background color and fill of the legend.
    - The border colors of the groups and tiles.
4. Click **OK**.

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5. Click **Edit View** to display the treemap view editor.
6. In the Layout pane, select the **Percentile Binning** or **Continuous Color Fill** options to change the color palette of the view.
   - Use **Percentile Binning** to specify that the color of the tiles within the treemap is displayed as a percentile bin. In the **Bins** list, select the number of bins to display in the treemap. You can select an integer, Quartile (4), or Decile (10). Values range from 2 to 12. The number of bins selected corresponds to the number of colors in the treemap. For example: You create a treemap for Region and Area. You specify Revenue as the Size By measure and Avg Order Size as the Color By measure. Then, you select Percentile Binning as the Style with 4 (Quartile) bins. The First Quartile represents those areas within the region that are under performing for the average order size by revenue. The **Binning Properties** area displays the percentage for the bin based on a total of 100% and is calculated based on the number of bins selected. Each percentage is color-coded and corresponds to the Color selection.
   - Use **Continuous Color Fill** to specify that the tiles within the treemap are displayed as a gradient color scheme. The low value gradient color is the minimum value for the selected Color By measure. The high value gradient color is the maximum value for the selected Color By measure.
7. Change the measures and attribute and hierarchal (excluding skip-level) columns to visualize the new data in more meaningful ways by using **Group By**, **Size By**, and **Color By** options.
8. Click **Done**.

Edit Heat Matrix Views

A heat matrix view visually represents the relationship between data values as a gradient of colors in a table format. You can edit properties such as view size, the display of header and data cells, and the display of a legend.

1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties** on the heat matrix you want to edit.
4. Edit properties as needed.
   - Use **Data Viewing** to control the size of the view in the layout. Options include scrolling with optional maximum width and height or paging with optional number of rows per page.
   - Use **Legend** to display a legend showing the continuous color variations or binning for the heat matrix.
   - Use Master-Detail to link the table to a master view. In the **Event Channels** field, enter the case-sensitive name of the channel the table listens to for master-detail events. Separate multiple channels with commas.
   - Use **Display Folder & Column Headings** to specify how to display headings for the columns and the view. Select the Folder.Column option to display the fully qualified folder name from the Subject Area and column name as the row or column title (for example, Offices.D1 Offices).
5. Click **OK**.
6. Left-click to drill in a cell.

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When drilling in multiple-level hierarchies, all members from the lowest levels are displayed as cells, and the detail level data replaces the current data. For example, when you drill in a country name, such as United States, the heat matrix displays data for the state (or provinces) in that country, but not for the country itself.

7. Right-click the outer edges to display a context menu of options, such as **Drill**, invoke actions, **Keep Only**, **Remove**, or focus on a specific cell.
8. Click **Edit View** to display the Heat Matrix editor.
9. In the Layout pane:
    a. In the **Style** box, select **Percentile Binning** or **Continuous Color Fill** to change the color palette of the view.
    b. Change the measures and columns to visualize the data in more meaningful ways by using **Rows**, **Columns**, and **Color By** drop targets.
10. To specify sorting, right-click a cell in the view and click **Sort**. The interactions that are available in the Sort dialog depend on the location in which you right-click within the view.
11. Click **Done**.

About Heat Matrix Views

A heat matrix view shows you a two-dimensional depiction of data in which values are represented by a gradient of colors. A simple heat matrix provides an immediate visual summary of information that is well suited for analyzing large amounts of data and identifying outlier values.

A heat matrix displays data from one measure. Colored cells are formed by the grouping and intersection of the columns and rows placed in the Prompts, Sections, Rows, Columns, and Color By drop targets. Cells are displayed as percentile bins or as a continuous color. You can hover over a cell to display its value or display values in cells all the time.

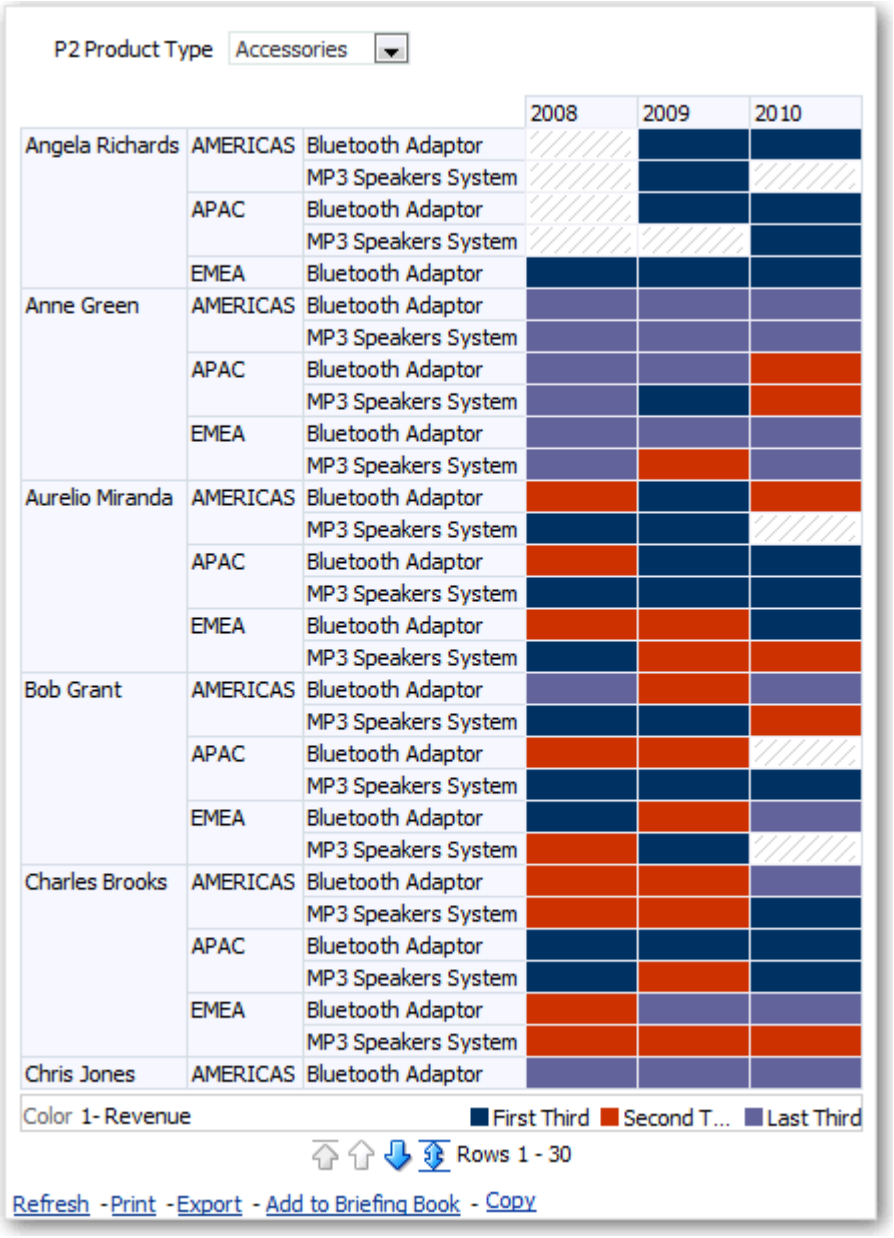
By default, the first measure of the analysis in the Criteria tab is selected as the Color By measure and represents the measure's value. The Style element defaults to Percentile Binning with "quartile" as the value for the number of bins. Cells display uniformly, in that each cell has the same width and the same height. Cell height and width don’t have to be the same. A "transparent" diagonal pattern of stripes indicates null values.

You can display a legend below the heat matrix that includes:

- One measure (selected in the Color By list) and its corresponding label.
- The number of specified bins (for example, quartile), color-coded and labeled, or a gradient bar that is displayed as a continuous color fill and is labeled "low" to "high."

Here is an example of a heat matrix view on a dashboard page. Each sales representative's revenue is displayed by region and product and prompted by product type. Sales revenue is binned by year. This heat matrix depicts the product revenue outliers for each sales representative (for example, in 2008, Angela Richards has no sales revenue for Bluetooth Adaptors or MP3 Speakers Systems for any region.)

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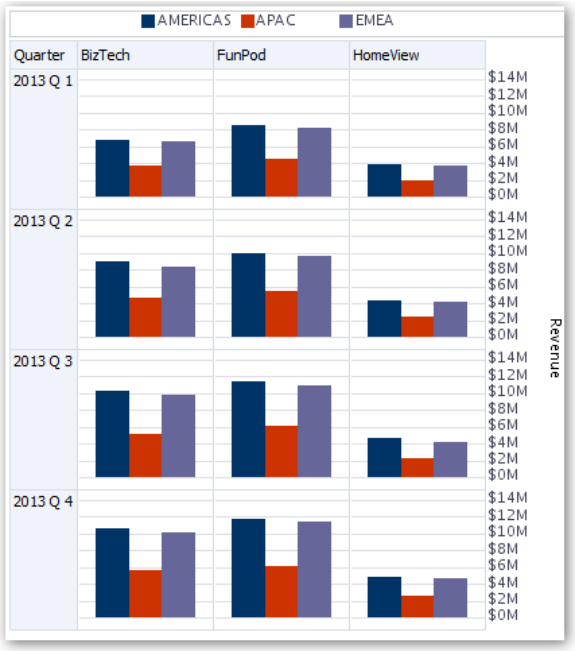
Edit Trellis Views

A trellis view is a type of graph view that displays a grid of multiple graphs, one in each data cell.

A trellis view can be simple or advanced. A simple trellis displays a core inner graph multiplied across row sets and column sets, displaying many small multiples that are ideal for comparing and contrasting. An advanced trellis displays a grid of small spark graphs that are ideal for monitoring trends and spotting patterns in a dataset.

The following figure shows a simple trellis view:

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The trellis view (also referred to as a trellis graph) is similar to a pivot table except that the data cells within the trellis contain graphs. Whereas a standalone graph type such as a single bar graph or a single scatter graph works on its own, the trellis graph works only by displaying a grid of nested graphs, known as inner graphs. So a bar graph trellis view is actually comprised of multiple bar graphs.

1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties** to edit properties.

   You can set the following kinds of properties:

   - Related to the grid canvas, such as legend location (simple trellis views only).
   - Related to graph size for the visualizations that are included in the trellis.
   - That specify the method to be used to browse data — either scrolling or paging controls.
   - That control the appearance of the trellis's grid and its visualizations, such as various style choices and the way that legends are displayed.
   - That control the type of scale and the appearance of scale markers for each of the trellis's visualizations (simple trellis views only).
   - That control the display of titles and labels (simple trellis views only).
4. Click **OK**.
5. Click **Edit View** to display the Trellis editor.
6. In the Layout pane:
   a. Drag and drop columns into the Columns and Rows fields to specify how data is arranged in the trellis.
   b. Select the type of graph you want to display for each of the cells in the trellis.
   c. Drag and drop columns to indicate how to color the graphs.

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7. Right-click a view heading, and click **Sort Column** to specify how values are sorted in the view.
8. Click **Done**.

About the Functions of Trellis Views

For the most part, a trellis view behaves like a pivot table. The main difference between a trellis and a pivot table is the way the data cells are displayed.

In the row and column label cells of a trellis, you can:

- Right-click to hide or move measure labels.
- Right-click to sort data.
- Drag to reposition rows and columns.

In the data cells of a trellis, you can hover the mouse pointer to display related contextual information. Numeric data cells in a trellis behave the same as numeric data cells in a pivot table. The ways in which the behavior of a trellis view differs from the behavior of a pivot table are the following:

- Graph data cells — There is no right-click functionality for the data cells in simple trellises, nor drilling in trellis graph data cells (left-click functionality).
- Microchart data cells — When you hover the cursor over the data cells in spark graphs, you're shown contextual information (such as first, last, minimum, and maximum values) that otherwise isn't displayed as it's in a pivot table view.

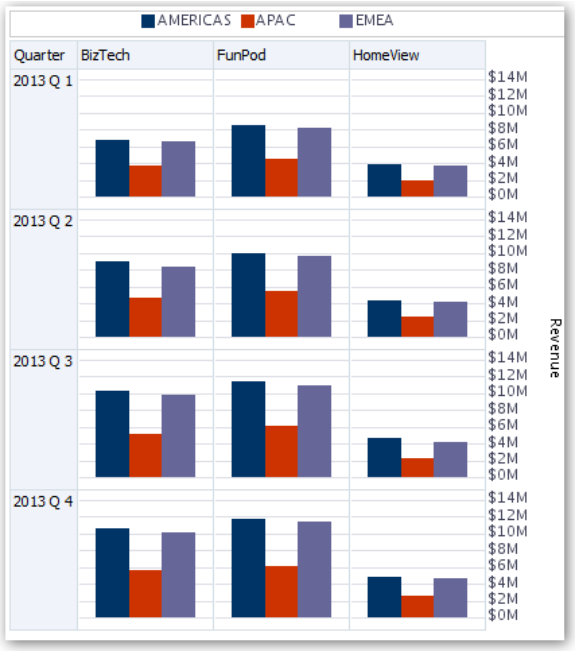
About Simple Trellis Versus Advanced Trellis

A trellis view can be a Simple Trellis or an Advanced Trellis.

The Simple Trellis displays a single type of inner visualization, for example, all bar graphs. The inner visualization always uses a common axis, so that all inner graphs are viewed on the same scale. Having a common axis makes all graph markers easy to compare across rows and columns.

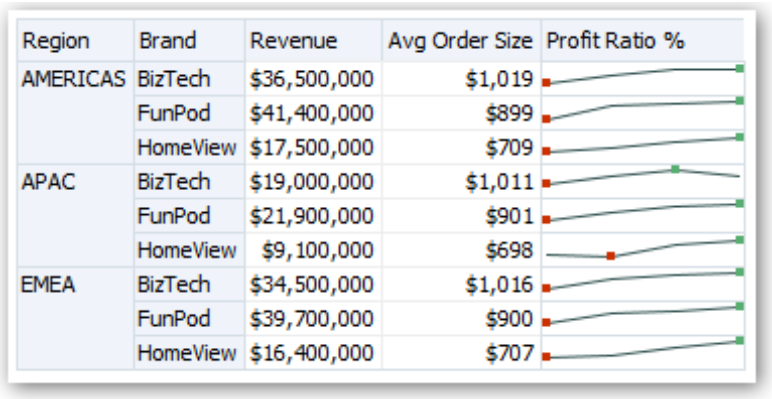
This figure shows a simple trellis view:

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The Advanced Trellis accommodates the display of multiple visualization types within its grid. An advanced trellis that illustrates sales trends might show a grid that contains numbers in the cells of one column (revenue, for example). Another column alongside the numbers column displays Spark Line graphs in its cells. Next to that column, a different microchart might be displayed, such as a column of Spark Bar graphs that visualize a different measure, such as unit totals.

This figure shows an advanced trellis view:



Region	Brand	Revenue	Avg Order Size	Profit Ratio %
AMERICAS	BizTech	$36,500,000	$1,019	
	FunPod	$41,400,000	$899	
	HomeView	$17,500,000	$709	
APAC	BizTech	$19,000,000	$1,011	
	FunPod	$21,900,000	$901	
	HomeView	$9,100,000	$698	
EMEA	BizTech	$34,500,000	$1,016	
	FunPod	$39,700,000	$900	
	HomeView	$16,400,000	$707	

Each measure that is visualized is assigned a different inner graph type. Each cell of the grid is scaled independently.

Think of an advanced trellis as a pivot table with spark graphs inside its data cells. But, for each measure that you add, you can optionally associate a dimension and display it as a microchart visualization. This makes an advanced trellis very different from a simple trellis. In a simple trellis, all of the measures are displayed in the same visualization, along with additional dimensions.

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Design Considerations for Trellis Views

Consider the following points when designing trellis views.

For all trellis views:

- For comparisons, select the Simple Trellis.
- For trend analysis, select the Advanced Trellis.
- Make the inner graphs that comprise a trellis readable and not too dense. A trellis view isn't especially useful for displaying multiple series or multiple groups. If you can't easily target a data point with the mouse (to display a tooltip), then the inner graph is likely too dense to be readable.
- For the Simple Trellis:
  - The total number of cells displayed is less than in a pivot table.
  - You can associate one or two of the dimensions with the visualization. You add fewer dimensions to the outer edge than in a pivot table.
  - Try to use a small number of outer-edge dimensions. The entire graph series should be visible at once (for easy comparison of like to like) with no need to scroll. If you must show additional dimensionality, then consider adding the dimensions to the graph prompt.
  - When determining which data to show in column headers and row headers, make sure that the column headers show one or two dimensions (each dimension with a small number of members).
- For the Advanced Trellis:
  - A common use case for an advanced trellis is to show trend graphs alongside numeric values, in a compressed form. So a typical advanced trellis contains a combination of spark graphs alongside number representations of the same measure.
  - Ideally, include no dimensions in the column headers. Include the measure in the column headers.
  - The dimensionality typically associated with a spark graph is time. Because a spark graph includes no visible labels, it's important that the data visualized is intrinsically ordered. For example, a spark graph that visualizes regions is meaningless, because the ordering of the regions (which would be the specific bars, in a spark bar graph) isn't intuitive.
  - Just as when designing pivot tables, you generally display time on the horizontal axis, with the other dimensions displayed on the vertical axis. The eye then scans from left to right to see how the dimensionality changes over time.
- Hierarchical columns don't work well with the simple trellis. When a hierarchical column is displayed on the outer edge, parents and children (such as Year and Quarter) are shown by default using a common axis scale. However, because Year and Quarter have different magnitudes, the markers in child graphs might be extremely small and hard to read against the parent scale. (Hierarchical columns do work well with the advanced trellis, because each data cell is a different scale.)

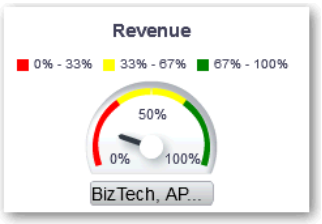
Edit Gauge Views

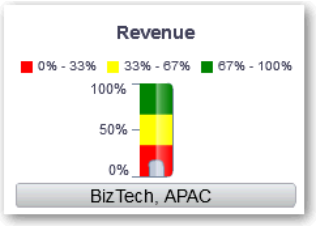
You use gauge views to compare performance to goals. Due to their compact size, gauges can be more effective than graphs for showing a single data value. Results show as a dial, bar, or

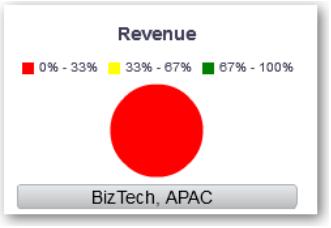
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bulb gauge. For example, you can use a gauge to see whether Actual Revenue falls within predefined limits for a brand.

The following figures show the same value in a dial, bar, and bulb gauge:







1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties** on the gauge you want to edit.
4. Edit the gauge properties.
    - Use **Gauges Per Row** to specify the number of rows of gauges to display and placement of labels.
    - Use **Listen to Master-Details Events** to link the gauge to a master view. In the **Event Channels** field, enter the case-sensitive name of the channel the gauge view listens to for master-detail events. Separate multiple channels with commas.
    - Use **Gauge Style** to change the width and height of gauges.
    - Use **Marker Type** to specify the marker type for a dial gauge, such as Needle, Line or Fill.
    - Use **Gauge Limits** to specify the scale of gauge limits. For example, you can specify a custom gauge limit. You can specify a static value such as 1000 as either an actual value or as a percentage. The value that you specify depends on the range of data points. You must ensure that the maximum gauge limit is more than the maximum data point. Do so to ensure that all data points are displayed on the gauge.
    - Use **Titles and Labels** to schange the appearance of titles and footers and the format of labels.

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5. Click **OK**.
6. Click **Edit View**.
7. Click the **Gauge Type** button on the toolbar and select the type of gauge.
8. Optional: Define thresholds for the gauge.
9. Click **Done**.

Set Thresholds

You can set thresholds for display in gauges and funnel graphs.

Each threshold has a high and a low value and is associated with a color in which the range identified by the threshold is displayed in the gauge, such as green for acceptable, yellow for warning, and red for critical.

1. Click **Edit View** to display the view editor.
2. In the Settings pane, select either **High values are desirable** or **Low values are desirable**.

   For example, selecting **High values are desirable** lists the statuses in order from the most desirable indicator (such as Excellent) at the top to the least desirable indicator (such as Warning) at the bottom. Generally with columns such as Revenue, high values are desirable. With columns such as Expenses, low values are desirable.
3. In the Threshold list, specify the data values that highlight a particular range of values.

   The values must be between the minimum and maximum values set for the view's limits. The range that a threshold identifies is filled with a color that differs from the color of other ranges.

   To specify a data value, you can enter a static value directly in a Threshold field, or you can click **Threshold Options** to set the value based on a measure column, a variable expression, or the results of a SQL query. Select **Dynamic** to enable the system to determine the threshold value.
4. Enter the labels for the ranges in the Status area.
   - Select **Threshold Values** to use the current threshold values as the label for the range.
   - Select **Specify Label** to use text that you specify as the label for the range, such as Excellent.

Edit Map Views

Map views present data in spatial form and use location context to uncover trends and transactions across regions. For example, a map view can show a map of the United States with the states color-coded by sales performance.

You create a map view after selecting columns to display in that view. The administrator can specify multiple background maps. Initially, the map view is displayed with the first background map that has at least one layer associated with a column that you selected. You can edit a map view by selecting a different background map, applying layers to the background map, and formatting the layers.

1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties**.

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4. On the Canvas tab, specify the map size.
   - Use **Canvas Size** to specify the map size within its container. You can select either **Default**, **Custom**, or a predefined size. If you select **Default** or a predefined size, then no other options are available and the map is sized to fit its container. The container is whatever area is holding the map, such as the area in the Map editor or the section of a dashboard page.
   - Use **Map Wrap-Around** to specify a "wrap-around" feature when you include line formats on a map. Lines are the only format that cross map borders, such as an airplane flight from San Francisco to Tokyo. When this feature is turned on, you can pan the map so that lines aren't broken.
5. On the Labels tab, specify whether to show labels for all layers or specific layers on the map view.

   The tab includes a box for each layer on the map view. The labels are displayed in the same order as that of the layers listed in the Map Formats area of the Map editor. Custom point layers have labels hidden by default.
6. On the Interaction tab, in the Initial Map View section, choose the initial center of the map and zoom level.
7. On the Tools tab, specify which tools are available with the map such as the zoom slider and the distance indicator.
8. Click **OK**.
9. Apply formats to the layers.
10. Click **Edit View**.
11. Modify formats and layers.
12. Click **Done**.
13. Drill in values.

About Map Views

You use map views to display data on maps in several different formats and to interact with the data.

When data is visualized on a map, relationships among data values that might not have been obvious previously can be displayed in a much more intuitive manner. For example, a map view can show a map of a city with the postal codes color-coded by sales performance, while an image marker displays the average discount given per order.

Map Components

A map consists of numerous components including a background or template map and a stack of layers that are displayed on top of each other in a window. A map has an associated coordinate system that all layers in the map must share. The map can be an image file, the object representation of an image file, or a URL that refers to an image file.

- **Main Content** - The main content is the background or template map, which provides the background geographic data and zoom levels. The main content can be an image such as the floor maps of office buildings or the appearance and presence of items such as countries, cities, and roads.
- **Layers** - One or more interactive or custom layers can overlay the main content.

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- **Toolbar** - The toolbar is visible by default and you can click its buttons to manipulate map contents directly. The map view itself has a toolbar. The content designer specifies whether to display the toolbar for the map view on a dashboard page. On a dashboard page, the toolbar is displayed directly over the map and contains only the **Pan**, **Zoom Out**, and **Zoom In** buttons.
  The toolbar in the Map editor contains additional options for modifying the map view.
- **Zoom Controls** - These controls adjust the detail of the geographic data that is shown in the map view. For example, zooming in from a country might show state and city details. The administrator specifies which zoom levels each layer is visible for. You can have multiple zoom levels for one layer, and you can have a single zoom level associated with multiple layers. When you zoom, you change the map information at that zoom level, but you do not affect the display of BI data at that level. You affect the display of data by drilling.

  The zoom controls include a zoom slider that is displayed in the upper left-hand corner of the map view with a thumb for large scale zooming and buttons for zooming a single level. When the zoom control is zoomed-out all the way, the zoom level is set to 0 and the entire map view is displayed.

  You determine the visibility of the zoom control. When you create a map view, by default the map is initially zoomed into the highest zoom level that fits the entire contents of the top-most layer. For example, if the highest ordered layer contains data only in the state of California, then the map zooms to the highest zoom level that still shows all of California.
- **Scale Tool** - Also known as the Distance Indicator, this tool provides a key to distance interpretation of the map and consists of two horizontal bars that display in the lower left-hand corner of the map view below the information panel and above the copyright. The top bar represents miles (mi) and the bottom bar represents kilometers (km). Labels are displayed above the miles bar and below the kilometers bar in the format: [distance] [unit of measure]. The length and distance values of the bars change as the zoom level changes and as the map is panned.
- **Legend** - The legend is a semi-transparent area in the upper right-hand corner of the map view that you can display and hide. The legend shows the information that relates to the current zoom level. The legend provides a read-only visual key for symbols, layers, and formatting on the map and displays all visible formats that are applied to the map. If a format is turned off, then the corresponding legend item is hidden also. If a format is turned on but zoomed out of view, then it is not displayed in the legend. The legend displays text such as "No formats defined for current zoom level" if you have no formats defined at the current zoom level.
  When you select a format on the map, the corresponding legend item is highlighted. Highlights have varying granularity, depending on the selected formats (for example, a pie graph does not have the level of granularity that color fill has).

  Use the **Expand Map Legend** and **Collapse Map Legend** buttons in the upper right-hand corner to control the display of the legend.
- **Overview Map** - The overview map consists of a miniature view of the main map that is shown in the lower right-hand corner of the main map. This overview map provides regional context.
  The reticule displays as a small window that you can move across a miniature view of the main map. The position of the reticule in the miniature map determines the viewable area of the main map. As you move the reticule, the main map is updated automatically. You can also pan in the overview map without using the reticule.

  The overview map is automatically hidden if the reticule can't be shown. This hiding generally happens when the scale difference between successive zoom levels is too small to show the miniature view in the overview map.

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- **Interactive Panel** - The top section of the interactive panel enables you to create and edit BI data formats in the analysis editor. If a format has editable thresholds, then a slider is displayed in the Map editor that enables you to edit thresholds by dragging the slider. The interactive panel enables you to rearrange formats within a geographic layer. For example, if the States layer has three formats, then you can select the order in which the formats are displayed.
  When displaying a tooltip by hovering the cursor over a map area, the corresponding detail is updated and highlighted in the interactive panel.

  Dashboard users can control the visibility of formats (by turning them on or off) and can adjust format thresholds if the content designer has allowed them to.

  The lower section of the panel includes the Feature Layer area, where you can select non-BI layers to add to the map. A non-BI layer is one that has not been associated with a BI column. You can't apply formats to non-BI layers.

About Formats and Layers in Map Views

These topics describe how formats and layers interact in map views.

Topics:

- About Layers in Map Views
- About Formats in Map Views

About Formats in Map Views

A format for a map view defines display properties for a feature such as a point or a line that represents a city or a river.

For example, if the feature is a polygon that shows a county, then the format can define the fill color for the county or can define a pie graph to be drawn over the county. Formats are tied to a particular geographic level such as continent, country, region, state, or city.

About the Types of Formats that Apply to Map Layers

A map view uses columns of BI data. Each column has a set of properties that define its characteristics, such as for formatting and interaction. Any formatting that is applied to a column isn’t applied to the map, except for the settings for interaction. Any formatting that originates from the map thresholds is applied.

You can apply various kinds of formats to map views and BI layers. You can’t apply formats to non-BI layers. You can define various formats to apply to BI layers.

Field	Description
Color Fill	Displays the Color Fill (*Layer*) dialog, which you use to display areas in fill colors that indicate that an area meets a particular condition. Color fill formats apply to regions or polygons. For example, a color fill format might identify a range of colors to represent the population in the states of a region or the popularity of a product in the states of a region. A map view can have multiple color formats visible at different zoom levels. For example, a color fill format for the layer at zoom levels 1-5 might represent the population of a state, and the county median income for the layer at zoom levels 6-10. You can also specify different colors to identify a range of data values.

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Field	Description
Bar Graph	Displays the Bar Graph (*Layer*) dialog, which you use to display a series of data as a bar graph within an area. Graph formats can show statistics related to a given region such as states or counties. For example, a graph format can display the sales values for several products in a state. Even though you can create multiple graph formats for a particular layer, such creation isn't recommend as the formats might overlap on the layer and the displayed results might be undesirable.
Pie Graph	Displays the Pie Graph (*Layer*) dialog, which you use to display a series of data as a pie graph within an area.
Shape	Displays the Variable Shape (*Layer*) dialog, which you use to display a measure column that is associated with an area by drawing markers or shapes within the region. You can also specify different colors for the shape to identify a range of data values.
Bubble	Displays the Bubble (*Layer*) dialog, which you use to display a bubble within an area, similar to the shape format.
Image	Displays the Image (*Layer*) dialog, which you use to display an image within an area, similar to the shape format. You can specify different images to identify a range of data values. You select images that have been specified by the administrator.
Line	Displays the Line (*Layer*) dialog, which you use to display a line on a map. You can include lines on maps to display paths such as highways, railway lines, and shipping routes. You can specify the width of lines and you can use the Map Wrap-Around feature on the Map Properties dialog to allow lines to be unbroken, such as when showing an airline flight path from San Francisco to Tokyo. You can vary the width of a line by each measure to accentuate a feature.
Custom Point	Displays the *Format* Custom Point (*Layer*) dialog, which you use to display a point format, such as a bubble, image, or shape in a layer. Custom points are displayed at all zoom levels and on top of all other map formatting. When you create a Custom Point format, you select columns to specify the latitude and longitude

About the Visibility of Formats in Map Views

The visibility of a format in a map view depends on various factors.

The factors on which visibility of a format depends:

- The zoom level on the map and the "zoom range" of the format. For example, a Color Fill format for States is visible when state boundaries are visible and it's turned on, but is no longer visible when the map is zoomed out to the Continent level.
- The data point limit. Formats are generally visible when they are zoomed into view and are turned on, but they might not be displayed if a particular layer has exceeded its maximum number of data points.

Custom point formats are unique in that they are displayed on the map always, for all zoom levels.

Format data is displayed in the legend only when the format is both turned on and zoomed into view. A format is turned on when the box beside its name is selected in the Map Formats area.

The map can't display multiple non-point formats at a time (at a single zoom level) but can display multiple point formats simultaneously, if they don't share the same latitude and longitude location. If multiple graph formats are specified at the same geographic layer, then they are displayed on top of each other.

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About the Application of Formats in Map Views

There are various guidelines which apply to formats in map views.

- The Color Fill, Bubble, Pie Graph, and Bar Graph formats apply to geographic areas such as polygons.
- The Bubble, Variable Shape, Image, and Custom Point formats are based on a single latitude and longitude location (a point).
- The line format is displayed only when a line geometry is present. Line formats are the only format that you can create for line geometries.
- When you define formats, you can specify that different formats apply to different measure columns in a layer.

About Layers in Map Views

A layer in a map view is any collection of features and formats that have a common set of attributes and a location.

For example, a layer that shows US states can include color coding of states by sales, and a pie graph that shows sales per brand for that state. In addition to the US states layer, you can use a layer that displays stores within a state as individual points, with popup notes that show sales for each store.

Layers are displayed on a background or template map. When you zoom in and out on the map, various layers are hidden or displayed. Some layers must be enabled for data, so you can display it in the map. Other layers, such as one that shows roads, aren't related to data.

Layers can be either predefined or custom. A predefined layer is one whose geometry is defined in a spatial table in an Oracle Database. The administrator makes predefined layers available, as described in Configuring How Data Is Displayed on Maps. A custom point layer is one that you define while editing a map view.

Layers can be of different types. A polygon layer represents regions, such as states. An example is a New England layer for the United States that consists of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

A point layer represents specific points on a map, based on a coordinate system. For example, a point layer might identify the locations of warehouses on a map. The layer can use a different image for the type of inventory (electronics, housewares, garden supplies) in a set of warehouses to differentiate them from each other.

You can create a custom point layer that applies points to a map using longitude and latitude coordinates. For example, suppose that your company is headquartered in New York City. You can create a custom point layer that displays your company icon over New York City, and that icon is always displayed whenever a map that includes New York City is shown. The custom point layer is always on top of the other layers and isn't affected by zoom levels. The custom point layer is used only by the current map view in the current analysis; it isn't used by other map views, even for the same analysis.

You can select layers to be visible or hidden on a map, but you can't modify predefined layers. You also create formats to apply to the layers, such as colored regions, bubbles, points, lines, or bar or pie graphs. Not all formats are available for all layer types. For example, point layers can't have color fill formats.

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Edit Formats and Layers in Map Views

You can edit the formats that are displayed on layers of a map view.

1. Open the map view for editing.
2. Click **Edit View** to display the Map editor.
3. Click **New**, select a format type, then select a layer to display the appropriate dialog for defining that format.
4. If no layers are specified in the map formats area, then click **New Map Format**. The map prompts you to import the geo-encoded columns for displaying a format for a particular geo-layer, if the columns aren't part of the analysis.
5. Hover over a layer name in the list to display options for modifying the layer.
6. Hover over a format name under a layer name in the list to display options for reordering, editing, and deleting formats.
7. Click the box beside a format name to make the format visible or invisible on the map.
8. Click **Done**.

Apply Formats to Layers in Map Views

You can format a map view, including with colors, bar graphs, pie graphs, variably sized bubbles, images, lines, or colored shapes that help you to apply binning and other formatting options.

- Click the **Create a new map format** link, if no layers are specified in the Map Formats list.
- Click the **Add new map formats** button, either in the Map Formats title bar or beside a layer name.

Move Around in Map Views

This topic describes various techniques in map views for moving around, modifying thresholds, and showing and hiding formats.

Topics:

- Pan in Map Views
- Zoom in Map Views
- Modify Thresholds for Formats on a Map View
- Show or Hide Formats on a Map View

Pan in Map Views

You pan using the map's toolbar and can pan on the main map or on the overview map. You can also use the reticule in the overview map to move around.

Pan is the default mode for the map view, and the pan mode is indicated by a hand cursor. With the Pan tool selected, you can move in various ways:

- Click and drag on the map background.

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- Hover over a region of the map to display an information window for that region for the data that is directly below the cursor.
- Click to display an information window. The information window can be used to drill or update a detail view.
- Double-click the map to zoom.

To pan in a map view, using the Pan tool, click the **Pan** button on the toolbar, then click the map background and drag and drop it to the appropriate location.

Zoom in Map Views

Zooming the map adjusts the detail of the geographic data that is shown on the map.

Zooming in from a country level might show state and city details. Zooming out from a street-level view might show cities but not street-level information. For master-detail linking, the map view focuses on the detail feature that was selected in the master view.

You can zoom in various ways:

- Click on the map background. To zoom by clicking, you must first select the zoom mode from the toolbar. The default mode is pan, which is indicated by a hand cursor. When you're in zoom mode, the mouse pointer changes to a magnifying glass and you can click-zoom directly on the map itself.

  When you're zooming in, you can either single-click or click and drag to use marquee zoom. You can draw a box that delineates the area in which you want to zoom.
- Hover over a region of the map to display an information window for that region for the data that is directly below the cursor.
- Click to zoom in and out. When you click, the map zooms in one "increment" using the click location as the center point.

Zooming and drilling aren't synonymous. When you zoom, no drill is performed (that is, no new query is issued). However, if you drill on a map layer, that drill likely results in a new zoom level being displayed, if a new layer is added to the map. If a new layer isn't added, then the zoom level doesn't change.

You can zoom using either the buttons on the toolbar or the zoom slider. When you use the zoom slider, you zoom in or out of the map as it's currently displayed. When you hover over the zoom slider, the names of the map layers are displayed beside their mid-range zoom level. Click the names to zoom the map to that level. When you zoom, a new query isn't issued.

You can zoom in map views with toolbar buttons, or you can use the slider:

- To zoom using the tools, click the **Zoom In** or **Zoom Out** button on the toolbar, then click the map background to zoom in that spot.

  If you're zooming in, then you can click and drag to draw a rectangle to specify the area in which to zoom.
- To zoom using the buttons on the slider, click the plus or minus sign on either end of the slider.

  You can also hover over the slider, then click the name of the level to zoom.

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Modify Thresholds for Formats on a Map View

You can modify the thresholds that are used for displaying formats on the map view.

You know that you have this ability if you see a slider under a format name in the Map Formats pane. Modifying thresholds is sometimes referred to as "what-if analysis." Format ranges are displayed as color fills on the slider background, with a "thumb" for each threshold that you can edit.

- Hover over a thumb to display the value under that thumb.
- Drag the thumb to adjust the threshold.
- Click a section on the slider to move the thumb to that section.
- Right-click the slider to display a menu with various options.
  - **Edit Color** — Displays a dialog, in which you select a predefined or custom color for the threshold.
  - **Add Threshold** — Adds another threshold to the slider, including a thumb to indicate the threshold. This addition creates a new formatting bin with a new color. For example, if three bins exist (with colors red, yellow, and green) and you create a threshold, then four bins now exist. A maximum of 12 bins is allowed.
  - **Remove Threshold** — Removes the threshold above where you right-clicked, including removing the thumb from the slider and a formatting bin.
- Click on a slider thumb number value to display a text box in which you can edit the number that corresponds to the threshold value. Press Enter or click outside the box to update the threshold value and the thumb position.

Show or Hide Formats on a Map View

Content designers can superimpose multiple layers of information (sometimes known as themes) on a single map view. They can create formats to enhance the layers. You can display or hide the formats for a map.

- In the Map Formats pane, from the View menu, select either **View All Formats** or **View Visible Formats**.
- In the Map Formats pane, deselect the box beside a format's name.

Set the Initial View Ports for Map Views

You can set the initial view port (the initial center of the map and zoom level) when a map view is first loaded or refreshed in a browser.

1. Open the map view:
   a. Open the analysis for editing.
   b. Click the Results tab of the analysis editor.
   c. Click **View Properties**.
2. In the Initial Map View section of the Interaction tab, select the appropriate value:

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Field	Description
Dynamic	Specifies that the map is zoomed or panned to the actual data on the map. This option focuses on the content that the user has added to the map view. This option is preferable for the initial displaying of the map view and for refreshing the map view, because it tries to display all BI content. This setting doesn't affect the printing of maps, because the coordinates and zoom level control all WYSIWYG interaction. The map is zoomed to the maximum zoom-level that still allows the content to fit on the map. This zoom-level might exceed the minimum and maximum visible zoom-levels that are specified for this layer in the Edit Background Map dialog. If the minimum and maximum visible zoom-levels are exceeded, then the format is hidden.
Last Saved	Specifies that the map is displayed at the last saved map center and zoom level. This option focuses on the last map window that was viewed. The display is based on the X (longitude) and (Y) latitude center coordinates and on the zoom level. While you can select this option for the initial view port, this option is preferable and is always used for printing maps and other WYSIWYG interactions.

3. Click **OK**.

Edit Narrative Views

A narrative view displays data results as one or more paragraphs of text. You use a narrative view to provide information such as context, explanatory text, or extended descriptions along with column values.

You can perform various tasks in the narrative view editor:

- Type a sentence with placeholders for each column in the results.
- Specify how rows are separated.
- Apply cosmetic formatting to the fonts used in the narrative view, or import the font formatting from a previously saved view.
- Add references to variables.

1. Open the analysis for editing.
2. Click the Results tab.
3. Click **Edit View** to display the narrative view editor.
4. If you have administrator privileges and want to format content in the narrative view with valid HTML markup, including JavaScript, select **Contains HTML Markup**.
5. In the **Prefix** field, enter the header for the narrative.

   This text is displayed at the beginning of the narrative.
6. In the **Narrative** box, enter the narrative text that is displayed for each row in the results.

   You can include both text and column values. Include a line break code at the end of this field to force each line of text and values onto its own line.

   To include column values, use an at sign (@), optionally followed by a number. Use an at sign by itself to indicate the first column. If you include multiple at signs, then the first occurrence of the sign corresponds to the first column, the second occurrence corresponds to the second column, and so on.

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Use @*n* to include the results from the designated column in the narrative. For example, @1 inserts the results from the first column in the analysis, and @3 inserts the results of the third column.

For example, for an analysis that returns the region name in the second column, specify `@2` to include the following values in the view: East Region and West Region.

7. In the **Row separator** field, enter a row separator for each line from the Narrative field that contains values. For example you might enter a string of plus signs (+) between each line.
8. In the **Rows to display** field, enter the number of rows from the column to return.

   For example, enter 5 to display values from the first 5 rows of the column. For a hierarchical column, you can use selection steps to display hierarchy levels with the hierarchical column. For example, create a step to select members based on hierarchy and add members of the specified level. A hierarchy level is considered a row.
9. In the **Postfix** field, enter the footer for the narrative. Ensure that the narrative ends in a line break, or that the footer begins with a line break.
10. Click **Done**

Edit Non-Data Views

You usually edit views that display data, such as tables, graphs, and gauges, but you can also edit views that don't contain data.

You can include the following types of non-data views in analyses and dashboards:

- Column Selector
- Filter
- Selection Step
- Static Text
- Title
- View Selector

About Column Selector Views

A column selector view is a set of drop-down lists that contain pre-selected columns. Users can dynamically select columns and change the data that is displayed in the views of the analysis.

One drop-down list can be attached to each column in the analysis, and multiple columns can be attached to each drop-down list. Updates that you make in the column selector view affect all the data views in the analysis.

You add columns to drop-down lists from the Subject Areas pane. When you add columns in this way, they aren't added to the Criteria tab for the analysis. Instead, when you display the Criteria tab, you see that the column is now referred to as a "Column Group" with the default column for the list specified also. The default column is the one on which you created the drop-down list.

About View Selector Views

A view selector view enables users to select a specific view of the results from among the saved views for an analysis. When placed on a dashboard, the view selector is displayed as a list from which users can choose the view that they want to display below the selector.

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Generally, you include views in the view selector that aren't being displayed in the Compound Layout view. For example, you might create a table, graph, gauge, and view selector view for an analysis, but include only the table and view selector view on the Compound Layout view. When the analysis is displayed on a dashboard page, users can select the graph or gauge view from the view selector view.

About Filters Views

A filters view displays the filters in effect for an analysis.

Filters, like selection steps, allow you to constrain an analysis to obtain results that answer a particular question. Filters are applied before the query is aggregated. See Creating Filters for Columns.

About Selection Steps Views

A selection steps view displays the selection steps in effect for the analysis. Selection steps, like filters, enable you to obtain results that answer particular questions. Selection steps are applied after the query is aggregated.

You don't modify selection steps from this view editor. To modify the selection steps, exit the Selection Steps editor and use the Selection Steps pane. See Refining Selections of Data.

About Static Text Views

A static text view adds static text to be displayed with the analysis results.

You can include variables in a static text view, as shown in the following example. See Advanced Techniques: Referencing Stored Values in Variables.

```
[u] Static Text View [/u][br/]
Region: @{variables.myFavoriteRegion} - Year:
@{variables.myFavoriteYear}[br/]
System Time: @{system.currentTime}[dddd,MMMM dd,yyyy][br/]
Product Version: @{system.productVersion}[br/]
[br/]
```

About Title Views

A title view displays a title, a subtitle, a logo, and timestamps to the results.

If you don't specify a title, then the name of the saved analysis is used as the title. For unsaved analyses, the **Title** text box is blank. You can reference variables in the text fields of the Title editor.

Graph Data in Analyses

This topic identifies additional information for graphing data in analyses.

Topics:

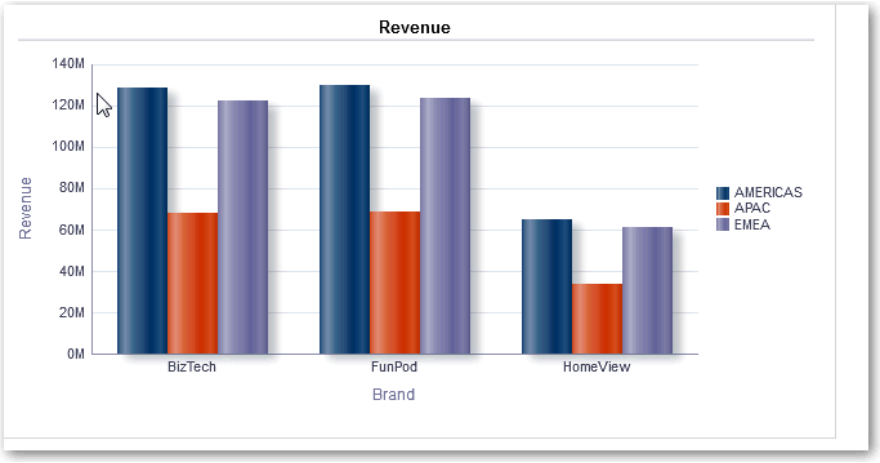
- Edit Graph Views
- Zoom and Scroll in Graphs
- Format the Visual Appearance of Graphs
- Limit Data Displayed in Graphs and Gauges

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Edit Graph Views

You can use graphs of various types for analyzing and displaying data.

For example, in the Brand Revenue analysis, you can edit a bar graph to compare the product revenue for three different regions, as shown below.



1. Open the analysis for editing.
2. Click the Results tab.
3. Click **View Properties** on the graph view you want to edit.
4. In the Graph Properties dialog, edit properties as needed.
5. On the Scale tab of the properties dialog, select **Click to edit Scale Markers** to display the Scale Markers dialog.

   Scale markers are accenting lines or shaded background ranges that mark key points, thresholds, ranges, and so on in a graph. Use a Line scale marker to draw a line across the graph at a specified position on the scale. Use Range to add a shaded background area behind the graph.

   You can apply line or range scale markers on one or more axes depending on the type of graph.
6. Click **OK**.
7. Click **Edit View** to display the Graph editor.
8. Use various toolbar buttons to affect the display of the graph.
9. Optional: Define thresholds for a funnel graph.
10. Optional: Drill in data in the view.
11. Click **Done**.

Zoom and Scroll in Graphs

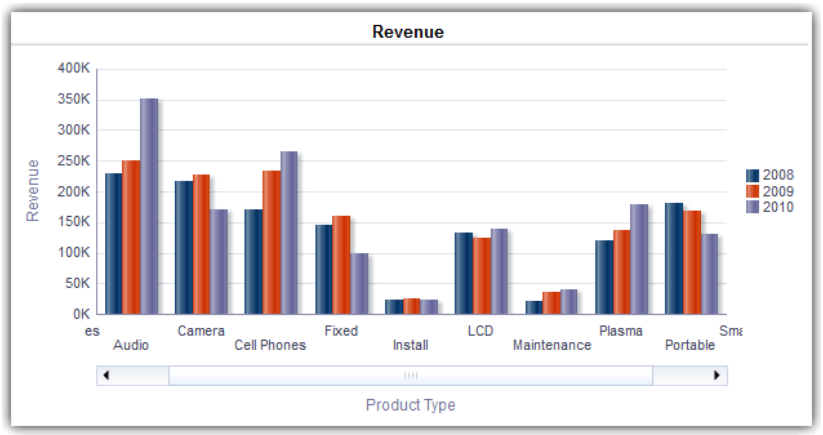
If zooming and scrolling has been enabled for a graph, then the graph includes a Zoom button. You can use the Zoom button to zoom in and out of a graph's plot area using its axes.

After you zoom in on an axis, you can scroll the axis. Enable zooming and scrolling with the General tab of the Graph Properties dialog.

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For example, while viewing a graph in results of a Brand Revenue analysis, you can zoom in on the Product Type axis. Doing so enables you to scroll the axis and view more data by product type.

To zoom and scroll in a graph, hover the cursor over the graph to reveal the **Zoom** button and click **Zoom**. If only one axis is enabled, select **Zoom In** or **Zoom Out**.



If both axes of the graph are enabled for zooming and scrolling:

- Select **Horizontal Axis**, then either **Zoom In** or **Zoom Out**.

  A zoom and scroll slider is displayed on the X axis.

  To unzoom the X axis, select **Actual Size**.
- Select **Vertical Axis**, then either **Zoom In** or **Zoom Out**.

  A zoom and scroll slider is displayed on the Y axis.

  To unzoom the Y axis, select **Actual Size**.
- To unzoom both the X and Y axes, select **Actual Size**.

Optionally, use other zoom features:

- Use **Zoom** to zoom in and out incrementally.
- Drag the scroll thumb on an axis to dynamically scroll the graph, revealing portions of the graph that are out of view.
- Click the scroll buttons on an axis to scroll left and right (on the X axis), or up and down (on the Y axis).
- Use the resize handles to zoom in and out on an axis.

Format the Visual Appearance of Graphs

You can format the visual appearance of graphs.

Formatting the visual appearance is based on two settings:

- The position of the graph elements (such as lines or bars in a line-bar graph or slices in a pie graph).
- Conditions applied to columns.

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Format Graphs Based on Position

Positional formatting enables you to customize the appearance of a graph based on the position of graph elements; that is, the numeric sequence in which graph elements (for example, bars) are displayed in a group.

A group is determined by the attribute columns that are displayed in the Group By drop target area.

You can format the visual appearance of a graph based on position in terms of its color, line width, and line symbols. You can't use positional formatting with waterfall graphs.

Format Graphs Based on Columns

Conditional formatting enables you to customize the appearance of a graph based on conditions applied to columns. The formatting is applied to the column values that meet the condition.

You can specify a color in which to display graph data based upon a specific column value, or range of column values that meet the condition specified for the column. For example:

- Conditionally changing the color of a graph based on specific column values.

  You want to create a bar graph to compare sales between two beverages, Lemonade and Cola. When creating a bar graph, you specify two conditions, one where the bar representing Lemonade sales is yellow and another where the bar representing Cola sales is blue.
- Conditionally changing the color of a graph based on a range of column values.

  A sales manager wants to create a bar graph to compare sales for all representatives across two sales bands. When creating a bar graph the sales manager specifies two conditions, one where the bar is red for all sales representatives with sales less than $250,000, and another where the bar is green for all sales representatives with sales greater than $250,000.

1. Click **Edit Graph Properties** on the toolbar of the graph editor.
2. Click the Style tab of the Graph Properties dialog.
3. Click **Style and Conditional Formatting**.
4. Click the Style Formatting tab to format the appearance of a graph based on the position of the graph elements. To add a custom formatted position:
   a. Select the tab for the graph element (for example, bar) to which you want to add a custom formatted position.
   b. Click **Add new position**. A new position entry is displayed in the Custom Formatted Positions table.
   c. Specify the formatting. For example, to select the color to be applied to the position, click the down arrow next to the **Color** box to access the Color Selector dialog. (Note that the formatting options depend on the element.)

      If you specify 0 for the width of a line, then the legend marker changes from the default line marker to symbol markers for the line and for other lines in the graph. For example, the symbol markers are shown as the legend markers for all the lines in the graph.
5. Click the Conditional Formatting tab to format the appearance of a graph based on a condition that is applied to columns. To add a condition to a column:

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a. Click **Add Condition Format** and select the column to which you want to apply a condition.

b. Select the operator and enter a column value, or a range of column values for this condition.

c. Click **OK**.

d. To select the color to be applied to column values when the condition is met, click the down arrow next to the **Color** box to display the Color Selector dialog.

6. Click **OK**.

Rules to Apply Conditional Formats in Graphs

Follow these rules when building and using conditions in graphs.

- You can create conditions only from columns that are being used by the graph.
- When format conditions conflict with each other, conflicting conditions are prioritized in the following order:
  1. Conditional formatting on attributes.
  2. Conditional formatting on measures
  3. Style formatting based on the positions of graph elements.
- When a user drills on a graph that has conditional formatting applied, the following rules apply:
  - A conditional format based on measures isn't carried to the next level. (It doesn't make sense to carry the conditional format to a different level; for example if, in a geographic hierarchy, from Region to City.)
  - A conditional format based on attributes is carried to the next graph if it hasn't been drilled on.

    For example, if you had the conditional format "Lemonade = Blue" and only drill on years, then "Lemonade = Blue" stays in place.
- Conditional formatting isn't supported on subtotals and totals for waterfall graphs.

Graph Exceptions for Conditional Formatting on Columns

This reference lists the graph exceptions that apply to conditional formatting based on columns.

Graph Type	Exception
Line Line-Bar Radar Time Series Line	Only symbol formatting is allowed for the line.
Pareto	Formatting is applied only to the bars, not to the Pareto line.

Limit Data Displayed in Graphs and Gauges

You can limit the data that is shown in graphs or gauges using section sliders. A section slider displays members of one or more attribute or hierarchical columns as values on a rectangular bar.

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The slider also provides mechanisms to select a value for that column such as increase and decrease buttons. The play button sequentially moves through the slider values.



Topics:

- Define Section Sliders in Graphs and Gauges
- Use Section Sliders in Graphs and Gauges

Define Section Sliders in Graphs and Gauges

You can define a section slider to limit the data that is shown in a graph or gauge.

For example, you can limit the data that is shown in a graph to a specific quarter in the year 2013.

1. Open the analysis for editing.
2. Click the Results tab.
3. Create the graph or gauge.
4. Click **Edit View** on the graph or gauge view.
5. In the Layout pane, drag columns to the Sections drop target.
6. Select **Display as Slider**.
7. Click **Section properties**.
8. Specify the maximum number of values to display in the section slider, and then click **OK**.
9. To close the editor, click **Done**.
10. To save the changes, click **Save Analysis**.

Use Section Sliders in Graphs and Gauges

You can use a section slider in a graph or gauge.

- Move the slider thumb to the desired value.
- Click the decrease button to move the slider thumb to the left.
- Click the increase button to move the slider thumb to the right.
- To sequentially move the slider through all the values, click the play button.

  The play button changes to a pause button that enables you to stop on a particular value.

The data in the graph or gauge is limited by the current value indicated by the slider thumb.

Save Views

You can save a view that you're working with at any time.

To save a view, you must save the new or existing analysis. For example, you can create a Brand Revenue analysis, edit its table view, and decide to save it for the first time.

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Click **Save Analysis** or **Save As** in the toolbar of the Results tab of the analysis editor.

Rearrange Views

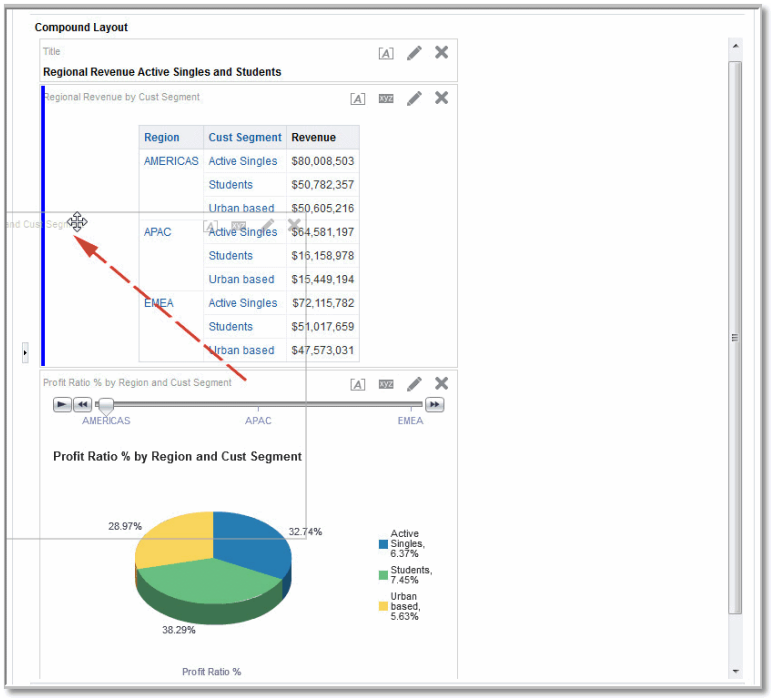
You can rearrange a view within a compound layout to be alongside the boundary of another view or to the outer boundary of the compound layout (where the view is displayed across the length or breadth of the compound layout).

For example, you can rearrange the views in the Brand Revenue analysis. You can arrange the bar graph of Projected Revenue to be displayed before the line graph of Actual Revenue.

1. Place the cursor just inside the top edge of the view that you want to rearrange.
2. Click and hold the left mouse button on the view.

   The view is displayed as a transparent, movable object.
3. Drag and drop the view to the position that you want.

   The view is displayed in a position marked by a blue bar (the drop target).



Refresh the Results in Views

When you work with views that show results data, such as the table and pivot table, you can refresh the results of the current analysis.

For example, you can add a filter in the Brand Revenue analysis. After doing so, you might want to see the effects of your change.

On the toolbar of the Results tab, click **Refresh the results of the current analysis**.

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Print Views

You can print views using HTML or Adobe PDF (Portable Document Format).

For example, you can display and print the Brand Revenue analysis in a new browser window by selecting the **Printable HTML** option.

1. Print one or more views.
   - To print a single view, click **Print this analysis** on the toolbar of the view's editor.
   - To print a group of views that displayed in the Compound Layout, click **Print this analysis** on the toolbar of the Results tab.
2. Select **Printable HTML** or **Printable PDF**.
   - For HTML, a new browser window displays the view or views to print.

     From the File menu of the new browser window, select **Print**.
   - For PDF, an Adobe Acrobat window displays the view or views to print.

     Select the options in the window to save or print the file.

Change Print Options for Views

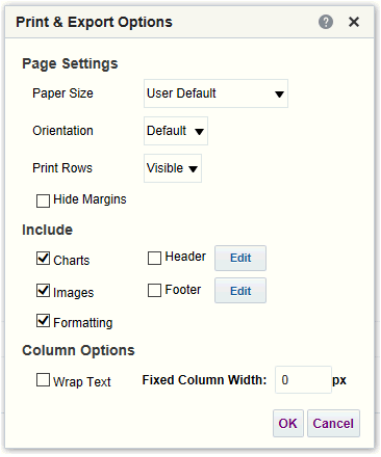
You can specify settings for printing dashboard pages and views.

For example, when printing the Revenue Dashboard that contains many views side-by-side on each page, you can set the Orientation to Landscape.

The print selections that you specify apply to PDF output only. If you then print the PDF file on a local or network printer, then the print selections specified in the browser are in effect. For example, the selection for paper size for the browser is in effect.

1. On the toolbar of the Results tab, click **Print & Export Options**.

   The Print & Export Options dialog is displayed.



2. Specify the appropriate options on the dialog. For example, specify the paper size and orientation and whether to include a header and footer.
3. Click **OK**.

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Preview How Views Are Displayed on Dashboards

You can preview views to see how they are displayed on a dashboard page.

For example, you can select **Show how results will look on a dashboard**. Doing so previews how results from a group of views are displayed in a dashboard.

1. If you want to preview a single view:

   On the toolbar of the view's editor, click **Show how results will look on a dashboard**.

2. If you want to preview a group of views that is displayed in the Compound Layout:

   On the toolbar of the Results tab, click the **Show how results will look on a dashboard**.

   The dashboard preview is displayed in a new window. Prompts are displayed and applied in the preview.

Remove Views

You can remove a view from a compound layout or analysis.

For example, you might find that the trellis view isn't the best way to show the results of the Brand Revenue analysis. You can remove that trellis view.

- To remove a view from a compound layout, click **Remove View from Compound Layout** on the view's toolbar. Removing a view from a compound layout doesn't remove it from the analysis.
- To remove a view from an analysis, select the view, then click **Remove View from Analysis** in the Views pane on the Results tab. Removing a view from an analysis removes it from the analysis and any compound layout to which it was added.

Sort Values in Views

You can sort values in table, pivot table, graph, heat matrix, and trellis views. You can sort on members, measures, and rows (where you see sideways triangles). You can't sort on page or section edges.

In pivot table and trellis views, values in columns are sorted on an edge from left to right. You can't sort values in ascending or descending order in any of the columns.

You can use many options to sort in views. For example, when you sort a column, you can select from the following options:

- **Sort Ascending** — Enables you to sort the values in the column by ascending order, as a first-level sort. For example, string values sort alphabetically A through Z, numbers sort lowest to highest, and dates sort earliest to latest.
- **Sort Descending** — Enables you to sort the values in the column by descending order, as a first-level sort.
- **Add Ascending Sort** — Specifies that an ascending sort for this column is added as another sort for the analysis.
- **Add Descending Sort** — Specifies that a descending sort for this column is added as another sort for the analysis.
- **Clear Sort** — Removes the sort specification for the specified column. This option works differently in the Selected Columns pane than in other places. If you make sort

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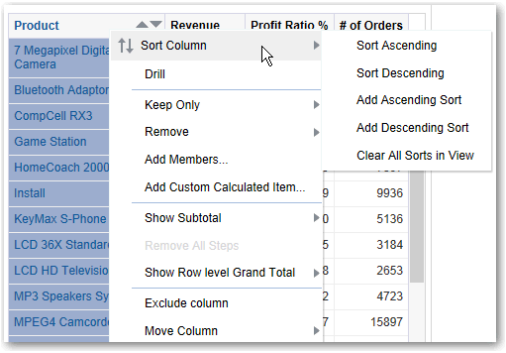
specifications in both the Selected Columns pane and in the view itself, then you return to the Selected Columns pane and click **Clear Sort**, only the sort that you specified in the Selected Columns pane is removed. A sort that you specified in the view remains.

- **Clear All Sorts in All Columns** — Removes all sort specifications that you have made. This option works differently in the Selected Columns pane than in other places, as described for **Clear Sort**.

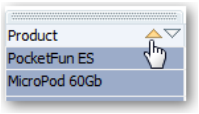
For example, in a table in the Brand Revenue analysis, you can select an ascending sort on the Revenue column. Doing so sorts revenue values from the lowest to highest.

You can sort values in the following ways:

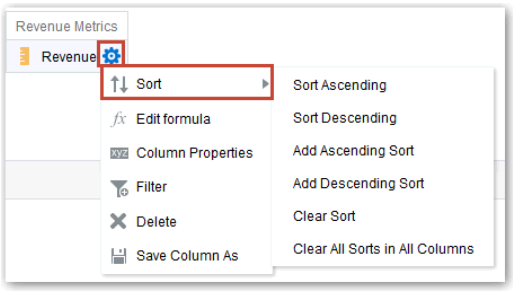
- Right-click in a view heading, click **Sort Column**, and select the appropriate option.



- Click the upwards and downward triangles that are found in column headings.



- Right-click a cell in a view and click **Sort** to display the Sort dialog. The interactions that are available in the Sort dialog depend on the type of data view (for example, graph or table) and the location in which you right-click within the view.
- From the Selected Columns pane of the Criteria tab, click **Options** beside a column, click **Sort**, and select the appropriate option.



Clear Sorts in Views

You can clear sorts that you have applied to columns in a view or analysis.

For example, you can clear all sorts in the Time column of the Brand Revenue analysis.

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To clear sorts that you have applied in a pivot table, table, heat matrix, or trellis view, right-click in the view heading and click **Clear All Sorts in View**.

1. Display the Selected Columns pane of the Criteria tab.
2. Click **Options** beside the column.
3. Select **Sort**, then **Clear Sort**.

When you clear sorts from the Criteria tab, you clear only the sorts that were defined from the Column Options menu. You don't clear the sorting done within a specific view.

To remove the primary sort from the column to which it now applies and apply it to the column whose button you just clicked, click a sort button in an unsorted column.

Drill in Results

You can drill in results.

Topics:

- About Drilling
- Drill in Tables and Other Views
- Drill in Graphs
- Drill in Map Views

About Drilling

Drilling enables you to navigate through hierarchical levels of data in views quickly and easily.

Many of the results that are displayed in views represent hierarchical data structures. The metadata specifies these hierarchies, and this enables you to access the different levels of detail within them.

- Drill down to display data in more detail, which displays more members.
- Drill up to display less data.

For example, in the results of the Brand Revenue analysis, you can drill for more data in the graph of Revenue by Product. To do this you can click on the MobilePhones data point. More data is displayed in the graph, such as the MobilePhones revenue per sales office for each of the last three years.

Drill in Tables and Other Views

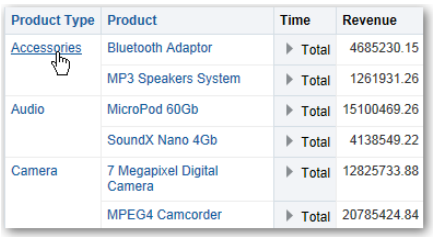
When you drill down in a table, pivot table, heat matrix, or trellis, the detail level data is added to the current data.

For example, when you drill from a continent, the table displays data for the continent and for the countries in that continent.

1. Hover over a value in a view.

   The value is underlined.

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Product Type	Product	Time	Revenue
Accessories	Bluetooth Adaptor	Total	4685230.15
	MP3 Speakers System	Total	1261931.26
Audio	MicroPod 60Gb	Total	15100469.26
	SoundX Nano 4Gb	Total	4138549.22
Camera	7 Megapixel Digital Camera	Total	12825733.88
	MPEG4 Camcorder	Total	20785424.84

2. Click the heading or member in which you want to drill.

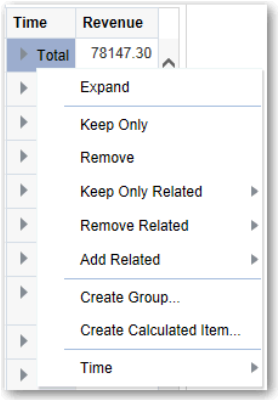
   More detail is added to the table or trellis.



Product Type	Item Description	Product
Accessories	8 X Zoom Optical LensBlack	Bluetooth Adaptor
	8 X Zoom Optical LensBlue	Bluetooth Adaptor
	8 X Zoom Optical LensPink	Bluetooth Adaptor
	8 X Zoom Optical LensSilver	Bluetooth Adaptor
	CompCell All in One Laser Jet F400Black	Bluetooth Adaptor

To drill in a hierarchical column in tables, pivot tables, and trellises, click the **Expand** or **Collapse** icon beside a member.

You can also use the right-click menu to expand and collapse columns.



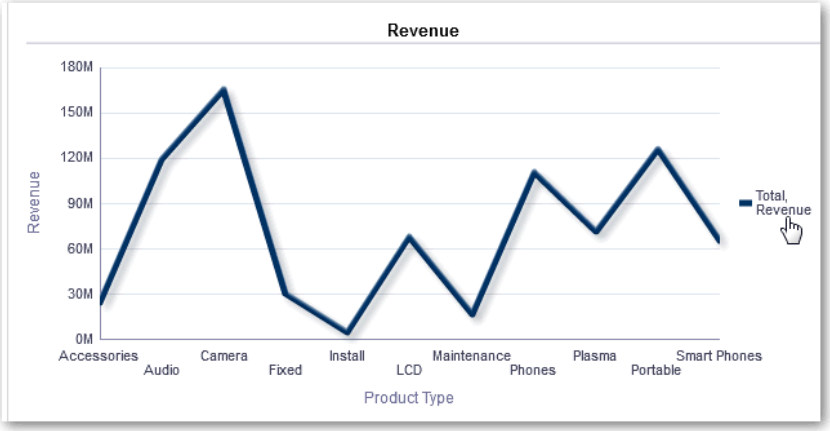
Drill in Graphs

When you drill down in a graph, the detail level data replaces the current data.

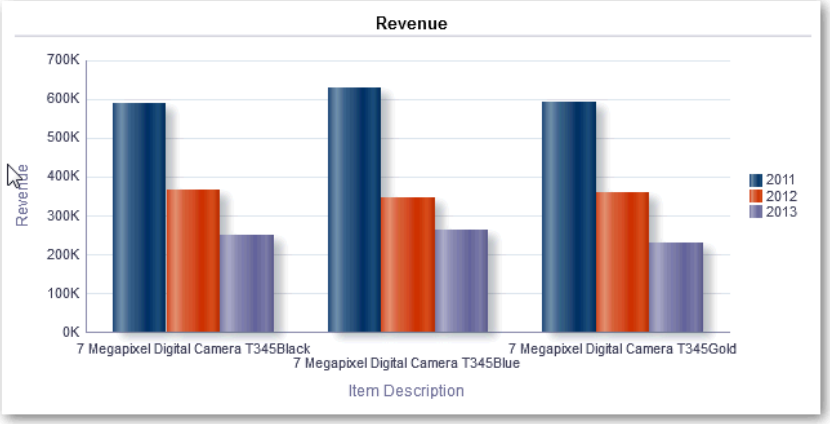
For example, when you drill down from a continent, the graph displays data for the countries in that continent, but not for the continent itself.

- Click a label on any axis or in the legend.

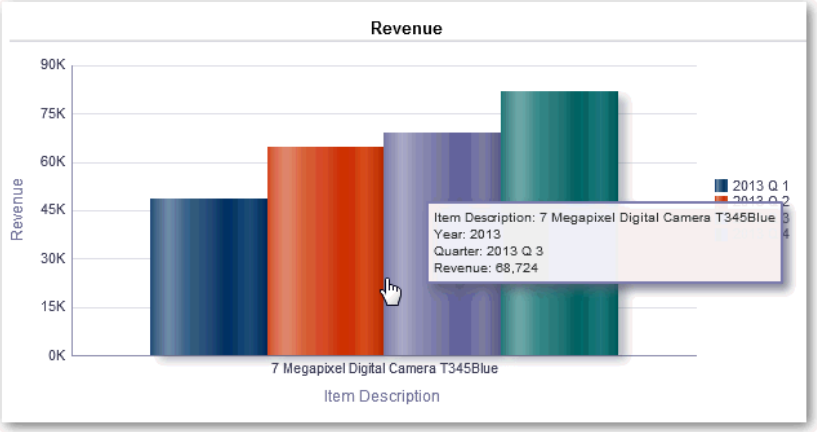
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- Click on a data point.



- More detail is shown in the graph.



Drill in Map Views

Drilling in a map enables you to navigate through the data. Drilling is available when the Pan tool is selected, as indicated by a hand cursor. If you hover over map data, then an information window is displayed with various information about that location.

When you click a region or a point on the map:

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- If the column is configured as a master for another view, then that view is updated with the latest information.
- If the column or map is configured to drill into a column or to perform a single action, then the drill or action is immediately initiated.
- If the column is configured to perform multiple actions or if multiple drills are possible, then the information window that is displayed contains a list of the actions or links for the multiple columns.

All columns in which you can drill are displayed in the information window as link text. When you click the link for a simple drill, you drill in the data, the map is redrawn with a different layer, and the information window is closed. If action links are defined, then you see a popup window that shows additional links.

Drilling updates map formatting to reflect the newly drilled data. For some drills (such as drilling on a State), the map zooms to the specified region while simultaneously updating the formatting. How you zoom and the formats and geographic levels that the map contains affect what is displayed. Formats have particular "zoom ranges" and are visible at different zoom levels. Zooming back up might display a new format, if you zoom out past the zoom level of the drilled format.

After you have drilled down, use the zoom slider to drill back up. Use the **Return** button on a dashboard page to display the original map view at the zoom or drill level that was in place before you started drilling.

Resize Rows and Columns in Views

You can resize the row and column edges of table, pivot table, and advanced trellis views.

For example, you can resize the Time column in a table of results of the Brand Revenue analysis.

Note that the resizing of rows and columns:

- Isn’t persisted if you resize rows and columns interactively. If you leave a table, then display it again, the interactive resizing is lost. If you set columns widths using properties, those widths are persisted.
- Is ignored if you export the view to PDF.

Topics:

- Configure to Resize in Views
- Resize in Views

Configure to Resize in Views

You must configure views to use scrolling as the method for browsing data before resizing can occur.

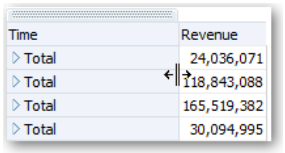
1. On the view's toolbar, click **View Properties**.
2. Select **Fixed headers with scrolling content** in the properties dialog.
3. Click **OK**. The scroll bar is displayed on the view, and rows and columns can be resized.

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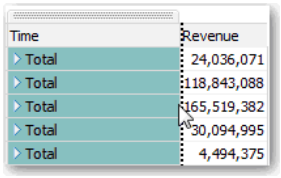
Resize in Views

You can resize a row or column edge in a table view, pivot table view, or advanced trellis.

1. Hover the mouse pointer over the border of the column or row edge.



2. Click and hold the mouse button down.



3. Drag the dotted line to the required size.
4. Release the mouse button.

Suppress Null Values in Views

You can select whether to include null values in an analysis when an entire row or column contains all null values. By default, null measure values are suppressed for all analyses.

For example, you might decide to display null values in the Revenue column of a Sales analysis.

1. Display the Results tab for the analysis that includes the view.
2. Click **View Properties**.
3. Select the appropriate **Include Null Values** options for the view.

   For example, suppose that you want to turn off null suppression for both rows and columns in a pivot table. Select **Include rows with only Null values** and **Include columns with only Null values**.

   This setting displays corresponding dimensions that have data, as well as null values. Note that if the view contains prompts or section edges, then they also inherit the null suppression value from either the row or column edge.

> **Note**
>
> Turning null suppression off might increase the volume of the data returned and impact performance. Contact your administrator for additional information.
>
> If results for analyses that include null values aren't as you expect, then contact your administrator. Verify that data in your sources is consistent.

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Assemble Views for Display

You use a compound layout to assemble different views for display on a dashboard. The views are displayed in separate containers within a compound layout.

- You can create additional compound layouts to vary presentation of analyses. You can use different compound layouts for different dashboards or for different devices. For example, a Brand Revenue dashboard might have one compound layout that shows a table and a graph, and another that shows a pie chart.
- You can duplicate a compound layout as a shortcut to creating a new compound layout. Views from the original compound layout are preserved. You can add views in addition to views that are already there, and delete views you don't want. For example, suppose you have a duplicate compound layout for the Brand Revenue analysis. You can keep the table, graph, pie chart, and gauge views, and add a performance tile view.
- You can rename a view so that the name is more meaningful to you. For example, for a Brand Revenue analysis, suppose a western region now consists only of California. You can rename the Western Region compound layout to California.
- You can delete compound layouts that are no longer useful for you. For example, for a Brand Revenue analysis, you might not need views for the Western region. You can delete the compound layout that contains those views.

1. Open the analysis for editing.
2. Click the Results tab, and use the toolbar options to assemble the view:
   - To create a compound layout, click on **Create Compound Layout**.
     A compound layout tab is displayed with only a title view. You can add views as needed.
   - To duplicate a compound layout, click on **Duplicate Compound Layout**.
     A compound layout tab that contains the same views as the selected compound layout is displayed. You can add or delete views as needed.
   - To rename a compound layout, click **Rename Compound Layout**.
     On the Rename dialog, type a new name for the compound layout and click **OK**.
   - To delete a compound layout, click on **Delete Compound Layout**.

Link Views in Master-Detail Relationships

You can link views so that one view drives changes in other views.

For example, when you select 2011 as a 'Year' value in the master view, you see 2011 data in a chart in the detail view .

You define two views to link:

- A master view that drives data changes in one or more detail views.

  The following types of views can be master views: funnel graph, gauge, graph, heat matrix, map, pivot table, table, and trellis. In a trellis view, only on the outer edges, can be master views, not the inner visualizations.

  Master views can be the same analysis as the detail view or in a different analysis.

  A master view contains a master column, where you set up the interaction that sends master-detail events on a channel. A channel carries master-detail events to the detail

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view. The master view must be displayed in the body of the view; it can't display on the page edge or section slider.

- A detail view that responds to events such as clicking on a value in a master view table.

  The following types of views can be detail views: funnel graph, gauge, graph, heat matrix, map, pivot table, table, and trellis. In a trellis view, only the outer edge can be detail views, not the inner visualizations.

  A detail view:

  – Can listen for events from multiple master views.

  – Can be in the same analysis as the master view or in a different analysis.

  – Can't act as a master view to another view.

Topics

- Define Master Views
- Define Detail Views

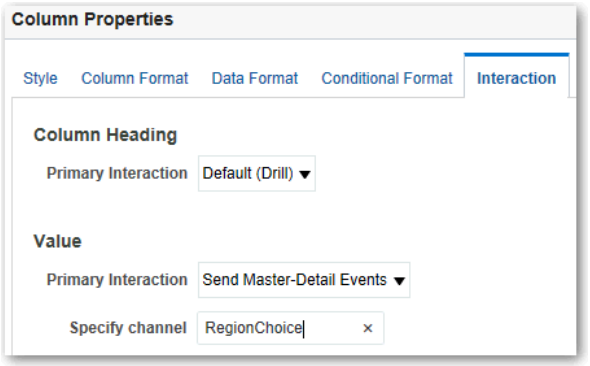
Define Master Views

As part of the process of linking views in master-detail relationships, you define the master view that sends changes to the detail views.

1. Open the analysis for editing.
2. For the column that is to be the master column, in the Criteria tab, click the **Options** button and select **Column Properties**.

   Make sure that you use one of the supported types for master views.
3. On the Column Properties dialog, click the **Interaction** tab.
4. In the **Primary Interaction** box in the **Value** area, select **Send Master-Detail Events**.
5. In the **Specify channel** field, enter a name for the channel on which the master view sends master-detail events.

   For example, if you're selecting a geographical region, you might name the channel "RegionChoice".



6. Click the Results tab to view the default table or pivot table view.
7. Click **OK**.

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Define Detail Views

As part of the process of linking views in master-detail relationships, you define the detail views that receive changes from the master view.

Note: Make sure that you position the master view column (that is, the column in the master view with **Primary Interaction** set to “Send Master-Detail Events”) on the Prompts or Sections area of the detail view.

1. Open the analysis for editing.
2. Click the Results tab.
3. Create the view that you want to use as the detail view.

   Make sure that you use one of the supported types for detail views.
4. On the view's toolbar, click **Edit**.
5. Drag the master view column (with **Primary Interaction** set to “Send Master-Detail Events” in the master view) to either the **Prompts** box or the **Sections** box, then click **Done**.
6. Click the **View Properties** button on the toolbar of the view's editor. The view's property dialog is displayed.
7. Select **Listen to Master-Detail Events**.

   The location of the **Listen to Master-Detail Events** option depends on the view type, as follows:

   - Gauge Properties dialog: General tab
   - Graph Properties dialog: General tab (for a graph or funnel graph)
   - Heat Matrix Properties dialog: General tab
   - Map Properties dialog: Interaction tab
   - Pivot Table Properties dialog: Style tab
   - Table Properties dialog: Style tab
8. In the **Event Channels** field, enter the name of the channel that you defined in Step 5 in Define Master Views.

   For example, you might have named a geographical region channel "RegionChoice".

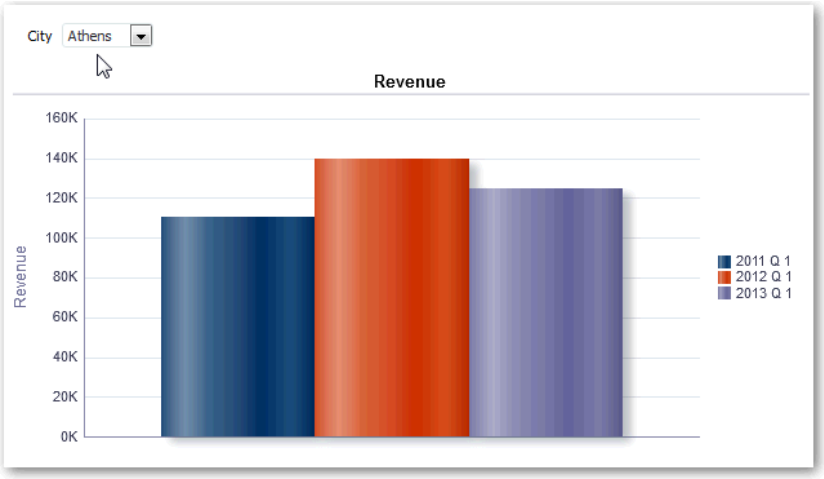
   Channel names are case-sensitive and must match exactly the channel names specified in the master view. Separate channels with commas, for example, channel a, channel b.
9. Click **OK**.

In the following example, a table view of a City Revenue analysis is linked to a bar graph through a master-detail relationship.

In the graph view, the City column is configured as the master view. The City column sends events to the graph view through the specified CityChoice channel.

The graph view has a prompt that enables users to choose a city. Data on the graph is displayed based on the city choice.

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The graph is the detail view, with the City prompt listening for events from the table view on the specified CityChoice channel. Suppose the user clicks on a value in the City column in the table view. The prompt in the graph view is set to that city, and the graph is refreshed.

Modify the Layout of Data in Views

Use the Layout pane to modify the way that data is arranged in a view.

Perform tasks such as adding and rearranging columns and adding totals.

Topics:

- Add and Rearrange Columns in Views
- Set Properties for Sections of Data in Views
- Add Totals to Tables and Pivot Tables
- Display Running Sums and Relative Values in Pivot Tables

Add and Rearrange Columns in Views

You can add and rearrange columns in views.

Topics

- Add Columns to Views
- Remove Columns from Views
- Rearrange Columns in Views

Add Columns to Views

This topic explains how to add a column to a view.

- Drag the column from the Subject Areas pane to the appropriate location in the view editor.
- Drag the column from the Subject Areas pane and drop it on a drop target on the Layout pane of the view's editor.

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For example, suppose you want to include the Office column in a table of the Brand Revenue analysis. You can drag the Office column from the Subject Areas pane to a drop target after the Product column.

Remove Columns from Views

You can remove columns from views.

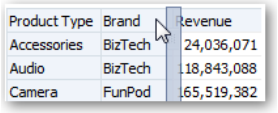
Removing a column from a particular view doesn't remove it from the underlying analysis or remove it from other views. If you want to remove the column from the analysis and all views, remove it using the **Criteria** tab.

1. Open the view for editing.
2. In the Columns and Measures section of the Layout pane, click **More Options**.
3. Select **Remove Column**.

Rearrange Columns in Views

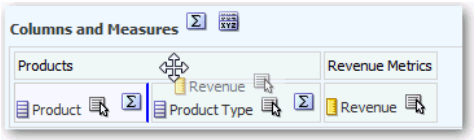
You can rearrange columns in views.

1. Open the view for editing.
2. Drag the column using the column handles and drop the column at a drop target.



To rearrange columns in the Layout pane:

1. Open the view for editing.
2. In the Layout pane, drag and drop the column to the required location.



This procedure provides the most basic steps for using the Layout pane to rearrange columns. Many options are available for arranging columns in the Layout pane. See About Drop Targets in the Layout Pane.

Set Properties for Sections of Data in Views

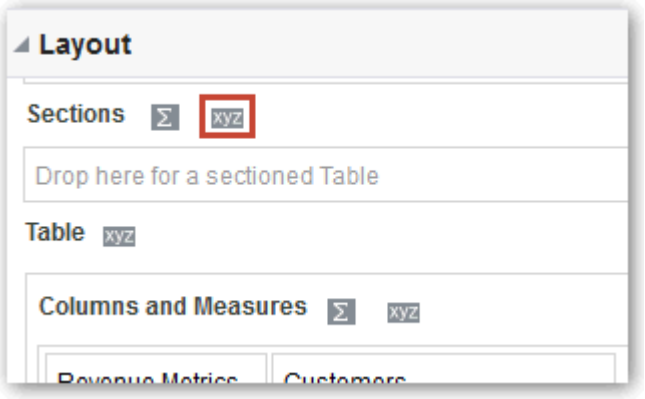
You can specify properties for the view body (such as a pivot table) or drop target (such as a section).

For example, you can set the background color to light green and insert a page break in a long table of revenue values.

1. Open the view for editing.

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2. In the view editor, display the Layout pane.
3. Click **Section Properties** next to the view body or drop target.



4. Set the appropriate properties.
   - Use **Insert Page Break** to specify whether to create a page break before the section, so that every time a value changes in the section drop target, the new section for that column is displayed on a new page. Page breaks are visible when you export an analysis to PDF. This is useful for data-driven detail analyses. Choose from:
   - – No Page Break — Don't break pages.
     – Innermost Column — Break at the innermost column, which inserts a page break between every section.
     – Outermost Column — Break at the outermost column, which inserts a page break when the section label in the outermost column changes.
     When the value of an outermost column changes, the value of the inner column is also considered changed. Therefore, setting page breaks at the outermost column inserts manual page breaks between every section.
     – Folder.Column — For example, Markets.Region, or Products.Brand. Inserts a page break when the section label in the specified column changes. This option is available only when the Sections drop target contains a column.
   - Use **Show Blank Rows** to specify whether to display rows that have no data in the section. Select this option to display all rows, even if a row is an empty text string and contains no value. Deselect the option to hide rows when there are no results to display. This option might be useful for example, to hide empty address lines.
   - Use **Maximum number of section slider values** on graphs to specify the maximum number of values to display on a section slider bar, but not to exceed the system maximum. The administrator configures the system maximum. If you enter a number that exceeds the system maximum, then it's ignored.
5. Click **OK**.

Add Totals to Tables and Pivot Tables

In the Layout pane, you can add column totals in tables and pivot tables.

You can position the totals at various locations in the view. You can add totals for columns that are displayed on the various edges. For each measure, the total uses the aggregation rule for that measure.

If you specify a total in the Rows or Columns drop target of a pivot table, then the totals that are displayed are the result of the columns that are specified in the Measures drop target. Total

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values aren't displayed on the Columns or Rows edges of the pivot table but rather in the data in the center of the pivot table.

1. Display the Layout pane for the view.
2. To add grand totals to the entire table, in the Columns and Measures drop target, click the **Totals** button, then click the location such as **Before**.

   For an entire pivot table, in the Rows or the Columns drop target, click **Totals**, then the location.
3. To turn on and off the totals that apply to all the values in the drop target, click the **Totals** button beside the drop target name, such as Sections.

   Then select the location for the total, such as **Before** the data items. A totals area is added to the view.
4. To specify custom text to insert into a total heading in tables and pivot tables, enter text in the **Caption** box.
   - Use `@` to display the data value. Suppose a total is specified for the Region column, and you enter the following text into the **Caption** box for the total heading: `- All values in the @`. The total heading displays the following text for the Western Region: `- All values in the Western Region`.
   - Use "@" to display the @ symbol.
   - Use "\" to display double quote. The double quote syntax isn't limited to a single character. In general, you can use a backslash escaped string inside double quotes. For example: `"1234567890\\abc\\d\"x\"yz!@#$%^&*()-+=_{}[];:'|?/><,.` ~" is display as `1234567890\abc\d"x"yz!@#$%^&*()-+=_{}[];:'|?/><,.` ~
   - Use \ to display the \ symbol.

Display Running Sums and Relative Values in Pivot Tables

You can use the Layout pane to display running sums or the relative value of measure columns in pivot tables.

Topics

- Display Running Sums for Measure Columns in Pivot Tables
- Display Relative Values for Measure Columns in Pivot Tables

Display Running Sums for Measure Columns in Pivot Tables

In a pivot table, you can display numeric measures as running sums, where each consecutive cell for the measure displays the total of all previous cells for that measure. This option is a display feature only that has no effect on actual pivot table results.

Typically, running sums are displayed for duplicated attribute columns or for measure columns for which the option to show data as a percentage of the column has been selected, with the last value being 100 percent. For example, you can display a running sum and percentage, to view progress toward next year's revenue target of $2 million. Running sums apply to all totals. The running sum for each level of detail is computed separately.

Column headings aren't affected when the running sum option is selected. You can format the column heading if you want it to indicate that the running sum option is in effect.

The following usage rules are in effect for running sums:

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- A running sum is incompatible with the SQL RSUM function (the effect would be a running sum of the running sum).
- All running sums are reset with each new section. A running sum doesn't reset at a break within a section or continued across sections.
- If a measure doesn't display in a single column or in a single row, then the measure is summed left to right and then top to bottom. (The lower right cell contains the grand total.) A running sum doesn't reset with each row or column.

1. Open the pivot table view in the view editor.
2. In the Layout pane, in the Measures area, click **More Options** for the row or column to be summed.
3. Select **Display as Running Sum**.

Display Relative Values for Measure Columns in Pivot Tables

In a pivot table, you can dynamically convert a stored or calculated measure into a percent or an index.

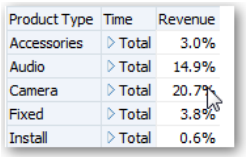
This shows the relative value of the item, compared to the total, without the need to explicitly create a calculated item for it. You can view the measure as a percentage between 0.00 and 100.00, or as an index between 0 and 1.

For example, if you're using a pivot table to examine sales by product, then you can duplicate the sales measure and view it as a percentage of the total. This enables you to see the actual sales, and the percentage of sales, that each product accounts for.

1. Open the pivot table in the view editor.
2. In the Layout pane, click **More Options** for the item that you want to show as a relative value.
3. Optional: To duplicate the measure column, select **Duplicate Layer**.

   The item is displayed in the pivot table, with the same name.
4. Select **Show Data As**.
5. Select **Percent of** or **Index of**.
6. Select the appropriate value such as **Column**, **Row**, or **Section**.

   The column is displayed in the pivot table view.



7. To rename the column, click **More Options** then **Format Headings**.

   In the Edit Format dialog, enter a value in the **Caption** field.

About Drop Targets in the Layout Pane

Drop targets enable columns in a data view to be displayed in the Layout pane. Drop targets indicate where you can insert, move, or drop a column. They represent a valid position for a column.

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Each drop target has properties that you can set. You use drop targets to modify the way data is arranged in a data view by dragging and dropping columns to different targets within the view. Each editor for a data view contains the Layout pane. The Layout pane is displayed slightly differently for each view type, such as graphs, performance tiles, and pivot tables. The Layout pane shows how the data in a view is laid out.

Concepts

- About the Types of Drop Targets
- About the Excluded Drop Target
- About the Guidelines for Drop Targets for Various Views

About the Types of Drop Targets

A data view can contain one or more drop targets, depending on the type of view.

Target	Description
<*view-type*> Prompts	Provides an interactive result set that enables you to select the data to view. The values from the columns that are displayed in this drop target are used as the initial criteria. In a view, these values are displayed in a drop-down list for selection, which is often referred to as the "page edge."
Sections	Populates the areas that divide the view into sections. If you select the **Display as Slider** option in this drop target, then the values of the columns that are dropped in the Sections drop target are displayed as a section slider rather than as unique views.
<*view-type*> area	Simulates the plot area or the body of the view itself and assists you in seeing what the view looks like. You can drag and drop columns to and from this area.

In addition to the drop targets explained in the table, the Layout pane shows excluded drop targets. The Layout pane includes other drop targets that are specific to the type of view. For example, the Layout pane for the radar graph includes a Radar Sections drop target that shows the columns values as points on each line along a radius of a circle.

About the Excluded Drop Target

To modify the layout of data, you must understand the Excluded drop target. A column in the Excluded drop target isn't included in the view results but still remains as part of the analysis.

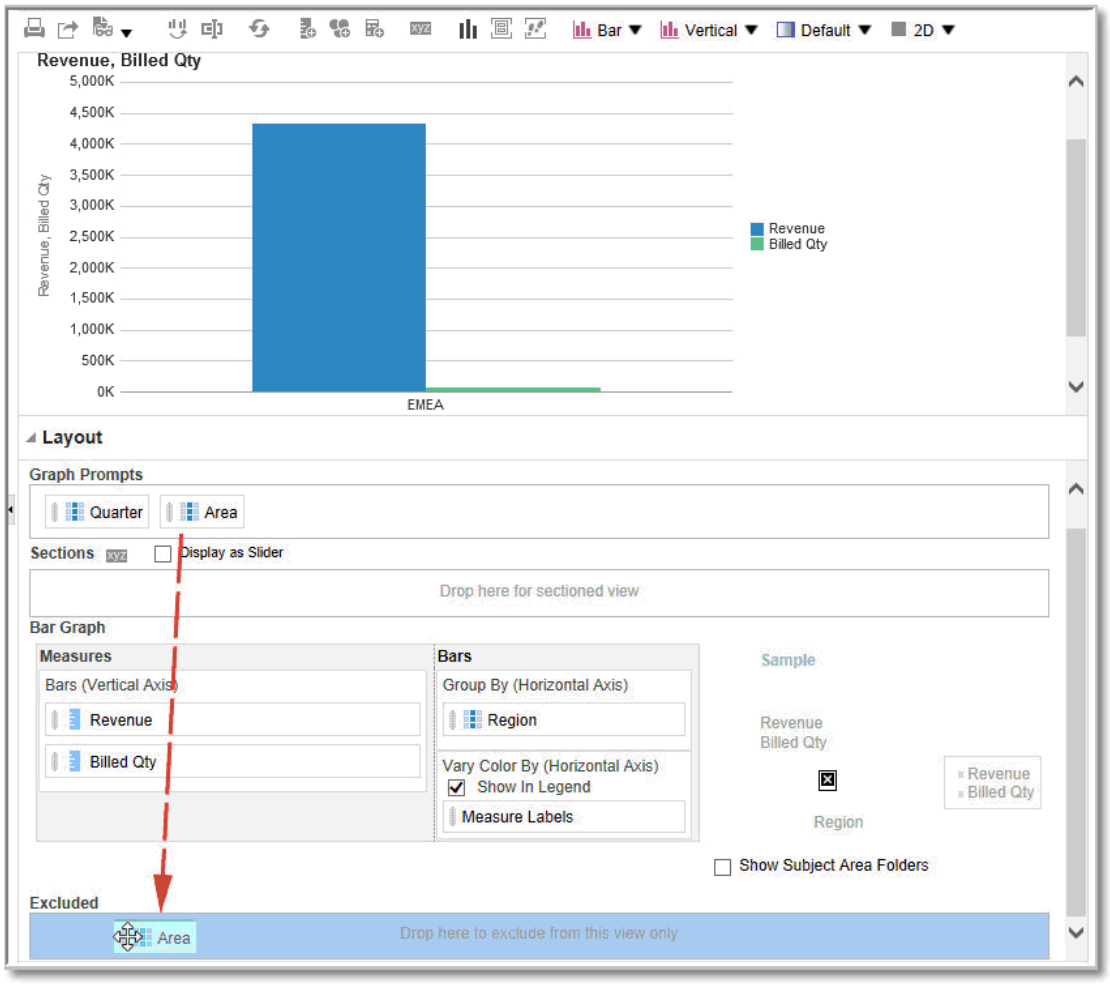
A general rule is that a column is placed in the Excluded drop target for a view if it isn't added explicitly to one or all views.

If you want a column that is in the Excluded drop target to be displayed in a view, then you can easily move it. Simply display the Layout pane for the view, and drag and drop the column from the Excluded drop target to the desired one.

Excluding columns differs from removing columns. You can use the **Remove Column** option from the **More Options** button in the Layout pane for a view to remove a column entirely from the analysis.

You place a column in the Excluded drop target after views have been created for the analysis in various ways. For example, you can select **Exclude Column** from the right-click menu of a view. Suppose that you're editing a view in its editor and you add a column to that view from the Subject Areas pane. The column is placed in the Excluded drop target for all other views in the analysis.

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About the Guidelines for Drop Targets for Various Views

As you modify the layout of views, there are guidelines that you need to bear in mind for drop targets in the Layout pane.

- Drop Target Guidelines for Graphs and Funnel Graphs
- Drop Target Guidelines for Heat Matrices
- Drop Target Guidelines for Trellises
- Drop Target Guidelines for Treemaps

Drop Target Guidelines for Graphs and Funnel Graphs

This reference describes the restrictions and guidelines that apply to dragging columns from one drop target and dropping them in another in graphs and funnel graphs.

- A bubble graph requires at least three measures. Plot one measure on the horizontal axis, another measure on the vertical axis, and a third measure on the bubble size axis.
- A pareto graph can have only one measure.

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If you drop another measure on the Measures drop target, then the measures are swapped; that is, the existing measure is replaced by the newly dropped measure and is moved automatically to the Excluded drop target.

- A time series line graph requires a single date or date-time data column to be selected on the horizontal axis. It has a single vertical axis, but supports multiple data series.
- A scatter graph requires at least two measures. For example, you can plot one measure column on the horizontal axis and another measure column on the vertical axis. These measures are plotted for values on the Group By axis.
- A funnel graph uses two measures but only one is required. If you don't select a second measure, then the first measure is used for the second measure. If you have selected two measures and then select a new measure, then the new measure replaces the measure currently in the Actual Measures drop target.
- A stacked bar graph requires at least two measures to allow comparison of values.

Drop Target Guidelines for Heat Matrixes

You use the Layout pane areas to visualize heat matrixes. You can quickly spot anomalies in large quantities of data and study individual values.

The Layout pane for heat matrixes is composed of various drop target areas:

Area	Guidelines
Prompts	Select an attribute or hierarchical column by which to filter the heat matrix. The Prompts area is initially empty. You can drag and drop one or more columns from the Sections, Rows, or Columns area or from the Subject Areas pane to the Prompts area.
Sections	Select an attribute or hierarchical column by which to section the heat matrix. The Sections area is initially empty. You can drag and drop one or more columns from the Prompts, Rows, or Columns area or from the Subject Areas pane to the Sections area.
Rows	Represents a column displayed in row alignment. All attribute and hierarchical columns defined on the Criteria tab are initially displayed in the Rows area in the order in which they were added to the Criteria tab. You can drag one or more attribute or hierarchical columns from the Subject Areas pane to the Rows drop target, or you can double-click one or more attribute or hierarchical columns to include in the Rows drop target. You can also drag and drop one or more attribute or hierarchical column from the Columns, Prompts, or Sections areas. If you add an attribute or hierarchical column to the heat matrix view after displaying the analysis results, then the new column is added as a subordinate column to the Rows drop target.
Columns	Represents a column displayed in column alignment. The Columns drop target is initially empty. You can drag one or more attribute or hierarchical column from the Subject Areas pane to the Columns drop target. You can also drag and drop one or more attribute or hierarchical column from the Rows, Prompts, or Sections areas.
Color By	See the next section for details.

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Details of the Color By Area for Heat Matrixes

The Color By area represents the measure value for the grouping and intersection of the row and column for heat matrixes.

- The first measure added in the Criteria tab is displayed as the Color By measure.
- You can select a measure from the **Color By** list. This list initially contains all measures added to the analysis in the Criteria tab.
- You can drag and drop a measure column from the Subject Areas pane to the Color By drop target. The current Color By measure is replaced with the new measure, and the heat matrix redraws to reflect the new measure.
  If you add a measure column to the heat matrix view after displaying the analysis results, then the new column replaces the existing column in the view and in the Color By drop target.
- If you remove the Color By measure column in the Criteria tab, then it's removed from the Color By list. The new measure value for the Color By list defaults to the last measure value added to the analysis.
  The Color By drop target is divided into two options:
  - **Style**: Select the style for the heat matrix. Style contains two options: **Percentile Binning** and **Continuous Color Fill**. If you select Percentile Binning as an option, then you can enter the number of bins, choose a color palette, and enter a custom label for the bins. If you select Continuous Color Fill, then the heat matrix tiles are displayed as a gradient color scheme.
  - **Color**: Select the color palette for the heat matrix.

Drop Target Guidelines for Trellises

This reference describes the guidelines that apply to working with drop targets in trellises.

- In advanced trellis views, measures comprise the innermost column headers of the trellis.
- When moving measures from the Color By drop target to or from the Group By drop target:
  - Dragging a single measure moves all the measures along with it. (This is known as sticky behavior.)
  - Dragging a new measure into the view moves all existing measures to wherever you place the new measure.
- To place a measure on the non-measure edge of a visualization, or in the Rows target or Columns target, you must first convert the measure to an attribute column. For information, see Editing the Formula for a Column.
- Attribute columns can be dragged out of the Measures drop target without causing the drop target or the measures inside it to move with the attributes.

Drop Target Guidelines for Treemaps

You use the Layout pane areas to visualize treemaps, which are constrained, hierarchical data. You can quickly spot trends and anomalies in large quantities of data and study individual values.

The Layout pane for treemaps is composed of various drop-target areas:

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Area	Guidelines
Prompts	Select an attribute or hierarchical column (excluding ragged and skip-level) by which to filter the treemap.
Sections	Select an attribute or hierarchical column (excluding ragged and skip-level) by which to section the treemap. For example, region that is grouped by year might be the container to display a treemap that is sized by revenue and colored by year-ago revenue.
Group By	Represents the top level of the hierarchical data that is sliced to produce or describe a container of aggregated values. The aggregated values display as tiles. The group area creates a header or group for the measure columns that are specified in the Size By and Color By areas. If more than one column of data is represented in the treemap, then a title bar is displayed for the grouping. For example, region that is grouped by year might be the container to display a treemap that is sized by revenue and colored by year-ago revenue. Region displays in the title bar.
Size By	Represents the distribution of the tiles within their parent. The size of the children is always equal to the size of the parent. Each rectangle's area is the aggregated value for the associated measure based on the applied filters (for example, prompted or filtered by region).
Color By	Represents a distribution of values across all of the tiles at the same level and adds additional scope to the analysis providing a "qualitative" perspective to the treemap.

Visualize Data in an Analysis

You can visualize data in analyses.

From the Home page

1. In the Home page, locate the analysis you want to visualize.
   For example, click the **Workbooks and Reports** search tag below the Search bar, or click the Search bar and select **Analysis**.
2. Hover over the analysis, click **Actions**, and select **Explore As Workbook**.
   You'll see the analysis displayed as a visualization. You can visualize the data, make changes, and save it as a visualization workbook.

From the Classic Home page

1. Navigate to the Classic Home page.
   If you're in the Home page, from the **Page Menu**, click **Open Classic Home**.
2. In the Recent pane or Catalog page, locate the analysis you want to visualize.
3. Click **More**, then **Explore As Workbook**.
   You'll see the analysis displayed as a visualization in a new browser tab or page. You can visualize the data, make changes, and save the workbook as a visualization.

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Build Dashboards

This chapter describes how to build dashboards to provide personalized views of corporate and external information.

Video

Topics:

- Typical Workflow to Build Dashboards
- Create Your First Dashboard
- Edit Dashboards
- Add and Delete Pages in Dashboards
- Create and Manage Layouts for Dashboards and Dashboard Pages
- Print Dashboards
- Organize Dashboard Pages in Briefing Books
- Save and Restore Dashboard State
- Publish Dashboard Pages
- Link to Dashboard Pages

Typical Workflow to Build Dashboards

Here are the common tasks to start building dashboards.

Task	Description	More Information
Create multiple analyses	Build analyses on which you can create views that you display on a dashboard.	Create Your First Analysis
Create a dashboard	Create a dashboard to display data from analysis.	Create Your First Dashboard
Add content to a dashboard page	Add content to dashboard pages to display items such as views and prompts.	Add Content to Dashboard Pages
Add prompts to dashboard pages	Add prompts to dashboard pages to drive the content on the pages.	Add Prompts to Dashboard Pages
Add pages to a dashboard	Optionally add one or more pages to the dashboard to display the data in various ways.	Add Pages to Dashboards
Recall personal settings for dashboards	Create customizations that enable you to view pages in their current state or with your favorite choices already selected.	Save and Restore Dashboard State
Run the dashboard	Try out the completed dashboard. Click **Run**.	

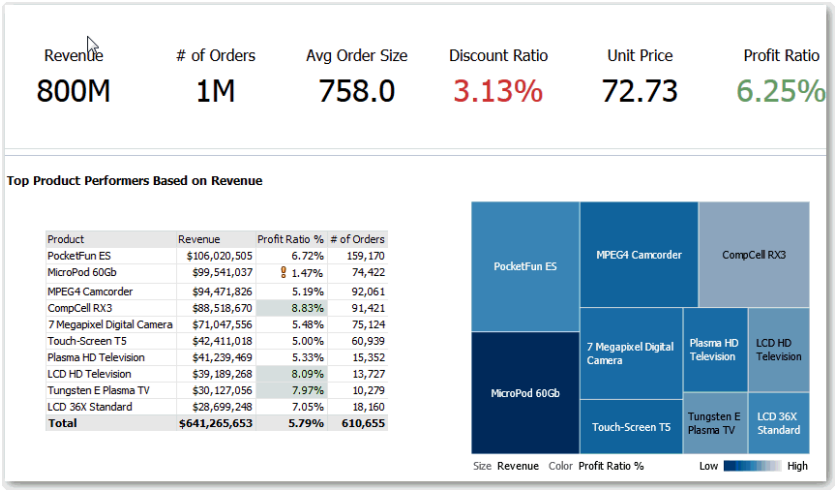
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Create Your First Dashboard

You can create dashboards to provide personalized views of corporate and external information. A dashboard consists of one or more pages that display results of an analysis.

Video

For example, you can create a Sales Performance dashboard and add content to track your team's revenue. Suppose you create three views for an analysis: performance tile view, a table view, and treemap view. You can create a dashboard that displays these three views. You can include prompts on the dashboard to enable users to specify the values to display in the views. See Create Column Prompts.



1. On the Classic Home page, in the **Create** pane, click **Dashboard**.
2. In the New Dashboard dialog, enter a short name and description for the dashboard.
3. Under **Location**, select where to save the dashboard. Where you save a dashboard determines whether the dashboard is private to you or shared with others.
   - To save for your personal use and private to you, save the dashboard in `/My Folders`.
   - To share with others, save the dashboard in `/Shared Folders`.
     To share a dashboard with others and to not list the dashboard in the **Dashboard** menu in the global header, save the dashboard in any level (such as `/Shared Folders/Company/Sales/Eastern`).

     If you specify a shared folder in which no dashboards have been saved, then a new Dashboards subfolder is created automatically.

     For example, if you select a folder named /Shared Folders/Company/Sales in which no dashboards have been saved, a new Dashboards folder is created. The Location entry changes to `/Shared Folders/Sales/Dashboards`. (A new Dashboards folder isn't automatically created if you choose a folder at any other level.)
4. Specify that you want to add content to the new dashboard now.
5. Click **OK**.

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The new dashboard, which contains one blank page, is displayed in the Dashboard builder for editing.

Edit Dashboards

You can edit dashboards to which you have appropriate permissions and privileges. You can add or delete dashboard pages, add content such as columns and sections, and edit properties and settings such as print options.

For example, you can add content to a Sales Performance dashboard to track your team's progress by adding a Brand Revenue analysis from the catalog.

1. Open the dashboard.
2. Click **Page Options**, then select **Edit Dashboard**, and make your changes.

Add and Delete Pages in Dashboards

You can add and delete pages in dashboards.

Topics:

- Add Pages to Dashboards
- Add Subpages to Dashboards
- Add Content to Dashboard Pages
- Understand How Dashboard Pages and Oracle Analytics Publisher Reports Interact
- Configure the Style and Behavior of Dashboards and Pages
- Change the Properties of Objects Added to Dashboard Pages
- Delete Objects on Dashboard Pages
- Delete Dashboard Pages
- Delete Dashboard Subpages

Add Pages to Dashboards

You can add new pages to organize content of a dashboard.

For example, you can first add a new dashboard page that contains regional sales data in a table and in a bar graph. Then, you can add another that contains links to various competitors' web sites.

1. Open the dashboard for editing.
2. On the toolbar of the Dashboard builder, click **Add Dashboard Page** and select the Add Dashboard Page menu option.
3. Follow the on-screen instructions.

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Add Subpages to Dashboards

You can add a new subpage to a dashboard to display additional information.

Adding subpages allows a second level of information to be presented to users. For example, you can first add a new dashboard page that contains regional sales data in a table and in a bar graph. Then, you can add a subpage that contains links to various competitors' web sites.

1. Open the dashboard for editing.
2. On the toolbar of the Dashboard builder, click **Add Dashboard Page** and select the **Add Subpage** menu option.
3. Follow the on-screen instructions.

Add Content to Dashboard Pages

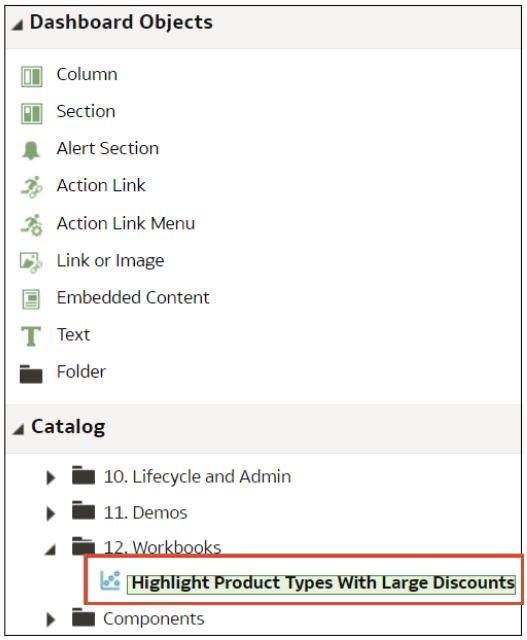
You can add dashboard objects (any of the objects from the Dashboard objects pane) to dashboard pages. You can also add objects that you have saved in the catalog.

For example, you can add content to the newly created Sales Performance dashboard to track your team's progress. To do so, you can add a Brand Revenue analysis from the catalog.

1. Open the dashboard for editing.
2. Navigate to the page to which you want to add content.
3. In the Dashboard Builder, select the objects to analyze in the Dashboard Objects pane or the Catalog pane and drag and drop them to the Page Layout area.
    - Use **Column** to add a column to align content on a dashboard. You can create as many columns on a dashboard page as you need. You can place columns horizontally or vertically.
    - Use **Section** to add sections within columns to hold the content for the page, such as action links and analyses. You can include as many sections as you need for a column.
    - Use Publisher Report to add one or more reports to make them available to other users. You can use a report to add configured analyses to a dashboard page. You can add a report as embedded content for display on the dashboard page or as a link to open the report in Oracle Analytics Publisher. If you modify in Oracle Analytics Publisher a report you added to a dashboard page and save your changes, then you must refresh the dashboard page to see those modifications.

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- Use Visualizations to embed visualizations and canvases in dashboards to share them with analysts. Drag the project onto the canvas, then choose which canvas or insight to display.



4. Set the properties of each object, as appropriate by clicking **Properties**.
5. Click **Save**.

Understand How Dashboard Pages and Oracle Analytics Publisher Reports Interact

You can run, view, and interact with a Publisher report on a dashboard page.

When you add a Publisher report to a dashboard page, the report includes a toolbar that provides these options:

- Analyze the data in the report.
- Select the layout template of the report.
- Change the output format of the report.
- Export the report.
- Send the report to an available destination such as a printer, fax, email, or FTP.
- Schedule the report.

When you configure an agent for a dashboard page that contains a Publisher report, be aware of these criteria:

- The output format of the Publisher report must be PDF.
- The agent must be set to deliver content in PDF format.

You can print a dashboard page or a briefing book that contains a Publisher report in certain formats.

If you want to print a dashboard page that contains a Publisher report or to include the page in a briefing book, then you must keep the following points in mind:

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- If you print the briefing book as PDF and if the output format of the Publisher report is PDF, then the Publisher report is printed after the other objects on the page. If you print a dashboard page that contains a Publisher report as PDF, but the dashboard page isn't part of a briefing book, then the Publisher report isn't printed.
- If you print the dashboard page or briefing book as MHTML, then the Publisher report isn't printed.

Configure the Style and Behavior of Dashboards and Pages

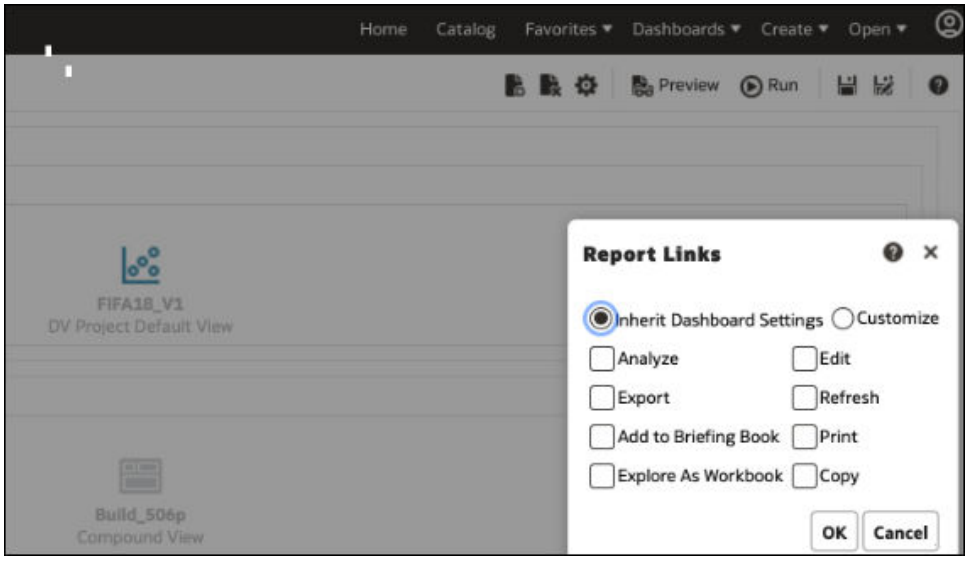
Use dashboard properties to configure style and behavior of dashboards and pages. For example, you might specify whether your team members can export, refresh, or print pages in a dashboard.

1. Open the dashboard for editing.
2. To specify the dashboard style and behavior, click **Tools** and select **Dashboard Properties**.

   In the Dashboard Properties dialog, make the property changes that you want. For example:

   - Use **Style** to select from a list of available dashboard styles if you want to change dashboard properties, such as logo, branding, page color, and link color. Administrators create styles and make them available to dashboard builders and users. If you want to use a style that isn't listed, ask your administrator to create a new style for you then start a new browser session and try again.
   - Use **Dashboard Report Links** to specify which report links (Analyze, Edit, Refresh, Print, Export, Add to Briefing Book, and Copy) to include with analyses at the dashboard level. You can set these links at the dashboard page level or the analysis level (which overrides dashboard level links).
   - Use **Contains HTML Markup** if you have administrator privileges to format content with valid HTML markup, including JavaScript.
   - Use **Hidden Page** to show the page heading of a hidden page when you navigate to it.
3. To specify the options displayed when content is embedded in an application, click **Tools**, then select **Page Report Links** to display the Report Links dialog. Select **Inherit Dashboard Settings** to embed dashboards with the same options as displayed in Oracle Analytics Cloud, or click **Customize** to change the options.

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For example, you might click **Customize**, then click **Explore As Workbook** to display a link at the bottom of an embedded analysis that enables the dashboard user to explore the report as a visualization.



4. To specify how a dashboard handles incoming navigation parameters, click **Tools** and select **Advanced Page Properties** to review navigation options.

   Incoming navigation parameters control the behavior of Oracle Analytics content shared to external portals or applications. For example, navigation parameters might direct users to a

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particular page in a dashboard, and format the content for PDF output. In the Advanced Page Properties dialog, you use the **Incoming Navigation Options** to specify whether navigation parameters are applied to all pages in the dashboard or just the landing page.

You can configure the behavior of these navigation links:

- **Prompted URL** - These links direct users to a specific dashboard page and can include formatting parameters. For example, a Prompted URL might go straight to a particular page, and format the content for PDF output.
- **Go URL** - These links include parameters to control how content looks and behaves. For example, a Go URL might include a username and password, and a command to refresh the results on a page.
- **"Navigate to BI Content" Actions** - These links use the Action Framework to direct users to specific areas of content.

5. For each type of navigation link, select the scope of the navigation parameters.
   - Click **Dashboard** to apply the navigation parameters to all pages in the dashboard. For example, if a prompted URL link formats the content for PDF output (using &Action=Print), then you format all pages in the dashboard for output to PDF.
   - Click **Page** to to apply the navigation parameters to the landing page only. For example, if a prompted URL link formats the content for PDF output (using &Action=Print), then you format just the landing page for output to PDF.
6. Click **OK**, then click **Save**.

Change the Properties of Objects Added to Dashboard Pages

You can change the properties of objects that have been added to a dashboard page.

For example, you can change the column properties of the Brand Revenue analysis to specify the heading display in 14-point bold Helvetica font.

1. Open the dashboard for editing.
2. Navigate to the page that contains the object.
3. Hover the mouse pointer over the object in the Page Layout area to display the object's toolbar and click **Properties**.

   Depending on the object type, you'll either display a menu of editing options or a properties dialog.
4. Make the property changes that you want.

   For example, for a dashboard section, you might select **Rename** to change the default section name, or for a dashboard web link you might change the caption or target URL.
5. Save your changes.

Delete Objects on Dashboard Pages

If you add an object that you later decide that you don't want, then you can delete it.

For example, you can delete last year's Brand Revenue analysis from the Sales Performance dashboard, to replace it with the current year's analysis.

1. Open the dashboard for editing.
2. Navigate to the page that contains the object to delete.

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3. Hover the mouse pointer over the object in the Page Layout area to display the object's toolbar and click **Delete**.

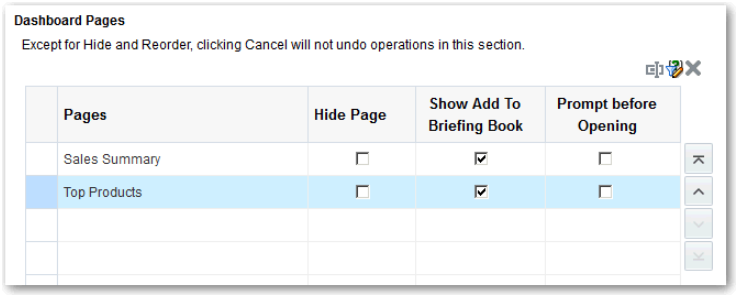
Delete Dashboard Pages

You can delete the current dashboard page, or one or more dashboard pages.

For example, you can delete pages 2 and 3 from the Sales Performance dashboard to retain only the page with the most recent Brand Revenue analysis.

You can delete one or more dashboard pages:

1. Open the dashboard for editing.
2. Click **Tools** and select **Dashboard Properties**.
3. For each page to delete:
   a. In the **Dashboard Pages** area of the dialog, select the page.
   b. On the Dashboard Pages toolbar, click **Delete.**

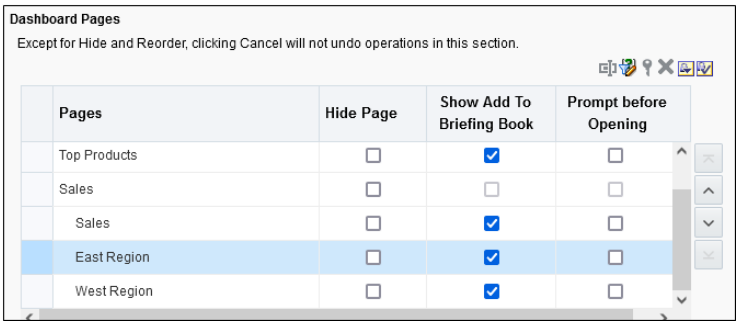


   c. Confirm the deletion.
4. Click **OK**.

Delete Dashboard Subpages

You can delete one or more dashboard subpages from within a dashboard page.

1. Open the dashboard for editing.
2. Click **Tools** and select **Dashboard Properties**.
3. For each subpage that you want to delete:
   a. In the **Dashboard Pages** area of the dialog, select the dashboard subpage that you want to delete.



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b. On the Dashboard Pages toolbar, click **Delete**.

c. Confirm the deletion.

4. Click **OK**.

Create and Manage Layouts for Dashboards and Dashboard Pages

You can specify and manage dashboard layouts for printing or exporting.

- About Custom Print and Export Layouts
- Create Custom Layouts
- Edit, Replace, or Remove Custom Layouts
- Items Not Supported for Custom Print Layouts in Oracle Analytics Publisher

About Custom Print and Export Layouts

You can create and define custom layouts for printing and exporting an entire dashboard or a single dashboard page.

Custom layouts allow you to:

- Produce high-quality printed dashboard content.
- Export dashboard content customized for Excel.

When you create a custom layout:

- The dashboard page is exported to Publisher, and the following items are auto-generated:
  - A Publisher report with a layout based on the exported dashboard layout.
  - A data model to retrieve data for the dashboard page components.
- The Publisher Report Editor opens in a new browser window with the auto-generated layout displayed as a thumbnail. The report editor allows you to edit, delete, or add a layout.

When you're creating a print layout, Publisher doesn't support some of the customizations and views such as hierarchical columns and map views.

After you've saved the custom layouts in Publisher, they're available for that dashboard and appear in the Custom Print & Export Layouts area of the Print & Export Options dialog.

If you delete the data model or the layouts manually from the Catalog, then the associated Publisher report won't work, and the layouts aren't available. If you delete an analysis, then the data model and layout are available but fail when run.

Create Custom Layouts

You can create one or more custom layouts for printing and exporting an entire dashboard or a single dashboard page.

The administrator can control the display of the Custom Print & Export Layouts component.

1. Open the dashboard or dashboard page that you want to print or export.
2. On the Dashboard page toolbar, click **Tools** and select **Print & Export Options**.

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3. In the Custom Print & Export Layouts area, click the gear icon, then select **Create Layouts**.

   The BI Publisher Report Editor opens in a new browser window with the auto-generated layout displayed as a thumbnail.

4. Make your changes in BI Publisher, and save the changes.
5. Close BI Publisher and save the dashboard.
6. To make the custom layouts available to users, do the following:
   a. Open the Print & Export Options dialog and go to the Custom Print & Export Layouts area.
   b. For each custom layout that you want to make available, select the following:
      - **PDF** - To make the layout available in the Print menu of a dashboard page.
      - **Excel** - To make the layout available in the Export to Excel menu of a dashboard page.
   c. Click **OK** to close the Print & Export Options dialog.
   d. Save the dashboard.

The analysis and dashboard font size is in pixels, but the Excel font size is in points. Therefore, when you export to Excel from an analysis or dashboard, the font size decreases to 75% of the analysis or dashboard font size.

Edit, Replace, or Remove Custom Layouts

You can edit, replace, or remove custom print and export layouts that you've created. For example, you might want to remove a custom print layout if the dashboard page to which the layout is associated has changed.

1. Open the dashboard or dashboard page.
2. On the Dashboard page toolbar, click **Tools** and select **Print & Export Options**.
3. In the Print & Export Options dialog, go to the Custom Print & Export Layouts area and click the gear icon, then select one of the following:
   - **Create and Edit Layouts** - A warning message is displayed indicating that the existing print layouts may not work properly if the dashboard page has been modified. Select one of the following and click **OK**:
     - **Keep existing layouts** - The BI Publisher Report Editor opens in a new browser window, where you can edit the existing layouts.
     - **Remove existing layouts and create new layouts** - The BI Publisher Report Editor opens in a new browser window, where you can create new layouts.
   - **Replace Layouts** - A warning message is displayed indicating that all the existing layouts will be replaced. Click **OK** to delete the associated BI Publisher report and data model, and auto-generate new layouts. The BI Publisher Report Editor opens in a new browser window, where you can create new layouts.
   - **Remove Layouts** - A warning message is displayed indicating that all the existing layouts will be removed. Click **OK** to remove the layouts and the associated BI Publisher report and data model.
4. When you've finished editing, replacing, or removing layouts, click **OK** to close the Print & Export Options dialog.
5. Save the dashboard.

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Items Not Supported for Custom Print Layouts in Oracle Analytics Publisher

Custom print layouts support a limited set of items.

If Publisher doesn't support an item, that item is removed from the layout and you see a message that indicates the reason for the unsupported item.

Print Dashboards

You typically view dashboards in electronic form. You can easily print a dashboard if you want to see its pages in PDF or HTML format.

For example, you can print a Stock Control dashboard page so you can refer to it during a visit to a supplier's factory. At this location, no external computing devices are permitted.

1. Open the dashboard.
2. Navigate to the dashboard page to print.
3. Click **Page Options**, then select **Print**.
4. Select **Printable PDF** or **Printable HTML**.
5. Open Adobe Acrobat or a browser window and print from there.

Organize Dashboard Pages in Briefing Books

You can organize dashboard pages in briefing books.

Topics:

- Add Content to New or Existing Briefing Books
- Edit the Content of Briefing Books
- Download Briefing Books
- Add a List of Briefing Books to a Dashboard Page

Add Content to New or Existing Briefing Books

You can add the content of dashboard pages or individual analyses to new or existing briefing books. A briefing book is a collection of static or updatable snapshots of dashboard pages and individual analyses.

For example, you might add the contents of a Regional Revenue analysis to a briefing book each quarter so that you can review quarterly revenue.

1. Open the dashboard for editing.
2. Navigate to the page to add or that contains the analysis to add.
3. To add the results of an individual analysis to a briefing book:
   a. Edit the dashboard, and select **Tools**, then **Page Report Links**.
   b. Select the **Customize** option and click **Add to Briefing Book**.
   c. Click **OK**.
4. To add the contents of the dashboard page to a briefing book:

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a. Click **Page Options** and select **Add To Briefing Book**.
b. In the Save Briefing Book Content dialog, click **Browse**.
c. In the Save As dialog, choose where to save content, then click OK.

Edit the Content of Briefing Books

You can edit briefing books to reorder content, delete content, and change the content type, navigation link properties, and content description.

For example, you can edit a briefing book to change the content description to reflect the periods of Brand Revenue analysis data.

1. In the global header, click **Catalog** to display the Catalog page.
2. Navigate to the briefing book to edit and click **Edit**.
3. In the Edit Briefing Book dialog, change the content:
   a. Select the content.
   b. Click **Edit Page** and change the content type, the number of navigation links to follow for updatable content, or the content description.
   c. Click **OK**.
4. Click **OK**.

Download Briefing Books

You can download briefing books to share them for viewing in different formats.

You can:

- Download briefing books to your computer in MHTML format and then share them for offline viewing.
- Download briefing books in PDF format and print them (you'll need Adobe Reader). The PDF version of a briefing book contains an automatically generated table of contents.

For example, you can download a briefing book that contains all the Brand Revenue analyses for the year. After downloading, you can view the briefing book in Adobe Reader and print it in preparation for a sales presentation.

1. In the global header, click **Catalog** to display the Catalog page.
2. Navigate to the briefing book to download.
3. Perform one of the following actions:
   - To download the briefing book in PDF format, click **PDF** and open or save the file.
   - To download the briefing book in MHTML format, click **Web Archive (.mht)** and open or save the file.
     Downloaded briefing books are saved with an .mht file extension and can be opened in a browser. You can then email or share the briefing book.

Add a List of Briefing Books to a Dashboard Page

You can add a list of briefing books to a dashboard page.

For example, you can add a list of briefing books that contain Brand Revenue analyses to a Sales Performance dashboard page.

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1. Open the dashboard for editing.
2. Navigate to the page to which you want to add a list of briefing books.
3. From the Dashboard Objects pane, drag and drop a folder object into a section.
4. Hover the mouse pointer over the folder object in the Page Layout area to display the object's toolbar and click **Properties**.
5. In the Folder Properties dialog, in the **Folder** field, enter the folder that contains the briefing books to list.
6. In the **Expand** box, specify whether to show an expanded view of the folder.
7. Click **OK** and click **Save** to save the dashboard.

Save and Restore Dashboard State

You can save personalized settings that you make for a dashboard page and later apply these settings to any dashboard.

As you work with dashboard pages, you frequently make the following types of settings:

- Filters
- Prompts
- Column sorts
- Drills in analyses
- Section expansion and collapse

If you save the settings as a customization, you don't have to make these choices manually each time you access the dashboard page.

Topics:

- Save Customizations of Dashboard Pages
- Apply Saved Customizations
- Edit Saved Customizations
- Clear the Current Customization

Save Customizations of Dashboard Pages

You can save customization for use by you or by others who have author, but not a consumer, role. You can also specify whether the customization is to be the default customization for a dashboard page, for you or for others.

For example, you can save a customization of the Sales Performance dashboard. The customization enables sales managers with permission to see a customized view of the Brand Revenue analysis.

1. Open the dashboard.
2. Navigate to the page on which you want to save a customization.
3. Make your personalized settings.
4. Click **Page Options** and select **Save Current Customization**.
5. Enter a descriptive name for the customization and specify for whom the customization is to be saved.

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6. Click **OK**.

Apply Saved Customizations

You can apply customizations that you have saved for your own personal use. You can also apply customizations that have been saved by someone else for your use.

For example, you can apply a shared Sales Team customization that was created for customized viewing of a Brand Revenue analysis by members of the sales team.

1. Open the dashboard.
2. Navigate to the page that contains the customization to apply.
3. Click **Page Options** and select **Apply Saved Customization**.

   Your personal saved customizations are shown, followed by shared saved customizations.
4. Click a saved customization in the list to apply it to the dashboard page.

Edit Saved Customizations

You can rename and delete customizations and change which customization to use as your default.

For example, you can change your default customization to one that you just saved for the Sales Performance dashboard.

1. Open the dashboard.
2. Navigate to the page that contains the customization to edit.
3. Click **Page Options** and select **Edit Saved Customizations**.
4. Rename or delete customizations or change the default customization, as appropriate.
5. Click **OK**.

Clear the Current Customization

You can clear the current customization if you decide that the choices for items such as filters, prompts, column sorts, drills in analyses, and section expansion and collapse aren't what you want.

For example, you can clear a customization that collapses the display of the Brand Revenue analysis.

To clear the current customization, click **Page Options** and select **Clear My Customization**. The current customization is cleared.

Publish Dashboard Pages

You can publish your dashboard pages to a shared dashboard and make them available to other users.

When you publish a dashboard page:

- Contents on the dashboard page are copied to the destination dashboard, and their references are updated.
- References to the shared content are retained.

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- Unsaved contents on the dashboard page are published with the saved contents.
- Ensure that other users who might display the published dashboard have the appropriate privileges for the objects on those pages. For example, if a page contains a BI Publisher report, then users must have privileges to view that report.

1. Open the dashboard for editing and navigate to the page you want to publish.
2. Click **Tools** (), then select **Publish Page to Dashboard**.

   A message is displayed if you have unsaved contents on the dashboard page. Click **OK** to publish them.
3. In the Publish Page to Dashboard dialog, specify the destination dashboard in the Dashboard field.

   A message is displayed if contents such as a page, analyses, and prompts exist in the destination dashboard. Click **OK** to replace the existing content in the destination dashboard.
4. 5. Click **OK** to publish the page to the destination dashboard.

Link to Dashboard Pages

You can create links to dashboard pages so that you can easily enable other users to display those pages.

For example, you can create a link to the Sales Performance dashboard and send the link to team members in an email.

Topics:

- About Bookmark Links
- Create Bookmark Links to Dashboard Pages

About Bookmark Links

A bookmark link is a URL that captures the path to a dashboard page and all aspects of the page state.

After you create a bookmark link, you can:

- Save the link as a bookmark so that you can return to the exact same page content at a later time.
- Copy and send the link to other users who then can view the exact same content that you're viewing. They can do this providing they have the same permissions as you and have access to the page.

When you create a bookmark link, the state of a dashboard page is saved in the catalog as a hidden bookmark object. The default number of days to save the object is 30.

Create Bookmark Links to Dashboard Pages

You can create bookmark links to dashboard pages that you can revisit or share with others.

1. Open the dashboard.
2. Navigate to the page for which you want to create the link.

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3. From the Page Options menu, select **Create Bookmark Link**.

The link is displayed in the Address Bar of the browser. If the link is a bookmark link, then you can save it as a bookmark or copy and send it to other users.

You can drill in an analysis that has been set to replace the dashboard with the new results. You can do the replacement rather than showing the new results directly on the dashboard. In this case, the **Create Bookmark Link** option is displayed as a link below the new results. This option isn't displayed on the Page Options menu.

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Filter and Select Data for Analyses

This chapter describes how to filter and select data for analyses.

Topics:

- Typical Workflow to Filter and Select Data
- About Filters and Selection Steps
- Create Filters for Columns
- Edit Filters for Columns
- Reuse Filters
- Use a Saved Analysis as a Filter
- Advanced Techniques: How Dashboard Prompts and Analysis Prompts Interact
- Refine Selections of Data
- Manipulate Members with Groups and Calculated Items

Typical Workflow to Filter and Select Data

Here are the common tasks to start filtering and selecting data to display in analyses.

Task	Description	More Information
Create an analysis	Select and arrange columns that you want to use in an analysis.	Create Your First Analysis
Create a filter	Limit the results that are displayed when an analysis runs.	Create Filters for Columns
Edit a filter	Change the operator and values in a filter.	Edit Filters for Columns
Save a filter	Save filters in the catalog or with the analysis.	Save Inline and Named Filters
Create a selection step	Select members, new groups, existing groups, new calculated items and conditions for displaying data.	Create Selection Steps
Create a group	Group column values for display in an analysis.	Create Groups and Calculated Items
Create a calculated item	Apply a function to column values to calculate a new value.	Create Groups and Calculated Items

About Filters and Selection Steps

You use both filters and selection steps to limit the results in an analysis. For example, you might list the top ten sales performers, or the most profitable customers. A filter is applied to a column before selection steps are applied.

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- Filters are applied directly to columns before the query is aggregated. Filters affect the query and thus the resulting values for measures. For example, suppose that you have a list of members in which the aggregate sums to 100. Over time, more members meet the filter criteria and are filtered in, which increases the aggregate sum to 200.
- Selection steps are applied after the query is aggregated and affect only the members displayed, not the resulting aggregate values. For example, suppose that you have a list of members in which the aggregate sums to 100. If you remove one of the members using a selection step, then the aggregate sum remains at 100.

About Prompted Filters

A prompted filter's operator is set to **is prompted**. This operator is valid for a column that contains text, numbers, or dates.

When you select the **is prompted** operator for a filter's column, you flag the column as ready to be filtered by a prompt. When a prompt is used, results include only records where the data in the column that is prompted matches the user's choices.

The **is prompted** operator is required for columns that are included in prompts where no prefiltered values are wanted.

Create Filters for Columns

You can create filters for columns.

Video

Topics:

- Create Inline and Named Filters
- Specify Values for Filters
- Embed an EVALUATE_PREDICATE Function in a Filter
- Combine and Group Filters
- Save Inline and Named Filters

A filter limits the results that are displayed when an analysis is run. Together with the columns that you select for the analysis, filters determine what the results contain. You specify filter criteria to display only the results that you want to show.

Create Inline and Named Filters

In most cases, you create and include a filter "inline" for use in only one analysis. You can also create a named filter to reuse the filter across all analyses and dashboards. Unless you want to reuse the filter, create an inline filter.

For example, as a sales consultant, you can analyze revenue for only those brands for which you're responsible.

Create an inline filter from the Selected Columns pane on the Criteria tab

1. Open the analysis for editing.
2. On the Selected Columns pane of the Criteria tab, click **Options** beside the column name and select **Filter**.

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Create an inline filter from the Filters pane on the Criteria tab

1. Open the analysis for editing.
2. On the Filters pane of the Criteria tab, click **Create a filter for the current Subject Area**.
3. Select a column name from the menu.

Create a named filter from the Home page

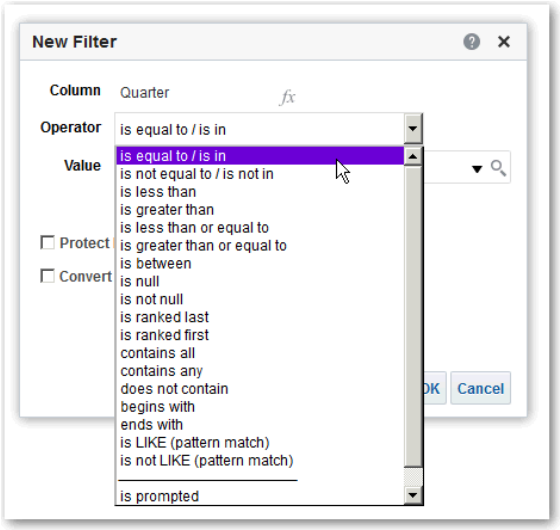
1. From the Classic Home page, in the **Create** pane, click **More** under **Analysis and Interactive Reporting**, then click **Filter**.
2. In the Select Subject Area dialog, select the data source that you want to filter. The New Filters dialog is displayed.

Specify Values for Filters

You can specify the values for a filter that displays in an analysis only those values in which you're interested.

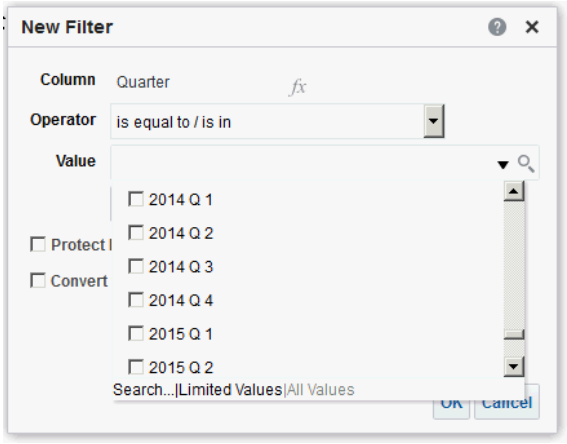
For example, in the Brand Revenue analysis, a filter can limit the analysis results to only the first quarter values in three years. As a result, you can discover how revenue performed year-to-year in these quarters.

1. In the New Filter dialog, select the appropriate operator such as **is equal to / is in**.



2. Select values from the list or click the **Search** icon to find more values from which to select.

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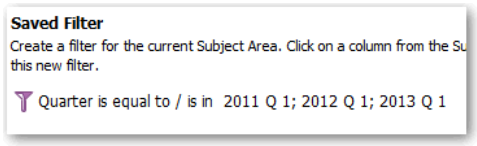


3. Optional: Select **Protect Filter** to prevent prompts from overwriting the filter.
4. Optional: Select **Convert this Filter to SQL**.
5. Click **OK**.

- For inline filters, the filter is displayed in the Filters pane on the Criteria tab.



- For named filters, the filter is displayed in the Saved Filters pane.



After specifying values, save the filter as named or inline.

Embed an EVALUATE_PREDICATE Function in a Filter

You can add an EVALUATE_PREDICATE function as an inline filter clause.

You can use this function when you can't create the required inline filter clause with filter operators. Use this function only for SQL functions and for database functions with a return type of Boolean. You can't use this function with hierarchical columns, XML data sources, and all multidimensional data sources. You need the Add EVALUATE_PREDICATE Function privilege granted by an administrator to embed this function in a filter.

1. Open the analysis for editing.
2. On the Filters pane of the Criteria tab, click **More options** and select **Add EVALUATE_PREDICATE Function**.
3. Enter the function's formula in the New EVALUATE_PREDICATE Function dialog.
4. Click **OK** to add the EVALUATE_PREDICATE function in the Filters pane.

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For example, you can add the following filter clause using an EVALUATE_PREDICATE function to exclude values with less than six letters in the Products.P4 Brand column.

```
SELECT
0 s_0,
"A - Sample Sales"."Products"."P3 LOB s_1,
"A - Sample Sales"."Products"."P4 Brand" s_2,
"A - Sample Sales"."Base Facts"."1- Revenue" s_3
FROM "A - Sample Sales"
Where EVALUATE_PREDICATE('length(%1)>6',"A - Sample Sales"."Products"."P4
Brand").
ORDER BY 1,2,3
```

Combine and Group Filters

You can combine and group multiple inline filters to create complex filters without using SQL statements.

You group or combine filters to establish the precedence in which data in an analysis is filtered. When you add two or more inline filters to an analysis or named filters, by default, the inline filters are combined using the **AND** Boolean operator. The **AND** operator indicates that the criteria specified in all the inline filters must be met to determine the results when an analysis is run.

You use the **OR** Boolean operator to indicate that the criteria specified in at least one of the filters must be met to determine the results of the analysis. The **OR** operator helps you to create a group of multiple filters using alternate criteria.

1. Open for editing a named filter or an analysis that contains inline filters.
2. On the Filters pane of the Criteria tab, confirm that the analysis contains two or more inline filters. Alternatively, on the Saved Filter pane, confirm that the named filter contains two or more inline filters.
3. On the Saved Filter pane or in the Filters pane of the Criteria tab, notice how the inline filters are combined using **AND** or **OR** operators.
4. Click the word **AND** before an inline filter to change an **AND** operator to an **OR** operator. You can toggle between the **AND** and **OR** operator in this way.
5. Change the **AND** and **OR** operators for other inline filters to create the required filter combinations. Alternatively, create more inline filters and change the **AND** and **OR** operators.
6. Click **Save Analysis** or **Save Filter** to save the filter combinations.

Save Inline and Named Filters

You can save inline filters and named filters.

When you create an inline filter in the Filters pane, you can optionally save the inline filter as a named filter. When you save an inline filter as a named filter, other people on your team can use this filter in a new analysis. You can also create a named filter as a standalone object from the global header.

For example, you can save a filter for the Quarter column in a shared folder in the catalog. As a result, your manager has access to that filter. Suppose that you save the filter that limits quarters to 2011 Q1, 2012 Q1, and 2013 Q1. Your manager can use this filter in a Product Revenue analysis to find how products performed only during these quarters.

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To save a named filter, simply click **Save As** on the toolbar, specify folder in the catalog, and click **OK**.

To save an inline filter as a named filter, do the following:

1. On the Filters pane on the Criteria tab, click **More options** and select **Save Filters**.
2. Specify a folder in the Oracle BI Presentation Catalog.
3. Click **OK**.

Edit Filters for Columns

You can edit an inline filter when you need to make changes to it. When you edit and save a named filter, the changes that you make to the filter propagate to wherever the filter is used.

For example, you can edit the filter for the Quarter column to include data for the "2010 Q1" quarter. This data is propagated to every analysis where the filter is applied.

1. Display the Edit Filter dialog.

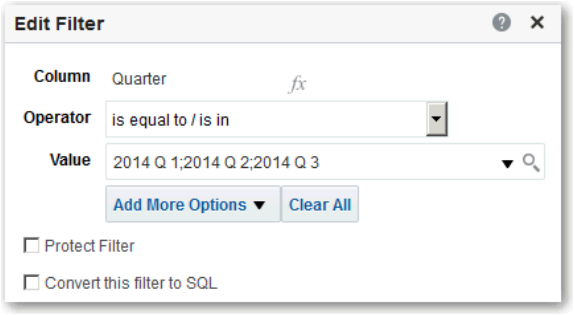
   For example, on the Saved Filter pane or in the Filters pane of the Criteria tab, hover the cursor over the filter, then click **Edit Filter**.



2. In the Edit Filter dialog, change the selection for any of the options that are described in the following table:

Option	Description
Operator	Select an operator to apply to the values that are specified in the **Value** field. The **Operator** list is populated based on the function that you're performing (such as creating a filter or creating a dashboard prompt). It's also populated based on the type of column that you selected. For example, you can choose **is greater than** to use only values greater than the value that you select in the **Value** list. If you select 100,000 from the **Value** list, then the filter uses values from the column that are greater than 100,000. You can use this information in an analysis to focus on products that are performing best.
Value	Specify a value or values from the list that contains members of the column that you select. You can also enter the value into the field manually or search. For example, suppose that you want to edit a filter that you have created for the Products column of an analysis. The **Value** field contains a list of products from the column. Depending on the operator that you chose, you can select one or more products to include in the analysis.
Protect Filter	Select this option to prevent prompts from overwriting the filter.
Convert this Filter to SQL	Select this option to convert the filter to a SQL WHERE clause that you can edit manually. After you convert a filter to SQL code, you can no longer view and edit the filter in the Edit Filter dialog.

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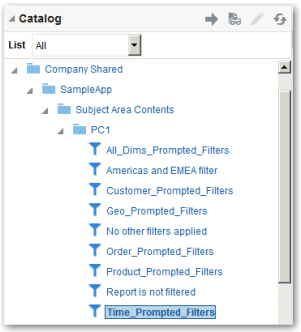
3. Click **OK**.

Reuse Filters

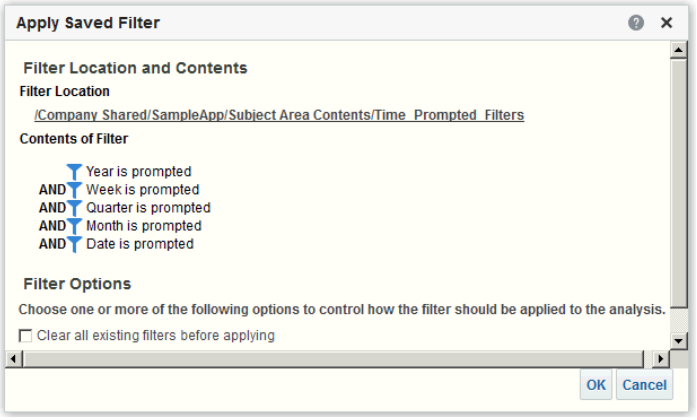
You can reuse a filter that you have saved as a named filter in the catalog. You can apply a saved filter to an existing analysis.

For example, you can apply a filter for the Quarter column to the Brand Revenue analysis.

1. On the Catalog pane on the Criteria tab, select a named filter.



2. Click **Add More Options**.



3. Click **OK**.

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Use a Saved Analysis as a Filter

You can create a filter based on the values that are returned by another analysis. You can use any saved analysis that returns a column of values to filter the matching column in an analysis.

For example, you can create a filter that is based on the results of the Brand Revenue analysis.

1. Create or open a named filter or analysis to which you want to apply an inline filter.
2. Find the filter.
   - If you're working with a named filter, then locate the Saved Filter pane. From the Subject Areas pane, select the column for which you want to create a filter.
   - If you're working with an inline filter, then locate the Filters Pane. From the Filters Pane toolbar, click **Create a filter for the current Subject Area**. Select the column for which you want to create the filter.
3. In the **Operator** field of the New Filter dialog, select **is based on the results of another analysis**.
4. In the **Saved Analysis** field, enter the path to the analysis or click **Browse** to locate it.
5. Select a column name from the **Use Values in Column** menu.
6. In the **Relationship** field, select the appropriate relationship between the results and the column to be filtered.
7. Click **OK**.

Advanced Techniques: How Dashboard Prompts and Analysis Prompts Interact

You can combine dashboard prompts and analysis prompts to quickly display precise, meaningful data.

There are various ways that you can combine prompts.

Wiring Method	Description
Auto wiring	Auto wiring assumes that you intended to create a functioning prompt for the column and, therefore, activates and applies the prompt. Auto wiring is applied when you create an analysis and add a column prompt. This method doesn't require the **is prompted** filter operator. Any unprotected filter can be used. Setting the filter operator to **is prompted** provides a more precise level of control between prompts and filters than the auto wiring method. See the "Filter operator is set to **is prompted**" row in this table.
Constrained prompts	Use this method with several columns in a prompt to constrain the user's prompt choice based on subsequent choices. Constrained prompts can be set up on the Prompt options dialog to specify which prompt narrows the choices. For example, suppose one column filters on region and the next column filters on city. Then, the city column can be constrained to show only cities in the selected region.

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Wiring Method	Description
Filter operator is set to **is Prompted**.	Use this method to build complex prompts that interact with filters. When you use this method, you have full control over how the dashboard prompts, inline prompts, and filters apply to the embedded analysis. See About Prompted Filters.
Selection Steps Override with Prompts Option	Use this method to use an analysis or dashboard column prompt to provide the data choices for a specific member selection step. Because you can't use filters with hierarchical columns, selection steps are the only way that you can use prompts with hierarchical columns. Only one selection step per column selection step set can be overridden with a prompt. All selection steps before and after the overridden step are processed as specified. See Refining Selections of Data and Overriding a Selection Step with a Prompt.
Protected versus Unprotected filters	Use this method to determine whether the dashboard prompt can supply the inline prompt's value when the corresponding column's filter value is set to something other than **Is prompted**. The unprotected and protected filter settings can be used when a dashboard prompt and inline prompt reside on the same dashboard. Also, both prompts must have been created for the same column. When the column's filter value is unprotected, the dashboard prompt value determines the analysis' results. Suppose the filter value is set to something other than **Is prompted** (for example, **Is equal to/is in**) and the filter is set to protected filter. Then, the dashboard prompt can't determine the report results.

Refine Selections of Data

As you specify which data members to include in an analysis, you create selections of data from the data source. Each selection specifies the criteria for a set of members for a particular column, such as Product or Geography.

Each selection consists of one or more steps. A step is an instruction that affects the selection, such as add Product members whose values contain the text "ABC." The order in which steps are performed affects the selection of data. Each step acts incrementally on the results from previous steps, rather than acting on all the members for that column.

Topics:

- Create Selection Steps
- Edit Selection Steps
- Save Selection Steps for Reuse
- Advanced Techniques: Create Condition Steps

Create Selection Steps

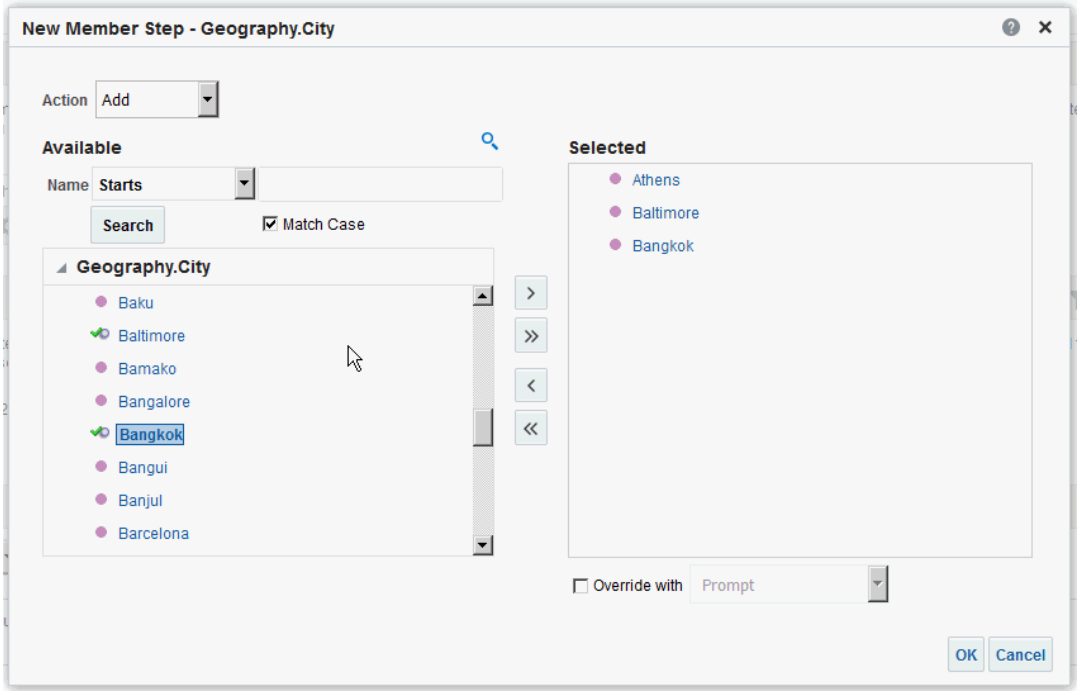
Selection steps help users display the data they want to analyze. When you add a column to an analysis, an implicit "Start with all members" step is added. The "all" implies all the members of the column after filters are applied.

For example, you can create a selection step to specify criteria for the following members in an Office column: Baltimore, Austin, and Athens.

1. Open the analysis for editing.

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2. Select the Criteria tab.
3. Display the Selection Steps pane by clicking **Show Selection Steps Pane** on the toolbar.
4. Click **Then, New Step**, and select the kind of step to create. For example, you can specify a list of selected members for the step.
5. For a member step, select **Add**, **Keep Only**, or **Remove** from the **Action** list.
6. If you're creating a member step, then move the members to include in the step from the Available area to the Selected area.



7. Specify the appropriate values for the condition such as the action, measure, and operator to use for the values of the column.
8. Click **OK**.

Edit Selection Steps

You can edit a selection step for an analysis or a selection step that has been saved as a group object.

For example, you can edit a member step for the Offices column in the Brand Revenue analysis. You can add then add another city to the list of cities.

1. Open the analysis for editing.
2. Click on the Results tab.
3. On the Selection Steps pane, hover the mouse pointer over the selection step that you want to edit.
4. Click the pencil icon on the toolbar.
5. Perform the appropriate edits. For example, add one or more members from the column to the step.
6. Click **OK**.

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Save Selection Steps for Reuse

If you have created a set of selection steps, then you can reuse them if you save them as a group in the catalog.

For example, you can reuse the selection steps for the Offices column as a group object. Doing this enables the set to be used inline with the Brand Revenue analysis.

1. Open the analysis for editing.
2. On the Results tab, display the Selection Steps pane.
3. Click **Save Selection Steps** to the far right of the column name.
4. In the **Save In** field, save it in /My Folders/*subfolder* (for personal use) or /Shared Folders/*subfolder* to share it with other users.
5. Enter a name for the saved selection steps.
6. Click **OK**.

Advanced Techniques: Create Condition Steps

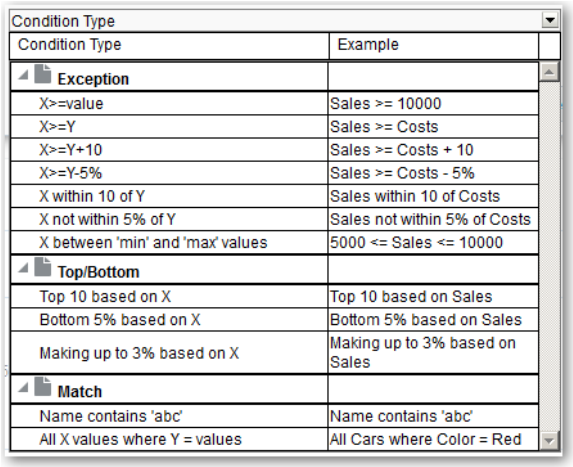
One type of selection step that you can create is a condition step. Most people don't need to perform this task.

You specify that members are selected from a column based on a condition. The condition can be one of various types including based on measures or on top/bottom values. This member list is dynamic and determined at runtime. For example, you can select the top 5% of members based on Brand Revenue.

1. Open the analysis for editing.
2. Select the Criteria tab.
3. Display the Selection Steps pane by clicking **Show Selection Steps Pane** on the toolbar.
4. Click **Then, New Step**, then select **Apply a Condition**.
5. In the New Condition Step dialog, select the type of condition to create, as described in the following table.

Type	Description
Exception	Select members using comparison values for measure columns. A sample condition is "Sales > Cost +10%."
Top/Bottom	Select the specified number of members after ranking the members by the specified measure column. You can specify an exact number of members or a percentage of the total members. Sample conditions are "Top 10 based on Sales" and "Top 5% based on cost.
Match	Select members based on matches with text strings and attribute values. A sample condition is "Name contains abc." This type is available only for columns that have a data type of string.
Time/Ordinal	Select members based on ranges of time and on hierarchical levels. A sample condition is "From July 2012 to December 2012." This type is available only for columns with a data type that relates to time.

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The components in this dialog differ slightly, depending on which type you select.

6. In the **Action** box, select the type of action to create for the members. You can select to add the selected members to the selection, keep only the selected members and remove all others. Or, you can select to remove the selected members from the selection.
7. In the box beside the action type, select the column for whose members you're creating the condition step.
8. Enter the appropriate values for the various fields of the dialog.

   For example, select the **Operator** based on the type of condition. For example, select Within for the Exception type.
9. Use the **Override with** box to specify whether an analysis prompt, a dashboard prompt, or a variable can override the values that you specify in this condition.

   Depending on what you're overriding, you can override certain values with a prompt, a presentation variable, a session variable, or a semantic model (repository) variable.

   If you select a variable type, then enter the name of the variable in the field. For example, suppose that you have a column called EMPLOYEE_ID. You can specify USER as the session variable with which to override the value of that column. When a user signs in, the column value is set to his user name. See Advanced Techniques: Reference Stored Values in Variables.

   In a list of steps, specify that only one step in the list can be overridden by a prompt or presentation variable.
10. In the **For** area, qualify all of the dimensions of the analysis other than the dimension whose members you want to select.

    Do this when creating condition steps of type Exception or Top/Bottom. For each dimension, you select which of its members to include. You can select specific members, or All, which specifies to aggregate the members when creating the condition. For example, suppose that you're qualifying the Region dimension. You can select a specific region, such as East, whose value is used in the New Condition Step dialog condition. If you select All, then the values of all regions are aggregated and used in the condition.

    You can use the **For** area to create a qualified data reference (QDR). A QDR is a qualifier that limits one or more of the dimensions to retrieve a single value for a measure column. A QDR is useful when you want to temporarily reference a measure column value without affecting the current status of the dimensions. The following is an example of a QDR:

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```
Add members of Total Products (Rgd Sk Lvl) where "A - Sample Sales"."Base
Facts"."1- Revenue", For: Cust Segments Hier: 'Active Singles', 'Baby Boomers'
is greater than "A - Sample Sales"."Base Facts"."1- Revenue", For: Cust
Segments"
```

When you specify a QDR, you can specify multiple members for limiting the dimensions. When you specify multiple members, the measure column value is aggregated using the default aggregation. For example, suppose that you want to create a condition for displaying those Regions in which Units is greater than 100. Suppose that you create a QDR for the Year dimension that specifies 2010 and 2011 and that the default aggregation is Sum. If the values for 2010 and 2011 for the Central region are 50 and 60 respectively, then both those years are displayed. Their sum exceeds the 100 units that were indicated.

11. Click **OK**.

Manipulate Members with Groups and Calculated Items

You can manipulate members using groups and calculated items.

Topics:

- About Groups and Calculated Items
- Create Groups and Calculated Items
- Edit Groups and Calculated Items
- View Group Contents
- Save Groups and Calculated Items
- Reuse a Group or Calculated Item in an Analysis
- Delete Groups and Calculated Items

About Groups and Calculated Items

You can create a group or calculated item as a way to display data in a table, pivot table, trellis, heat matrix, or graph.

Groups and calculated items enable you to add new "members" to a column, when those members don’t exist in the data source. These members are also known as "custom members."

Use a group to define members of a column, as a list of members or a set of selection steps that generate a list of members. A group is represented as a member.

A calculated item is a computation between members, which is represented as a single member that can’t be drilled. When you create a calculated item, you add a new member in which you have selected how to aggregate the item. You can aggregate using Sum or Average or custom formula.

Create Groups and Calculated Items

Use a group or calculated item to add new "members" to a column.

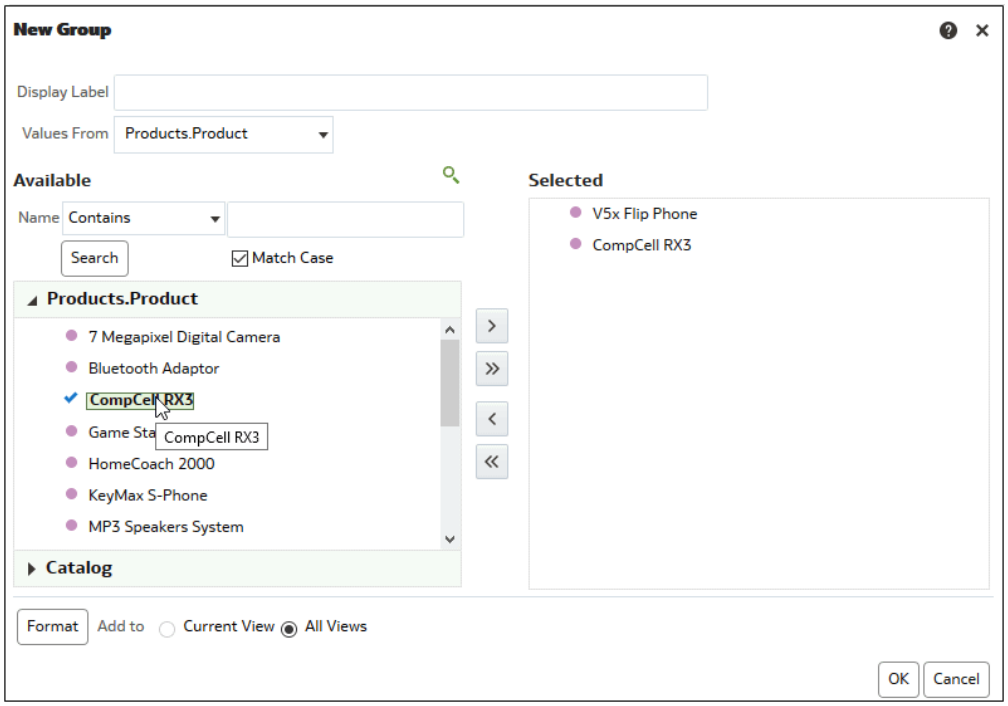
For example, you can review how much revenue was generated for mobile devices and compare that number to other product types. You can create a group called Mobile Devices for the Product column that includes Flip Phones and Smart Phones.

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Video

1. Open the analysis for editing.
2. On the toolbar of the Results tab, click **New Group** or **New Calculated Item**.

   The New Group or New Calculated Item dialog is displayed.
3. Enter a value for **Display Label** for the group or calculated item when it's displayed in a view.
4. In the **Values From** list, select the column whose values you want to include in the group or calculated item.
5. If you're creating a calculated item, select the function for the calculated item.
6. Move the appropriate column values from the Available area to the Selected area.

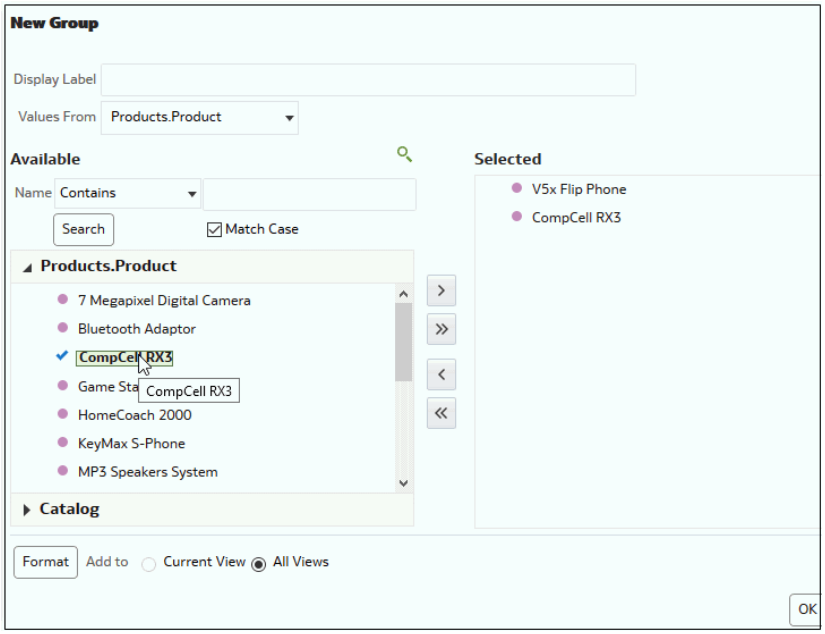


7. For a calculated item with **Custom Formula** selected as the function, select mathematical operators to include in the function using the toolbar. You can also use these functions: Absolute, Ceiling, Floor, Round, and Sqrt.

   A formula creates a dynamic custom grouping within the view. All measures referenced in a formula must be from the same column and must be present in the results. Formulas can be inserted into, or combined with, other calculated items.

   Instead of specifying a named item for columns, you can specify $n or $-n. Here, *n* is an integer that indicates the item's row position. If you specify $n, then the measure is taken from the *n*th row. If you specify $-n, then the measure is taken from the *n*th to the last row.

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8. Optional: If you're creating a calculated item, select **Remove calculated item members from view**.

   Use this box to suppress the display of members that you have included in the calculated item in the view.

9. Click **OK**.

   By default, the new group or calculated item is created for all views in the analysis.

Edit Groups and Calculated Items

You can edit groups and calculated items through the Selection Steps pane or from the catalog pane. You can also edit groups and calculated items in a table, pivot table, heat matrix, or trellis.

For example, you can edit a group to include the Game Station and Plasma Television members.

Use one the following methods to edit a group or calculated item:

- In the Selection Steps pane, click the link to the group or calculated item, and then click **Edit**.
- In the Catalog pane (if you saved it in the Catalog), select the object, and click **Edit**.
- In a table, pivot table, heat matrix, or trellis (on an outside edge), right-click the group or calculated item and select **Edit Group** or **Edit Calculated Item**.

View Group Contents

You can view the contents of a group to verify that it contains the members that you want.

For example, suppose you created a group of categories in a Product Category column. You can view the group contents to verify that it contains the appropriate categories.

1. Open the analysis for editing.
2. Click on the Results tab.

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3. In the table view, right-click on the cell that contains the group.
4. Select **View Group Definition**.



5. Click **Close**.

Save Groups and Calculated Items

You can save a group or calculated item as either an inline object (with an analysis) or as a named object (a standalone object).

For example, you can save the Mobile Devices group as a named object in the catalog, for reuse in the Brand Revenue analysis.

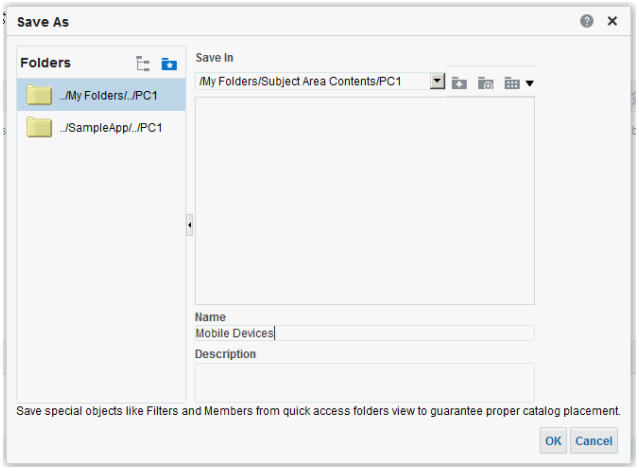
Save a group or calculated item as an inline object

- To save the analysis and the group or calculated item that it contains, click **Save Analysis**.

  The group or calculated item is saved as a part of the analysis.

Save a group or calculated item as a named object

1. On the Results tab, display the Selection Steps pane.
2. Click the link for the group or calculated item.
3. Select **Save Group As** or **Save Calc Item As**.



4. Enter a folder in the **Save In** field.
5. Click **OK**.

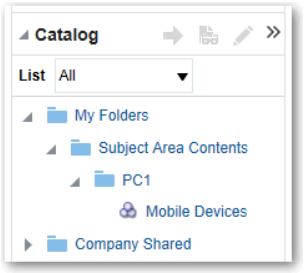
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Reuse a Group or Calculated Item in an Analysis

You can add a group or calculated item to the same column on which it was created in another analysis. The group or calculated item can be either a list of members or a set of selection steps.

For example, you can display the Brand Revenue analysis and add the group members from the Mobile Devices group. The members of the Mobile Devices group are included as an "Add" step in the Selection Steps pane.

1. On the Results tab, display an analysis containing the same column to which you want to apply the selections from a group or calculated item.
2. In the Catalog pane, select the group or calculated item.



3. On the toolbar of the Catalog pane, click **Add More Options**.
4. Select **Add** to add the group or calculated item itself. Select **Add Members** to add only the group or calculated item members.

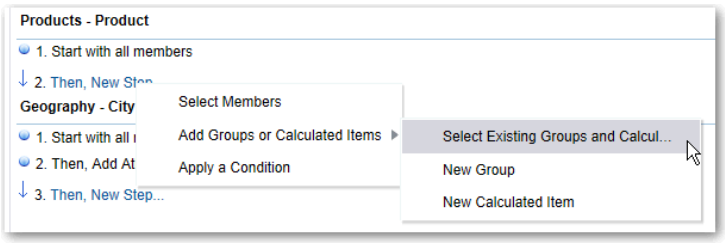
Reuse a group or calculated item from the Edit Member Step dialog:

1. On the Results tab, display an analysis containing the same column to which you want to apply the selections from a group or calculated item.
2. Display the Selection Steps pane.
3. In the entry for the column you want, click the pencil icon.
4. From the Action menu, select **Start with Group or Calculated Item**.
5. Move the saved group or calculated item from the Available area to the Selected area.
6. Click **OK**.

Reuse a group or calculated item from the Selection Steps pane:

1. On the Results tab, display an analysis containing the same column to which you want to apply the selections from a group or calculated item.
2. On the Selection Steps pane select **Then, New Step** for the appropriate column.
3. Select **Add Groups or Calculated Items**.
4. Select **Select Existing Groups and Calculated Items**.

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5. On the resulting dialog, select the group or calculated item from the Available area and move it to the Selected area.
6. Click **OK**.

Delete Groups and Calculated Items

You can delete inline and named groups and calculated items.

For example, suppose you no longer need the combination of Flip Phones and Smart Phones in the analysis. You can delete the Mobile Devices group.

Delete an inline group or calculated item:

1. On the Results tab, right-click on the cell that contains the group or calculated item that you want to delete.
2. Click **Remove**.

Delete a named group or calculated item:

1. On the global toolbar, click **Catalog**.
2. Locate the group or calculated item in the Catalog page.
3. Click **More** on the group or calculated item.
4. Select **Delete**.

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21

Prompt in Analyses and Dashboards

This chapter describes how to create prompts for soliciting values to display in analyses and dashboards.

Topics:

- Typical Workflow to Create Prompts in Analyses and Dashboards
- Create Prompts
- Edit Prompts
- Add Prompts to Dashboard Pages
- Add Hidden Prompts to Dashboard Pages

Typical Workflow to Create Prompts in Analyses and Dashboards

Here are the common tasks to start creating prompts for soliciting values to display in analyses and dashboards.

Tasks	Description	More Information
Create an analysis	Select and arrange columns that you want to use in an analysis.	Create Your First Analysis
Create a column prompt	Create a prompt to filter the data that you see displayed.	Create Column Prompts
Edit a prompt	Edit the prompt to change it in every place where it's used.	Edit Prompts
Add a column prompt to a dashboard page	Add a prompt to a new or existing dashboard.	Add Prompts to Dashboard Pages
Create a currency prompt	Create a prompt to display money data in a different currency.	Create Currency Prompts

Create Prompts

You create prompts to enable analysts to display the data they're interested in.

Topics:

- Create Column Prompts
- Create Variable Prompts
- Override a Selection Step with a Prompt
- Create Currency Prompts

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Create Column Prompts

A prompt enables you to filter the data that you see. A column prompt enables users viewing a dashboard to select a value for a column that affects what they see on the dashboard.

Video

Use the following procedure to create:

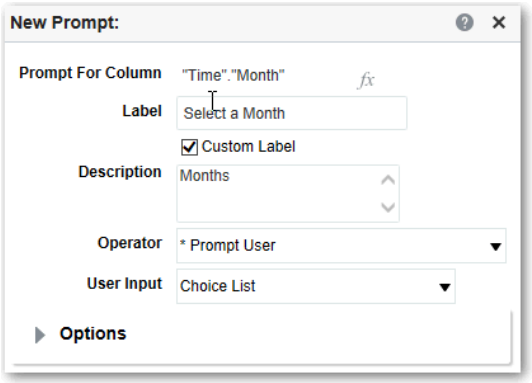
- A named column prompt that you can apply to one or more dashboards.
- An inline column prompt that is embedded in an analysis. For example, you can add a prompt to the Brand Revenue analysis so that the analysis can be reviewed for specific brands. You add a prompt directly to a column in the analysis (an inline prompt).

1. Open the analysis for editing.
2. On the Definition pane of the Prompts tab, click **New** to access the prompt type selection list. Select **Column Prompt** and select the appropriate column.
3. Click **Custom Label** and enter a caption for the column filter prompt. The caption displays as the field label for the prompt.

   For example, "Select a currency."
4. In the **Description** field, enter a short description for the prompt.

   This description becomes tooltip text, which is displayed when the user hovers the mouse pointer over the prompt's label in the dashboard or analysis.
5. From the **Operator** list, select the operator to use, such as "is greater than." If you want the user to select the operator at runtime, then select the ***Prompt User** operator.

   If you're creating a prompt that includes a group in the prompt's value selection list, then you must set the Operator to either **is equal to/is in** or **is not equal to/is not in**. See About Groups and Calculated Items.
6. In the **User Input** field, select how you want the prompt interface to ask the user for input. For example, prompt the user with a radio button to select only one prompt value.

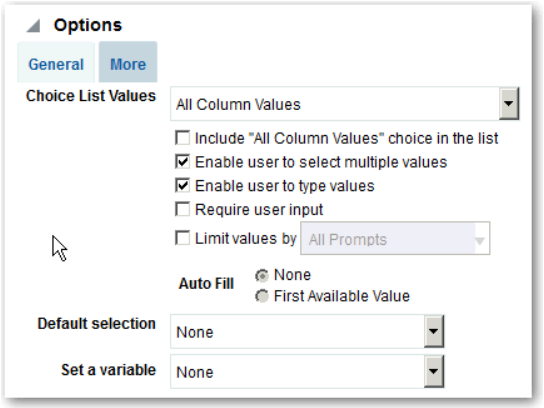


7. Depending on the type of user input that you specified, enter the appropriate values in the **User Input** field.

   For example, select **Custom Values** to indicate that users can select from a list of prompt values that you created rather than the values supplied by the column.

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8. Within the Options section, select prompt options to specify the display of list values and user interaction with the prompt. The prompt options vary depending on the user input type and list values type that you selected.



9. In the **Default selection** field, select the prompt value or values that users see initially.

   If you select a default type, then a field is displayed where you can either select specific values, or specify how you want the default values to be determined. For example, if you select SQL Results, you must then supply a SQL statement to generate the list of values.

10. Click **OK**.
11. Click **Save Prompt** in the editor or save the analysis.
12. Use the arrow buttons in the Definition pane to reorder the selected prompt. Reordering the prompts controls the order in which the choices are displayed to users at runtime.
13. Select the type of layout you want on the prompts page by clicking **New Row** or **New Column** in the Definition pane.

    A row-based layout saves space because it organizes prompts horizontally. A column-based layout aligns prompts into neat columns. Click the boxes in the New Column or New Row column in the Definition table that correspond to where you want to add a new column or row to the prompts page.

14. Preview the prompt with sample data using the Display pane, or click **Preview** (if available) in the Definition pane toolbar to view the prompt with actual prompt values.

Create Variable Prompts

A variable prompt enables the user to select a value that is specified in the variable prompt to display on the dashboard.

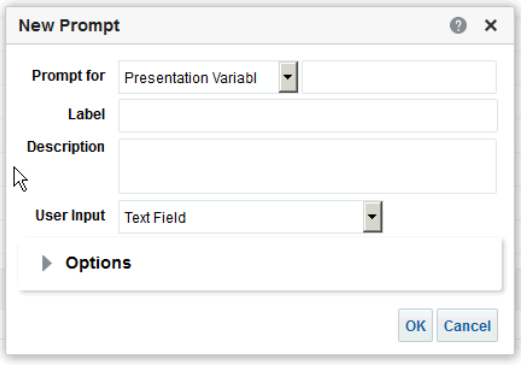
A variable prompt isn't dependent upon a column, but can still use a column. You can use variable prompts to enable the user to specify existing data to perform sales projections.

For example, you can create a variable prompt called Sales Projections and specify the variable prompt values as 10, 20, and 30 percent. Then you create an analysis that contains the Region and Dollars columns. Within the Dollars column formula, you select the multiply operator and insert the Sales Projection variable. When users run this analysis, they can select a percentage by which to recalculate the Dollars column.

1. Open the analysis for editing.
2. Display the Prompts tab.

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3. On the Definition pane of the Prompts tab, click **New** then **Variable Prompt** to display the New Prompt dialog.



4. In the **Prompt for** field, select the variable type that you're creating and then enter the name of the variable.

   This variable name is the name that you add to the analysis or dashboard where you want the variable prompt's value specified by the user to display. Currently, you can create only presentation variables.

5. In the **Label** field, enter a caption for the variable filter prompt. The caption is displayed as the prompt's field label.
6. In the **Description** field, enter a short description for the prompt. This description is displayed as tooltip text, which is displayed when the user hovers the mouse pointer over the prompt's label in the dashboard or analysis.
7. In the **User Input** field, select how you want the prompt interface to ask the user for input. For example, prompt the user with a radio button to select only one prompt value.
8. If you selected either the **Choice List**, **Check boxes**, **Radio buttons**, and **List box** user input type, then you must also specify the prompt's list of values.
9. Within the Options section, select the prompt options. The prompt options vary depending on the user input type that you selected.

   The prompt options enable you to further specify how you want the user to interact with the prompt. For example, whether user input is required.

10. In the **Default selection** field, select the prompt value that users see initially. If you select a specific value, then the **Default Value** field is displayed in which you can enter a value.
11. Click **OK** to display the prompt is displayed in the Definition pane.
12. Save your changes.

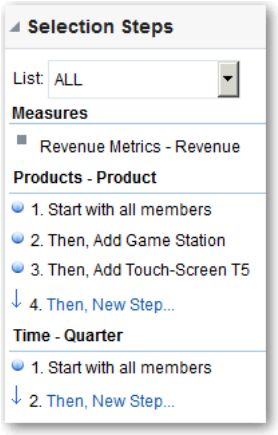
Override a Selection Step with a Prompt

You can override a selection step with either a dashboard prompt or an inline prompt.

For example, you can specify that the Products.Brand selection step be overridden with a column prompt specifying the BizTech and FunPod members.

1. Open the analysis for editing.
2. In Results tab, select the columns for the analysis and then navigate to the Selection Steps pane by selecting **Show/Hide Selection Steps Pane**.
3. Specify the selection steps for the analysis.

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4. Determine which selection step you want to override with a column prompt and click **Edit**.
5. In the dialog, select **Override with prompt**, if it's available for that type of step.
6. Click **OK** and save the analysis.

Create Currency Prompts

A currency prompt enables users to change the currency type that is displayed in a dashboard or analysis.

Use this procedure to create a currency prompt that you can apply to one or more dashboards, or to create a currency prompt that's embedded in an analysis.

1. Open the analysis for editing.
2. Display the Prompts tab.
3. In the Definition pane, click the **New** button and select **Currency Prompt**.
4. In the **Label** field, enter a caption.
5. In the **Description** field, enter a short description. This description is displayed as tooltip text, which is displayed when the user hovers the mouse pointer over the prompt's label in the dashboard or analysis.
6. Click **OK**.
7. Save the prompt.
   - If you're creating a dashboard prompt, then click the **Save** button in the prompt's editor, specify the folder in which you want to save the prompt, and give the prompt a descriptive name. Dashboard prompts that are saved in personal folders are available only to you. Dashboard prompts that are saved in shared folders are available to other users that have permission to access the object.
   - If you're creating an inline prompt, then save the analysis.
8. Use the arrow buttons in the Definition pane to reorder the selected prompt. Reordering the prompts controls the order in which the choices are displayed to users at runtime, so ensure that the order is logical, especially if you're creating constrained prompts.
9. If you want to add a new row or column to the prompts page, then click the **New Row** button or **New Column** button in the toolbar. In the Definition table, click the check box corresponding to the prompt that you want to display in a new row or column.

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10. To preview how the prompt is displayed on the dashboard, either use the Display pane to preview the prompt with sample data, or click the **Preview** button in the toolbar to view the prompt with actual prompt values.

Edit Prompts

You can edit a saved dashboard prompt or inline prompt, to propagate its changes to wherever the prompt is used.

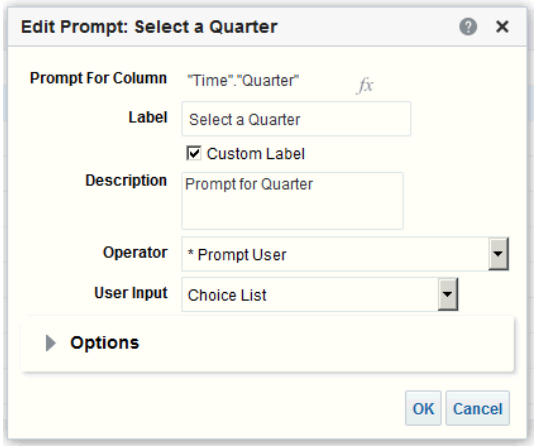
For example, you can edit the prompt for the Brand column to change the user input to a choice list. This change is propagated to the Brand Revenue analysis where the prompt is used.

1. In the Definition pane on the Prompts tab, double-click to open the appropriate prompt.

   Alternatively, in the Definition pane on the Prompts tab, select the appropriate prompt and click **Edit**.

2. Make the appropriate changes in the Edit Prompt window.

   For example, change the label for the prompt or change the user input to a choice list.



3. Click **OK**.
4. Click **Save Prompt**.

   The changes are propagated to wherever the prompt is used.

Add Prompts to Dashboard Pages

You can add a prompt to a dashboard or dashboard page.

Video

For example, you can create a dashboard prompt for the Brand column. You add the prompt to the Sales Performance dashboard, to drive the content on the dashboard page. You add a filter for Brand that uses the "is prompted" operator to flag the column as ready to be filtered by a prompt. When the prompt is used, the results include only records where the data in the column that is prompted matches the user's choices.

1. Open the dashboard for editing.
2. In the Dashboard builder's Catalog pane, locate and drag and drop an object such as an analysis onto a section in the dashboard page.

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3. Add a new or pre-created prompt:
   - To add a new prompt, click **New**, then **Dashboard Prompt**, and follow the on-screen instructions.
   - To add a pre-created prompt, in the Dashboard builder's Catalog pane, locate and drag and drop the dashboard prompt onto a section in the dashboard page.

   The dashboard prompt is added to the dashboard page.
4. To specify whether to include the prompt's **Apply** and **Reset** buttons on the dashboard page, in the toolbar of the Dashboard builder, click **Tools**. Then select **Prompts Buttons on Current Page** and either **Apply Buttons** or **Reset Buttons**.
5. Click **Save** in the dashboard toolbar.
6. To preview the dashboard page, click **Preview** in the dashboard toolbar.

Add Hidden Prompts to Dashboard Pages

You can add a hidden prompt to a dashboard or dashboard page.

1. Create and save a prompt to use as a hidden prompt.
2. Open a dashboard for editing.
3. On the Dashboard page toolbar, click **Tools** and select **Dashboard Properties**.
4. In the Dashboard Properties dialog, click the **Filters and Variables** pencil icon to add a hidden prompt to the entire dashboard.

   Alternatively, to add a hidden prompt to a page, locate the page in the Dashboard Pages area and click **Select a prompt to capture default filters and variables** icon.
5. In the Dashboard Filters and Variables dialog, click the **Embed new hidden dashboard prompt** plus icon to browse for and select the prompt. Click **OK** to add the hidden prompt.
6. Click **OK** to save the dashboard properties.
7. Click **Save** in the dashboard toolbar.
8. To preview the dashboard page, click **Preview** in the dashboard toolbar.

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Make Analyses Interactive

Make your analyses and dashboards more interactive. Embed hyperlinks to some related business intelligence content or add links to other web pages.

Video

Topics:

- Typical Workflow to Make Analyses Interactive
- Create Named Actions for Reuse
- Create Inline Actions
- Add Actions to Analyses
- Add Actions to Dashboard Pages
- Edit Named Actions
- Edit and Delete Action Links in Analyses
- Edit and Delete Action Links in Dashboard Pages
- Save Inline Actions in Analyses to the Catalog
- Save Inline Actions in Dashboards to the Catalog

Typical Workflow to Make Analyses Interactive

Here are the common tasks to start making analyses more interactive.

Task	Description	More Information
Create an analysis	Select and arrange columns that you want to use in an analysis.	Create Analyses
Create a named action	Create an action and save it to the catalog.	Create Named Actions for Reuse
Create an inline action	Create an action and save it with an analysis.	Create Inline Actions
Add an action to an analysis	Add an action to a column value in an analysis.	Add Actions to Analyses
Add an action to a dashboard	Add an action or an action menu to a dashboard.	Add Actions to Dashboard Pages

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Create Named Actions for Reuse

Create action links so users can navigate to related BI content such as websites and reports, or perform business tasks. You save named actions to the catalog to that they're available to your analysts and business users.

Users can click an analysis that is embedded within column headings and column values. Users can also click links in views such as graphs, and on grand totals within tables and pivot tables.

1. From the Classic Home page, go to **Create** and click **Action** under **Actionable Intelligence**.
2. Click the option for the type of action you want to create.
3. Optional: Change the default parameters to change the information that is displayed when the action executes.
   - **Navigate to BI Content** - Display an analysis or dashboard stored in the My Folders or the shared folder area.
   - **Navigate to a Web Page** - Display a web page.
   - **Invoke a Web Service** - Invoke a web service operation or any Service-Oriented Architecture (SOA) service that is exposed as a Web Service (for example, a Business Process Execution Language (BPEL).
   - **Invoke a HTTP Request** - Invoke an external system command that is exposed by a URL API. This sends a HTTP request through the server to a target URL.
   - **Invoke a Server Script** - Execute a custom script when the current agent completes. The custom script type can be either Javascript or VBScript. This action supports custom script actions when the server is running on Microsoft Windows. For other platforms (including Windows), consider using the Invoke Java Method (EJB) or Invoke Web Services action.
   - **Invoke a Browser Script** - Invokes a JavaScript function that the administrator has made available to you. Click **Browse** to see a list of functions that the administrator has made available, or type the name of a function in the **Function Name** field. For example, you might specify `USERSCRIPT.mycurrencyconversion`.
   - **Invoke a Java Method** - Invokes a Java method in an Enterprise Java Bean (EJB). See **Invoke a Java Method (EJB)**.
4. Click **Save Action** and choose where to save the action.
5. Verify that the action runs properly:
   a. Navigate to the named action in the catalog.
   b. Click **Execute**.
   c. Respond to any request for more information or any confirmation prompt that is displayed.

Create Inline Actions

An inline action is a link that you define for a particular analysis or dashboard and don't save by name in the catalog.

For example, in the Brand Revenue analysis, you might decide to create a link to an Opportunity Detail web site.

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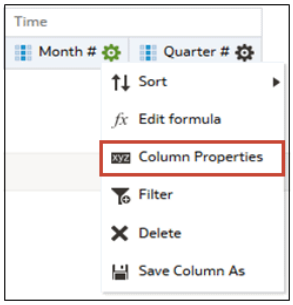
- Analyses – Add actions to column headings, column values, or hierarchy level values using an action link. See Add Actions to Analyses.
- Dashboard page - Add action links or action link menus to the page. See Add Actions to Dashboard Pages.

Add Actions to Analyses

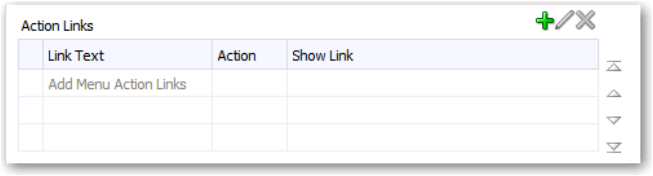
You can use an action link to add actions to a column heading, column value, or hierarchy level value in an analysis.

For example, in the Brand Revenue analysis, you can include an action that contains an action link to an Opportunity Detail web site. Sale consultants can query the site for an opportunity by responding to a prompt for Opportunity Name or Opportunity ID.

1. Open the analysis for editing.
2. On the Criteria tab, open the **Options** menu for a column and select **Column Properties**.



3. Click the **Interaction** tab.
4. In the Primary Interaction box in the Column Heading area or the Value area, select **Action Links**.



5. Click **Add Action Link**.
6. In the **Link Text** field, enter the text you want the link to display.
7. To create an action, click **Create New Action**, select the type of action you want, and specify the settings for the action.

   See Create Named Actions for Reuse.

   Alternatively, click **Select existing action**, select the action you want, and specify any associated parameters in the Edit Parameter Mapping dialog.
   If you chose to show the link conditionally, then in the visualization, you must place the column containing the action link at a more detailed grain than the columns used in the condition.
8. Save your changes.

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Add Actions to Dashboard Pages

You can add actions to dashboard pages using action links and action link menus.

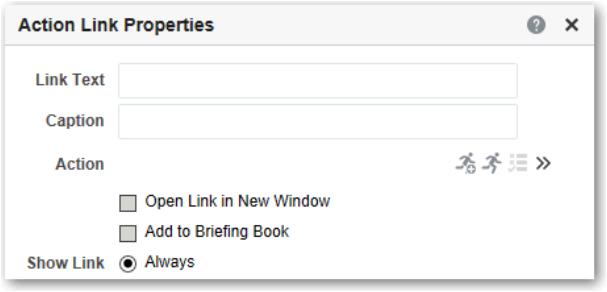
Topics

- Add Actions to Dashboard Pages with Action Links
- Add Actions to Dashboard Pages with Action Link Menus

Add Actions to Dashboard Pages with Action Links

Link a related report or a useful web site to your dashboard. For example, give sales consultants a direct link to an Opportunity web site from the Sales Performance dashboard so they can query opportunities by responding to a prompt for Opportunity Name or Opportunity ID.

1. Open the dashboard page for editing.
2. From the Dashboard Objects pane, drag and drop an Action Link object on the dashboard page.
3. Click **Properties** for the new link.



4. Complete the fields in the dialog.
5. Click **OK**.
6. In Dashboard builder, click **Save**.

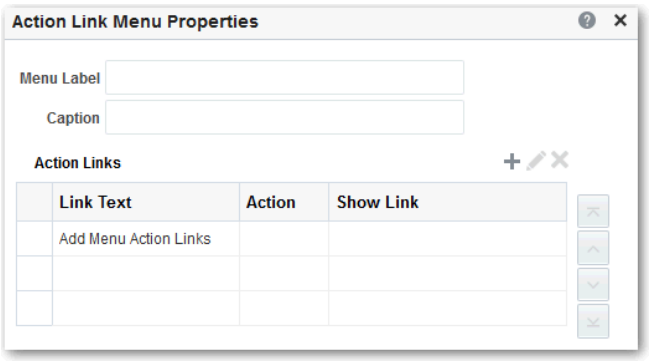
Add Actions to Dashboard Pages with Action Link Menus

You may want to offer several action links on your dashboards. Use menus to group your links together and keep things organized.

For example, you can give sales consultants a Related Information menu on the Sales Performance dashboard with useful links, such as an external Opportunity web site or a related Brand Revenue dashboard.

1. Open the dashboard for editing.
2. From the Dashboard Objects pane, drag and drop an Action Link Menu object on the dashboard page.
3. Click **Properties** for the new menu.

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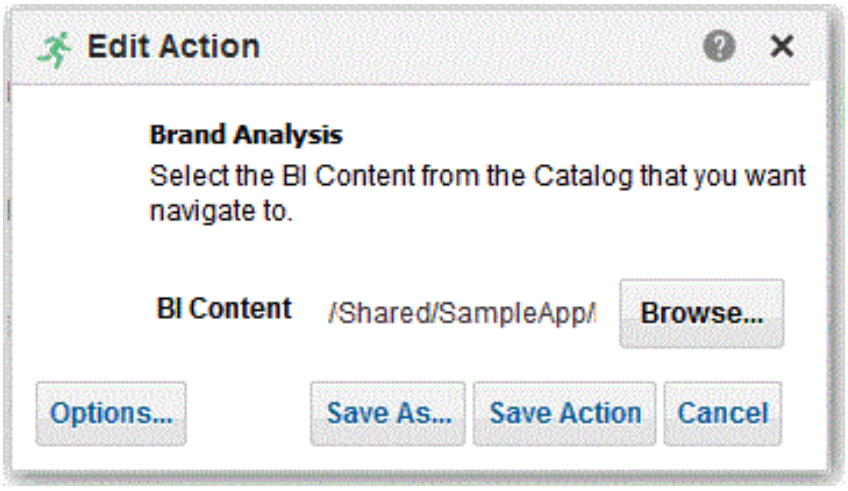


4. Add the action links to the menu.
5. Click **OK**.
6. In Dashboard builder, click **Save**.

Edit Named Actions

You can edit existing named actions. For example, you can edit the Brand Analysis action in the Sales Performance dashboard to navigate to a newly created analysis.

1. Navigate to the action in the catalog.
2. Click **Edit**.



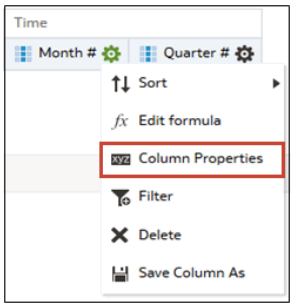
3. Edit the action and click **OK**.
4. Click **Save Action**.

Edit and Delete Action Links in Analyses

You can edit action links or delete action links you don't want any more. So, if an action link navigates to an obsolete analysis or web site you can point somewhere new or remove the link.

1. Open the analysis for editing.
2. On the Criteria tab, open the **Options** menu for a column and select **Column Properties**.

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3. Click the **Interaction** tab.
4. To edit an action or action link:
   a. In the Action Links area, select the action to edit and click **Edit Action Link**.
   b. Make the changes you want.
   c. To edit the associated action, click **More** and select **Edit Action**.
   d. Make the changes you want.
5. To delete an action link:
   a. In the Action Links area, select the action link that you want to delete.
   b. Click **Delete**.
6. Click **OK**.
7. Click **Save Analysis** in the Criteria tab.

Edit and Delete Action Links in Dashboard Pages

You can edit action links or delete those you don't want any more. For example, if the URL to an "Opportunity" site changes you can point to the new URL.

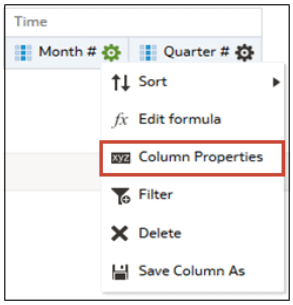
1. Open the dashboard for editing.
2. If the action and action link are associated with an action link menu:
   a. Click **Properties** for the action link menu.
   b. Make the appropriate changes to the menu label and caption.
   c. In the Action Links area, select the action you want and click **Edit**.
3. To edit an action that isn’t part of a menu, click **Properties** for the action link.
4. Update the action link.
5. Click **More** and select **Edit Action** to edit the action.
6. Edit the action and click **OK**.
7. Click **OK** in the Action Link Properties dialog, and in the Action Link Menu Properties dialog (if displayed).
8. Click **Save**.
9. Click **Delete** on the action link (or action link menu) toolbar to remove actions you don't want any more.

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Save Inline Actions in Analyses to the Catalog

You can save useful inline actions to the catalog and reuse them in other analyses and dashboards.

1. Open the analysis for editing.
2. On the Criteria tab, open the **Options** menu for a column and select **Column Properties**.



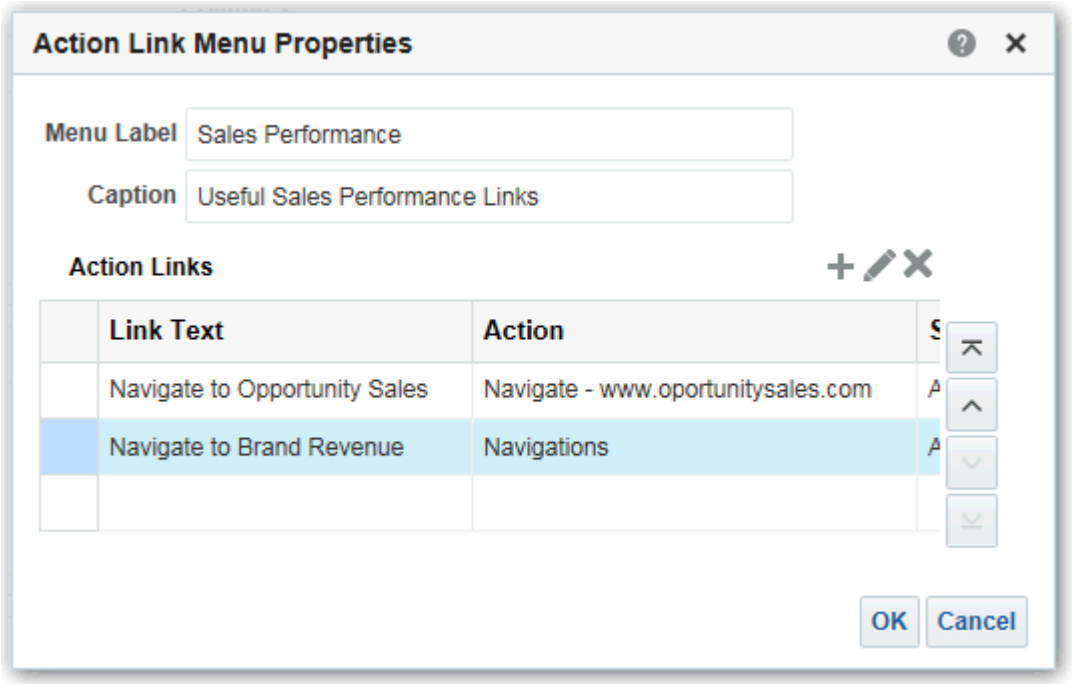
3. Click the **Interaction** tab.
4. In the Action Links area, select the action you want and click **Edit Action Link**.
5. Click **More** and select **Save Action As**.
6. Specify how the action appears in the catalog, then click **OK** to save it.

Save Inline Actions in Dashboards to the Catalog

You can save useful inline actions to the catalog and reuse them in other analyses and dashboards.

1. Open the dashboard for editing.
2. If the action and action link are associated with an action link menu:
   a. Click **Properties** for the action link menu.

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b. Make the appropriate changes to the menu label and caption.

c. In the Action area, select the action you want to save to the catalog.

3. To save an action that isn't part of a menu, click **Properties** for the action link.
4. Click **More** and select **Save Action As**.
5. Specify how the action appears in the catalog and click **OK**.
6. Click **Save**.

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Managing Content

This chapter describes how to manage your content in the catalog.

Topics:

- Typical Workflow to Manage Content
- About Naming Restrictions for Catalog Objects
- Rename Content
- Search for and Replace Text in Catalog Objects
- Access Favorites Easily
- Access Properties
- Assign Access Permissions
- Send Email Reports and Track Deliveries
- Automate Business Processes with Agents
- Perform Advanced Agent Job Management Tasks
- Assign Ownership of Items
- Assume Ownership of Items
- About Embedding External Images and Other External Resources in Your Content
- Access Your Reporting Content in Smart View
- Perform Advanced Catalog Management

Typical Workflow to Manage Content

Here are some common tasks that you perform to access and organize content in the catalog.

Task	Description	For More Information
Find and explore your content	Exploring your content, including searching for items that you need to edit.	Find Your Content
Rename content	Improve or update the naming of your content.	Rename Content
View or set content properties	Display information about your content or change various content options and properties.	Access Properties
Give access to others	Assign permissions so that others can access your content	Assign Access Permissions
Email reports and track deliveries	Email reports to anyone inside or outside the organization. Keep everyone up to date with daily or weekly reports.	Send Email Reports and Track Deliveries

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Task	Description	For More Information
Automate business processes	Create agents that deliver analyses, dashboards, and briefing books to targeted audiences on-demand or on a regular schedule.	Automate Business Processes with Agents
Configure devices and delivery profiles	Configure the devices and delivery profiles to be used to reach you when an alert is generated by an agent.	Configure Your Devices and Delivery Profile
Change content ownership	Assign another user as the content owner.	Assign Ownership of Items
Analyze using Smart View	Analyze reporting content in Smart View.	Access Your Reporting Content in Smart View
Perform advanced catalog management	Generate advanced reports about your catalog, review the underlying XML for individual items, and more.	Perform Advanced Catalog Management

About Naming Restrictions for Catalog Objects

You can't use special characters when naming or renaming catalog objects, such as workbooks, dashboards, and analyses.

When you name or rename a catalog object, don't use these special characters in the catalog object name:

Name	Special Character
Ampersand	&
Asterisk	*
Caret	^
Colon	:
Comma	,
Dollar sign	$
Double backslash	\\
Exclamation mark	!
Forward slash	/
Greater than sign	>
Hash	#
Hash	#
Less than sign	<
Percent sign	%
Plus	+
Question mark	?
Quotation mark	"
Single quotation mark	'
Tilda	~
Vertical bar	|

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Rename Content

You can rename items and views to make their names more meaningful to you.

Topics:

- Rename Items
- Rename Views

Rename Items

You can rename items to make their names more meaningful to you. For example, you can change the name of the "High Products" filter to "Top 3 Products."

1. On the Classic Home page, click **Catalog**.
2. In the Catalog page, search for the item that you want to rename.
3. In the search results for the item, click **More**, and then **Rename**.
4. Give the item a new name.
5. Optional: Click **Preserve references to the old name of the item**, if the option is available for the item.

   Use this option to specify that existing references to the previous name of the item are maintained. This creates a shortcut with the old name that points to the renamed item in the catalog. If you don’t select this option, then existing references break.
6. Click **OK**.

Rename Views

You can rename views to make their names more meaningful to you. For example, you can change the name of a view from "Sales Forecast 2014" to "Forecast 2014."

1. Open the analysis for editing.
2. On the Results tab, click **Edit View**.
3. In the view editor toolbar, click **Rename View**.
4. In the Rename View dialog, give the view a new name.
5. Click **OK**.

Search for and Replace Text in Catalog Objects

You can search for specific text in the catalog and replace it with other text.

This allows a power user with the catalog privilege Can Replace Text, and read/write permissions on catalog objects, to do plain text replacement on selected catalog objects and folders. You can perform single or multiple text searches on the selected content.

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> **⚠ Caution**
>
> Replacing text in this way doesn't guarantee correctness of the new change, and you must ensure the change is carefully reviewed and validated. Oracle recommends that you back up the catalog before making text replacement changes, as these changes can render artifacts invalid or unusable.

You can replace text in the following catalog object types:

- Dashboard
- Dashboard Prompt
- Analysis
- Filter
- Workbook
- Agent
- Action

Specifically, you can search for and replace:

- A simple text string, as described in Search for and Replace a Simple Catalog Text String.

  For example, suppose that an object contains the string "My Misspeled Wirds." You can search and replace that string with the proper text of "My Misspelled Words."

- Multiple or complex text strings all at the same time using an JSON file, as described in Search for and Replace Multiple Catalog Text Strings.

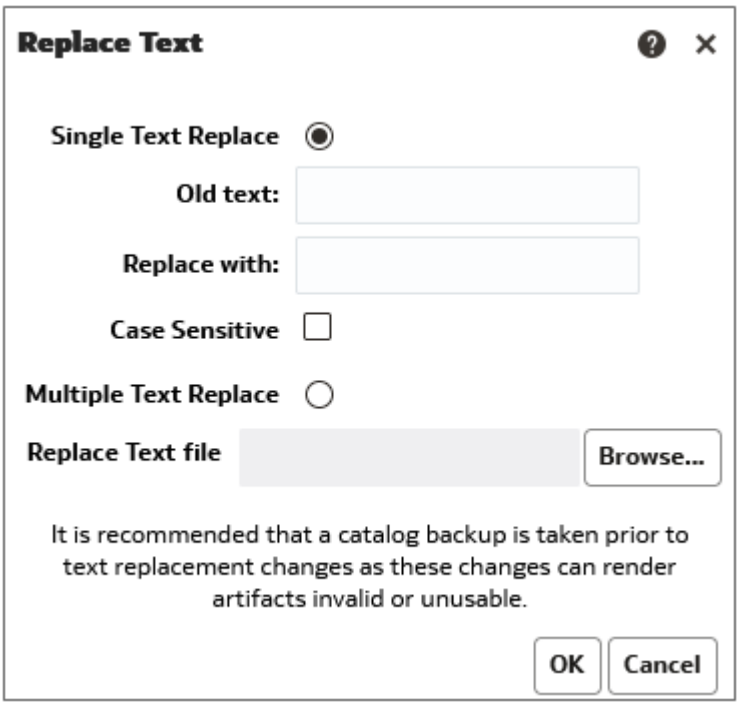
  For example, suppose that the administrator renames a workbook, subject area, a table, or column. The table "Sales" might be renamed "MySales." You can search and replace all uses of that object throughout the catalog.

Search for and Replace a Simple Catalog Text String

You can search for a simple text string in the catalog and replace it with other text.

1. On the Classic Home page, click **Catalog**.
2. In the Catalog page, select a folder or an object to perform text replacement on.
3. In the search results for the item, click **More**, and then click **Replace Text**.

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4. Click **Single Text Replace**.
5. In the **Old text** field, enter the text string to search for.
6. In the **Replace with** field, enter the replacement text.
7. To make the search case insensitive, deselect **Case Sensitive**.
8. Click **OK**.
9. You can review the progress of the job from the Classic Home page, by clicking **My Profile**, **Background Tasks**, and **Replace Text Tasks**.

About Search and Replace of Multiple Catalog Text Strings

You can perform more powerful search and replace operations on multiple catalog text strings all at the same time by importing a JSON file that identifies each text string to search for and replace.

JSON File Format to Search for and Replace Text Strings

In the search and replace JSON file, you use an items element to identify all of the text strings to search for and replace.

The action elements are contained in a commands element.

- `items` — Specifies the section containing the text items to replace.
- `oldValue` — Specifies the text string to search for.
- `newValue` — Specifies the replacement text.
- `ignoreCase` — Ignores case when set to true, but becomes case-sensitive when set to false. The default value is false.

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Example JSON File for Searching for and Replacing Text Strings

The following is a partial example of an JSON file for searching for and replacing a text string.

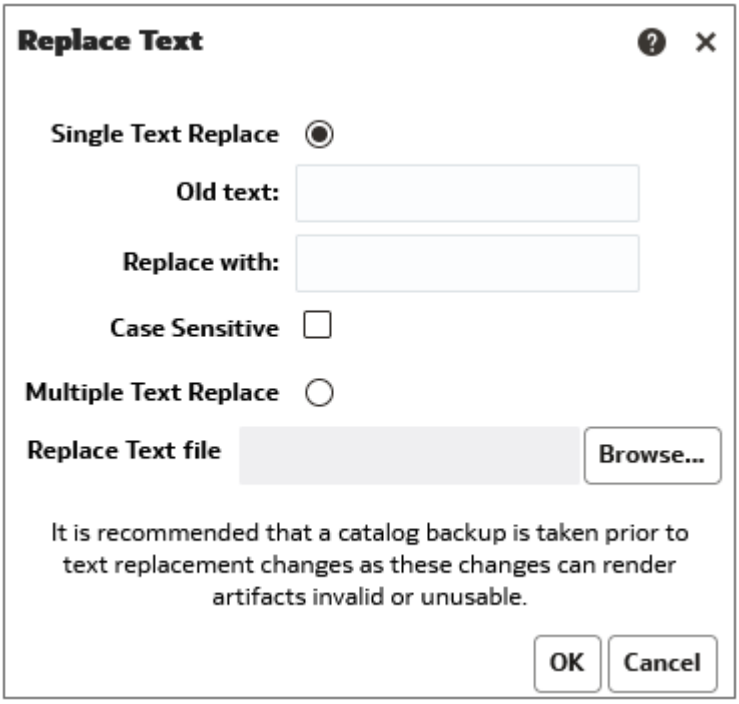
```
{
  "Items": [
    {
      "oldValue": "Text1"
      "newValue": "New Value1"
      "ignoreCase": true
    },
    {
      "oldValue": "text2",
      "newValue": "New Value2",
      "ignoreCase": false
    }
  ]
}
```

Search for and Replace Multiple Catalog Text Strings

Use this procedure to search for and replace multiple catalog text strings all at the same time.

1. Create the JSON file for searching for and replacing multiple text strings.

   See About Search and Replace of Multiple Catalog Text Strings.
2. On the Classic Home page, click **Catalog**.
3. In the Catalog page, search for the item for which you want to replace the text.
4. In the search results for the item, click **More**, and then click **Replace Text**.



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5. Click **Multiple Text Replace**.
6. In the **Replace Text File** field, enter the path or click **Browse** to specify the JSON file that you created in Step 1.
7. Click **OK**.

   Text replacement triggers a background job to complete the task.
8. Review the progress of the replace text job by following these steps:
   a. Display the Classic Home page.
   b. Click **My Profile**, **Background Tasks**, and then click **Replace Text Tasks**.

Access Favorites Easily

You can access your favorite content easily using the **Favorites** option on the Home page.

Topics:

- Add Content to Your Favorites List
- Remove Content from Your Favorites List

Add Content to Your Favorites List

You can bookmark as favorites the content that you work with the most. Your favorites are displayed with a gold star, and you can view all of your favorites by clicking **Favorites** on the Home page.

For example, you might regularly view the "Box Plot & Bar" project. You can flag the project as a favorite to help you quickly access it.

1. Display the Classic Home page, Catalog page, or Favorites page where the content is displayed.
2. Locate the content that you want to mark as a favorite.
3. Click **More**, and then **Add to Favorites**.

Remove Content from Your Favorites List

You can remove content from your favorites list that you no longer need to access as often. For example, you might remove the "Box Plot & Bar" project from your favorites because it's out-of-date.

1. Display the Classic Home page, Catalog page, or Favorites page where the content is displayed.
2. Locate the content that you want to remove from your favorites.
3. Click **More**, and then **Remove from Favorites**.

Add or Remove Favorites from Other Pages

You can add or remove favorites from other pages.

For example, you might want to flag an analysis in the Alerts page as a favorite to help you quickly access it.

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1. Go to the page or folder and search for the content you want to add or remove from the favorites list.
2. Select the item and click **More**.
3. From the Action menu of the item, click **Add to Favorites** or **Remove from Favorites**.

Access Properties

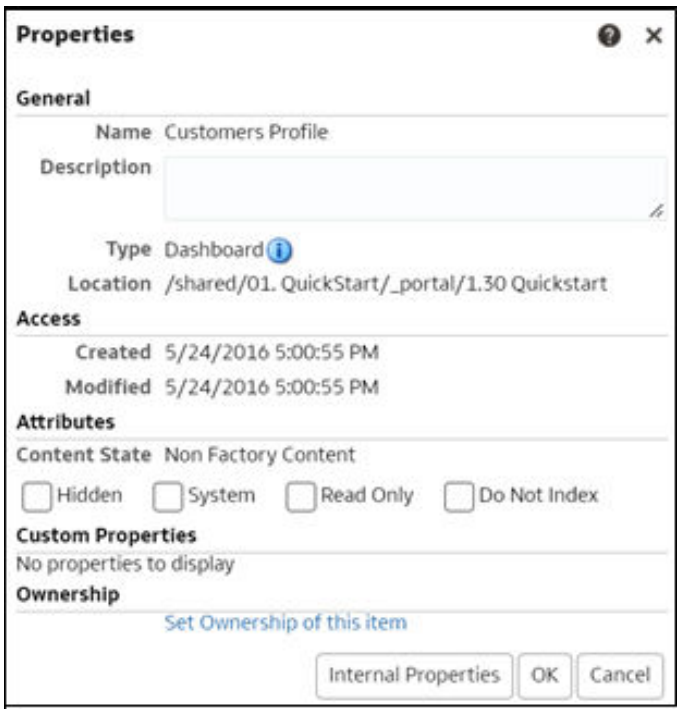
Administrators can access the properties of any item or folder to perform tasks such as view system information or change access levels. All other users can access and modify the properties for only those items that they create or own.

For example, you might want to change the Brand Revenue analysis to be read-only so that other users can't modify it.

1. On the Classic Home page, click **Catalog**.
2. In the Home page or Catalog page, locate the catalog item that you want to edit.

   You can locate a catalog item in the Recent or Others list on the Home page, or use the Search tool to locate a catalog item. For example, you might locate an analysis named 'Revenue by Region'.
3. Click **More**, then **Properties**.
4. Review or change the settings in the Properties dialog.

   For example, you can set an item as read-only or take ownership of an item.



5. Click **OK** to save changes or click **Cancel**.

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Assign Access Permissions

You can give others access to items in the catalog and to dashboard sections. This helps you to control the content that users can view or edit.

Topics:

- Add or Update Item Permissions
- Add or Update Dashboard Section Permissions

Add or Update Item Permissions

You give catalog item access permissions to application roles.

The permissions that you can assign to others vary depending on the type of content. To change permissions, the application role that you are assigned to must have the Change Permission privilege.

1. On the Home page, click **Navigator** and then click **Catalog**.
2. In the Catalog page, search for the content to which you want to assign permissions.
3. In the search results for the item, click **More** and **Permissions**.



4. In the Permissions dialog, click **Add users/roles** to access the Add Application Roles and Users dialog to add any required accounts.

   The roles and users inherit permissions from the roles of which they are members. For example, you can grant Full Control permission to the BIServiceAdministrator application role on the Sales Revenue analysis. This enables any user or application role with that role to have Full Control on the item. You can see the permissions that users and roles have on items (either granted directly or inherited). Click the **Click to see effective permissions** button in the Add Application Roles and Users dialog to display or hide a Permissions column to see the effective permissions for each row in the **Selected Members** table.
5. In the Permissions dialog, click the **Permissions** list. Most of the items in the list are parent permissions and contain several child permissions.
6. Optional: To build a specific list of permissions, click **Custom**. This option gives the user authority to bypass any permissions set on the folder that prevent the user from accessing the item from the Catalog or a dashboard. This option doesn't change the folder permissions.

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For example, you can grant users the Traverse permission for the Test folder in the shared folder area. Then, they *can* access items embedded in dashboards stored in this folder. Also, they can access embedded items in dashboards stored in subfolders, such as /<*shared folder area*>/Test/Guest folder. However, users can't access (meaning view, expand, or browse) the folder and subfolders from the Catalog.

7. Click **OK** twice.

Add or Update Dashboard Section Permissions

You can give others access to dashboard sections, thereby controlling which users have access to those sections. To grant access, you assign permissions to users of the dashboard.

For example, you assign permissions for the Project Costs section of the dashboard to the BI administrator. You can restrict access to BI consumers to prevent unwanted changes.

1. Open a dashboard for editing.
2. Select **Properties** in the section toolbar.
3. Select **Permissions**.
4. In the Permissions dialog, click the **Permissions** list to select permissions.
5. Click **OK**.

Send Email Reports and Track Deliveries

Send email reports to anyone inside or outside the organization or use agents to send reports to a range of other devices. Keep everyone up-to-date with regular daily or weekly reports.

Topics

- Send Email Reports Once, Weekly, or Daily
- Track the Reports You Distribute By Email or Through Agents
- View and Edit Recipients for Deliveries
- Suspend and Resume Deliveries
- Restore and Enable Delivery Schedules
- Generate and Download a Deliveries Report (CSV)
- Email Security Alert

Send Email Reports Once, Weekly, or Daily

Send Email reports to one or more recipients directly from the catalog. It's easy to distribute reports this way and quicker than downloading a report and mailing it from your email client. To keep everyone up-to-date, schedule daily or weekly emails.

1. On the Classic Home page, do one of the following:
   - Navigate to the item you want to email, click **Edit**, and in the **Results** tab, click **Email**.
   - Click **Catalog**, navigate to the item you want to email, click the **More** action menu, and select **Email**.
2. Enter the email address for one or more recipients.

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Separate multiple email addresses with a comma. For example: `jane.white@abc.com, steve.brown@abc.com`.

3. Customize the **Subject** line.
4. Send the email **Now** or click **Later** to set a date and time in the future.
5. To email report updates on a daily or weekly basis, click **Repeat** and then select **Daily** or **Weekly**.

You can check the status of email deliveries from the Console.

Track the Reports You Distribute By Email or Through Agents

Track the reports you've chosen to send to people by email from the Console. Quickly see when reports were sent and which items are pending (scheduled to run in the future). Review, change, or delete your deliveries (scheduled or completed) from the same page.

Any agents that you set up to deliver content are displayed in the Console too. This way, all your delivery information is in one place.

You can filter the deliveries by their status to track deliveries most important to you. The various status messages are explained here.

Delivery Status	Description
Canceled	Someone canceled the delivery. Users can cancel any delivery that they own.
Completed	Delivery ran successfully.
Disabled	Users can temporarily disable any delivery or agent that they own through the catalog. For example, you might stop a job running on its defined schedule if you want to edit the report or change who sees the report.
Failed	Delivery ran as scheduled but it didn't complete successfully. Click **Show details...** after the error icon () to find out what went wrong so you can fix it.
Not Scheduled	No one has set up a schedule for the delivery or the scheduled run date is for a date in the past (rather than a future date).
Running	Delivery is in progress.
Suspended	Administrators can temporarily suspend deliveries that other users set up. For example, before you migrate from a test environment to a production environment, your administrator might suspend deliveries in the test environment, and resume them in the production environment.
Timed Out	Delivery timed out because it took too long to complete.
Try Again	Something went wrong. Try to run the delivery again.
Warning	Delivery ran as scheduled but it wasn't 100% successful. For example, the delivery specifies 10 recipients but only 9 of them received it because 1 of the email addresses was incorrect. Click **Show details...** after the warning icon () to find out more.

To track deliveries from the Console:

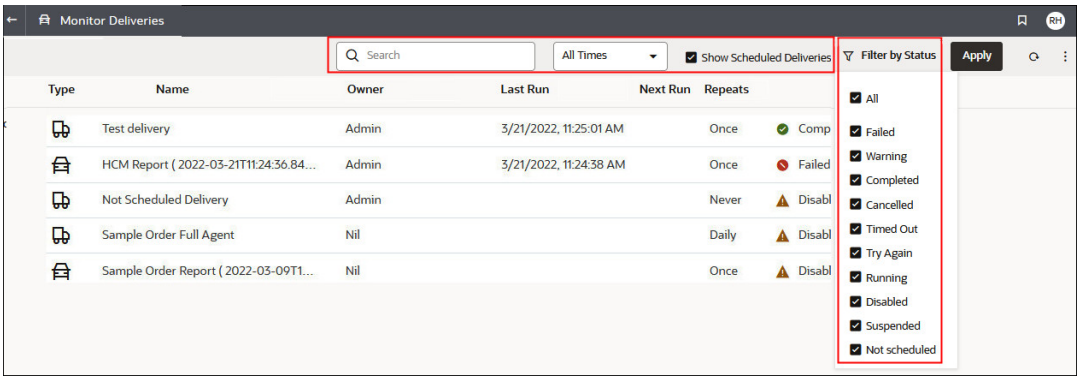
1. Go to the Home Page, click **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.

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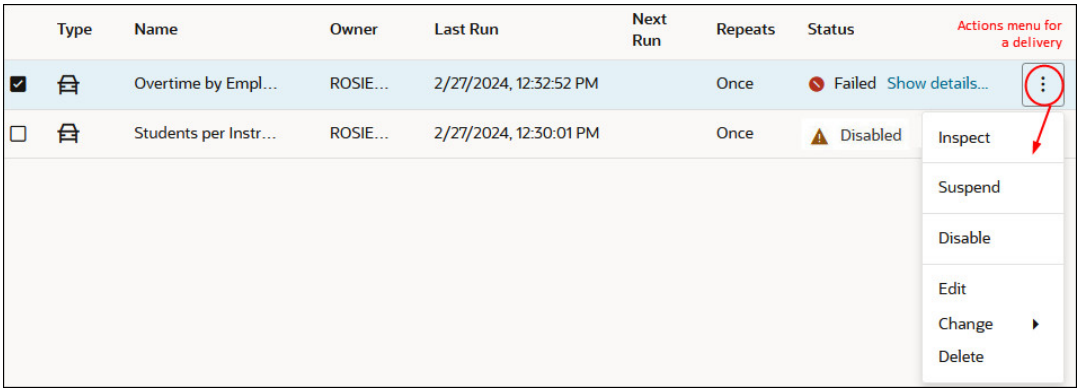
Deliveries are listed by run date, with the most recent delivery displayed first. Initially, you see only the deliveries sent in the last 24 hours (**Last Day**). To see deliveries for the last week or all deliveries, select **Last 7 Days** or **All Times**.

Click **Show Scheduled Deliveries** (then **Apply**) to show deliveries that are scheduled to run in the future. For example, you might schedule a delivery to run tomorrow at 9am. If you look at the Deliveries page the night before or at 8am, you'll see the delivery only when you select **Show Scheduled Deliveries** as the delivery hasn't run yet.

3. Filter the list of deliveries by name, time, or status, and then click **Apply**.
   - **Name**: To filter by name, start typing the name of the delivery you're looking for in the search box, and then press **Enter**.
   - **Time**: To filter by time, click the time filter. Select from **Last Day**, **Last 7 Days**, **All Times**.
   - **Status**: To filter by status, click **Filter by Status**. Select one or more from **Failed, Warning, Completed, Canceled, Timed Out, Try Again, Running, Disabled, Suspended, Not Scheduled**.
   - **Show Scheduled Deliveries**: Select to include deliveries that are scheduled to run in the future. Deselect to show only deliveries that have run or are running.



4. Click **Actions** for a delivery to review or manage a single delivery.



5. To preview the content, click **Actions** for the delivery, and select **View Report**.

   This option isn't available if the delivery is generated by an agent.

6. To see details about a delivery, such as the date of last and next run, delivery frequency, history, agent path, and so on, click **Actions** for the delivery and select **Inspect**.
   - **History**: Click **History** to view and search for historical job runs. Use the name, time, and status filters to help you find the delivery you want.

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- **Recipients**: Click **Recipients** to view details about the users who will receive the delivery.

7. To edit a delivery, click **Actions** for the delivery, and select **Edit**.
   - Email deliveries — Update the email options.
   - Agent deliveries — Edit the agent associated with the delivery.
8. To troubleshoot a delivery that fails or completes with a warning, click **Show details...**.

   Failed - Click **Show details...** to find out what went wrong so you can fix it.

   Warning - Click **Show details...** to find out more.
9. To disable a delivery, click **Actions** for the delivery, and select **Disable**.

   If you want to enable the delivery later on, click **Actions** for the delivery, and select **Enable**.
10. To delete a delivery and all future scheduled deliveries, select **Delete**, then **OK** to confirm.
11. To delete, resume, or suspend multiple deliveries, Ctrl-click to select them and then right-click to select the action you want to perform (**Delete**, **Resume**, **Suspend**).

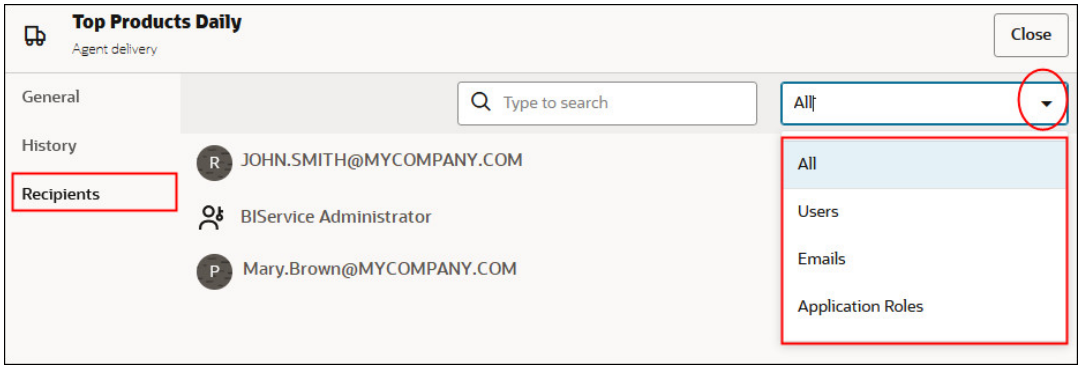
View and Edit Recipients for Deliveries

You can review and edit the recipients of all your deliveries and agents from the Monitor Deliveries page. If you need to make recipient changes across multiple deliveries, the Monitor Deliveries page offers a convenient way to do it.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.
3. To view the current recipients for a delivery, click the Action menu for the delivery, and select **Inspect**.
4. Click **Recipients**.
5. Review the current recipient list.

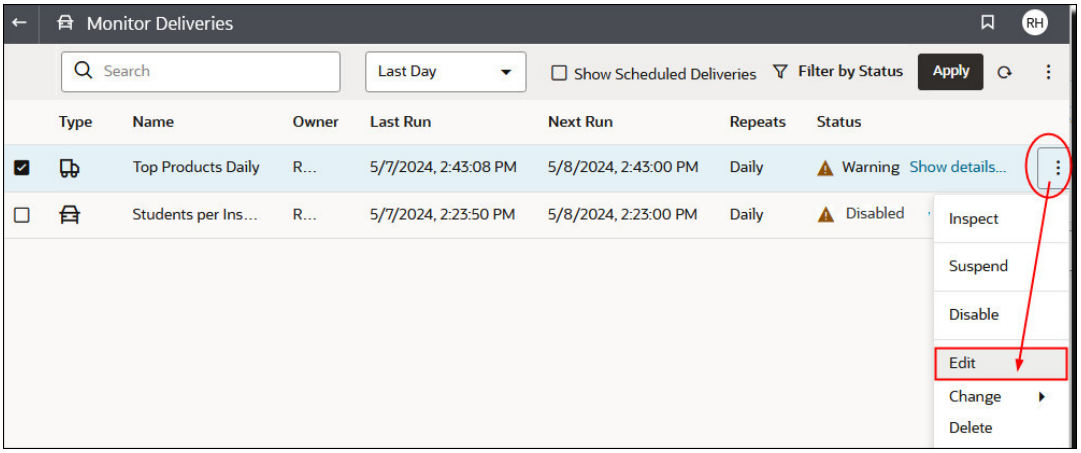
   To filter the list, click the down arrow and select the type of recipient you want to view. Either **Users**, **Emails**, or **Application Roles**. The Application Role filter doesn't show you the users assigned to each application role. If needed, administrators can obtain this information from the **Users and Roles** page in the Console.

   To search for a particulate recipient, start typing the name of the user, email address, or application role in the search box.



6. To edit the recipients, click the Action menu for the delivery, and select **Edit**.

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7. Modify the list of recipients for the agent or email delivery.
   - For agents, click **Recipients** and modify the recipient list.
   - For email deliveries, edit the email addresses in the **To** field.

Suspend and Resume Deliveries

Administrators can temporarily suspend any delivery, at any time.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.
3. To access everyone's deliveries in addition to your own, click the Action menu for the page, and select **Admin View**.
4. To suspend a delivery, click the Action menu for the delivery and select **Suspend**.

   To suspend multiple deliveries at once, select **Shift** + click or **Ctrl** + click to select all the deliveries you want to suspend, then right-click and select **Suspend**.
5. To resume a delivery, click the Action menu for the delivery and select **Resume**.
6. To resume or suspend multiple deliveries, Ctrl-click to select them, and then right-click to select the action you want to perform (**Resume** or **Suspend**).

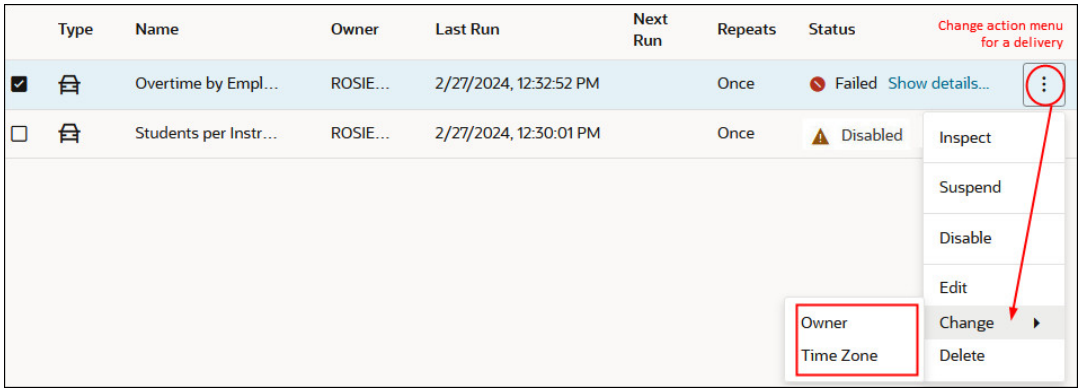
Change the Owner or Time Zone for Deliveries

If you're an administrator, you can change the owner or time zone for one or more deliveries. You can make yourself the new owner or select a different user. This is useful when the original owner changes, leaves your organization, or after migration from a different environment. The change time zone option also comes in handy if you need to change the time zone for multiple deliveries, and this is especially useful when you migrate deliveries from a different environment with a different time zone.

For example, you might migrate deliveries from an on-premises Oracle Analytics Server environment where the time zone is correctly set to your local US time to an environment with a different time zone. If you migrate to Oracle Analytics Cloud where the time zone changes to UTC, your deliveries arrive too early. In this scenario, you need an easy way to update the time zone for all your deliveries.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.

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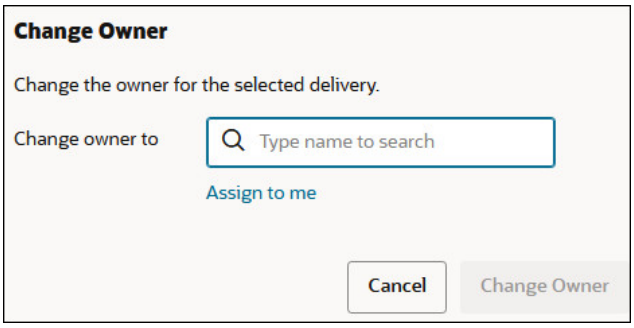
The **Change** menu is available only to administrators. If you don't have the required permissions, ask your administrator to make the changes for you.

3. To change the owner of a delivery, click the Action menu for the delivery, select **Change**, and then **Owner**.

   To change multiple deliveries at once, select **Shift** + click or **Ctrl** + click to select all the deliveries you want, then right-click and select **Change**, then **Owner**.

   a. Start typing the name of the new owner to find the user. Use * as a wildcard.

      Alternatively, click **Assign to Me** to make yourself the new owner.



   b. Click **Change Owner**.

   c. If the current owner and the RunAs user for a delivery are the same, the new owner becomes the new RunAs user. Click **OK** to acknowledge and allow changes to the RunAs user, where required.

      When the RunAs user changes, take care to review the new RunAs user's data and object security to ensure the required access levels are applied.

4. To change the time zone of a delivery, click the Action menu for the delivery, select **Change**, and then **Time Zone**.

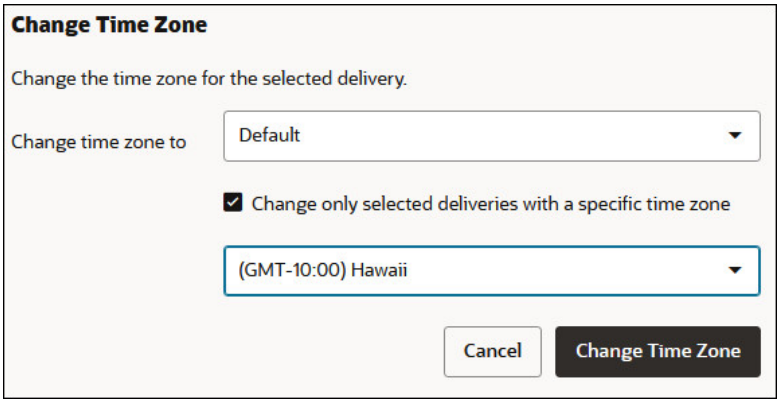
   To change multiple deliveries at once, select **Shift** + click or **Ctrl** + click to select all the deliveries you want, then right-click and select **Change**, then **Time Zone**.

   a. Select the new time zone for the deliveries you selected.

   b. To only change a specific time zone, click **Change only selected deliveries with a specific time zone** and then select the time zone you want to change.

      Don't select the checkbox if you want all deliveries to use the new time zone.

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c. Click **Change Time Zone**.

Restore and Enable Delivery Schedules

When you restore content from a snapshot or migrate content from a different environment, delivery schedules defined for agents, analyses, and dashboards in the snapshot aren't restored or activated right away. When you're ready to restore deliveries on your system, you can decide whether to enable or disable delivery schedules on your system. This is useful as you might not want to immediately start delivering content.

For example, if you're restoring a production environment, you probably want to restart deliveries as soon as possible. Whereas in a test environment, you might prefer to disable deliveries after restoration and activate them at a later date.

1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.
3. To restore deliveries, click the **Action** menu for the page and select **Restore Deliveries**.
4. Select whether to restore and activate deliveries or restore deliveries only. Select one of the following:
   - **Maintain Delivery Schedule Status**

     All delivery schedules maintain their status (enabled or disabled).

     – Existing delivery schedules remain unchanged.

     – New delivery schedules created during the restore process inherit the schedule status that's defined in the corresponding agent, analysis or dashboard.

     For example, this option is useful when you restore deliveries in a production environment where you want deliveries to be active immediately.
   - **Disable Delivery Schedules for New Deliveries**

     Delivery schedules that are created during the restore process for agents, analyses, and dashboards are disabled. Existing delivery schedules remain unchanged.

     For example, this option is useful when you restore deliveries in a test environment where you don't need to activate deliveries immediately.
   - **Disable All Delivery Schedules And Delete All History (Not recommended)**

     All delivery schedules are disabled during the restore process and any delivery history is deleted.

     – Existing delivery schedules are disabled.

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- New delivery schedules created for agents, analyses, and dashboards during the restore process are disabled.
- Historical delivery details no longer available.

This option is not recommended. If you do select this option, you must manually enable delivery schedules for all agents, analyses, and dashboards.

5. Click **Restore**.
6. To activate a delivery, click the Action menu for the delivery, and select **Enable**.

   To activate multiple deliveries at once, select **Shift** + click or **Ctrl** + click to select all the deliveries you want to activate, then right-click and select **Enable**.

   If necessary, click **Edit** to redefine the delivery schedule.

Generate and Download a Deliveries Report (CSV)

If you're an administrator, you can generate a report that contains details about your deliveries and download the report in CSV format for analysis. You can customize the report so it only contains information you want to see. For example, if you're interested in active deliveries, there's an option to exclude deliveries that are disabled or suspended from the report. You can also control the detail that's included and whether to include everyone's deliveries or just your own.

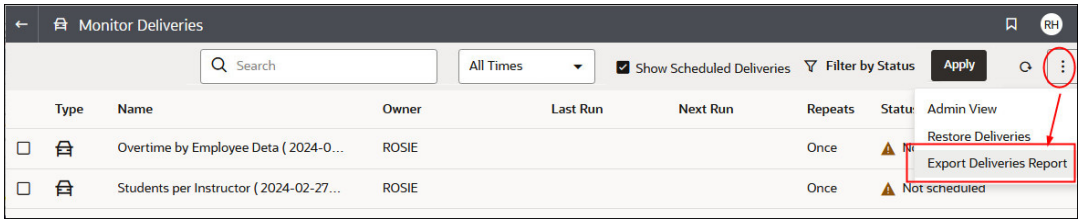
Delivery reports can include the following information:

- **Name** - Name of the agent delivering the report.
- **Agent Path** - Location of the agent delivering the report.
- **Content Data** - Name of the report being delivered.
- **Content Type** - Type of content in the report.
- **Owner** - User who created the delivery.
- **Repeats** - Delivery frequency. For example, once, daily, weekly, and so on.
- **Run As User** - User running the report.
- **User Recipients** - Users receiving the report.
- **Email Recipients** - Email addresses of users receiving the report.
- **Application Role Recipients** - Application roles receiving the report, that is, users assigned to these application roles receive the report.
- **Disabled** - Specifies whether the delivery is disabled: TRUE or FALSE
- **Suspended** - Specifies whether the delivery is suspended: TRUE or FALSE

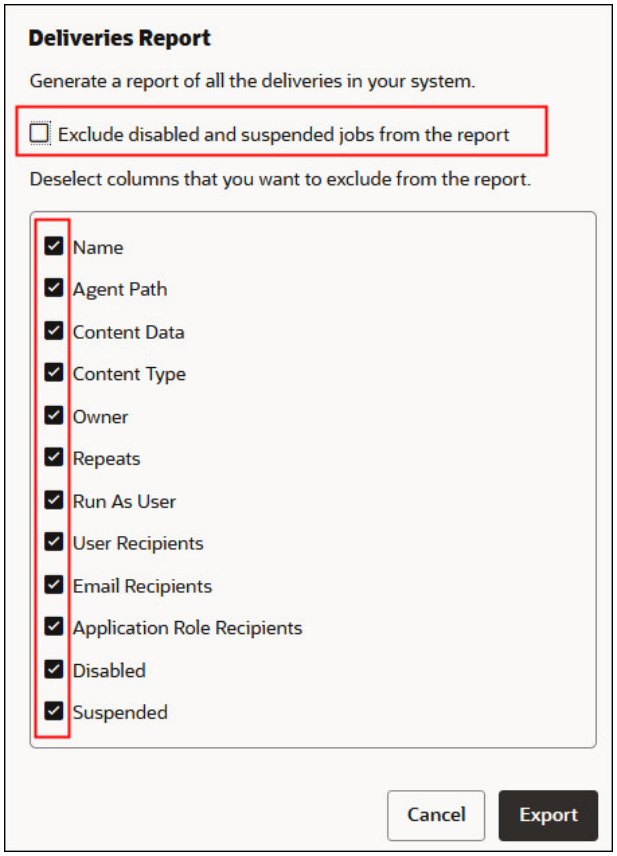
1. In the Oracle Analytics Home page, click the **Navigator**, and then click **Console**.
2. Click **Monitor Deliveries**.
3. Click the Action menu for the page, and select **Export Deliveries Report**.

> **Note**
>
> To include everyone's deliveries in the report rather than only deliveries that you own, click **Admin View** before you click **Export Deliveries Report**.

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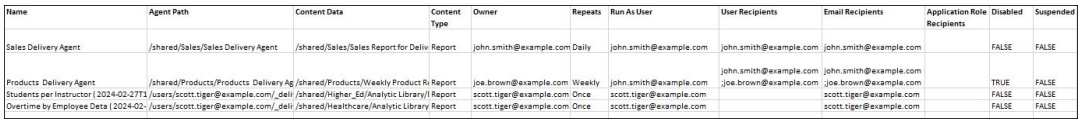


4. Customize the report.
   - Select **Exclude disabled and suspended jobs from the report** if you want the report to contain only jobs that are active.
   - Deselect information to exclude it from the report.



5. To generate the report and download the CSV file to your local file system, click **Export**.
6. Navigate to your download folder and open the report in your favorite editor.

   Look for a CSV file with the name: `DeliveriesReport<timestamp>`. For example, `DeliveriesReport20240620100144854.csv`.



Name	Agent Path	Content Data	Content Type	Owner	Repeats	Run As User	User Recipients	Email Recipients	Application Role Recipients	Disabled	Suspended
Sales Delivery Agent	/shared/Sales/Sales Delivery Agent	/shared/Sales/Sales Report for Deliv	Report	john.smith@example.com	Daily	john.smith@example.com	john.smith@example.com	john.smith@example.com		FALSE	FALSE
Products Delivery Agent	/shared/Products/Products Delivery Ag	/shared/Products/Weekly Product R	Report	joe.brown@example.com	Weekly	john.smith@example.com	john.smith@example.com ;joe.brown@example.com	john.smith@example.com ;joe.brown@example.com		TRUE	FALSE
Students per Instructor (2024-02-27T1	/users/scott.tiger@example.com/_deli	/shared/Higher_Ed/Analytic Library/I	Report	scott.tiger@example.com	Once	scott.tiger@example.com		scott.tiger@example.com		FALSE	FALSE
Overtime by Employee Deta (2024-02-	/users/scott.tiger@example.com/_deli	/shared/Healthcare/Analytic Library	Report	scott.tiger@example.com	Once	scott.tiger@example.com		scott.tiger@example.com		FALSE	FALSE

Email Security Alert

Content that you send by email isn't encrypted. It's your responsibility to safeguard any sensitive data that you send.

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See Send Reports by Email and Track Deliveries.

Automate Business Processes with Agents

Content authors can create agents that deliver analyses, dashboards, and briefing books to targeted audiences on-demand or on a regular schedule.

Topics:

- Create Agents to Deliver Content
- Schedule an Agent to Deliver Content Directly from an Analysis
- Disable and Enable the Schedule for an Agent
- Subscribe to Agents
- List Agents You Subscribe To or Own
- Access and Manage Your Alerts
- Perform Advanced Agent Job Management Tasks

Create Agents to Deliver Content

You can create agents that deliver analyses, dashboard pages, and briefing books to specific recipients and subscribers. These agents can deliver content on-demand or on a regular schedule.

Oracle Analytics can run up to 20 agents simultaneously. To avoid exceeding this limit, don't schedule too many agents to run at the same time or try to update agents while many agents are running.

1. On the Classic Home page, click **Create** and select **Agent**.
2. Optional: Set some general options for the agent.
    a. Set a priority level for the agent.

       Consider the importance of the content you want to deliver.

    b. Define how you want to generate the content, that is, which user do you want to run report queries as.
3. Set up a delivery schedule.
    a. Click the **Schedule** tab.
    b. Select whether you want the agent to run on a schedule, how often it runs, when to start, and when to stop.

       When you select the date and time, for time zones where daylight savings applies, the time zone reflects the daylight savings time. For example, if, during the summer months, you select **(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London**, this means BST (British Summer Time).

       The minimum frequency for daily run by delivery agent is 15 minutes.
4. Optional: Click the **Condition** tab, and select **Use a condition** if you want the agent to only run under certain conditions.
    - Click **Create** to define the condition.
    - Click **Browse** to select an existing condition from the catalog.

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Keep the default (**Do not use a condition**), if you want the agent to always deliver its content.

5. Select the content you want to deliver, such as a dashboard page or an analysis.
   a. Click the **Delivery Content** tab.
   b. Enter a name in the **Subject** field.
   c. Select the content that you want to deliver.
   d. Select the format that you want to deliver the content in.
   e. Select the option for how you want to deliver the content when the agent runs.
      - **Deliver results directly** - Delivers the results in an email.
        This option displays if you have the **Deliver Content in Email** privilege. This privilege is assigned to everyone by default (Authenticated User).
      - **Deliver as attachment** - Delivers the results as an email attachment.
        This option displays if you have the **Deliver Content in Email** privilege. This privilege is assigned to everyone by default (Authenticated User).
      - **Deliver link to results** - Delivers a link that you click to sign into Oracle Analytics where you can view the results.
        This option displays when an administrator grants you the **Deliver Content Link in Email** privilege. This privilege is denied to everyone by default (Denied: Authenticated User).

      Recipients of an agent must have the same privileges as the delivery agent. For example, if the recipient of an agent delivering a link doesn't have the **Deliver Content Link in Email** privilege, the recipient is shown as invalid.
6. Specify who you want the content to be delivered to and who else is allowed to subscribe to this agent.
   a. Click the **Recipients** tab.
   b. Click **Add Recipient** to add users individually or add users by their application role.
   c. Click **Add Email Recipient** to enter the email address of one or more recipients.
   d. Click **Get Recipients from the Analysis Used in the Agent Condition**, and select analysis columns from a condition used by this agent. If the **Condition** tab doesn't contain a condition, then you can't select this option. At runtime this adds recipients whose email addresses are configured for the selected columns used in the condition.

      If you select this option the agent must be saved under Shared Folders.
   e. Click **Only Return Rows Relevant to the User Running the Agent** to only return data available to the user.
   f. To allow other people to subscribe to this agent, select **Publish Agent for Subscription** and then define who can subscribe, by selecting their user name or an application role.

      This option is only available for agents or reports saved in Shared Folders.
7. Specify how you want content to be delivered to the recipients. You can send deliveries to Oracle Analytics, by email, and to devices such as mobile phones and pagers.
   a. Click the **Destinations** tab.
   b. Click **Home Page and Dashboard** to deliver content. Users receive alerts in Oracle Analytics whenever deliveries are sent to them.
   c. Click **Devices** to deliver the content in other ways.

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- To let users decide how they receive deliveries, select **Active Delivery Profile**.
- To restrict the types of devices that deliveries can be sent to, select **Specific Devices** and select only the device types you want.

Users set up their deliveries profile through **Delivery Options** preferences (My Account).

8. Save the agent.

   If you want other people to subscribe to the agent, you must save it in a subfolder under `/Shared Folders` so they can find it. For example, `/Shared Folders/MySharedAgents/Sales/MonthlySalesTarget_Agent`.

   After saving the agent, you can run the agent by clicking the **Run Agent Now** button. This is helpful, for example, if you want to test the agent.

The Actions tab is reserved for future use.

Schedule an Agent to Deliver Content Directly from an Analysis

You can set up an agent to deliver content directly from an analysis. When you create an agent in this way, Oracle Analytics sets the **Content** property for you and creates a delivery condition for the agent to help you get started.

1. Navigate to the analysis in the catalog.
2. Click the **More** action menu, and select **Schedule**.
3. Further define the agent, as required.

Disable and Enable the Schedule for an Agent

You can temporarily disable (and then enable) an agent's schedule.

Disabling an agent's schedule stops the agent from running on its defined schedule. It doesn't stop you from running it by other means, for example, by the **Run Agent Now** button in the agent editor.

1. On the Classic Home page, click **Catalog** and navigate to the agent whose schedule you want to disable or enable.
2. Click the **More** action menu, and select **Disable Schedule** to disable the agent's schedule.
3. Click the **More** action menu, and select **Enable Schedule** to run the agent on schedule again.

You also can disable and enable an agent's schedule by using the **Enabled** box in the Schedule tab of the agent editor.

Subscribe to Agents

Subscribe to an agent if you want to receive the most up-to-date information generated by the agent. You can only subscribe to agents if the owner allows you to do so.

1. On the Classic Home page, click **Catalog**.
2. Navigate to the agent you want to subscribe to.
3. Click the **More** action menu, and select **Subscribe**.

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To make an agent available for subscription, the owner must select **Publish Agent for Subscription** (**Recipients** tab) and identify who's allowed to subscribe.

4. To unsubscribe at any time, click the **More** action menu, and select **Unsubscribe**.

List Agents You Subscribe To or Own

You can display a list of agents that you subscribe to and any agents that you own.

1. On the Classic Home page, click **Catalog**.
2. Click **Search**.
3. To find all the agents, enter ***** (asterisk) in the Search box, select **All** from the Location list, and then select **Agent** from the Type list.

   Alternatively, enter the name or part of the name of an agent in the **Search** field, select a specific **Location**, and then select **Agent** from the Type list.
4. Click **Search**.

Access and Manage Your Alerts

Alerts notify you when content arrives from an agent.

1. On the Classic Home page, click **Alerts!**
2. View and manage your alerts.
   - View the content for an alert.
   - Clear an alert and all its occurrences.
   - Edit the agent that generated the alert, if you have permission to do so.
   - Run the agent that generated the alert, if you have permission to do so.
   - Subscribe to the alert.
   - Clear all your alerts and all their occurrences.

Perform Advanced Agent Job Management Tasks

You can use Oracle Analytics to perform management tasks related to working with agent jobs.

If you want to perform advanced tasks, you can use the Job Manager Command Line Interface on a local Windows or Linux machine. For example, the Job Manager Command Line Interface enables you to add, remove, list, and view agent jobs.

Topics:

- About the Job Manager Command Line Interface
- Use the Job Manager Command Line Interface

About the Job Manager Command Line Interface

You can use the Job Manager command line interface to create and manage scheduled jobs.

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You can configure and submit agents for execution using Oracle Analytics Classic, however you can also use the Job Manager command line interface for similar tasks using commands and scripts.

The Job Manager command line interface is deployed when you install Oracle Analytics Server.

Use the Job Manager Command Line Interface

You use the Job Manager command line interface to perform advanced job management. For example, you can create, delete, and view scheduled jobs.

1. To use the command line, change to the following directory:

   `ORACLE_HOME/bi/modules/oracle.bi.jobmanager/scripts`

2. Run the appropriate script:
   - `jobmanager.cmd` (on Windows)
   - `./jobmanager.sh` (on Linux)
   - For assistance about commands run:
     `jobmanager.cmd - help | ./jobmanager.sh -help`
3. Enter a command. For example, use `listJobs` to generate a report of all scheduled jobs.

   ```
   ./jobmanager.sh listJobs /u admin /p myPassword /scheduler 123.456.78.9 /
   schedulerport 9502
   ```

Configure Your Devices and Delivery Profile

You use the Delivery Options tab of the My Account dialog to configure the devices and delivery profiles to be used to reach you when an alert is generated by an agent.

- About Devices and Delivery Profiles
- Configure Your Devices
- Configure Your Delivery Profiles

About Devices and Delivery Profiles

Devices and delivery profiles control how best to reach you when an alert is generated by an agent and on which devices you want to receive the content.

- **Device** — A device is the medium used to deliver content to you. The content of an agent can be delivered to you in different ways, such as, an email or SMS message.
- **Delivery profile** — A delivery profile specifies which devices to use to deliver content to you, based on the priority of the content. You can define several delivery profiles to meet your needs, and switch among them. However, only one profile can be active at any given time.

  For example, you might have an **In the Office** delivery profile that delivers content to an office email, and an **On the Road** profile that delivers content to your cell phone, depending on the priority of the information.

You configure your devices and your delivery profiles from the Delivery Options tab of the My Account dialog.

Your administrator manages the types of devices that are available to you. See .

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Depending on the destinations that are specified for an agent, content can be delivered to the:

- Home page and dashboard (Alerts section).
- Active delivery profile or specific devices.

  When the destinations are specific devices, content is delivered to the devices that you have configured rather than to the devices in your active delivery profile. For example, if an agent is defined to be delivered by email devices, then the default email device that you configured is used rather than any email devices that you configured in your active delivery profile.

Delivery content is assigned a specific priority. The default priority is normal. When you select devices for your active profile, you can indicate what priority content should be sent to that device. For example, if you have added a cell phone to your delivery profile, then you might associate it with high priority content only.

Configure Your Devices

You can configure one or more devices where you want alerts to be delivered.

1. On the Classic Home page, click **Signed In As *Your-Username*** and then select **My Account**.
2. Click the **Delivery Options** tab.
3. In the **Devices** area, click **Create Device** to add a device.

   Some agents are set up to deliver alerts according to your active delivery profile but some agents only deliver to specific devices and you define those here. For example, if an agent is set up to deliver to email devices, then the email device that you specify here is used rather than any email devices that you specify in your active delivery profile.
4. For **Name**, enter a name for the device that's easy to recognize. For example, **My Work Email** or **My Work Mobile**.
5. Select the device category. For example, **Email**.
6. For **Device Type**, specify the type that describes your device.
7. For **Address/Number**, enter the address or number associated with your device. For example, your work email address or work mobile phone number.

   Don't use punctuation such as spaces, dashes, or parentheses when you enter a number.
8. Click **OK** to return to the Deliver Options tab of the My Account dialog.

   The device is displayed in the Devices list for the appropriate category (for example, **Email**).
9. If you want this device to be the default device, then select the **Default** option to the right of the device name.
10. To edit a device, perform the following steps:
    a. Select the device in the list.
    b. Click the **Edit Device** button to display the Edit Device dialog.
    c. Make your edits and click **OK** to return to the Deliver Options tab of the My Account dialog.
11. Click **OK**.

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Configure Your Delivery Profiles

You can set up one or more delivery profiles to say where you want alerts to be delivered.

1. On the Classic Home page, click **Signed In As *Your-Username***, and then select **My Account**.
2. Click the **Delivery Options** tab.
3. In the **Delivery Profile** area, click **Create Delivery Profile**.
4. For **Name**, enter a name for the delivery profile that's easy to recognize. For example, **In the Office** or **On the Road**.
5. For each delivery device you want to use when this is the active profile, select one or more priority options — **High**, **Normal**, or **Low**.

   These priorities are used together with the priority of the delivery content to determine which device the content is delivered to.

   Don't set the priority for devices that you don't want to use. Devices that don't have a priority selected aren't used by the profile.
6. Click **OK**.
7. If you want this delivery profile to be your active profile, select the **Active** option.

Migrate Content to Other Catalogs

You can copy catalog content from one environment to another using the catalog archive and unarchive options. Archiving saves your content to a `.catalog` file on your local file system. Unarchiving uploads content from catalog files to another catalog location.

Topics

- Save Content to a Catalog Archive
- Upload Content from a Catalog Archive
- Track the Progress of Your Catalog Unarchive Tasks

Save Content to a Catalog Archive

You can copy or move content you create in one environment to another environment using the catalog archive or unarchive feature. Archiving saves one or more objects or folders that contain multiple objects to a `.catalog` file on your local file system.

If you don't select **Keep Permissions**, permissions are excluded. This can be useful if you're migrating content from a test environment and none of the permissions you assigned to test users are required in the production system. When you unarchive, the content inherits permissions from the parent folder on the target system.

When you unarchive, timestamp information is retained and you can choose to only overwrite items that are older than those in the catalog archive.

If you don't select **Keep Timestamps**, the original age of content isn't saved or considered when you unarchive the content.

You can upload the `.catalog` file at a different location.

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1. On the Classic Home page, click **Catalog**.
2. Select one or more folders or objects to copy or move to another catalog.

   To select multiple items, press and hold the `Ctrl` key, and click the folders or objects you want to copy.
3. In the **Tasks** pane beneath the **Folders** pane, click **Archive**.
4. Select **Keep Permissions** to save the permission settings, if any.
5. Select **Keep Timestamps** to save information such as time created, last modified, and last accessed.
6. Click **OK**.
7. Select **Save File**.

   If you want to, change the name of the catalog file.
8. Select a folder and click **Save**.

Upload Content from a Catalog Archive

You can upload content from Oracle Analytics and Oracle BI Enterprise Edition 11.1.1.9.0 or later. Select the custom catalog folder where you want the content to go, and you'll see an **Unarchive** option. Point to a catalog archive, any valid `.catalog` file, to copy its content to this folder.

1. On the Classic Home page, click **Catalog**.
2. Navigate to a custom folder where you want to unarchive the content of your file.
3. In **Unarchive**, click **Browse** to select the archive file.
4. In **Replace**, select an option:
   - **None:** Never overwrite existing content. This is the default setting.
   - **All:** Overwrite existing content, except for content marked Read-Only.
   - **Old:** Overwrite existing content if it’s older than the content in the file.
   - **Force:** Overwrite all content, even newer content and content marked Read-Only.
5. In **ACL**, select how to apply Access Control List permissions.
   - **Create**: Preserves objects' permissions as they were in the original, creating and mapping users and application roles as necessary. If the user or role is not available, objects inherit their owner from the new parent folder, which is similar to the Inherit option.
   - **Inherit**: Inherit objects' permissions from its new parent folder. (Default)
   - **Preserve**: Preserve objects' permissions as they were in the original, mapping users and application roles as necessary.
6. Click **OK**.

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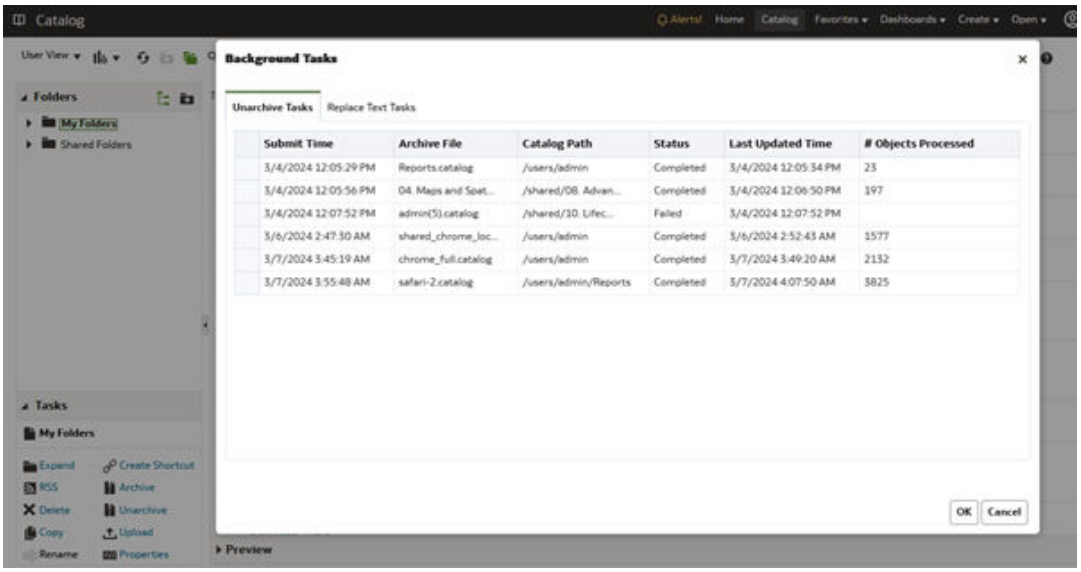
Track the Progress of Your Catalog Unarchive Tasks

You can track the progress and current status of any catalog unarchive operations that you initiate from the **Unarchive Tasks** tab.

Large catalogs might take some time to process. Check the information on this tab to find out when your task starts or completes, and troubleshoot any errors that might occur.

1. Navigate to the Classic Home page.
2. Click **My Profile**, and select **Background Tasks**.
3. Click **Unarchive Tasks**.

   If the tab doesn't display, clear the browser cache.



4. Check the status to see whether your unarchive operation is complete, still in progress, not started yet (submitted), or failed for some reason.

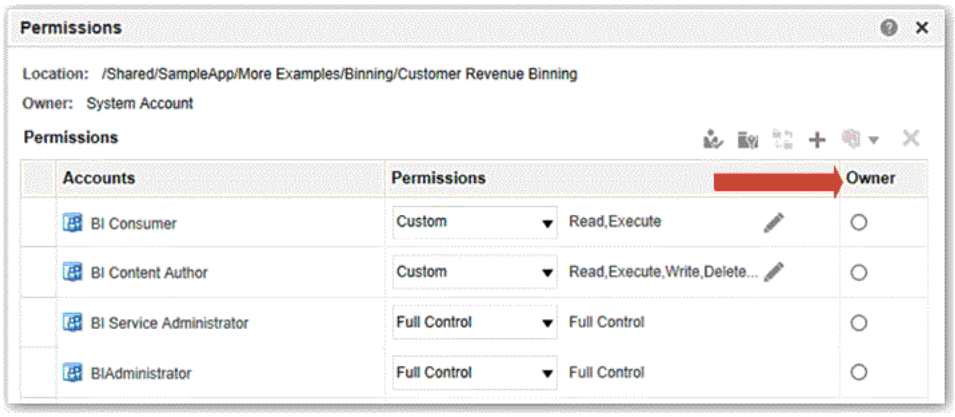
Assign Ownership of Items

When you create content in the catalog, you can grant ownership of the content to others. Also, a user who has been granted the proper privileges can take ownership of content.

For example, you can create a Brand Revenue analysis and grant ownership to a Regional Sales Analyst tasked with maintaining the analysis going forward.

1. On the Classic Home page, click **Catalog**.
2. In the Catalog page, search for the content to which you want to assign ownership.
3. In the search results for the item, click **More** and **Permissions**.
4. In the Permissions table, click the **Owner** column to specify the new owner.

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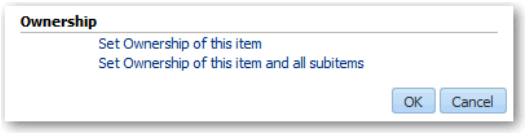
5. Click **OK**.

Assume Ownership of Items

As a user or a member of a role, you can take ownership of shared folder content if you're assigned the BIServiceAdministrator role.

For example, if you're a user of the Sales group, you can assign properties to the Sales Forecast analysis to mark yourself as an owner.

1. On the Classic Home page, click **Catalog**.
2. In the Catalog page, search for the content that you want to own.
3. In the search results for the item, click **More** and **Properties**.



4. In the Ownership area, select whether to take ownership of just the item or of the item and its child items.
5. Click **OK**.

About Embedding External Images and Other External Resources in Your Content

You can embed external images and other external resources in reports if your administrator considers it safe to do so.

If you try to add an image from an unapproved source, an invalid image error prompts you to contact your administrator to configure a safe domain for the image.

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Your administrator maintains a list of safe domains. For example, if you want to embed images from *.example.org, ask your administrator to add this domain to the safe list. See Register Safe Domains.

In addition to images, your administrator can authorize or restrict access to other web resources, such as frames, scripts, fonts, stylesheets, audio, video, and connections.

Access Your Reporting Content in Smart View

Oracle Smart View for Office (Smart View) provides a common Microsoft Office interface designed specifically for Oracle's Enterprise Performance Management (EPM) and Business Intelligence (BI).

Using Smart View, you can view, import, manipulate, distribute and share data in Microsoft Excel, Word and PowerPoint interfaces. It's a comprehensive tool for accessing and integrating EPM and BI content from Microsoft Office products.

Perform Advanced Catalog Management

You can use the Catalog page in Oracle Analytics to perform most management tasks for your catalog. You can also use Catalog REST APIs to programmatically perform searches, manage access control lists, move and copy catalog objects, manage folders, and so on. See Catalog REST Endpoints.

If you want to perform advanced tasks, you can deploy and use the Catalog Command Line Interface on a local Windows or Linux machine. For example, the Catalog Command Line Interface enables you to create advanced catalog reports and diagnose catalog issues by viewing the underlying XML code of catalog objects.

Topics:

- Use the Catalog Manager Command Line Interface

Use the Catalog Manager Command Line Interface

You use the Catalog Manager command line interface to perform advanced catalog management. For example, you can create, delete, rename, and view catalog objects.

1. On Windows, from the Start menu, select **Oracle Analytics Client Tools**, then **Catalog Manager CLI**.
2. When using the command line, change to the following directory:

   `BI_DOMAIN\bitools\bin`
3. Run the appropriate script:
   - `runcat.cmd` (on Windows)

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- `runcat.sh` (on Linux)
- For assistance about commands run:
  `runcat.cmd - help | runcat.sh -help`

4. Enter a command.

   For example, to generate a report that lists the contents of the catalog, enter `runcat.sh -cmd report`.

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Part IV
Reference

This part provides reference information.

Topics:

- Frequently Asked Questions
- Troubleshoot
- Design Tips
- Data Preparation Reference
- Expression Editor Reference
- Accessibility Features and Tips

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Frequently Asked Questions

This reference provides answers to frequently asked questions about visualizing and reporting data.

Topics:

- How do I find out which version of Oracle Analytics Server I'm using?
- What's the maximum access control list (ACL) entry limit for a single artifact?
- What's the maximum number of column values that display when I use a parameter as a filter?
- What are the display limits for prompts?
- What's the maximum size map layer file that I can upload?
- When I want to save an object, where does the default location come from?
- Can I enable other users to access my analyses, dashboards, and workbooks?
- Can I make analyses and dashboards interact with prompts and other analyses?
- I have interacted with a dashboard drilling and applying filters. How do I save the state of my dashboard and share the dashboard with others?
- How do I remove the Diagnose link displayed on my analyses and dashboards?
- Can I migrate analyses between different environments?
- Can I change default logo and dashboard style?
- Why don't I see images from background maps when I print pages or when I export images in formats such as PDF, PPT, and PNG?
- Why do some users have permissions that I didn't assign?

FAQs to Explore and Report

This topic provides answers to frequently asked questions about exploring and reporting data.

How do I find out which version of Oracle Analytics Server I'm using?

The version of the Oracle Analytics Server is available in the title of the About dialog.

Navigate to the About dialog from the Home page. Click the user profile icon, and then click **About**. The title of the About dialog mentions the version of the Oracle Analytics Server you're using.

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What are the display limits for prompts?

Prompt Limits	Limit	More Information
Maximum number of choice values	1000	Applies to: • Choice lists, check boxes, list boxes, and radio buttons in prompts. • List of values displayed in the Select Values dialog when you select the Search option in a prompt values list.
Maximum number of default values	1000	Applies to dashboard prompts.

What's the maximum access control list (ACL) entry limit for a single artifact?

The maximum number of entries (users or roles) allowed in the permission dialog for an individual artifact is 128. An artifact can be a workbook, data flow, sequence, watchlist, and so on.

> **Note**
>
> ACL entries impact performance. Oracle recommends that you use role-based access control and avoid directly assigning individual users to ACL entries.

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.

What's the maximum size map layer file that I can upload?

The maximum file size that you can upload is 25MB.

When I want to save an object, where does the default location come from?

You can save any object in any location. However, the **Save In** field in the Save dialog sometimes recommends the best location based on the object type that you're saving. For example, you should save filters, groups, and calculated items within a subject area folder so that these items are available when you build an analysis for the same subject area. If a subject area folder doesn't exist in your `/My Folders` or within `/Shared Folders`, then a subject area folder is created automatically. The **Save In** field defaults a save path to `/My Folders/Subject Area Contents/<subject area>`; however, the dialog's Folders area displays all instances of the subject area folder in the catalog.

You can save other objects such as analyses and prompts in any folder. Bear in mind the distinctions between shared and personal folders, when deciding whether to share the object that you're saving with others.

Can I enable other users to access my analyses, dashboards, and workbooks?

Yes. To enable other users to access your analyses, dashboards, and workbooks, move or save the analysis, dashboard, or workbook to a shared folder and then give other users the required access permissions. See Assign Access Permissions and Assign Shared Catalog Folder and Workbook Permissions.

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Can I make analyses and dashboards interact with prompts and other analyses?

Yes, analyses and dashboards interact with prompts. See Advanced Techniques: How Dashboard Prompts and Analysis Prompts Interact. You can link views such that one view drives changes in one or more other views. See Linking Views in Master-Detail Relationships.

I have interacted with a dashboard drilling and applying filters. How do I save the state of my dashboard and share the dashboard with others?

You can save and get back the settings that you make on a dashboard. See Save and Restore Dashboard State. You can share dashboard pages with other users by sharing links to those pages. See Link to Dashboard Pages.

How do I remove the Diagnose link displayed on my analyses and dashboards?

In Classic view, sign in as a user with the BI Service Administrator role and set the value of the configuration setting **Diagnose BI Server Query** to **Denied**. You can find this setting under **Administration\ Security - Manage Privileges\Admin: General**.

Tip: You can access the Administration page by clicking the *user* **My Profile** icon, then **Administration**.

Can I migrate analyses between different environments?

Yes. You can migrate analyses between service environments by copying and pasting the XML code for the analyses using the Advanced tab of the analysis editor. See Advanced Techniques: Examining the Logical SQL Statements for Analyses.

Can I change default logo and dashboard style?

Yes. On the Dashboard Properties page, choose a predefined theme that includes a custom logo from the **Style** list. Administrators create these themes and make them available to dashboard builders.

Why don't I see images 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 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. 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`

Why do some users have read permissions that I didn't assign?

If you save or move a report, dashboard, or workbook containing an artifact (for example, a dataset) to a shared folder, and when prompted you share the related artifacts, then Oracle Analytics assigns the artifacts read permissions for the users who can access the report, dashboard, or workbook in the shared folder.

Without the read permission, users won't be able to access the correct content when they open the report, dashboard, or workbook.

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Troubleshoot

This topic describes common problems and how to solve them.

Topics:

- Troubleshoot General Issues
- Troubleshoot Issues with Workbooks, Analyses, and Dashboards
- Troubleshoot Visualization Issues

Troubleshoot General Issues

This topic describes common problems that you might encounter and explains how to solve them.

I can’t access certain options from the Home page

Check with your administrator to ensure that you have the correct permissions to access the options that you need.

I see a performance decrease when using Mozilla Firefox

If you use Mozilla Firefox and notice a decrease in performance, then ensure that the **Remember History** option is enabled. When Firefox is set to not remember the history of visited pages, then web content caching is also disabled, which greatly affects performance. See Firefox documentation for details on setting this option.

I'm having trouble uploading data from a spreadsheet (XLSX) exported from Microsoft Access

Open your spreadsheet in Microsoft Excel and resave it as an Excel Workbook (*.xlsx).

When you export spreadsheets from other tools the file format can vary slightly. Saving your data again from Microsoft Excel can fix this.

Users can't see the **Auto Insights** option in the Visualize canvas in the workbook editor.

In Console, navigate to **Advanced System Settings**, then **Performance and Compatibility**, and enable the **Enable Auto Insights on Datasets** option. Then ask dataset developers to select the **Enable Insights** option on the Dataset Inspect dialog for datasets where they require insights. Workbook users can then use the **Auto Insights** option in the Visualize canvas in the workbook editor.

My analysis or workbook times out

You attempt to run an analysis or workbook and find that it times out. You see a message like this:

```
[nQSError: 60009] The user request exceeded the maximum query governing execution time.
```


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This message is displayed when an Oracle Analytics query spends more than the allotted time communicating with the data source. For performance reasons, the limit for a single query to run is 11 minutes. If 11 minutes is too high for your organization, your administrator can select a lower query limit through system settings. See System Settings - Maximum Query Limit.

Try running the query again. To prevent this error, avoid long-running queries or split the query into multiple queries.

> **Note**
>
> The query limit automatically extends to 60 minutes to accommodate occasional, longer-running queries. To avoid excessive loads on the database, Oracle Analytics restricts the number of queries that are allowed to automatically extend at any one time. Administrators can disable occasional query limit extensions for your organization through system settings. See System Settings - Query Limit Extension.

Search results on the Home page don't include the data I'm looking for

Datasets that users create from files must be indexed (and in some cases certified) to appear in search results on the Home page.

- A file-based dataset must be indexed before you can use it to build visualizations from the Home page.
- A file-based dataset must be indexed and certified before other users with permission to access the dataset can use it to build visualizations from the Home page.

See About Indexing a Dataset and Visualize Data from the Home Page.

Troubleshoot Issues with Workbooks, Analyses, and Dashboards

This topic describes common problems that you might encounter when using workbooks, analyses and dashboards, and explains how to solve them.

I can’t see data in an analysis or workbook

You open an analysis or workbook, but you don’t see any data in it.

There might be some temporary issue with the database. Contact your administrator for assistance.

You might not have the permissions needed to access the data. Contact the object's owner or administer and ask them to check your access permissions. You'll need read permissions to the analysis or workbook and any artifacts included in the analysis or workbook (for example, a dataset).

I can’t access a particular analysis, dashboard, or workbook

You attempt to display an analysis, dashboard, or workbook and find that you don’t have access.

Typically you can’t access an analysis, dashboard, or workbook if you lack the appropriate permissions or application role for accessing it. Contact the owner of the analysis, dashboard, or workbook or your administrator for assistance in obtaining the proper permissions or application role.

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I can’t find an analysis, dashboard, or workbook

Try searching the catalog. You can search for analyses, dashboards, or workbooks by name (full or partial) and by folder location. The search isn’t case-sensitive. Searches of the catalog return only those objects that you have permission to see.

Contact your administrator if you still can’t find an analysis, dashboard, or workbook and you suspect that it was deleted by mistake. Your administrator can restore earlier versions of the catalog from recent snapshots, if required.

The analysis or workbook is running very slowly

You attempt to run an analysis or workbook and find that it takes a long time.

Various underlying circumstances can cause an analysis or workbook to run slowly. Contact your administrator and ask that he review log files associated with the analysis or workbook. After reviewing the log files with the administrator, make the appropriate adjustments in the analysis or workbook.

The analysis or workbook returned data that I didn’t expect

Various underlying circumstances can cause an analysis or workbook to return unexpected results. For an analysis, in the Subject Areas pane of the Criteria tab, click **Refresh** to ensure that you’re seeing the most recent information. For a workbook, refresh the source data.

I don’t understand why my analysis or workbook shows a view display error

When you display an analysis or workbook, you might see a message such as the following: "View Display Error. Exceed configured maximum number of allowed input records." This message indicates that you've selected more data than can be displayed in a view of that type. Add one or more filters to the analysis or workbook to reduce the amount of data. For example, add a filter that specifies a date range of only a few years.

The matched Year columns for a subject area and external data source don’t work properly

This mismatch is generic to a column that contains numbers but that should be handled as if it contains characters. Microsoft Excel typically sets the data type of a column that contains only numbers to numeric. Numbers are then prefixed with a single quote that creates the problem of an added space at the start of the number. In the case of matches and filters, this leading space causes the match to fail.

To work around this issue, create a formula that concatenates a zero-length string (single quotes with nothing between them) to the column with the number. For example, if the column with numbers is in column A, you create a string equivalent by adding a column for each cell with the formula `=concatenate(A2,''), =concatenate(A3,'')`.

I can't see the Auto Insights option on the Visualize canvas in the workbook editor

Ask the Oracle Analytics administrator to enable auto insights.

The Auto Insights option is greyed out on the Visualize canvas in the workbook editor

On the Dataset Inspect dialog for datasets that require insights, select the **Enable Insights** option.

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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 saying something went wrong and I'm unable to import my .dva file

This message displays because one or more data sources use a connection with the same name as a connection you're trying to import. Delete these data sources.

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.

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.

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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, ask your administrator to clear the MongoDB cache.

The visualizations that I embedded into a custom application or web page don't render correctly

If the visualizations aren't rendering correctly, then view or open the application or web page's HTML page and confirm that the DOCTYPE declaration exists and is set to <!DOCTYPE html>. See Prepare the HTML Page.

When I click Explain Selected for a visualization that uses data from a subject area, I get an error message

When you click **Explain Selected** for data points on a visualization using data from a subject area, you might receive the following error message: “We were unable to perform an analysis on this dataset due to a missing setting. Please correct the RPD configuration as described in the documentation.”

This error message is displayed because the Contextual Insights algorithm needs to use the RAND function in the database. You can fix this by enabling the RAND_SUPPORTED feature in the physical layer of your semantic model.

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Design Tips

This chapter contains reference information to help you build visualizations and reports.

Topics:

- Find the SQL_ID for an Oracle Analytics Query
- Use the IndexCol Function
- Use Usage Tracking with Initialization Blocks
- Minimize Impact on Query Performance Due to Network Latency
- Assign the Aggregation Rule for Report Totals
- Select the Best Option to Render Dashboards
- Improve the Time to Display Dashboard Pages with Prompts
- Configure Timestamps
- Use Filter Functions Instead of Time Series Functions
- Tune Performance of Multidimensional Database Queries
- Tune Performance of Relational Database Queries
- Tune Performance with Excluded Columns

Find the SQL_ID for an Oracle Analytics Query

When you tune queries for Oracle Analytics, you look at the data model, report design, dashboard design, and network configuration, and sometimes you need to investigate the database.

For database investigations, you need to know the `SQL_ID` of the SQL statement so you can track the specific query through Active Session History (ASH), Automatic Workload Repository (AWR), and Oracle SQLTXPLAIN (SQLT).

This topic shows you how to find the `SQL_ID` by mining the Oracle Analytics usage tracking tables and the Oracle database system table called `V$SQL` (or `GV$SQL` for an RAC database).

The V$SQL Table

The `V$SQL` table is an Oracle database system table that tracks statistics for individual SQL queries. There's one row in the table for each SQL statement that you run and each row is uniquely identified by the `SQL_ID` column. You can use this `SQL_ID` to track a given SQL statement throughout the Oracle database.

You'll find a lot of useful information about your queries in the `V$SQL` table (or `GV$SQL` for an RAC database).

Usage Tracking Tables

The usage tracking tables don't directly track the `SQL_ID` but you can easily trace the `SQL_ID` back to the `V$SQL` table (or `GV$SQL` for an RAC database).

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When you enable usage tracking in Oracle Analytics, all the queries are tracked in two tables:

- S_NQ_ACCT: Contains logical queries
- S_NQ_DB_ACCT: Contains physical queries

The logical query is logged in the logical query table and the physical query (or queries spawned by the logical query) is logged in the physical query table.

You can join the logical and physical tables on the logical query ID column. The logical query ID column in the logical table is ID and in the physical table it's LOGICAL_QUERY_ID.

The key to finding the SQL_ID is the PHYSICAL_HASH_ID column in the physical table. The PHYSICAL_HASH_ID value is also written to the V$SQL table (or GV$SQL table) in the ACTION column.

The Oracle BI Server calculates a hash code from the text of the logical SQL query and the text of the physical SQL queries. The physical SQL hash code of any SQL queries run from the Oracle BI Server is recorded in the ACTION column in the V$SQL table. For more information, see Associate S_NQ_ACCT Record with the BI Query Log.

For more information about the various usage tracking columns, see Track Usage and Understand the Usage Tracking Tables.

Setup

Now that you know where to find the PHYSICAL_HASH_ID, you can write a SQL statement that correlates the SQL query running in the database with a specific analysis running in Oracle Analytics.

When the usage tracking tables are in the same database instance as the data warehouse, you can write a single query to find the SQL_ID.

If the usage tracking tables and your data warehouse are in different Oracle database instances, you need to run two queries. First, you run a query to pull the PHYSICAL_HASH_ID of the query you want to investigate from the usage tracking tables. Second, you pull the SQL_ID from the V$SQL table using the value of the PHYSICAL_HASH_ID to filter the ACTION column.

Example 1

In this example, assume that the usage tracking tables and the data warehouse are co-located. Any or all of the columns from the usage tracking and V$SQL tables can be used in the query, but in this example you select the following subset:

```
select

o.sql_id,

to_char(l.start_ts, 'YYYY-MM-DD HH24:MI:SS'),

l.id as l_id,

p.logical_query_id,

l.hash_id,

l.saw_src_path,

l.query_src_cd,
```


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```
l.success_flg,

l.num_db_query,

l.query_text,

p.query_text,

o.sql_text,

p.physical_hash_id,

o.action

from

usage_tracking.s_nq_acct l,

usage_tracking.s_nq_db_acct p,

v$sql o

where

l.id = p.logical_query_id and o.action = p.physical_hash_id and l.start_dt >
trunc(sysdate - 1) and l.end_dt < trunc(sysdate)

order by l.start_ts, l.id, l.hash_id, p.physical_hash_id, o.sql_id;
```

Example 2

In this example, assume that the usage tracking tables and the data warehouse are located in different Oracle databases.

First, write a query against the usage tracking tables to get the `PHYSICAL_HASH_ID`:

```
select

to_char(l.start_ts, 'YYYY-MM-DD HH24:MI:SS'),

l.id as l_id,

p.logical_query_id,

l.hash_id,

l.saw_src_path,

l.query_src_cd,

l.success_flg,

l.num_db_query,

l.query_text,
```


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```
p.query_text,

p.physical_hash_id

from

usage_tracking.s_nq_acct l,

usage_tracking.s_nq_db_acct p

where

l.id = p.logical_query_id and l.start_dt > trunc(sysdate - 1) and l.end_dt <
trunc(sysdate)

order by l.start_ts, l.id,l.hash_id, p.physical_hash_id;
```

Next, write a query against the `V$SQL` table to get the `SQL_ID`, using the values of `PHYSICAL_HASH_ID` as a filter:

```
select

o.action,

o.sql_id,

o.sql_text

from

v$sql o

where

o.action = '<physical_hash_id>'

order by o.sql_id;
```

If you have an RAC database, instead of the `V$SQL` table, you use the `GV$SQL` table to get the `SQL_ID`:

```
select

o.action,

o.sql_id,

o.sql_text

from

gv$sql o

where
```


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```
o.action = '<physical_hash_id>'

order by o.sql_id;
```

This method doesn't work if you're troubleshooting initialization blocks, because the initialization block usage tracking table (`S_NQ_INITBLOCK`) doesn't contain a physical hash ID.

Example 3

In this example, you use the A - Sample Sales subject area and select only a few columns from the usage tracking tables.

From A - Sample Sales, run the following query:

```
[2022-02-04T15:11:17.629+00:00] [OBIS] [TRACE:2] [USER-0] [] [ecid:
e49b96a8-33c4-4ba7-a877-e564d207eca1-00242531,0:1:38:3] [sik: bootstrap]
[tid: dd1bc700] [messageId: USER-0] [requestid: 33e30020] [sessionid:
33e30000] [username: oacadmin] ################################################
[[

-------------------- SQL Request, logical request hash:

cee7ec94

SET VARIABLE QUERY_SRC_CD='Report';SELECT

   0 s_0,

   "A - Sample Sales"."Offices"."D1  Office" s_1,

   "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2,

   "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3

FROM "A - Sample Sales"

ORDER BY 2 ASC NULLS LAST

FETCH FIRST 125001 ROWS ONLY

]]
```

When you select `start_ts`, `id`, `hash_id`, `query_src_cd`, and `query_text` from the usage tracking logical table, you get the `ID` value `E841EBB79217270A660CDD3EFB5D986C`.

START_TS	ID	HASH_ID	QUERY_SRC_CD	QUERY_TEXT
2/4/2022 3:11:17 PM	E841EBB79217270A660CDD3EFB5D986C	cee7ec94	Report	SELECT 0 s_0, "A - Sample Sales"."Offices"."D1 Office" s_1, "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2, "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3 FROM "A - Sample Sales" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY

Next, select `logical_query_id`, `hash_id`, `physical_hash_id`, and `query_text` from the usage tracking physical table where `LOGICAL_QUERY_ID` is `E841EBB79217270A660CDD3EFB5D986C`.

LOGICAL_QUERY_ID	HASH_ID	PHYSICAL_HASH_ID	QUERY_TEXT
E841EBB79217270A660CDD3EFB5D986C	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

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When you look at the Manage Sessions log, the logical query spawns the SQL code that's in the QUERY_TEXT column:

```
[2022-02-04T15:11:17.637+00:00] [OBIS] [TRACE:2] [USER-18] [] [ecid:
e49b96a8-33c4-4ba7-a877-e564d207eca1-00242531,0:1:38:5] [sik: bootstrap]
[tid: dd1bc700] [messageId: USER-18] [requestid: 33e30020] [sessionid:
33e30000] [username: oacadmin] -------------------- Sending query to database
named 01 - Sample App Data (ORCL) (id: <<62275>>), client type Oracle Call
Interface (OCI), connection pool named Sample Relational Connection, logical
request hash cee7ec94, physical request hash bd6708b8: [[

WITH

SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1,

     sum(T5398.Cost_Variable) as c2,

     T5257.Office_Dsc as c3,

     T5257.Office_Key as c4

from

     BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ ,

     BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */

where  ( T5257.Office_Key = T5398.Office_Key )

group by T5257.Office_Dsc, T5257.Office_Key),

SAWITH1 AS (select 0 as c1,

     D1.c3 as c2,

     D1.c2 as c3,

     D1.c1 as c4,

     D1.c4 as c5

from

     SAWITH0 D1)

select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from ( select D1.c1
as c1,

     D1.c2 as c2,

     D1.c3 as c3,

     D1.c4 as c4

from
```

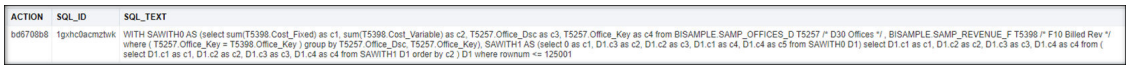

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```
    SAWITH1 D1

order by c2 ) D1 where rownum <= 125001

]]
```

Finally, select `action`, `sql_id`, and `sql_text` from the `V$SQL` table where `Action` is `bd6708b8`.



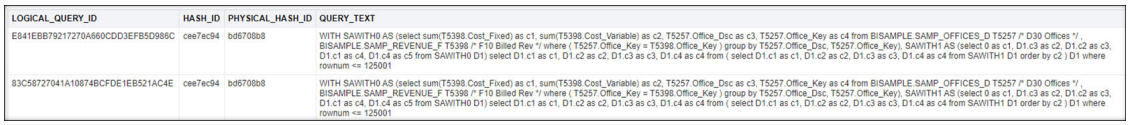
ACTION	SQL_ID	SQL_TEXT
bd6708b8	1gxhc0acmztwk	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

The query in the `sql_text` column is the same SQL code seen in the usage tracking physical table. From this, you see that the `sql_id` for the query in question is `1gxhc0acmztwk`.

If you run the same query again, another row is added to the usage tracking logical table with a new ID but the `hash_id` is the same.

START_TS	ID	HASH_ID	QUERY_SRC_CD	QUERY_TEXT
2/4/2022 3:11:17 PM	E841EBB79217270A660CDD3EFB5D986C	cee7ec94	Report	SELECT 0 s_0, "A - Sample Sales"."Offices"."D1 Office" s_1, "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2, "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3 FROM "A - Sample Sales" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY
2/4/2022 4:03:17 PM	83C58727041A10874BCFDE1EB521AC4E	cee7ec94	Report	SELECT 0 s_0, "A - Sample Sales"."Offices"."D1 Office" s_1, "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2, "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3 FROM "A - Sample Sales" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY

Similarly, another row is added to the usage tracking physical table with a new `logical_query_id`, but both the `hash_id` and `physical_hash_id` remain the same.



LOGICAL_QUERY_ID	HASH_ID	PHYSICAL_HASH_ID	QUERY_TEXT
E841EBB79217270A660CDD3EFB5D986C	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
83C58727041A10874BCFDE1EB521AC4E	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

Example 4

The `physical_hash_id` is also reused if you run a similar logical query against a subject area that's based on the same logical and physical models. For example, if you run a similar query against C - Sample Costs:

```
[2022-02-04T16:10:17.862+00:00] [OBIS] [TRACE:2] [USER-0] [] [ecid:
e49b96a8-33c4-4ba7-a877-e564d207eca1-00242ce7,0:1:15:3] [sik: bootstrap]
[tid: 58504700] [messageId: USER-0] [requestid: 13c9003c] [sessionid:
13c90000] [username: oacadmin] ################################################
[[

------------------- SQL Request, logical request hash:

7b5ea9b1

SET VARIABLE QUERY_SRC_CD='Report';SELECT

   0 s_0,

   "C - Sample Costs"."Offices"."D1  Office" s_1,

   "C - Sample Costs"."Base Facts"."10- Variable Costs" s_2,

   "C - Sample Costs"."Base Facts"."11- Fixed Costs" s_3
```


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```
FROM "C - Sample Costs"

ORDER BY 2 ASC NULLS LAST

FETCH FIRST 125001 ROWS ONLY

]]
```

This logical query spawns the same SQL code seen in the query you ran, run against A – Sample Sales:

```
[2022-02-04T16:10:17.866+00:00] [OBIS] [TRACE:2] [USER-18] [] [ecid:
e49b96a8-33c4-4ba7-a877-e564d207eca1-00242ce7,0:1:15:5] [sik: bootstrap]
[tid: 58504700] [messageId: USER-18] [requestid: 13c9003c] [sessionid:
13c90000] [username: oacadmin] -------------------- Sending query to database
named 01 - Sample App Data (ORCL) (id: <<52912>>), client type Oracle Call
Interface (OCI), connection pool named Sample Relational Connection, logical
request hash 7b5ea9b1, physical request hash bd6708b8: [[

WITH

SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1,

     sum(T5398.Cost_Variable) as c2,

     T5257.Office_Dsc as c3,

     T5257.Office_Key as c4

from

     BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ ,

     BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */

where  ( T5257.Office_Key = T5398.Office_Key )

group by T5257.Office_Dsc, T5257.Office_Key),

SAWITH1 AS (select 0 as c1,

     D1.c3 as c2,

     D1.c2 as c3,

     D1.c1 as c4,

     D1.c4 as c5

from

     SAWITH0 D1)

select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from ( select D1.c1
as c1,
```


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```
     D1.c2 as c2,

     D1.c3 as c3,

     D1.c4 as c4

from

     SAWITH1 D1

order by c2 ) D1 where rownum <= 125001

]]
```

First, use the usage tracking logical table to find the ID. You can see that the logical `hash_id` is different than the query run against A – Sample Sales.

START_TS	ID	HASH_ID	QUERY_SRC_CD	QUERY_TEXT
2/4/2022 4:10:17 PM	3A10DF1D047B20505630EE5EAB2A64CF	7b5ea9b1	Report	SELECT 0 s_0, "C - Sample Costs"."Offices"."D1 Office" s_1, "C - Sample Costs"."Base Facts"."10- Variable Costs" s_2, "C - Sample Costs"."Base Facts"."11- Fixed Costs" s_3 FROM "C - Sample Costs" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY

In the usage tracking physical table, you see that even though the logical `hash_id` is different, the `physical_hash_id` is the same.

LOGICAL_QUERY_ID	HASH_ID	PHYSICAL_HASH_ID	QUERY_TEXT
E841EBB79217270A660CDD3EFB5D986C	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
83C58727041A10874BCFDE1EB521AC4E	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
3A10DF1D047B20505630EE5EAB2A64CF	7b5ea9b1	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

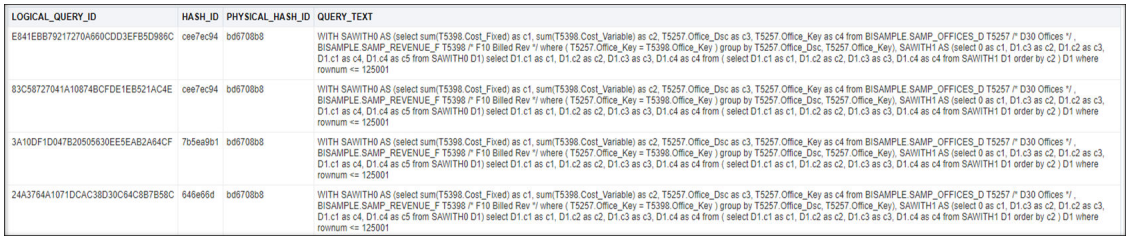
Example 5

In this example, you run the same queries, but this time you click **Refresh**. Notice the variable `OBIS_REFRESH_CACHE=1` to denote the refresh. As expected, another row is inserted into the usage tracking logical table but it has a different `logical hash_id`.

START_TS	ID	HASH_ID	QUERY_SRC_CD	QUERY_TEXT
2/4/2022 3:11:17 PM	E841EBB79217270A660CDD3EFB5D986C	cee7ec94	Report	SELECT 0 s_0, "A - Sample Sales"."Offices"."D1 Office" s_1, "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2, "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3 FROM "A - Sample Sales" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY
2/4/2022 4:03:17 PM	83C58727041A10874BCFDE1EB521AC4E	cee7ec94	Report	SELECT 0 s_0, "A - Sample Sales"."Offices"."D1 Office" s_1, "A - Sample Sales"."Base Facts"."10- Variable Costs" s_2, "A - Sample Sales"."Base Facts"."11- Fixed Costs" s_3 FROM "A - Sample Sales" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY
2/4/2022 4:10:17 PM	3A10DF1D047B20505630EE5EAB2A64CF	7b5ea9b1	Report	SELECT 0 s_0, "C - Sample Costs"."Offices"."D1 Office" s_1, "C - Sample Costs"."Base Facts"."10- Variable Costs" s_2, "C - Sample Costs"."Base Facts"."11- Fixed Costs" s_3 FROM "C - Sample Costs" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY
2/4/2022 4:17:10 PM	24A3764A1071DCAC38D30C64C8B7B58C	646e66d	Report	SET VARIABLE OBIS_REFRESH_CACHE=1:SELECT 0 s_0, "C - Sample Costs"."Offices"."D1 Office" s_1, "C - Sample Costs"."Base Facts"."10- Variable Costs" s_2, "C - Sample Costs"."Base Facts"."11- Fixed Costs" s_3 FROM "C - Sample Costs" ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY

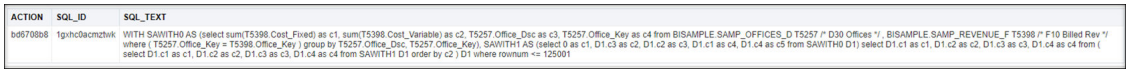
However, when you query the usage tracking physical table, you can see that all the queries have the same `physical_hash_id`.

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LOGICAL_QUERY_ID	HASH_ID	PHYSICAL_HASH_ID	QUERY_TEXT
E841EBB79217270A660CDD3EFB5D986C	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
83C58727041A10874BCFDE1EB521AC4E	cee7ec94	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
3A10DF1D047B20505630EE5EAB2A64CF	7b5ea9b1	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001
24A3764A1071DCAC38D30C64C8B7B58C	646e66d	bd6708b8	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

Because these four logical queries all have the same `physical_hash_id`, you see only a single record in the `V$SQL` table for this query.



ACTION	SQL_ID	SQL_TEXT
bd6708b8	1gxhc0acmztwk	WITH SAWITH0 AS (select sum(T5398.Cost_Fixed) as c1, sum(T5398.Cost_Variable) as c2, T5257.Office_Dsc as c3, T5257.Office_Key as c4 from BISAMPLE.SAMP_OFFICES_D T5257 /* D30 Offices */ , BISAMPLE.SAMP_REVENUE_F T5398 /* F10 Billed Rev */ where (T5257.Office_Key = T5398.Office_Key) group by T5257.Office_Dsc, T5257.Office_Key), SAWITH1 AS (select 0 as c1, D1.c3 as c2, D1.c2 as c3, D1.c1 as c4, D1.c4 as c5 from SAWITH0 D1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from SAWITH1 D1 order by c2) D1 where rownum <= 125001

Example 6

You can use the same method to troubleshoot data visualization queries based on a subject area (RPD) or a database connection. For database connections, this includes both data visualizations and queries used to populate datasets.

You can determine the query type, that is, data visualization, dataset, analysis, ODBC, and so on, from the value of the `QUERY_SRC_CD` column. For example, data visualization queries have a value `Visual Analyzer`, a query used to populate a dataset has the value `data-prep`, analyses have the value `Report`, and queries for some internal ODBC procedure calls have the value `Soap`.

To generate a SQL statement for a data visualization, you must change Data Access to Live for the underlying dataset.

In this example, you create a data visualization query (similar to the previous queries) against a dataset based on a connection to an Oracle database:

```
[2022-02-03T19:42:06.564+00:00] [OBIS] [TRACE:2] [USER-0] [] [ecid:
f95b5f1b-1e5c-4604-b82a-3eb3717f3aa6-002aa26e,0:1:1:3] [sik: bootstrap] [tid:
58b0a700] [messageId: USER-0] [requestid: ed830023] [sessionid: ed830000]
[username: oacadmin] ################################################ [[

-------------------- SQL Request, logical request hash:

3158b05

SET VARIABLE QUERY_SRC_CD='Visual Analyzer',SAW_SRC_PATH='{"viewID":"view!
1","currentCanvas":"canvas!1"}',ENABLE_DIMENSIONALITY = 1; SELECT

   0 s_0,

   XSA('oacadmin'.'BISAMPLE_OfficeRevenue')."SAMP_OFFICES_D"."OFFICE_DSC" s_1,

   XSA('oacadmin'.'BISAMPLE_OfficeRevenue')."SAMP_REVENUE_F"."COST_FIXED" s_2,

   XSA('oacadmin'.'BISAMPLE_OfficeRevenue')."SAMP_REVENUE_F"."COST_VARIABLE"
s_3

FROM XSA('oacadmin'.'BISAMPLE_OfficeRevenue')

ORDER BY 2 ASC NULLS LAST
```


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```
FETCH FIRST 125001 ROWS ONLY

/* AdditionalDetail='VisualAnalyzer' */
```

Which spawns the following SQL code:

```
[2022-02-03T19:42:06.960+00:00] [OBIS] [TRACE:2] [USER-18] [] [ecid:
f95b5f1b-1e5c-4604-b82a-3eb3717f3aa6-002aa26e,0:1:1:5] [sik: bootstrap] [tid:
58b0a700] [messageId: USER-18] [requestid: ed830023] [sessionid: ed830000]
[username: oacadmin] ------------------- Sending query to database named
'oacadmin'.'BISAMPLE' (id: <<147945>>), client type OCI 10g/11g, connection
pool named 'oacadmin'.'BISAMPLE', logical request hash 3158b05, physical
request hash c48e8741: [[

WITH

SAWITH0 AS (select T1000005.OFFICE_KEY as c1,

     T1000005.OFFICE_DSC as c2

from

     BISAMPLE.SAMP_OFFICES_D T1000005),

SAWITH1 AS (select T1000008.OFFICE_KEY as c1,

     T1000008.COST_FIXED as c2,

     T1000008.COST_VARIABLE as c3

from

     BISAMPLE.SAMP_REVENUE_F T1000008),

SAWITH2 AS (select D1.c2 as c1,

     D2.c2 as c2,

     D2.c3 as c3

from

     SAWITH0 D1 inner join SAWITH1 D2 On D1.c1 = D2.c1),

SAWITH3 AS (select D102.c1 as c1,

     sum(D102.c2) as c2,

     sum(D102.c3) as c3

from

     SAWITH2 D102
```


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```
group by D102.c1)

select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from ( select 0 as
c1,

     D110.c1 as c2,

     D110.c2 as c3,

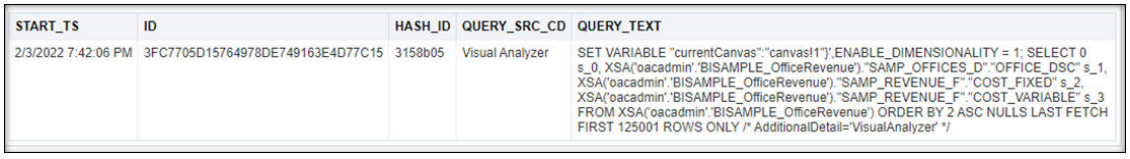
     D110.c3 as c4

from

     SAWITH3 D110

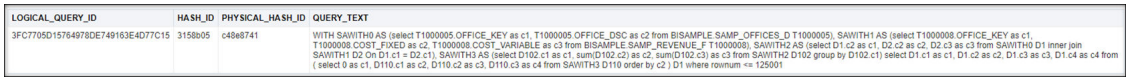
order by c2 ) D1 where rownum <= 125001
```

From the usage tracking logical table, you can find the `hash_id` that's used as a filter against the usage tracking physical table.



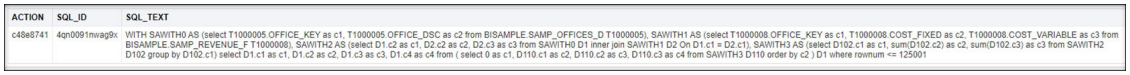
START_TS	ID	HASH_ID	QUERY_SRC_CD	QUERY_TEXT
2/3/2022 7:42:06 PM	3FC7705D15764978DE749163E4D77C15	3158b05	Visual Analyzer	SET VARIABLE "currentCanvas":"canvas!1"}',ENABLE_DIMENSIONALITY = 1; SELECT 0 s_0, XSA('oacadmin','BISAMPLE_OfficeRevenue')."SAMP_OFFICES_D"."OFFICE_DSC" s_1, XSA('oacadmin','BISAMPLE_OfficeRevenue')."SAMP_REVENUE_F"."COST_FIXED" s_2, XSA('oacadmin','BISAMPLE_OfficeRevenue')."SAMP_REVENUE_F"."COST_VARIABLE" s_3 FROM XSA('oacadmin','BISAMPLE_OfficeRevenue') ORDER BY 2 ASC NULLS LAST FETCH FIRST 125001 ROWS ONLY /* AdditionalDetail='VisualAnalyzer' */

From the usage tracking physical table, you can find the `physical_hash_id`.



LOGICAL_QUERY_ID	HASH_ID	PHYSICAL_HASH_ID	QUERY_TEXT
3FC7705D15764978DE749163E4D77C15	3158b05	c48e8741	WITH SAWITH0 AS (select T1000005.OFFICE_KEY as c1, T1000005.OFFICE_DSC as c2 from BISAMPLE.SAMP_OFFICES_D T1000005), SAWITH1 AS (select T1000008.OFFICE_KEY as c1, T1000008.COST_FIXED as c2, T1000008.COST_VARIABLE as c3 from BISAMPLE.SAMP_REVENUE_F T1000008), SAWITH2 AS (select D1.c2 as c1, D2.c2 as c2, D2.c3 as c3 from SAWITH0 D1 inner join SAWITH1 D2 On D1.c1 = D2.c1), SAWITH3 AS (select D102.c1 as c1, sum(D102.c2) as c2, sum(D102.c3) as c3 from SAWITH2 D102 group by D102.c1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select 0 as c1, D110.c1 as c2, D110.c2 as c3, D110.c3 as c4 from SAWITH3 D110 order by c2) D1 where rownum <= 125001

When you query the `V$SQL` table, you find the `SQL_ID` again.



ACTION	SQL_ID	SQL_TEXT
c48e8741	4qn0091nwag9x	WITH SAWITH0 AS (select T1000005.OFFICE_KEY as c1, T1000005.OFFICE_DSC as c2 from BISAMPLE.SAMP_OFFICES_D T1000005), SAWITH1 AS (select T1000008.OFFICE_KEY as c1, T1000008.COST_FIXED as c2, T1000008.COST_VARIABLE as c3 from BISAMPLE.SAMP_REVENUE_F T1000008), SAWITH2 AS (select D1.c2 as c1, D2.c2 as c2, D2.c3 as c3 from SAWITH0 D1 inner join SAWITH1 D2 On D1.c1 = D2.c1), SAWITH3 AS (select D102.c1 as c1, sum(D102.c2) as c2, sum(D102.c3) as c3 from SAWITH2 D102 group by D102.c1) select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from (select 0 as c1, D110.c1 as c2, D110.c2 as c3, D110.c3 as c4 from SAWITH3 D110 order by c2) D1 where rownum <= 125001

You can also find the logical `hash_id` and `physical_hash_id` in the Manage Sessions log (see the highlighted sections in the previous log examples). This means you can find the `SQL_ID` from the log itself. The benefit of using the usage tracking tables is that log entries in Manage Sessions are temporary so unless you're collecting hash IDs at the same time as running the query, they're lost.

However, data is only written to the usage tracking tables when a query completes. So, if you're troubleshooting a long-running query that hasn't completed yet and you want to determine the `sql_id`, you can get the logical `hash_id` and `physical_hash_id` from the Manage Sessions log.

If you're troubleshooting a SQL statement and you need to investigate the database, you can join information in the usage tracking tables and the `V$SQL` system table (or `GV$SQL`) to quickly find the `SQL_ID` for the SQL statement you're investigating.

Use the IndexCol Function

In Oracle Analytics, `CASE` statements are often used when a calculation branches based on a variable value. When a variable is referenced in a `CASE` statement, it's preferable to use the

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IndexCol function instead to improve the efficiency of the generated SQL code. This topic describes the IndexCol function and when to use it.

About the IndexCol Function

You use the IndexCol function when the columns or values in a calculation vary depending on the value of a session, repository, or presentation variable.

The syntax of the IndexCol function is:

```
INDEXCOL(<<integer_literal>>, <<expr_list>>)
```

Where the first argument resolves to an integer and the items that comprise the <<expr_list>> correspond to the number of possible values of the first argument. One of these items is then used in the SQL statement based on the value of the first argument.

For example, if the <<integer_literal>> argument has three possible values, then there must be three arguments in the <<expr_list>> argument, one for each possible value of <<integer_literal>>.

The first argument is often based on the value of a session variable or a CASE statement in reference to variables. You can model the IndexCol function in the repository (RPD) file or directly in a report column. You can nest multiple IndexCol functions to form a single statement.

Benefits of the IndexCol Function

A calculation using a <<case when>> statement is pushed to the physical SQL code in its entirety. By comparison, the IndexCol function pushes down only the required column or expression to the database. This is because the IndexCol function is evaluated before the physical SQL code is generated.

When combined with variable prompts, which allow selection in a list of values, you can significantly modify the report structure without any increased cost on performance.

One drawback of the IndexCol function is that you can't use it with like in integer calculations, although you can use like in the list of expressions. If an integer calculation requires a like, you must use a CASE statement instead.

Example

Assume there's a session variable called PREFERRED_CURRENCY that sets the preferred currency for a user. Then, based on the value of the session variable, Revenue is displayed in the currency specified by the user.

Two calculations have been created to return the correct currency based on the value of the session variable.

The first uses a CASE statement, like this:

```
CASE

WHEN VALUEOF("NQ_SESSION"."PREFERRED_CURRENCY") = 'USD' THEN "01 - Sample App
Data (ORCL)"."","BISAMPLE"."F19 Rev. (Converted)"."Revenue_Usd"

WHEN VALUEOF("NQ_SESSION"."PREFERRED_CURRENCY") = 'EUR' THEN  "01 - Sample
App Data (ORCL)"."","BISAMPLE"."F19 Rev. (Converted)"."Revenue_Eur"

WHEN VALUEOF("NQ_SESSION"."PREFERRED_CURRENCY") = 'AUD' THEN  "01 - Sample
```


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```
App Data (ORCL)"."."BISAMPLE"."F19 Rev. (Converted)"."Revenue_Aud"

ELSE NULL

END
```

The second uses the `IndexCol` function like this:

```
INDEXCOL(

CASE VALUEOF("NQ_SESSION"."PREFERRED_CURRENCY")

WHEN 'USD' THEN 0

WHEN 'EUR' THEN 1

WHEN 'AUD' THEN 2

END ,

"01 - Sample App Data (ORCL)"."."BISAMPLE"."F19 Rev.
(Converted)"."Revenue_Usd", "01 - Sample App Data (ORCL)"."."BISAMPLE"."F19
Rev. (Converted)"."Revenue_Eur", "01 - Sample App Data
(ORCL)"."."BISAMPLE"."F19 Rev. (Converted)"."Revenue_Aud")
```

Because the first argument of the `IndexCol` function must resolve to an integer, a `CASE` statement is used for the resolution.

When a query is run using the `CASE` statement calculation, the entirety of the `CASE` statement is pushed down to the database, because the `CASE` statement is evaluated at runtime. In some cases, this causes issues with the optimizer.

```
WITH

SAWITH0 AS (select sum(case  when 'USD' = 'USD' then T42437.Revenue_Usd when
'EUR' = 'USD' then T42437.Revenue_Eur when 'AUD' = 'USD' then
T42437.Revenue_Aud else NULL end ) as c1,

     T42412.Office_Dsc as c2,

     T42412.Office_Key as c3

from

     BISAMPLE.SAMP_OFFICES_D T42412 /* D30 Offices */ ,

     BISAMPLE.SAMP_REVENUE_CURR_F T42437 /* F19 Rev. (Converted) */

where  ( T42412.Office_Key = T42437.Office_Key )

group by T42412.Office_Dsc, T42412.Office_Key),

SAWITH1 AS (select 0 as c1,

     D1.c2 as c2,
```


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```
     D1.c1 as c3,

     D1.c3 as c4

from

     SAWITH0 D1)

select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3 from ( select D1.c1 as c1,

     D1.c2 as c2,

     D1.c3 as c3

from

     SAWITH1 D1

order by c2 ) D1
```

The same query run using the IndexCol function pushes down only the expression needed to satisfy the query, because the IndexCol function is resolved prior to SQL generation. This helps avoid issues with the Optimizer.

```
WITH

SAWITH0 AS (select sum(T42437.Revenue_Usd) as c1,

     T42412.Office_Dsc as c2,

     T42412.Office_Key as c3

from

     BISAMPLE.SAMP_OFFICES_D T42412 /* D30 Offices */ ,

     BISAMPLE.SAMP_REVENUE_CURR_F T42437 /* F19 Rev. (Converted) */

where  ( T42412.Office_Key = T42437.Office_Key )

group by T42412.Office_Dsc, T42412.Office_Key),

SAWITH1 AS (select 0 as c1,

     D1.c2 as c2,

     D1.c1 as c3,

     D1.c3 as c4

from

     SAWITH0 D1)

select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3 from ( select D1.c1 as c1,
```


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```
     D1.c2 as c2,

     D1.c3 as c3

from

     SAWITH1 D1

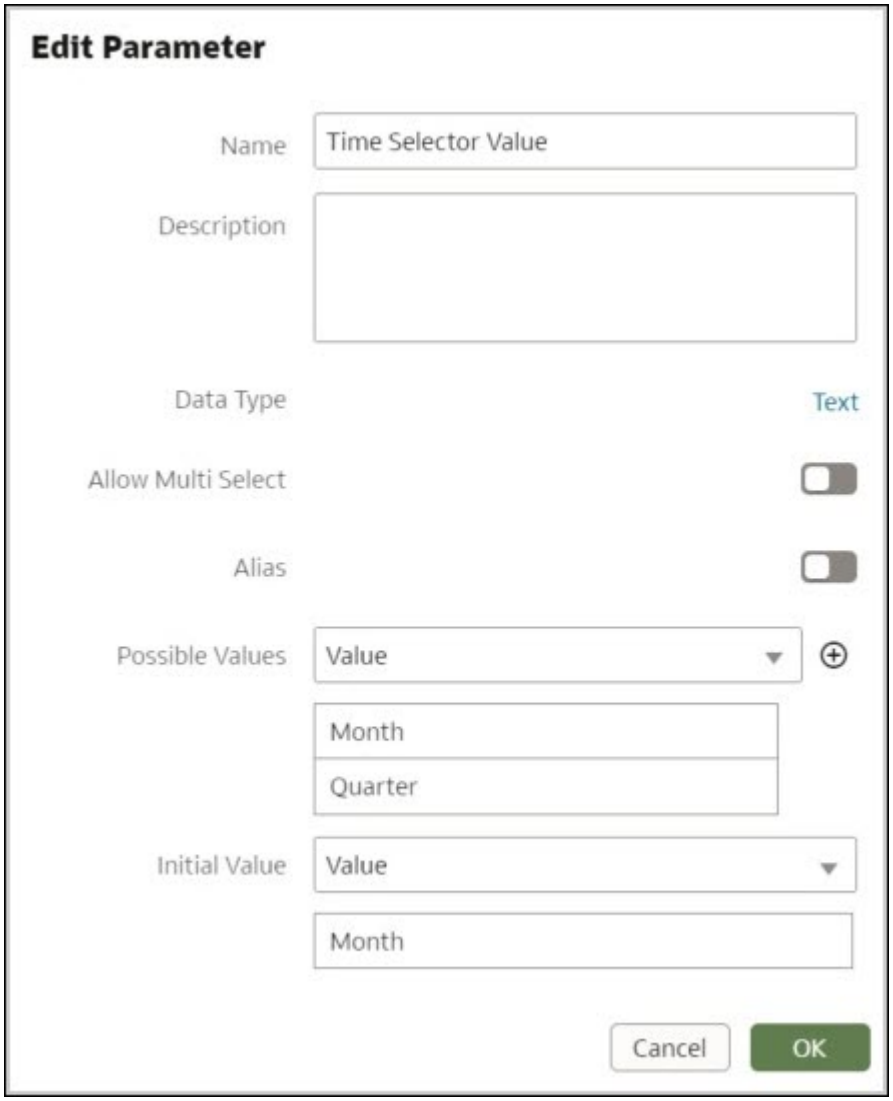
order by c2 ) D1
```

Workbooks and IndexCol

You can use the `IndexCol` function in workbooks.

In this example, the `IndexCol` function is used to change the period granularity in a visualization:

1. Create a parameter to use as the column selector to select the period grain, in this case, either Month or Quarter.



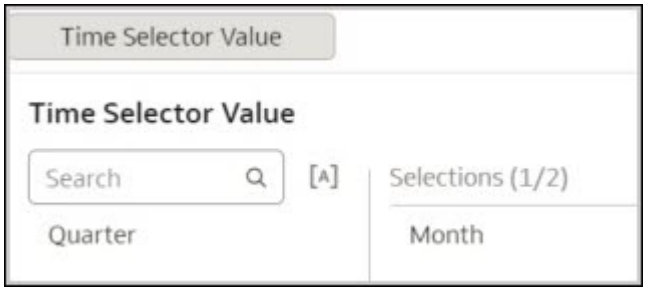
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2. Create a custom calculation to perform the `IndexCol` function. Here the calculation is:

```
indexcol(case when @parameter("Time Selector Value")('Month')='Month' then
0 else 1 end, "HCM - Workforce Core"."Time"."Month Name", "HCM - Workforce
Core"."Time"."Quarter")
```



3. Add the parameter to the filter bar of a workbook. Users can then change the granularity of a report by selecting either **Month** or **Quarter** from the column selector filter.



Use Usage Tracking with Initialization Blocks

This topic covers tips for working with initialization blocks and usage tracking in Oracle Analytics.

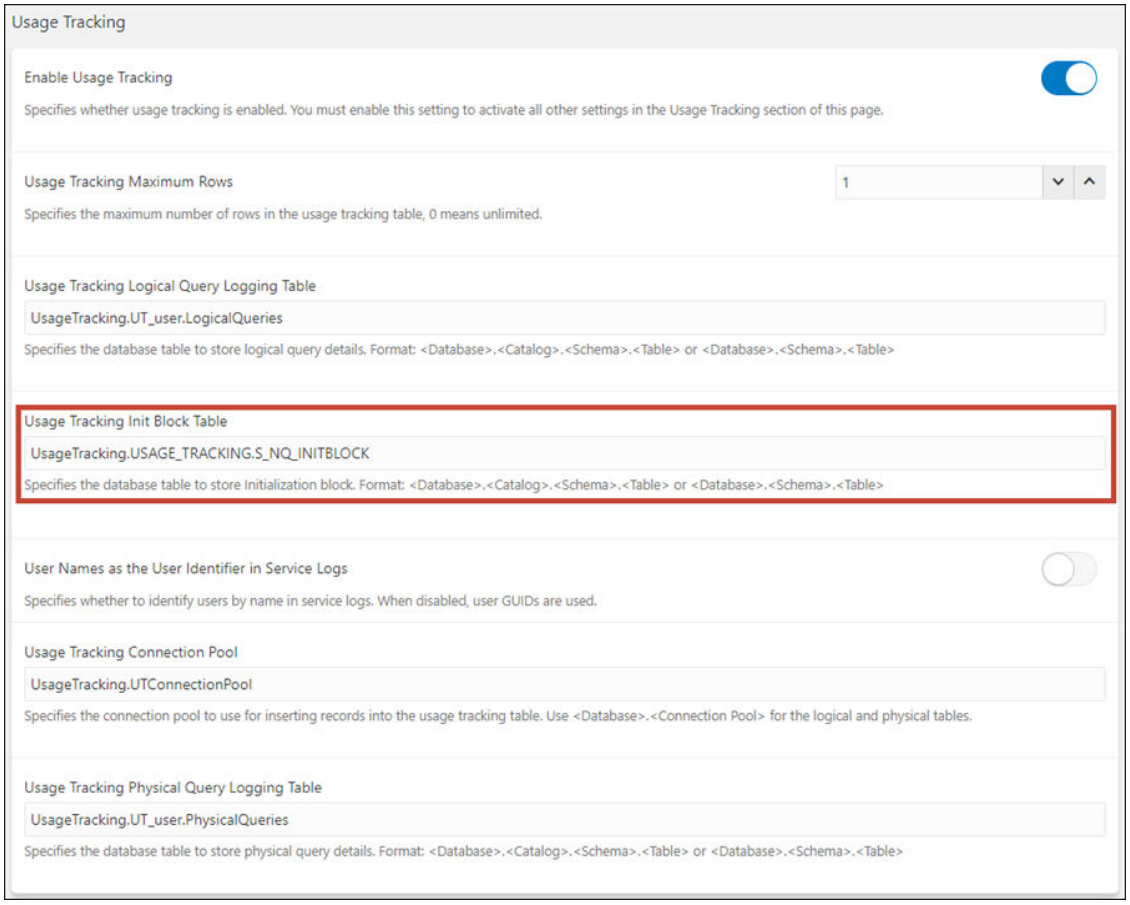
Enable Usage Tracking

Once the initial round of optimizing session variable initialization blocks is complete, enable usage tracking for initialization blocks to understand their performance better.

Table names for usage tracking in Oracle BI Enterprise Edition (OBIEE) are shown in this topic. The actual names can be anything, but they should identify each table's contents, such as `PHYSICAL`, `LOGICAL`, or `INITBLOCK`.

Enable usage tracking in **System Settings** and restart the Business Intelligence (BI) Server to start usage tracking. See Usage Tracking Options.

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Monitor Initialization Blocks

After enabling usage tracking, log in to Oracle Analytics. All session variable initialization blocks that aren't deferred run when you log in and populate the initialization block usage tracking table.

Using SQL Developer, SQL*Plus, or another SQL entry tool, run the following query against the initialization block usage tracking table using a `SESSION_ID` obtained from a session log (for example, `-1883570176`).

```
SELECT USER_NAME, SESSION_ID, BLOCK_NAME,
TO_CHAR(START_TS,'DD-MM-YYYY HH24:MI:SS') START_TIME,
TO_CHAR(END_TS,'DD-MM-YYYY HH24:MI:SS') END_TIME
FROM USAGE_TRACKING.S_NQ_INITBLOCK
WHERE SESSION_ID = -1883570176
ORDER BY SESSION_ID, START_TS, END_TS
```

Don't filter using the `USER_NAME`. Instead, note the `START_TIME` and the `USER_NAME` of the row from a session log that you're interested in.

Filter the query using the `SESSION_ID` associated with the `USER_NAME` and optionally, the `START_TIME`.

The following figure shows the query result in a table.

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USER_NAME	SESSION_ID	BLOCK_NAME	START_TS	END_TS
DBCooper	-1883570176	SIGNNING ON	11/14/22 16:40:25	11/14/22 16:40:37
DBCooper	-1883570176	SIGNED ON	11/14/22 16:40:25	11/14/22 16:40:37
BISystemUser	-1883570176	Get_S_YEAR_PREVIOUS_MTH	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	Verify ORCL DSN	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_DATES	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_HR_JOB_NAME	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_IRIS_USER	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_MIF_USER	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_HISTP_USER	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_RAPID_USER	11/14/22 16:40:37	11/14/22 16:40:37
BISystemUser	-1883570176	get_EPRODR_USER	11/14/22 16:40:37	11/14/22 16:40:37
DBCooper	-1883570176	get_PROSP_USER_LEVEL	11/14/22 16:41:12	11/14/22 16:41:12
DBCooper	-1883570176	SIGNED OFF	11/14/22 16:40:25	11/14/22 17:01:42

This table shows that the `SIGNING ON` and `SIGNED ON` calls take twelve seconds. Then the `SIGNED OFF` call shows that the user logged off after 21 minutes of activity. Administrators can see exactly how long things are taking and where corrective action is needed.

Usage tracking for initialization blocks makes the following three system calls during a user session:

- `SIGNING ON`
- `SIGNED ON`
- `SIGNED OFF`

> **Note**
>
> If you're not investigating specific login problems, ignore the three blocks named `SIGNING ON`, `SIGNED ON`, and `SIGNED OFF`. `SESSION_ID` can be a negative number. There are two different `USER_NAME` values for the same `SESSION_ID`: BISystemUser and the actual user name.

You can specify initialization blocks as deferred. These run as needed using the original user name. All session variable initialization blocks that aren't deferred run when a user logs in and populate the initialization block usage tracking table. They run using the BISystemUser user name.

Tune Initialization Blocks in Oracle Analytics Server (OAS)

This section applies only to Oracle Analytics Server.

A significant change to Oracle Analytics in 2022 is that session variable initialization blocks are run in parallel. The `NUM_INIT_BLOCK_THREADS_PER_USER` parameter governs the number of initialization block threads that can run in parallel. It's defined in the `SECURITY` section of the `NQSCONFIG.INI` file, as shown in this example:

```
[SECURITY]
NUM_INIT_BLOCK_THREADS_PER_USER = 4;
```


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NUM_INIT_BLOCK_THREADS_PER_USER specifies the number of parallel threads used to run initialization blocks for a user. The default value is 4, sufficient if the initialization blocks are optimized. Increase the NUM_INIT_BLOCK_THREADS_PER_USER value to 8 and restart the BI Server if session variable initialization blocks take longer than expected.

The maximum value is 16.

> **Note**
>
> Investigate the underlying SQL code and its performance in the database if a particular initialization block takes a long time to run.

Be sure to optimize initialization blocks for all instances to provide the best log in and visualization experience. Once optimized, initialization block usage tracking can assist in pinpointing bottlenecks in your instances. See NQSConfig.INI File Configuration Settings.

For more information on usage tracking for Oracle Analytics Server, see Track Usage.

Minimize Impact on Query Performance Due to Network Latency

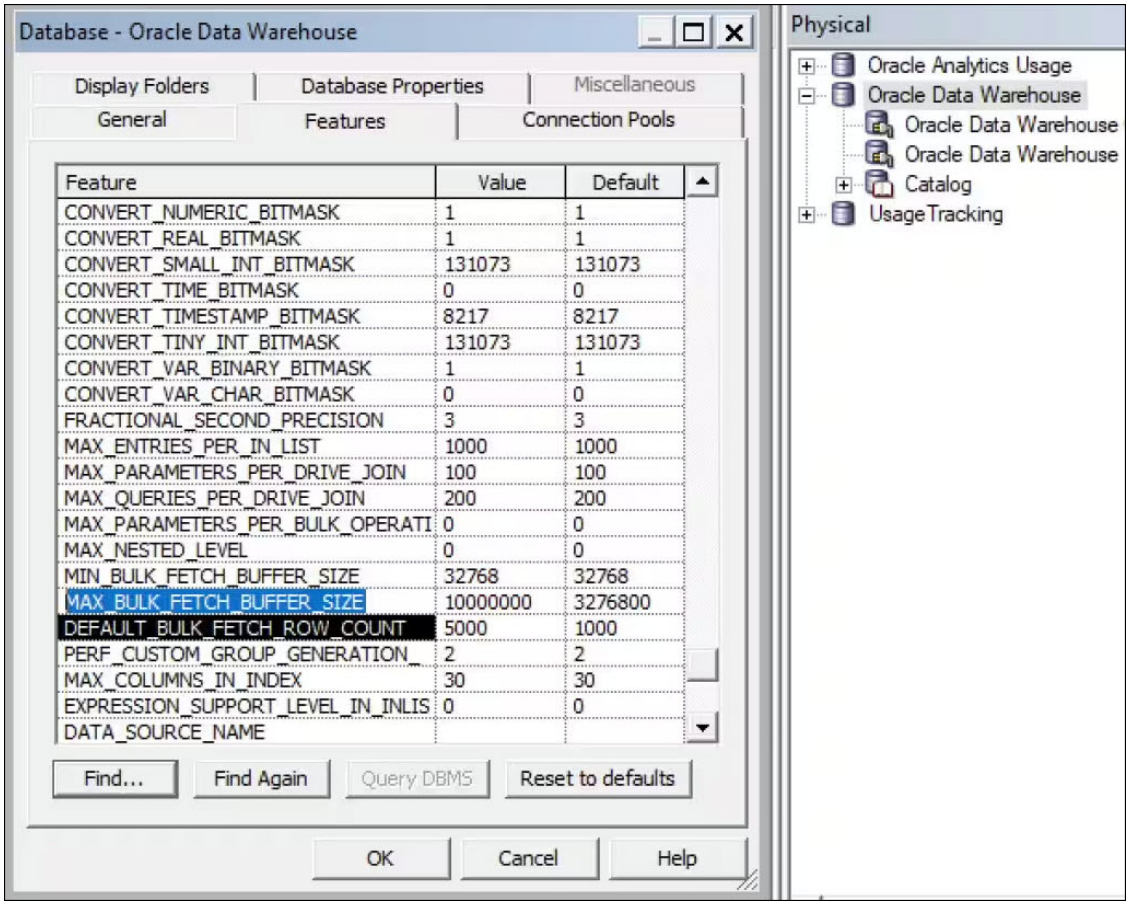
Network latency increases when Oracle Analytics Cloud connects to a database on a different data center. This topic explains how you can minimize the negative performance impact from this higher network latency by reducing the number of network roundtrips between Oracle Analytics Cloud and your data source. Making fewer network roundtrips reduces the response time of your database queries.

To achieve this, Oracle recommends that you increase the default bulk fetch row count and the size of the fetch buffer. You can modify both these settings in the data model file (RPD) for your Oracle Analytics Cloud:

- DEFAULT_BULK_FETCH_ROW_COUNT: Increase the bulk fetch row count value to 5,000. Because the number of rows in bulk fetches is limited by the size of the bulk fetch buffer, you need to increase the fetch buffer size too.
- MAX_BULK_FETCH_BUFFER_SIZE: Increase the buffer size to a large value, such as 1,000,0000.

If the buffer size isn't large enough, each bulk fetch contains fewer rows than expected by the DEFAULT_BULK_FETCH_ROW_COUNT. When network latency is high, this can degrade performance.

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Assign the Aggregation Rule for Report Totals

This topic describes ways to explicitly assign the aggregation rule for report totals, which helps improve performance and is intended specifically for technical developers writing reports with Oracle Analytics.

The following figure shows an example where the report definition is year, month, and customer region, with a metric `Count Distinct of Customers with Orders` that's defined as a count distinct of customers with orders.

C50 Region	Count Distinct Customers with Orders
AMERICAS	182
APAC	113
EMEA	185
Grand Total	**480**

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The logical query looks like this:

```
SELECT
   0 s_0,
   "A - Sample Sales"."Cust Regions"."C50  Region" s_1,
   "A - Sample Sales"."Counts"."32  # of Cust with Orders  (Cnt Distinct)"
s_2,
   REPORT_AGGREGATE("A - Sample Sales"."Counts"."32  # of Cust with Orders
(Cnt Distinct)" BY ) s_3
FROM "A - Sample Sales"
WHERE
("Time"."T02 Per Name Month" = '2011 / 11')
ORDER BY 2 ASC NULLS LAST
FETCH FIRST 500001 ROWS ONLY
```

The physical query that's generated looks like this:

```
WITH
SAWITH0 AS (select count(distinct T42433.Cust_Key) as c1,
     T42430.Region as c2
from
     BISAMPLE.SAMP_CUSTOMERS_D T42428 /* D60 Customers */ ,
     BISAMPLE.SAMP_ADDRESSES_D T42430 /* D62 Customers Addresses */ ,
     BISAMPLE.SAMP_TIME_MTH_D T42405 /* D02 Time Month Grain */ ,
     BISAMPLE.SAMP_REVENUE_F T42433 /* F10 Billed Rev */
where  ( T42405.Mth_Key = T42433.Bill_Mth_Key and T42405.Per_Name_Month =
'2011 / 11' and T42428.Cust_Key = T42433.Cust_Key and T42428.Address_Key =
T42430.Address_Key )
group by T42430.Region),
SAWITH1 AS (select count(distinct T42433.Cust_Key) as c1
from
     BISAMPLE.SAMP_TIME_MTH_D T42405 /* D02 Time Month Grain */ ,
     BISAMPLE.SAMP_REVENUE_F T42433 /* F10 Billed Rev */
where  ( T42405.Per_Name_Month = '2011 / 11' and T42405.Mth_Key =
T42433.Bill_Mth_Key ) )
select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from ( select D1.c1
as c1,
     D1.c2 as c2,
     D1.c3 as c3,
     D1.c4 as c4
from
     (select 0 as c1,
               D1.c2 as c2,
               D1.c1 as c3,
               D2.c1 as c4,
               ROW_NUMBER() OVER (PARTITION BY D1.c2 ORDER BY D1.c2 ASC) as c5
          from
               SAWITH0 D1,
               SAWITH1 D2
     ) D1
where  ( D1.c5 = 1 )
order by c2 ) D1 where rownum <= 500001
```

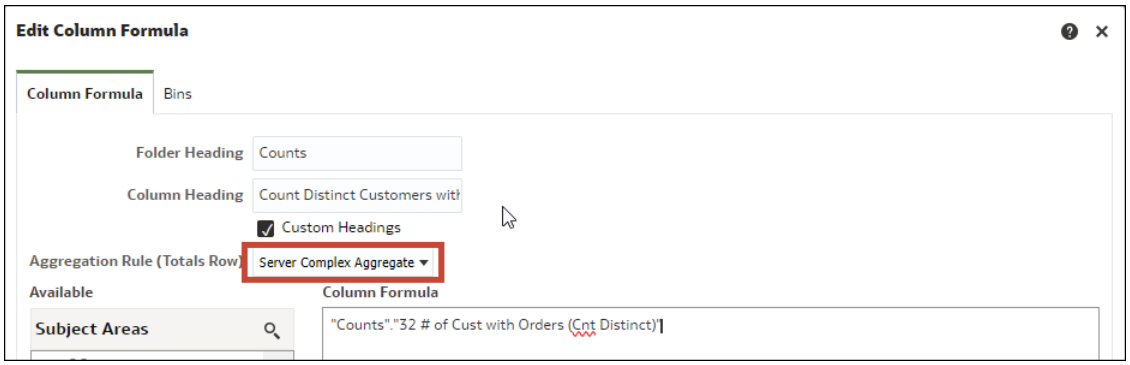

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The total value, 480, is the sum of the constituent values, 182 + 113 + 185. The logical query expression that calculates the total is: “REPORT_AGGREGATE("A - Sample Sales"."Counts"."32 # of Cust with Orders (Cnt Distinct)" BY) s_3”.

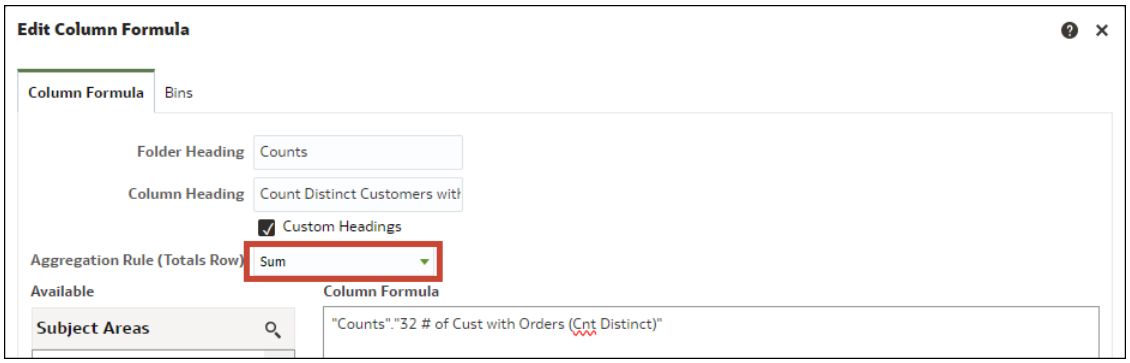
When REPORT_AGGREGATE is used, the total is calculated independently of the constituent values. But for this report design, the correct total can be calculated from the constituents for this report.

If you edit the column formula to change the **Aggregation Rule (Totals Row)** from **Server Complex Aggregate** to **Sum**, the logical and physical SQL query is changed.

The following figure shows the original aggregation.



The following figure shows the modified aggregation.



The modified logical SQL query now has REPORT_SUM:

```
SELECT
   0 s_0,
   "A - Sample Sales"."Cust Regions"."C50  Region" s_1,"A - Sample
Sales"."Counts"."32  # of Cust with Orders  (Cnt Distinct)" s_2,
   REPORT_SUM("A - Sample Sales"."Counts"."32  # of Cust with Orders  (Cnt
Distinct)" BY ) s_3
FROM "A - Sample Sales"
WHERE
("Time"."T02 Per Name Month" = '2011 / 11')
ORDER BY 2 ASC NULLS LAST
FETCH FIRST 500001 ROWS ONLY
```

This is the physical query that's generated:

```
WITH
SAWITH0 AS (select count(distinct T42433.Cust_Key) as c1,
```


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```
     T42430.Region as c2
from
     BISAMPLE.SAMP_CUSTOMERS_D T42428 /* D60 Customers */ ,
     BISAMPLE.SAMP_ADDRESSES_D T42430 /* D62 Customers Addresses */ ,
     BISAMPLE.SAMP_TIME_MTH_D T42405 /* D02 Time Month Grain */ ,
     BISAMPLE.SAMP_REVENUE_F T42433 /* F10 Billed Rev */
where  ( T42405.Mth_Key = T42433.Bill_Mth_Key and T42405.Per_Name_Month =
'2011 / 11' and T42428.Cust_Key = T42433.Cust_Key and T42428.Address_Key =
T42430.Address_Key )
group by T42430.Region),
SAWITH1 AS (select 0 as c1,
     D1.c2 as c2,
     D1.c1 as c3
from
     SAWITH0 D1)
select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4 from ( select D1.c1
as c1,
     D1.c2 as c2,
     D1.c3 as c3,
     sum(D1.c3) over ()  as c4
from
     SAWITH1 D1
order by c2 ) D1 where rownum <= 500001
```

The same option to explicitly set the aggregation is available in workbooks. See Format Numeric Values of Visualizations. For this example, for the column Count Distinct Customers with Orders, change **Aggregation Method** to **Sum**.

Review your reports to see that the best aggregation rule is being used for the report. Use an explicit aggregation rule when the report design allows it.

For more information about reports, see Create Analyses.

Select the Best Option to Render Dashboards

As an administrator or author in Oracle Analytics Cloud, you can select the best option for rendering content on dashboards for your users. This topic describes how dashboard content is rendered and the advantages of each option.

Consider an example of a dashboard that has multiple tabs, and each tab includes multiple visualizations. A dashboard construct has the following elements in it:

- Dashboard structure (layout) including organization of tabs, visualizations layout on each tab, prompts, and filters
- Information related to each visualization including subject areas, columns on the subject areas, and the visualization type (such as chart or table)

When a user opens a dashboard, the system starts to load the dashboard construct, determines where to place the tabs and visualizations, and runs the queries for each visualization as part of rendering the dashboard. You can decide whether users must wait for the dashboard metadata to load completely before any dashboard content is rendered.

Metadata generally loads quickly. For dashboards with many embedded objects (including conditions, dashboard prompts, and visualizations), the metadata can take some time to load and this can be sensitive to aspects of application design such as the availability and latency of the data source. As a result, the user might be waiting for the dashboard to render without any

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feedback and it might look like the dashboard is still loading or that the browser has stopped responding.

Administrator Controls

Administrators control how dashboards are rendered using the property **Enable Immediate Dashboard Rendering** in **System Settings**:

- **On**: Specifies to render dashboard content immediately, even if some content is unavailable.
- **Off** (default): Specifies to wait for all dashboard content to be loaded before rendering.

For more information, see Performance and Compatibility Options.

Author Controls

Authors can control how dashboards are rendered individually at the dashboard level using options on the **Dashboard Properties** dialog, available in the **Tools** drop-down list:

- **Render Content when Available** (default): Specifies to display the dashboard content immediately, even if some content is unavailable.
- **Wait for All Content**: Specifies to wait for all the dashboard content to load before displaying content.

When you specify to display dashboard content immediately, visualizations start to render and data is loaded when the respective dashboard elements are completed.

Improve the Time to Display Dashboard Pages with Prompts

You can improve the time that it takes to display dashboard pages by specifying prompt values before users open the dashboards.

Without prompting first, dashboard content executes with default values, which may or may not be the data your users are interested in. Additionally, users have to wait until all the content runs and the dashboard renders completely, or they may have to cancel each object individually.

To save time and reduce the query load on the database and Oracle Analytics Cloud, you can collect the prompt values before analyses content is displayed on dashboard pages. This confirmation in displaying content initially improves the wait time for displaying the page with default prompt selections. The content of analyses isn't displayed on the page until the user responds to prompts. Other objects (such as dashboard prompts, text, and so on) are displayed.

For example, you can prompt for which regions to include before displaying the Brand Revenue analysis on the Sales Performance dashboard page.

When you prompt users for values before displaying analyses, the following occurs:

- A message is displayed at the top of the page, which indicates that the page isn't fully loaded. The message also instructs the user to select prompt values and click **Continue**. Clicking **Continue** displays the content on the page using the prompt values that the user specifies. If the user doesn’t specify any prompt values, then the analysis is displayed with default prompt values.
- The page displays static information about the objects that haven't yet been displayed. The information includes the object name, an icon that represents the object view, the view name, and the object description (if available).

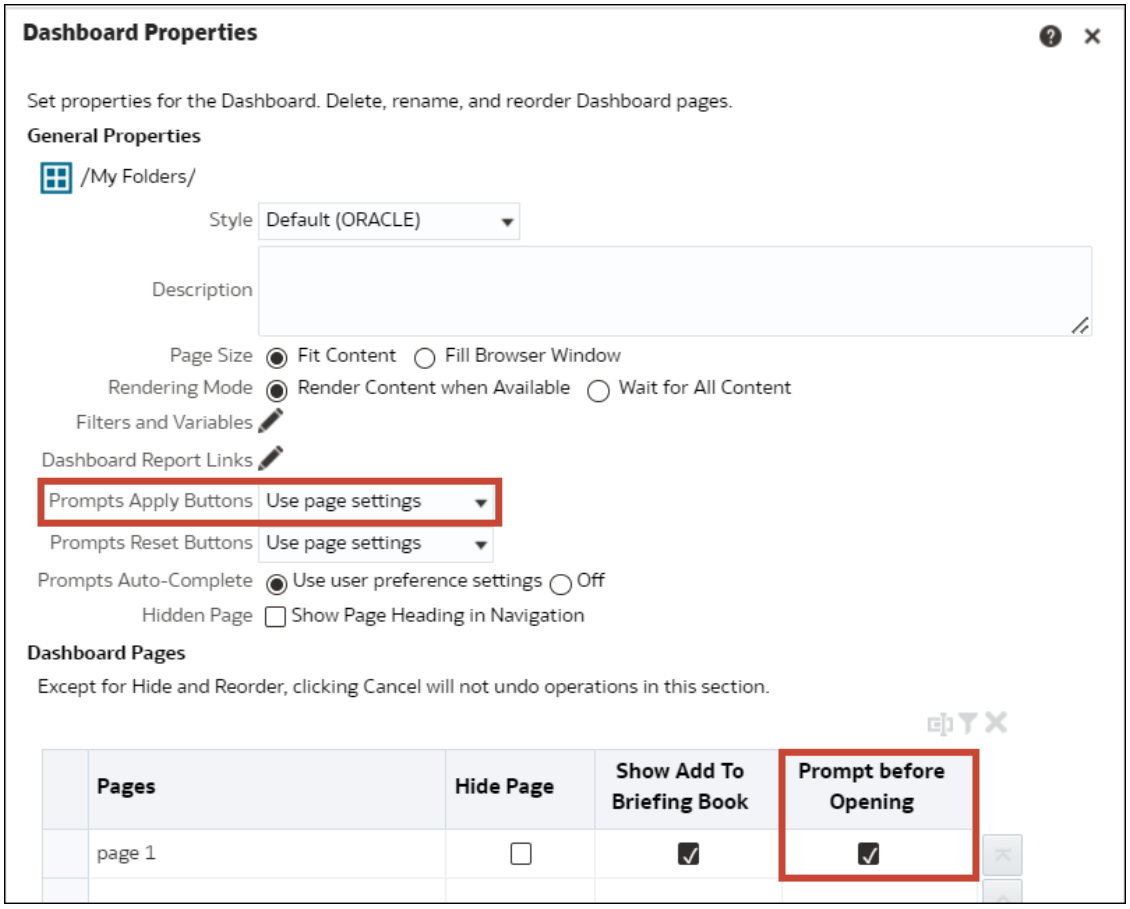
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- On the Page Options menu (displayed from **Page Options** on the Dashboard page toolbar), all options except **Edit Dashboard** are disabled.
- The **Apply** button on dashboard prompts isn't displayed. Instead any prompt values are applied automatically when the user clicks **Continue**.

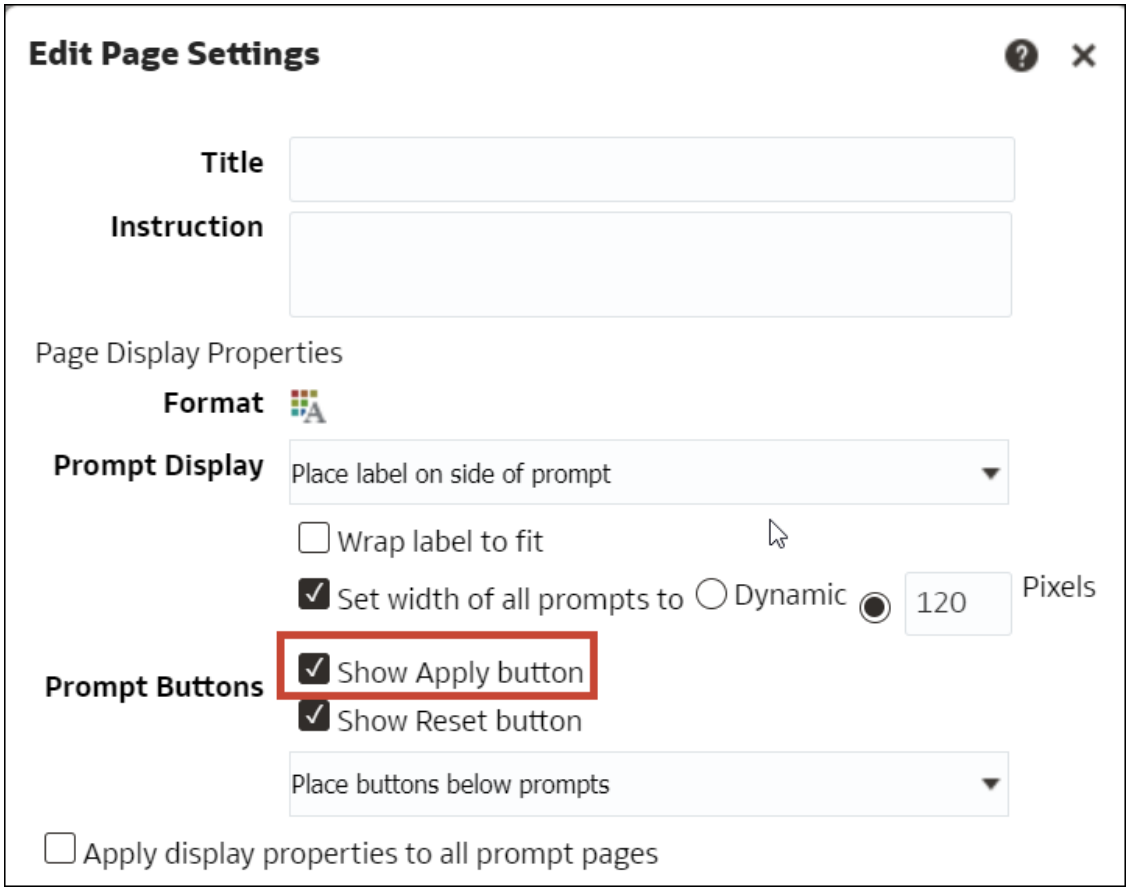
Prompts are a page-level property, so you need to activate them for each page in the dashboard for which you want to use **Prompt before Opening**. This allows you to set prompts for some dashboards and not others, which may be an appropriate experience depending on who's using the dashboard and how much data the reports are running against.

1. Open the dashboard for editing.
2. Click **Tools** and select **Dashboard Properties**.
3. Locate the page in the Dashboard Pages area and select **Prompt before Opening**.
4. Click **OK**.
5. Click **Save**.
   After the first execution of the dashboard, the **Continue** button is no longer displayed. You can also specify to select new prompt values without automatically executing the dashboard with each selection.
6. Click **Tools** and select **Dashboard Properties**.
7. For **Prompts Apply Buttons**, select **Use page settings** or **Show All Apply buttons**.
8. Click **OK**.
9. Click **Edit** to open the Edit Page Settings dialog.
10. For **Prompt Buttons**, select **Show Apply button**.
11. Click **OK**. The dashboard automatically gets the new prompt settings.
12. Click **Save**.

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Setting **Prompt before Opening** for a dashboard page is the best approach for streamlining your experience by reducing unnecessary steps, and for optimizing system performance. It also eliminates unproductive report executions. Because a single report can have more than one query, the system benefit can be significant.

For more information about creating prompts, see Create Prompts.

Configure Timestamps

In Oracle Analytics, administrators set the default time zone used for date and time calculations in **System Settings**. This global setting applies to all calculations. This topic explains how to use the `TIMESTAMPADD` function to specify another time zone if you want to use a different timestamp in a particular calculation.

Set the Default Time Zone for Calculations in System Settings

By default, the system time for Oracle Analytics Cloud is based on UTC time. The following functions return values using the UTC time or date:

- `CURRENT_DATE`
- `CURRENT_TIME()`
- `CURRENT_TIMESTAMP()`
- `NOW()`

As an administrator, you can change the timestamp used in calculations using the **Default Time Zone for Date Calculations** option in the Console, under **Advanced System Settings**.

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Select the desired time zone from the drop-down list and apply the changes for the new value to take effect.



For more information about global time zone settings, see System Settings - Format Options.

Use a Specific Time Zone for Timestamps in Calculations

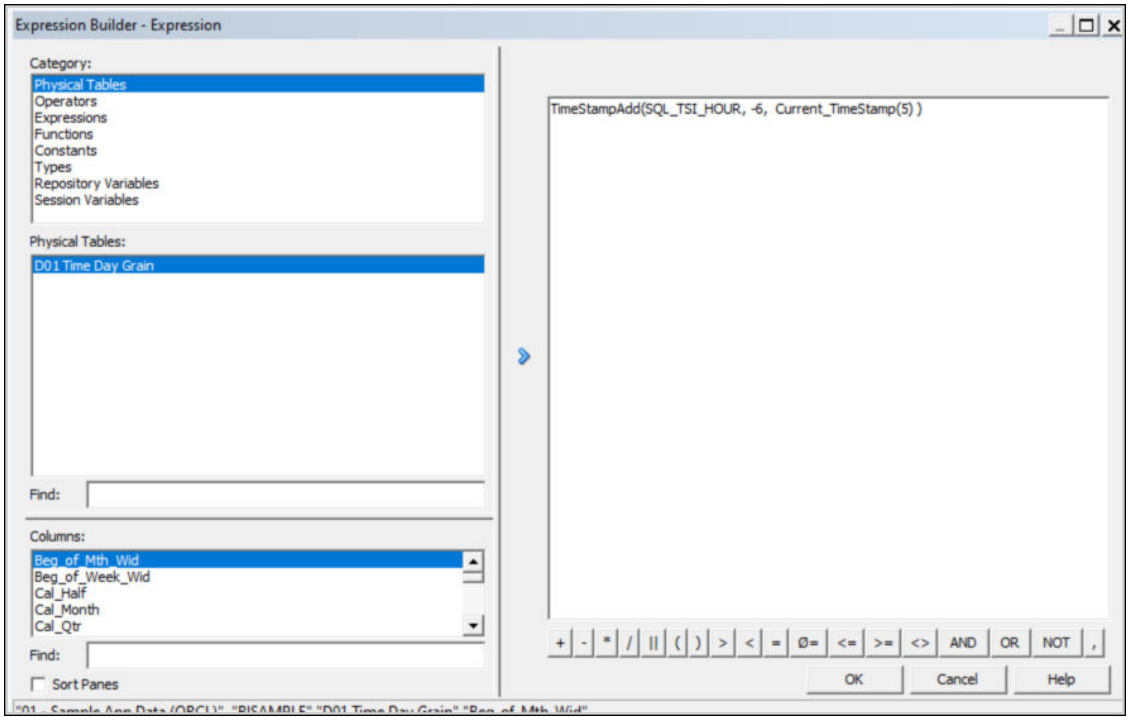
To generate a timestamp other than the system setting in your calculations, use the `TIMESTAMPADD` function in conjunction with `CURRENT_TIMESTAMP()` or `NOW()`. The basic `TIMESTAMPADD` calculation is:

`TIMESTAMPADD(SQL_TSI_<<interval>>, <<integer expression>>, <<timestamp expression>>)`

For timestamp calculations, `HOUR` is the interval and the time offset is the difference in hours between UTC and the time zone to be reported on. For example:

```
TIMESTAMPADD(SQL_TSI_HOUR, -6,CURRENT_TIMESTAMP(5))
```

This calculation returns the current timestamp in US Mountain time. You can create the new timestamp column as a derived column in the logical table source or map it directly to the database The difference is where the calculation is to be performed; that is, Oracle Analytics or the database. The following figure shows a calculation mapped directly to the database in the Expression Builder - Expression dialog.



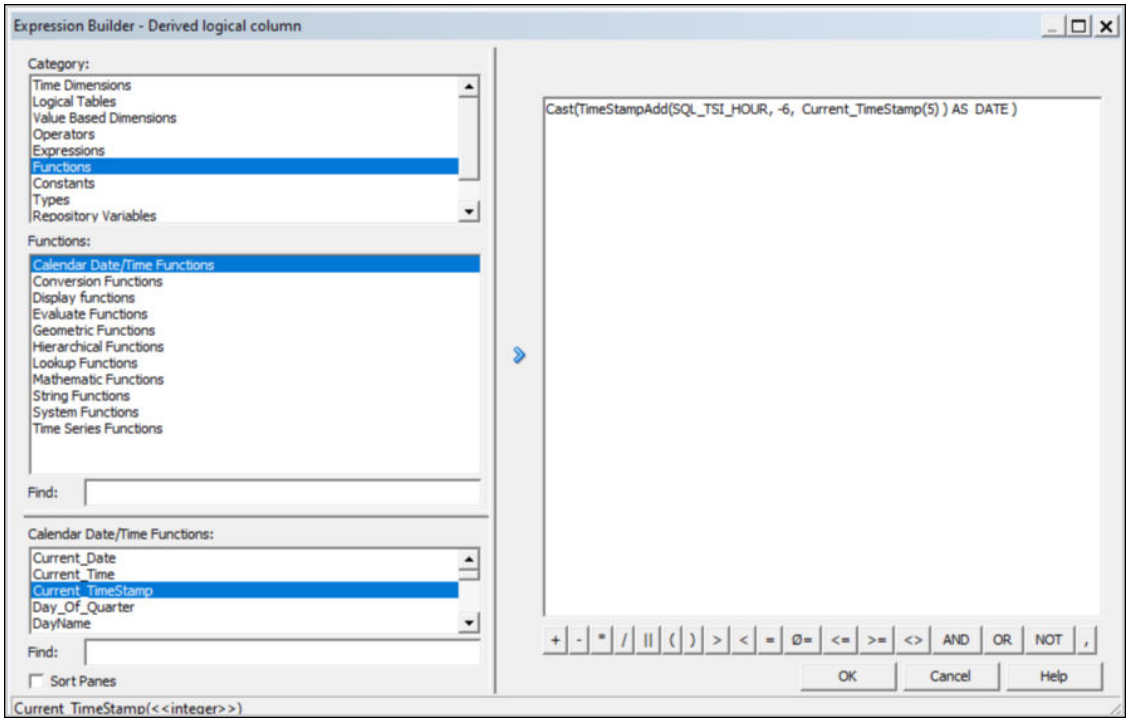
When the default time zone is set to UTC, the `CURRENT_DATE` function doesn't return the correct date for certain hours of the day relative to a user's time zone. For example, when it's midnight UTC, the local date doesn't match the UTC date for the duration of the time offset.

Casting the timestamp calculation as a date resolves this issue. For example:

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```
cast(TIMESTAMPADD(SQL_TSI_HOUR, -6,CURRENT_TIMESTAMP) as date)
```

The following figure shows a calculation that's created as a derived column in the Expression Builder - Derived logical column dialog.



For unique or singular reports, you can create timestamp calculations at the report level in either a data visualization or a classic analysis. If you plan to reuse the calculations, it's often easier to define them as columns in the semantic model (or RPD file).

For more information about the functions mentioned in this topic, see Date and Time Functions and Time Series Functions.

Use Filter Functions Instead of Time Series Functions

This topic explains the difference between time series functions and filter functions and explains how to implement filter functions. This information applies to both workbooks and classic dashboards.

Times Series Functions vs. Filter Functions

The times series functions `Ago` and `Todate` offer a simple way to create metrics to calculate `year-ago, year-to-date,` and so on. This method works well for business user reports; however, these functions generate complex queries that have a significant cost on performance. Also, each time that one of these functions is used in a report, an additional sub-query is generated using even more resources on the database.

In classic dashboards, instead of using time series functions, you can usually achieve the same result by using base metrics with the `Filter` function to filter on the appropriate time period. This method might be too complex for business user reports but it works well in dashboards predefined by the IT team. Using this method, the generated physical SQL code is much simpler and more efficient, and doesn't require an additional sub-query. This means the SQL query runs faster and uses fewer resources on the database, reducing the overall database CPU usage and input-output calls.

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The following figure shows an example of the physical query that's generated when you use both the base metric and month Ago metric in the same report. Two queries are generated.

```
[2022-05-19T15:52:15.425+00:00] [OBIS] [TRACE:2] [USER-18] [] [ecid
WITH
SAWITH0 AS (select T68."DAY_DT" as c2,
     T68."PER_NAME_MONTH" as c3,
     ROW_NUMBER() OVER (PARTITION BY T68."PER_NAME_MONTH" ORDER BY
from
     "CLOUD_TIME_SMALL" T68),
SAWITH1 AS (select Case when case D1.c4 when 1 then D1.c2 else NULL
     D1.c2 as c2,
     D1.c3 as c3
from
     SAWITH0 D1),
SAWITH2 AS (select min(D1.c1) over (partition by D1.c3)  as c1,
     D1.c2 as c2
from
     SAWITH1 D1),
SAWITH3 AS (select D1.c1 + 1 as c1,
     D1.c2 as c2
from
     SAWITH2 D1),
SAWITH4 AS (select T68."PER_NAME_MONTH" as c2,
     T68."DAY_DT" as c3,
     ROW_NUMBER() OVER (PARTITION BY T68."PER_NAME_MONTH" ORDER BY
from
     "CLOUD_TIME_SMALL" T68),
SAWITH5 AS (select Case when case D1.c4 when 1 then D1.c3 else NULL
```

The following figure shows the SQL code that's generated for a single query when you use a Filter function instead.

```
WITH
SAWITH0 AS (select sum(case  when T68."PER_NAME_MONTH" = '2019 / 08' then T63."REVENUE" end ) as c1,
     sum(case  when T68."PER_NAME_MONTH" = '2019 / 09' then T63."REVENUE" end ) as c2
from
     "CLOUD_TIME_SMALL" T68,
     "CLOUD_F_BILL_REV" T63
where  ( T63."TIME_BILL_DT" = T68."DAY_DT" and (T68."PER_NAME_MONTH" in ('2019 / 08', '2019 / 09')) ) )
select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3 from ( select distinct 0 as c1,
     D1.c1 as c2,
     D1.c2 as c3
from
     SAWITH0 D1 ) D1 where rownum <= 125001
```

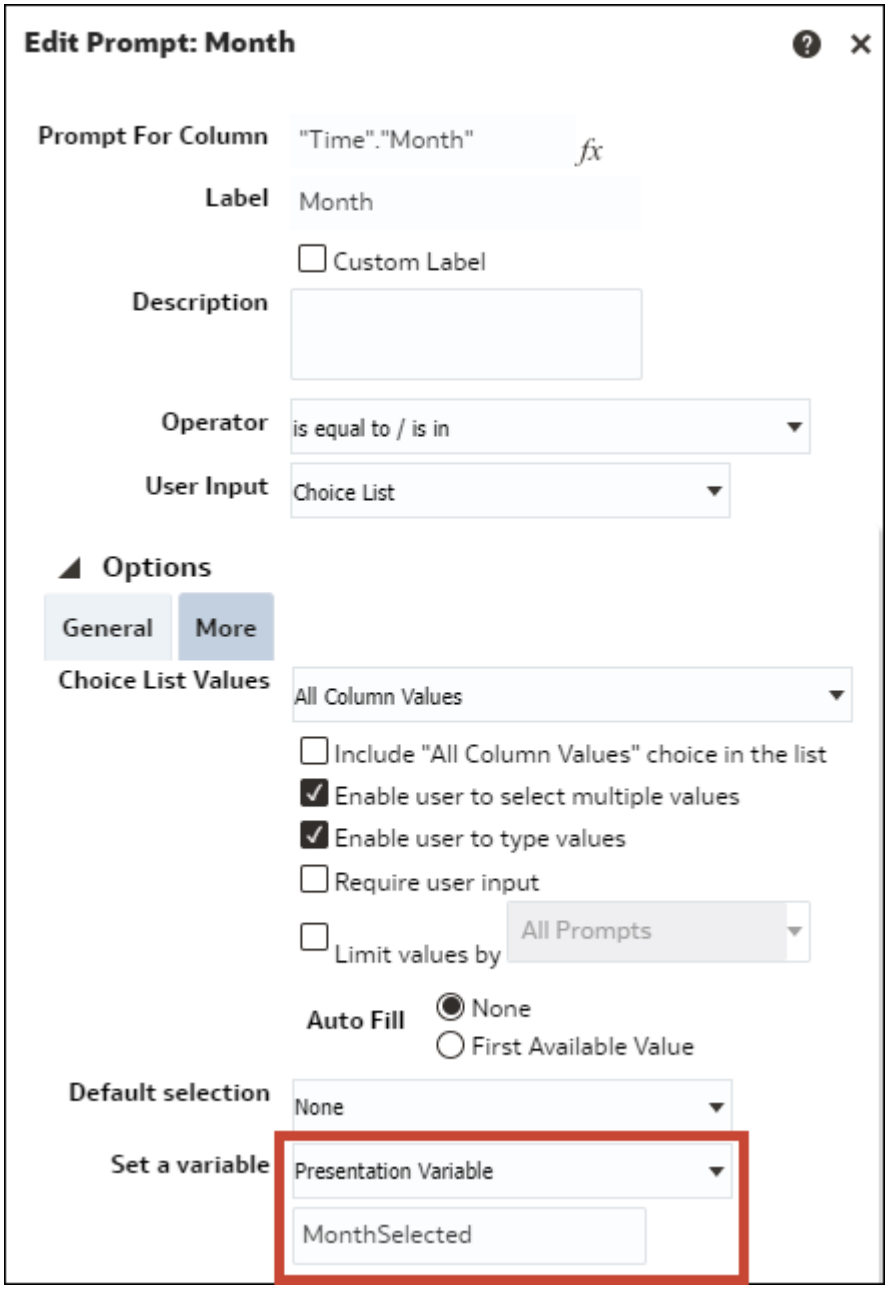
Implement Filter Functions in a Dashboard with Prompts

In most implementations, the dashboard already includes a prompt so users can select the month that they're looking for. The first step is to identify the time periods that you need to filter on based on a user's selection.

In this example, the calendar dimension includes the column Julian Period Number because it makes the calculation easier. This is also feasible without Julian Period Number but would require much more complex formulas to calculate the time period selected.

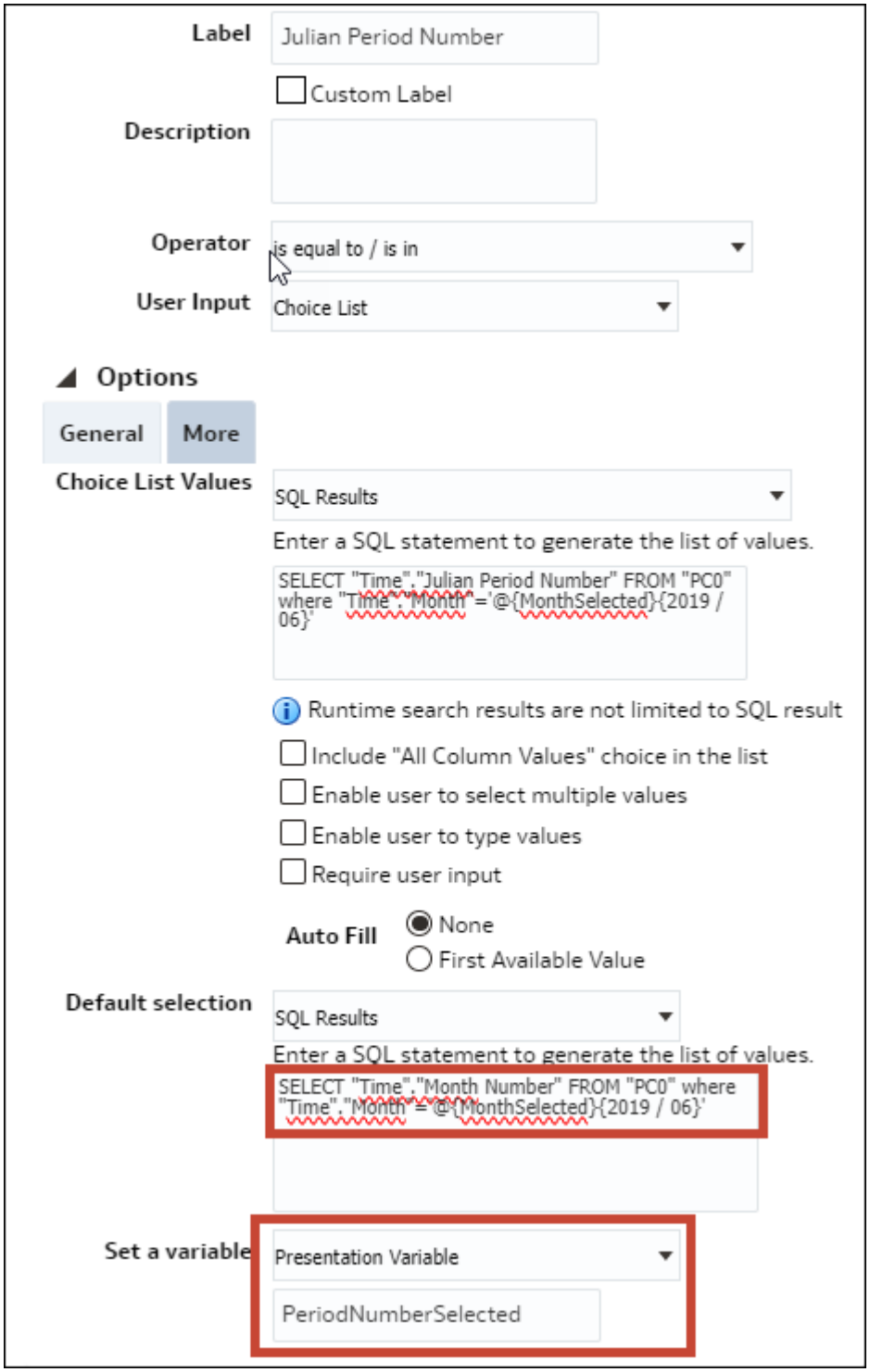
1. Modify the Month prompt to add the presentation variable (MonthSelected).

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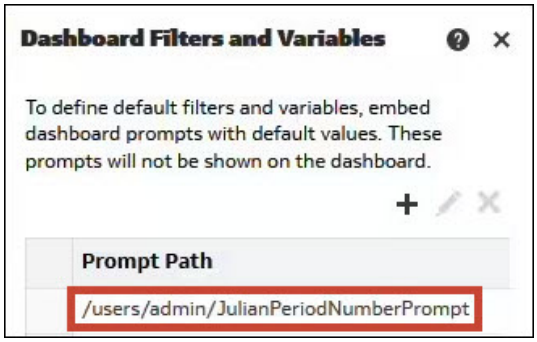
2. Create a separate dashboard prompt to retrieve the corresponding `Julian Period Number` and put it in another variable (`PeriodNumberSelected`). This second prompt isn't shown to the end user; instead it's hidden in the dashboard and the value is calculated automatically based on the variable `MonthSelected`.

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3. Edit your dashboard properties and click **Filters and Variables**.
4. Add the `Julian Period` prompt path.

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5. In the analysis, delete the global filter on the `Month` column, and use the column formulas filter functions based on `Julian Period Number` as required. Here are some examples:
   `Current Month: Filter("Revenue Metrics"."Revenue" using "Time"."Julian Month Number"=@{PeriodNumberSelected}{80800})`

   `Month Ago: Filter("Revenue Metrics"."Revenue" using "Time"."Julian Month Number"=@{PeriodNumberSelected}{80800}-1)`

   `Year Ago: Filter("Revenue Metrics"."Revenue" using "Time"."Julian Month Number"=@{PeriodNumberSelected}{80800}-12)`

   `Year to date: Filter("Revenue Metrics"."Revenue" using "Time"."Julian Month Number"<=@{PeriodNumberSelected}{80800} and “Time”.”Year”=@{YearSelected}{2019})`

Implement Filter Functions in a Workbook with Parameters

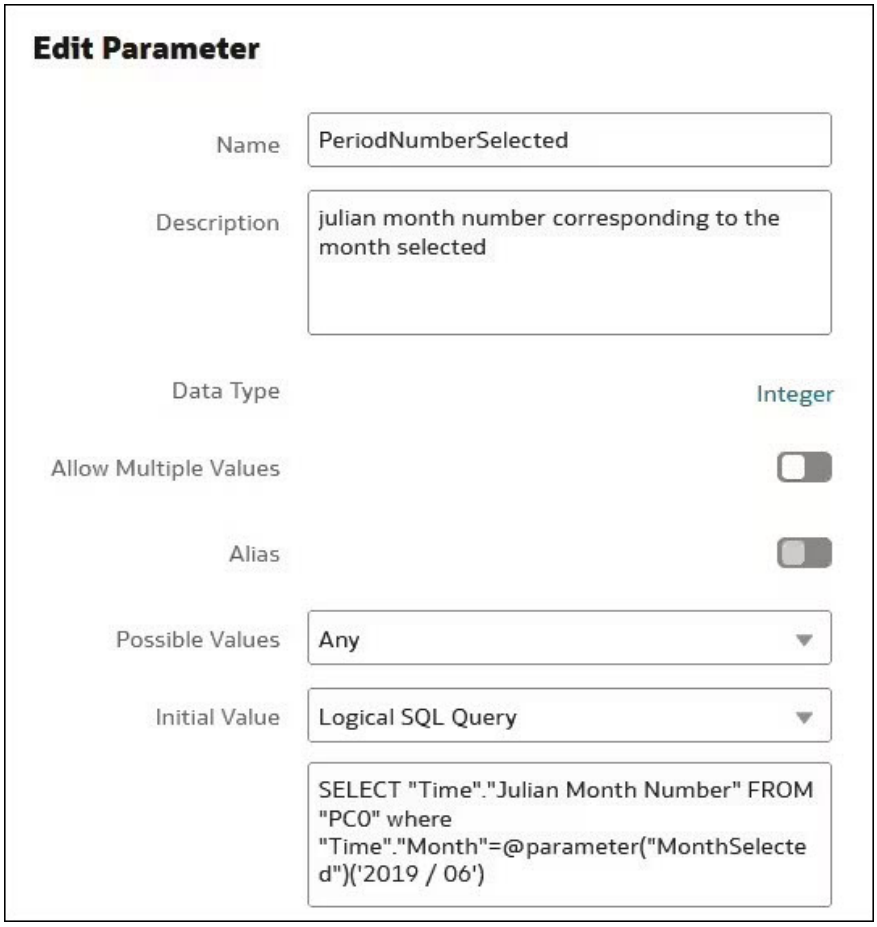
You can apply the same principle in a workbook. Prompts and presentation variables are replaced by a dashboard filter and parameters.

Create three parameters: MonthSelected, PeriodNumberSelected, and YearSelected. Only the parameter MonthSelected is displayed in the canvas in a dashboard filter.

The possible values for the parameter MonthSelected are defined based on a logical SQL query selecting all months.

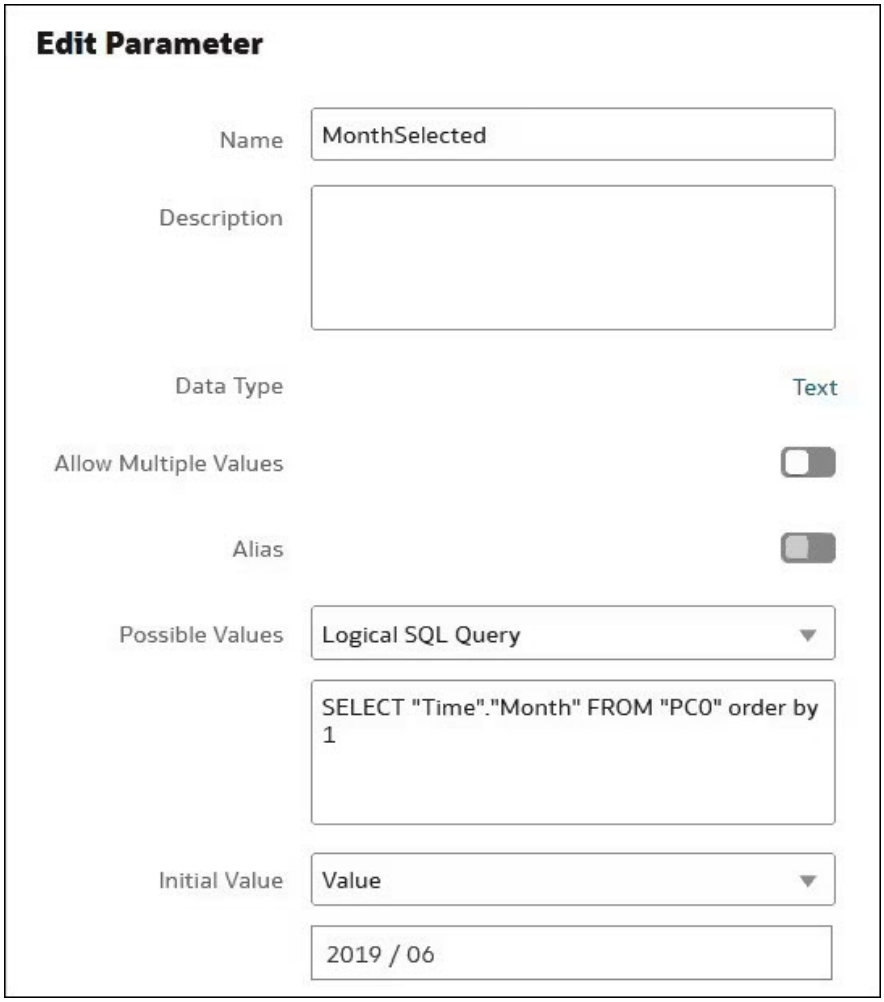
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For the parameters PeriodNumberSelected and YearSelected, the possible values aren't populated.



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Only the initial value is populated with a logical query filtered based on the value of MonthSelected.



Tune Performance of Multidimensional Database Queries

When you use a multidimensional database as a data source in Oracle Analytics, you may experience performance issues which result in suboptimal multidimensional expression (MDX) queries being generated.

By modifying the design, you can improve the MDX queries that Oracle Analytics generates. This can have a huge impact, not only on your report performance but also on the volume of resources used in the database. How you use supported or non-supported functions greatly impacts the MDX queries generated and therefore the performance.

Because each use case is unique, your development team should review the options, analyze the Oracle Analytics query logs, and select the best solution for your use case.

This topic doesn't address performance issues caused by your infrastructure, such as networks, browsers, or report presentation.

Methodology

Oracle recommends that you do the following tasks to increase performance. It's important that you understand MDX query structure as well as the query logs that Oracle Analytics generates.

- Simplify the MDX queries generated.

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- Reduce the number of MDX queries generated.
- Ensure that optimal filters and selections are applied in the MDX query.
- Performance tune with the database administrator (DBA) on the multidimensional database and verify why the source database is still performing poorly.
- Modify the analysis based on DBA feedback.

Selection Steps Optimization

When you optimize selection steps, you can simplify the MDX queries, reduce the number of MDX queries generated, and increase performance.

The following figure shows an example of a comparison of optimized and not optimized selection steps.

Optimized	**Sales Person - Sales Rep Hierarchy** 1. Start with all members 2. Then, Keep Leaves of Monica Velasquez Group	Selection steps are optimized to include all members and the keep only the relevant member.
Not optimized	**Sales Person - Sales Rep Hierarchy** 1. Start with Monica Velasquez Group 2. Then, Add Leaves of Monica Velasquez Group 3. Then, Remove Monica Velasquez Group	Selection step is poorly defined and complex MDX is generated.

CASE Statements

`CASE` statement functionality isn't supported in MDX queries and must always be applied in Oracle Analytics. The logic explained in this section with regards to `CASE` statements is valid for most functions that aren't supported in MDX queries (`if null`, and so on).

There are advantages and disadvantages when using `CASE` statements. When you include `CASE` statements in report formulas, they aren't included in the MDX query. This can simplify the MDX query and improve performance. However, the tradeoff is that you can't filter as effectively which means that the query might return more records than is necessary.

The following are restrictions for using `CASE` statement functionality:

- If the `CASE` statement doesn't combine multiple members, the base column used in the statement should be included in the query and the views as a hidden separate column.
- If the `CASE` statement combines multiple members, the base column can't be included in the view without impacting the level of aggregation. If this is the case:
  - If the aggregation rule of measure isn't External Aggregation, the base column must be excluded from the query.
  - If the aggregation rule of measure is External Aggregation, the base column must be included in the query and excluded from the view. You must change the aggregation rule of measure from the default into a simple internal aggregation rule (`SUM`, `MAX`, `MIN`). This works only if the internal aggregation rule is used to combine members and provides correct results.

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FILTER Function

Unlike the `CASE` statement functionality, the `FILTER` function can be shipped to the database for execution.

The main benefit of using the `FILTER` function in report formulas is that the selection is applied in the MDX query and the volume of data calculated and retrieved from the database is reduced.

The main drawback of using the `FILTER` function is that it may increase the number of MDX queries executed. By default, one query is executed for each `FILTER` function used.

CASE vs. FILTER Example

In this example, a user requests a report that shows profit by quarter and selected product SKU. In addition, the SKUs are grouped together into 12 categories. The category Other Cola has the following LOB's products assigned: Cola, Diet Cola, and Shared Diet Cola.

	Birch Beer	Caffeine Free Cola	Dark Cream	Diet Cream		Diet Root Beer		Grape	Old Fashioned	Orange	Other Cola			Sasparilla	Strawberry	Vanilla Cream
	Birch Beer	Caffeine Free Cola	Dark Cream	Diet Cream	Diet Cream	Diet Root Beer	Diet Root Beer	Grape	Old Fashioned	Orange	Cola	Diet Cola	Shared Diet Cola	Sasparilla	Strawberry	Vanilla Cream
	Root Beer	Colas	Cream Soda	Cream Soda	Diet Drinks	Root Beer	Diet Drinks	Fruit Soda	Root Beer	Fruit Soda	Colas	Colas	Diet Drinks	Root Beer	Fruit Soda	Cream Soda
Quarter	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit	Profit
Qtr1	908.00	593.00	2,544.00	2,695.00	2,695.00	2,963.00	2,963.00	2,838.00	1,697.00	2,283.00	5,096.00	1,359.00	1,359.00	1,153.00	-116.00	690.00
Qtr2	986.00	446.00	3,231.00	2,723.00	2,723.00	3,079.00	3,079.00	2,998.00	1,734.00	2,522.00	5,892.00	1,534.00	1,534.00	1,231.00	-84.00	815.00

Here's the `CASE` statement logical query:

```
SELECT

   0 s_0,

   CASE when XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" in
('Cola','Diet Cola','Shared Diet Cola') THEN 'Other Cola' ELSE
XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" END s_1,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Product"."Category") s_2,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU") s_3,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Year"."Quarter") s_4,

   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Product"."Category") s_5,

   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU") s_6,

   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Year"."Quarter") s_7,

   XSA('Admin'.'Sample.BasicPM')."Product"."Category" s_8,

   XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" s_9,

   XSA('Admin'.'Sample.BasicPM')."Year"."Quarter" s_10,

   XSA('Admin'.'Sample.BasicPM')."Basic"."Profit" s_11

FROM XSA('Admin'.'Sample.BasicPM')

ORDER BY 8 ASC NULLS LAST, 11 ASC NULLS LAST, 5 ASC NULLS LAST, 2 ASC NULLS
```


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```
LAST, 7 ASC NULLS LAST, 10 ASC NULLS LAST, 4 ASC NULLS LAST, 6 ASC NULLS
LAST, 9 ASC NULLS LAST, 3 ASC NULLS LAST

FETCH FIRST 125001 ROWS ONLY
```

There's no grouping based on the `CASE` statement. A simple MDX query is generated, with the `CASE` statement processed by Oracle Analytics:

```
With
  set [_Product3]  as 'Descendants([Product], [Product].Generations(3),
leaves)'
  set [_Year2]  as 'Descendants([Year], [Year].Generations(2), leaves)'
select
  { [Measures].[Profit]
  } on columns,
  NON EMPTY {crossjoin({[_Year2]},{[_Product3]})} properties GEN_NUMBER,
[Product].[MEMBER_UNIQUE_NAME], [Product].[Memnor], [Year].
[MEMBER_UNIQUE_NAME], [Year].[Memnor] on rows
from [Sample.Basic]
```

The `CASE` statement is executed on the BI Server and this is seen by the database setting set to `database 0:0,0`:

```
 RqList <<11777451>> [for database 0:0,0]
                            D1.c6 as c6 [for database 0:0,0],
                            D1.c4 as c4 [for database 0:0,0],
                            case  when D1.c7 in ([ 'Cola', 'Diet Cola',
'Shared Diet Cola'] ) then 'Other Cola' else D1.c7 end  as c2 [for database
0:0,0],
                            D1.c5 as c5 [for database 0:0,0],
                            D1.c3 as c3 [for database 0:0,0],
                            D1.c1 as c1 [for database 0:0,0],
                            D1.c7 as c7 [for database 0:0,0],
                            D1.c8 as c8 [for database 0:0,0]
```

Alternatively, you can use a filter against the profit metric to retrieve only the required LOB members. In this scenario, you create three metrics with the corresponding filters applied.

Here's the `FILTER` statement logical query:

```
SELECT

   0 s_0,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Product"."Category") s_1,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU") s_2,

   DESCRIPTOR_IDOF(XSA('Admin'.'Sample.BasicPM')."Year"."Quarter") s_3,

   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Product"."Category") s_4,

   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU") s_5,
```


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```
   SORTKEY(XSA('Admin'.'Sample.BasicPM')."Year"."Quarter") s_6,

   XSA('Admin'.'Sample.BasicPM')."Product"."Category" s_7,

   XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" s_8,

   XSA('Admin'.'Sample.BasicPM')."Year"."Quarter" s_9,

   FILTER(XSA('Admin'.'Sample.BasicPM')."Basic"."Profit" USING
XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" in ('Cola','Diet
Cola','Shared Diet Cola')) s_10,

   FILTER(XSA('Admin'.'Sample.BasicPM')."Basic"."Profit" USING
XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" in ('Sasprilla','Birch
Beer','Dark Cream')) s_11,

   FILTER(XSA('Admin'.'Sample.BasicPM')."Basic"."Profit" USING
XSA('Admin'.'Sample.BasicPM')."Product"."Product SKU" in ('xxxxx')) s_12

FROM XSA('Admin'.'Sample.BasicPM')

ORDER BY 7 ASC NULLS LAST, 10 ASC NULLS LAST, 4 ASC NULLS LAST, 6 ASC NULLS
LAST, 9 ASC NULLS LAST, 3 ASC NULLS LAST, 5 ASC NULLS LAST, 8 ASC NULLS LAST,
2 ASC NULLS LAST

FETCH FIRST 125001 ROWS ONLY
```

In this scenario, three queries, one for each filter, are generated and you experience performance issues.

Query 1:

```
With

  set [_Product3]  as 'Filter([Product].Generations(3).members,
((IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"xxxxx")))'

  set [_Year2]  as 'Descendants([Year], [Year].Generations(2), leaves)'

select

  { [Measures].[Profit]

  } on columns,

  NON EMPTY {crossjoin({[_Year2]},{[_Product3]})} properties MEMBER_NAME,
GEN_NUMBER, property_expr([Product], [MEMBER_NAME],
Ancestor(currentaxismember(), [Product].Generations(2)),
"Category_Null_Alias_Replacement"), property_expr([Product], [Default],
Ancestor(currentaxismember(), [Product].Generations(2)), "Category"),
property_expr([Product], [MEMBER_UNIQUE_NAME], Ancestor(currentaxismember(),
[Product].Generations(2)), "Category - Member Key"), property_expr([Product],
[Memnor], Ancestor(currentaxismember(), [Product].Generations(2)), "Category
- Memnor"), [Product].[MEMBER_UNIQUE_NAME], [Product].[Memnor], [Year].
```


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```
[MEMBER_UNIQUE_NAME], [Year].[Memnor] on rows

from [Sample.Basic]

]]
```

Query 2:

```
With

  set [_Product3]  as 'Filter([Product].Generations(3).members,
((IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Birch Beer") OR (IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Dark Cream") OR (IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Sasprilla")))'

  set [_Year2]  as 'Descendants([Year], [Year].Generations(2), leaves)'

select

  { [Measures].[Profit]

  } on columns,

  NON EMPTY {crossjoin({[_Year2]},{[_Product3]})} properties MEMBER_NAME,
GEN_NUMBER, property_expr([Product], [MEMBER_NAME],
Ancestor(currentaxismember(), [Product].Generations(2)),
"Category_Null_Alias_Replacement"), property_expr([Product], [Default],
Ancestor(currentaxismember(), [Product].Generations(2)), "Category"),
property_expr([Product], [MEMBER_UNIQUE_NAME], Ancestor(currentaxismember(),
[Product].Generations(2)), "Category - Member Key"), property_expr([Product],
[Memnor], Ancestor(currentaxismember(), [Product].Generations(2)), "Category
- Memnor"), [Product].[MEMBER_UNIQUE_NAME], [Product].[Memnor], [Year].
[MEMBER_UNIQUE_NAME], [Year].[Memnor] on rows

from [Sample.Basic]

]]
```

Query 3:

```
With

  set [_Product3]  as 'Filter([Product].Generations(3).members,
((IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Cola") OR (IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Diet Cola") OR (IIF(IsValid([Product].CurrentMember.MEMBER_ALIAS),
[Product].CurrentMember.MEMBER_ALIAS, [Product].CurrentMember.MEMBER_Name) =
"Shared Diet Cola")))'
```


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```
  set [_Year2]  as 'Descendants([Year], [Year].Generations(2), leaves)'

select

  { [Measures].[Profit]

  } on columns,

  NON EMPTY {crossjoin({[_Year2]},{[_Product3]})} properties MEMBER_NAME,
GEN_NUMBER, property_expr([Product], [MEMBER_NAME],
Ancestor(currentaxismember(), [Product].Generations(2)),
"Category_Null_Alias_Replacement"), property_expr([Product], [Default],
Ancestor(currentaxismember(), [Product].Generations(2)), "Category"),
property_expr([Product], [MEMBER_UNIQUE_NAME], Ancestor(currentaxismember(),
[Product].Generations(2)), "Category - Member Key"), property_expr([Product],
[Memnor], Ancestor(currentaxismember(), [Product].Generations(2)), "Category
- Memnor"), [Product].[MEMBER_UNIQUE_NAME], [Product].[Memnor], [Year].
[MEMBER_UNIQUE_NAME], [Year].[Memnor] on rows

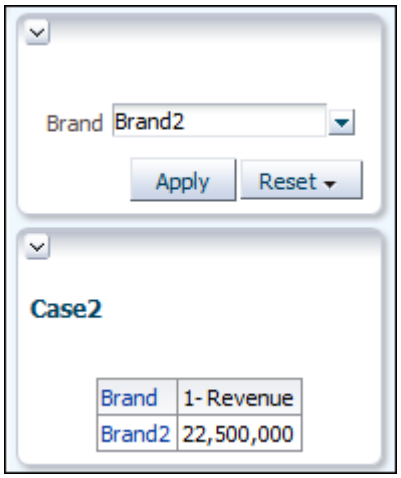
from [Sample.Basic]
```

Product Filter Applied Example

A better approach is to include the product column in the report with a single measure column without a filter. Then create a filter that includes the required products. If you want to group the products into different categories, use a `CASE` statement. In this scenario, a single MDX query is generated with the filtered rows and even though the `CASE` statement is applied by Oracle Analytics, it uses the subset of data and not all records.

Here's another scenario where `CASE` statements cause performance issues.

A developer applies a `CASE` statement to rename brands, and a dashboard prompt allows users to select the brand.



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```
SELECT
   0 s_0,
   "E - Sample Essbase"."Products"."P4  Brand" s_1,
   case "E - Sample Essbase"."Products"."P4  Brand" when 'BizTech' then 'Brand1' when 'FunPod' then
   'Brand2' else 'Brand3' end s_2,
   SORTKEY("E - Sample Essbase"."Products"."P4  Brand") s_3,
   "E - Sample Essbase"."Base Facts"."1- Revenue" s_4
FROM "E - Sample Essbase"
WHERE
(case  "Products"."P4  Brand" when 'BizTech' then 'Brand1' when 'FunPod' then 'Brand2' else 'Brand3'
end = 'Brand2')
```

Because the `CASE` statement isn't supported in the MDX, the filter on `Brand2` can't be applied in the MDX query. All brands are selected, and this isn't optimized.

```
With
  set [_Products2]  as '[Products].Generations(2).members'
select
  { [Measures].[Gross Revenue]
  } on columns,
  NON EMPTY {{[_Products2]}} properties GEN_NUMBER, [Products].[Memnor],
  [Products].[MEMBER_UNIQUE_NAME] on rows
from [BISAMPLE.Sample]
```

In this type of scenario, Oracle recommends you remove the `CASE` statement and rename members in the database or create aliases.

Tune Performance of Relational Database Queries

Many customers experience performance issues with data warehouse applications. In some cases, the SQL queries generated by Oracle Analytics are complex to analyze. This topic provides some guidelines for how to analyze and minimize performance issues that might originate from the SQL queries generated by Oracle Analytics.

This topic doesn't cover performance issues due to problems with your network, browser, or report presentation.

Analyze the Query Log for Oracle Analytics (Log Level 3 Required)

For information on how to find this log or understand the content, see Manage the Query Log.

1. Compare the amount of time your query spends in Oracle Analytics with the time spent in the database, that is, response time versus physical query duration. Normally, the time spent in Oracle Analytics doesn't exceed a few seconds.
2. If the response time is more than a few seconds, analyze the individual steps taken in Oracle Analytics to find the cause (log level 5 required).

Analyze the Physical SQL Query

1. Check whether all the tables included in the query are necessary. Look for any tables that are joined but not included in the `SELECT` clause and don't have any filters applied (real filters, not join conditions).
2. Identify how many physical queries and sub-queries are generated. More precisely, how many times does the query read a fact table? In a perfect world, the query reads a single fact table and only once. When there's more than one fact table, find out why and see if you can remove some.

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3. Check for excluded columns, non-additive aggregation rules (`REPORT_AGGREGATE`, `count(distinct)...`), selection steps, a sub-query in the report, set operators (`UNION`), totals, sub-totals, multiple views, and so on.
4. Check for any outer joins. Discover where they originate from and whether you can remove some by changing the design.

Analyze the Execution Plan

If optimizing the SQL query isn't enough, analyze the execution plan to find the root cause of your performance issue. Ask your database administrator (DBA) to help you. There are four main ways to improve performance at this point:

1. Reduce the volume of input-output calls by improving data access paths (indexes).
2. Reduce the volume of input-output calls by reducing the volume of data read. For example, you can review the filters applied or the data model structure (see the next section).
3. Increase parallelism (number of threads used to read big tables).
4. Improve the input-output call speed (infrastructure improvements, in-memory database, and so on).

Review and Improve the Data Model to Reduce the Volume of Data Read

1. Create aggregate tables.
2. Use fragmentation.
   For example, if users mostly select data from the current Year, Quarter, or Month, you might split the fact into two tables: current and archive. On the Oracle database, you can also use partitioning.
3. Use denormalization to reduce the number of joins.
4. Split up tables to reduce the number of columns.
   The volume of data read doesn't just depend on the number of rows in each table. Table volume also depends on the number and size of its columns. For example, you could split a big table with 500 columns into two tables; one table with the 50 most frequently used columns and the other with the remaining 450 columns that are rarely used.

Many performance issues in Oracle Analytics originate from poor design because this causes sub-optimal SQL queries to be generated. By modifying the design, you can improve the SQL queries that Oracle Analytics generates. This can have a huge impact, not only on the performance of your reports but also on the amount of resources used in the database.

Tune Performance with Excluded Columns

It's quite common for analyses to contain unused columns. Columns that aren't required but are still selected significantly impact performance. This topic explains how to improve performance by removing any column that isn't required.

Identify Unused Columns

When you include columns in the analysis that are excluded from the view (for example, `Year`), you impact performance by:

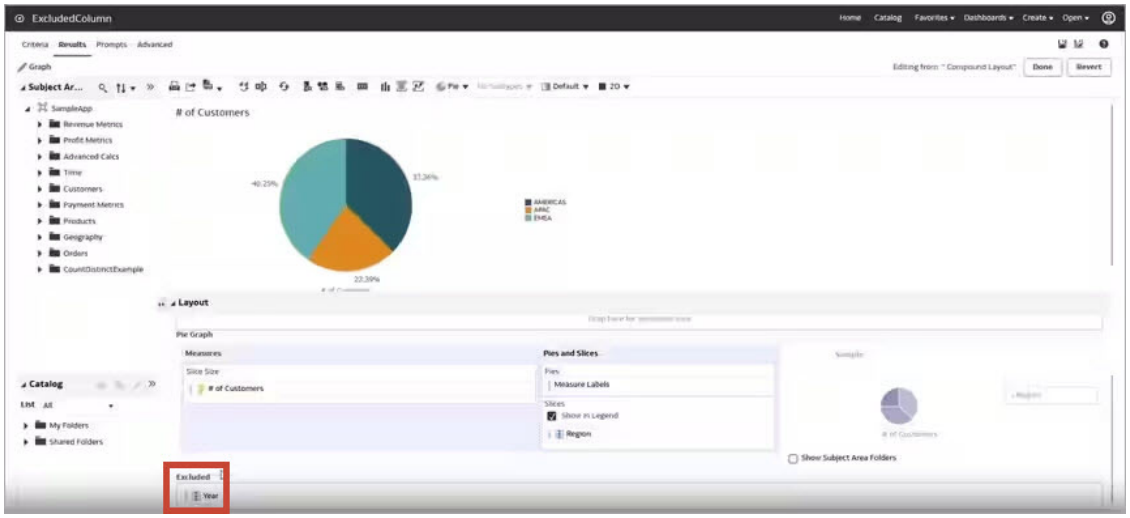
- Increasing the volume of data that needs to be retrieved from the database
- Increasing the number of columns to be retrieved and processed
- Forcing the analysis to compute results at multiple levels of aggregation

The following figure shows a simple report with the number of customers by region and year.

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The report that's displayed is a graph showing the number of customers by region. You can see that the `Year` column is excluded.



Logical Query with Unused Year Column

Even though the `Year` column isn't displayed in the view, it's still selected as part of the logical query.

```
SET VARIABLE OBIS_REFRESH_CACHE=1,QUERY_SRC_CD='Report',SAW_SRC_PATH='/shared/PerfTuningWebinars/ExcludedColumn';SELECT
   0 s_0,
   "PC0"."Geography"."Region" s_1,
   "PC0"."Time"."Year" s_2,
   "PC0"."Revenue Metrics"."# of Customers" s_3,
   REPORT_AGGREGATE("PC0"."Revenue Metrics"."# of Customers" BY "PC0"."Geography"."Region") s_4
FROM "PC0"
ORDER BY 2 ASC NULLS LAST
FETCH FIRST 125001 ROWS ONLY
```

Including the `Year` column in the analysis has the following impact:

- Additional columns are retrieved and processed.
- Additional rows are retrieved and processed, because the number of customer rows is selected not only by region, but also by year.
- Further aggregation is required.

Physical Query with Unused Year Column

If you review the physical query, you can identify areas where performance is impacted.

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```
WITH
OBICOMMON0 AS (select count(distinct T63."CUST_NUMBER") as c1,
     T59."REGION" as c2,
     T68."PER_NAME_YEAR" as c3,
     grouping_id(T59."REGION", T68."PER_NAME_YEAR") as c4
from
     "CLOUD_TIME_SMALL" T68,
     "CLOUD_D_GEOGRAPHY" T59,
     "CLOUD_F_BILL_REV" T63
where  ( T63."TIME_BILL_DT" = T68."DAY_DT" and T59."ADDR_KEY" = T63."ADDR_KEY" and T59."ADDR_KEY" = T26362."ADDR_KEY" )
group by grouping sets (
     (T68."PER_NAME_YEAR", T59."REGION"),
     (T59."REGION"))),
SAWITH0 AS (select D1.c1 as c1,
     D1.c2 as c2,
     D1.c3 as c3,
     D1.c4 as c4
from
     (select D1.c1 as c1,
               D1.c2 as c2,
               D1.c3 as c3,
               D2.c1 as c4,
               ROW_NUMBER() OVER (PARTITION BY D1.c2, D1.c3 ORDER BY D1.c2 ASC, D1.c3 ASC) as c5
          from
                    OBICOMMON0 D1 inner join
                    OBICOMMON0 D2 On D2.c2 = D1.c2
          where  ( D1.c4 = 0 and D2.c4 = 1 )
     ) D1
where  ( D1.c5 = 1 ) )
select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3, D1.c4 as c4, D1.c5 as c5 from ( select 0 as c1,
     D1.c2 as c2,
     D1.c3 as c3,
     D1.c1 as c4,
     D1.c4 as c5
from
     SAWITH0 D1
order by c2 ) D1 where rownum <= 125001
```

This example shows `SELECT count distinct` from the customer number aggregation rule. In some situations, it also impacts reports with a sum aggregation rule. The generated query in this scenario also uses a grouping set. At the database level, it might be selecting many rows (millions) and then having to group by `Year` and `Region`, as well as `Region`. This can consume significant, unnecessary database resources.

Remove Unused Columns

Remove the `Year` column and analyze the impact on the logical and physical queries that are generated.

Logical Query After Year Column Removed

Now, the logical query doesn't contain the `Year` column and, more importantly, the report aggregation is removed.

```
SET VARIABLE QUERY_SRC_CD='Report',SAW_SRC_PATH='/shared/PerfTuningWebinars/ExcludedColumn';SELECT
   0 s_0,
   "PC0"."Geography"."Region" s_1,
   "PC0"."Revenue Metrics"."# of Customers" s_2
FROM "PC0"
ORDER BY 2 ASC NULLS LAST
FETCH FIRST 125001 ROWS ONLY
```

Physical Query After Year Column Removed

The physical query is much simpler now that it doesn't include grouping sets, and the number of records selected is greatly reduced.

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```
WITH
SAWITH0 AS (select count(distinct T63."CUST_NUMBER") as c1,
     T59."REGION" as c2
from
     "CLOUD_D_GEOGRAPHY" T59,
     "CLOUD_F_BILL_REV" T63
where  ( T59."ADDR_KEY" = T63."ADDR_KEY" )
group by T59."REGION")
select D1.c1 as c1, D1.c2 as c2, D1.c3 as c3 from ( select 0 as c1,
     D1.c2 as c2,
     D1.c1 as c3
from
     SAWITH0 D1
order by c2 ) D1 where rownum <= 125001
```

By reviewing the analysis of non-performant reports, and in the first instance, simply removing redundant unused columns, you can achieve significant performance gains. The physical query generated has reduced complexity and fewer records are returned, therefore less processing is required.

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Data Preparation Reference

Learn about developer capabilities in Oracle Analytics for analyzing workbook performance and embedding content, and integration with a range of OCI services, for example OCI Data Science and OCI Language.

Topics:

- Data Profiles and Semantic Recommendations
- General Custom Format Strings
- Transform Reference
- Developer Options
- Create a Connection to Your Oracle Cloud Infrastructure Tenancy
- Integrate Oracle Analytics with Oracle Cloud Infrastructure Functions
- Integrate Oracle Analytics with Oracle Cloud Infrastructure Data Science
- Integrate Oracle Analytics with Oracle Cloud Infrastructure Document Understanding
- Integrate Oracle Analytics with Oracle Cloud Infrastructure Language
- Integrate Oracle Analytics with Oracle Cloud Infrastructure Vision

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

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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

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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

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- 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.

You can use existing semantic files such as Unsupervised Semantic Parsing (USP) files, or you can create your own semantic files. Ask your administrator to upload custom knowledge files to Oracle Analytics. When you enrich datasets, Oracle Analytics presents enrichment recommendations based on this semantic data. When you create workbooks, you can also include knowledge enrichments in your visualizations by adding them from the Data Panel.

Creating Your Own Custom Knowledge Files

When you create your own semantic files, follow these guidelines:

- Create a data file in CSV or Microsoft Excel (XLSX) format. The maximum file size you can upload is 250 MB.
- Populate the first column with the key, which Oracle Analytics uses to profile the data.
- Populate the other columns with the enrichment values.

Ask your administrator to upload your custom knowledge file to Oracle Analytics.

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.

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General Format String	Result
[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`.
DDDDD or ddddd	Displays the first letter of the name of the day of the week in the user's locale, for example, `T` 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`.

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General Format String	Result
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 s.# or s.00 (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 ss.# or ss.00 (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, pm.
gg	Displays the era in the user's locale.

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**.

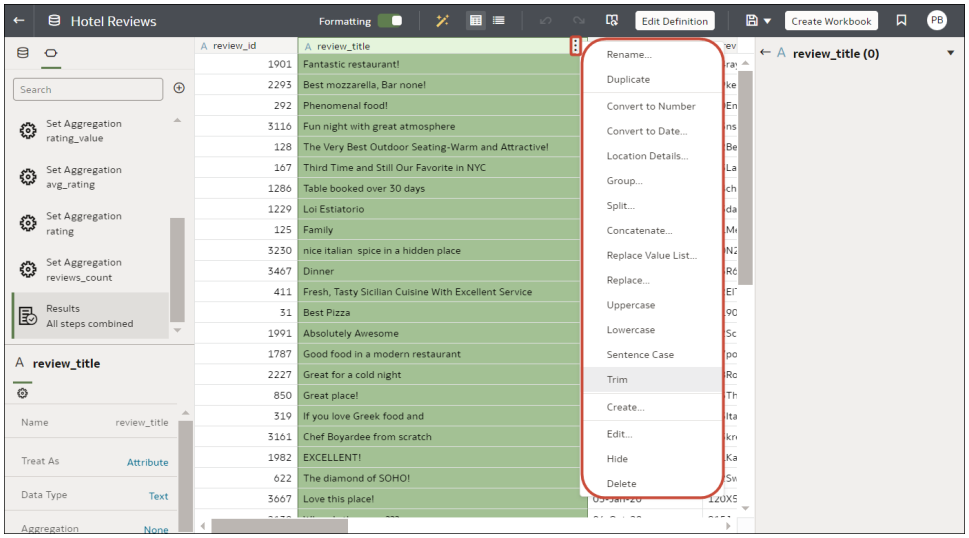
Options	Description
Bin	Create your custom groups for number ranges.
Convert to Number	Change the data type of the column to number and delete any values that aren't numbers.
Convert to Text	Change the data type of a column to text.
Delete	Select and remove a column from the dataset.
Duplicate	Create 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.
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.

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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.
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.

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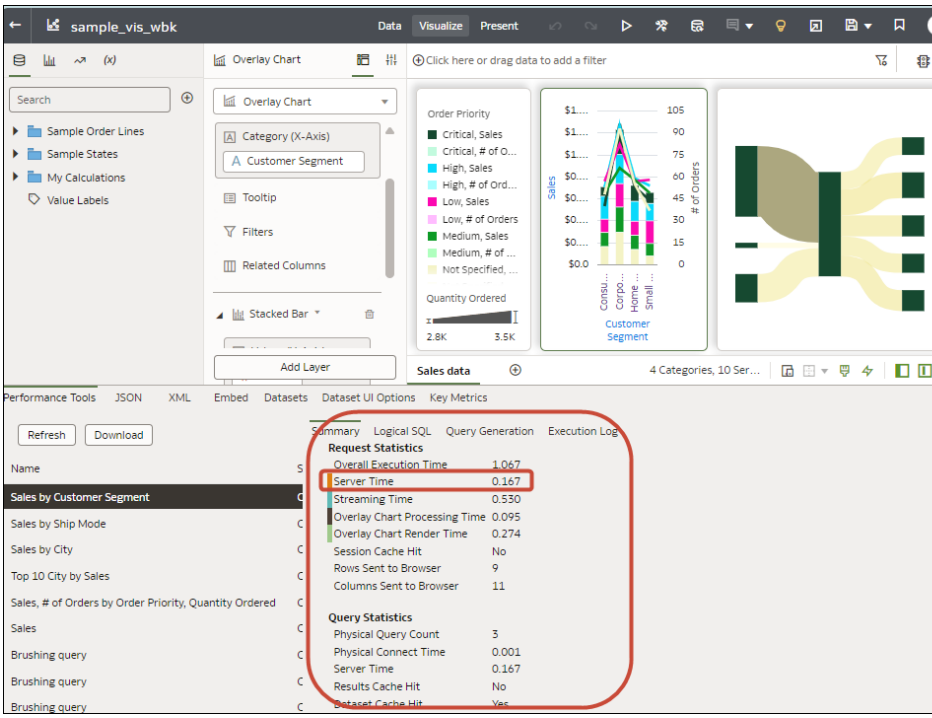
Option	Description
Log	Calculate the natural logarithm of an expression.
Lowercase	Update the contents of a column with the values all in lowercase letters.
Power	Raise the values of a column to the power that you specify. The default power is 2.
Rename	Change the name of a column.
Replace	Change specific text in the selected column to any value that you specify. For example, you can change all instances of *Mister* to *Mr.*.
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.

Developer Options

The Visualize canvas includes developer options that enable you to embed analytics content in other applications, and review performance statistics for visualization components. To use developer options, you need to be logged in with administrator or content author privileges.

To display Developer options, open a workbook, display the Visualize pane, and click **Menu** (⋮), then **Developer**.

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Tab	Description
Performance Tools	Review performance statistics such as query time, server time, and streaming time for visualization components in a workbook. Click **Refresh** to get the latest statistics. You can then use the following tabs to analyse performance: Summary, Logical SQL, Query Generation, Execution Log. **Tip**: When you're looking at metrics on the **Summary** tab, to see a more detailed definition of each metric, hover over a metric in the **Request Statistics** column or a legend on the adjacent chart. For example, hover over **Server Time** to find out more about how this statistic is calculated. 
Embed	Embed Oracle Analytics content in other applications. Use the **Copy** option to copy HTML code that you can paste into another application so that Oracle Analytics content is displayed.
JSON	Find out a column reference for embedded content that uses filters.
XML, Datasets, Prep Datasets, Prep UIOptions	Don't use these tabs. They're for internal diagnostics only.

Enable Developer Options

You enable developer options in Oracle Analytics Server to perform advanced tasks, such as accessing embedding links or analyzing workbook performance. You must have administrator or content author privileges to enable and use developer options.

Developer options aren't available if you log into Oracle Analytics Server with consumer privileges only. However, you can analyze the performance of a visualization canvas by appending a workbook URL in your browser with `&devtools=true`.

1. In the Home page, click the user icon, then click **Profile**.
2. On the Admin page, click **Advanced**, and click **Enable Developer Options**.

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3. Click **Save**, then **Close**.

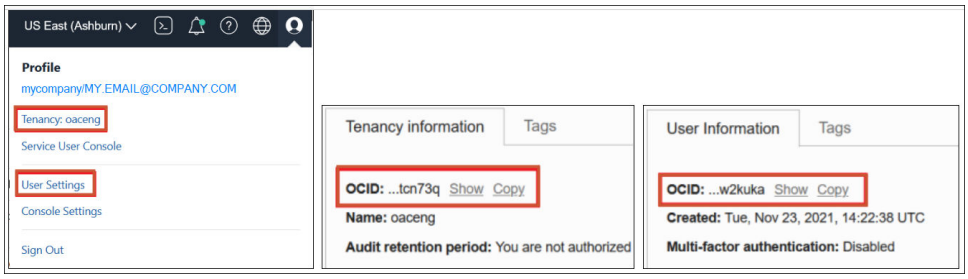
   If you have administrator or content author privileges, you can now display developer options below the Visualize pane in workbook designer (open a workbook, display the Visualize pane, and click **Menu** (⋮), then **Developer**).

Create a Connection to Your Oracle Cloud Infrastructure Tenancy

In Oracle Analytics, you create a connection to Oracle Cloud Infrastructure (OCI) so that you can integrate Oracle Analytics with OCI functions, OCI Vision, OCI Data Science, or OCI Language. For example, you might register a language conversion function hosted in OCI so that you can convert English text into Spanish or German using an Oracle Analytics data flow.

You connect to an OCI tenancy using an API key.

1. In OCI Console, navigate to the OCI tenancy profile, and copy the Region, Tenancy OCID, and User OCID.
   - For Region, review the geographical region displayed at the top of the profile.
   - For Tenancy OCID, click the **Tenancy** name, and copy the **OCID**.
   - For User OCID, click **User Settings**, and copy the **OCID**.



   See Where to Get the Tenancy's OCID and User's OCID.
2. In Oracle Analytics, on the Home page, click **Create**, then click **Connection**.
3. At the Select Connection Type dialog, click **OCI Resource**.
4. For **Connection Name**, specify a user-friendly name to identify this connection in Oracle Analytics.
5. To connect using an API key:
   - For **Connect Using**, select **API Key**.
   - For **Tenancy OCID**, paste in the tenancy OCID that you copied in step 1.
   - For **Default Region**, select the region in which your OCI tenancy is located.
   - For **User OCID**, paste in the user OCID that you copied in step 1.
   - For **Public API Key**, click **Generate**, then click **Copy**.
   - In your OCI tenancy, paste the API key into the API Keys page under User Settings and click **Add**.
6. To connect using a resource principal:
   - For **Connect Using**, select **Resource Principal**.
   - For **Default Region**, select the region in which your OCI resource is located.

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- For **Compartment**, click **Select** and select the OCI compartment that you're connecting to.
- For **Services**, select the OCI services that the connection will be used for. To select services, you must be logged into Oracle Analytics as a user with BI Service Administrator privileges.

7. In Oracle Analytics, in the Create Connection dialog, click **Save**.

   If you're connecting using an API key, wait a few seconds before saving the connection to avoid this error: `"Failed to save the connection. Invalid connection parameters specified"`.

Integrate Oracle Analytics with Oracle Cloud Infrastructure Functions

Integrate Oracle Analytics with Oracle Cloud Infrastructure (OCI) functions so that you can use them in data flows to transform data.

- About Using OCI Functions in Oracle Analytics
- About Configuring OCI Functions to Use in Oracle Analytics
- Policies Required to Integrate OCI Functions with Oracle Analytics
- Typical Workflow for Transforming Data Using OCI Functions
- Create a Connection to Your Oracle Cloud Infrastructure Tenancy
- Register OCI Functions in Oracle Analytics

About Using OCI Functions in Oracle Analytics

You can transform data in Oracle Analytics using functions created in OCI. For example, you might use a language conversion function to convert English text into Spanish or German.

You register OCI functions in Oracle Analytics first, and then any Oracle Analytics user with BI Service Administrator or DV Content Author privileges can use them in data flows.

About Configuring OCI Functions to Use in Oracle Analytics

Create functions in OCI Console so that you can use them to transform data in Oracle Analytics data flows.

About Registering OCI Functions in Oracle Analytics

When you register an OCI function in Oracle Analytics, if it's grayed out in the Select a Function dialog, check that it's configured with the `oac-compatible` tag and invoked with the correct `funcMode` value.

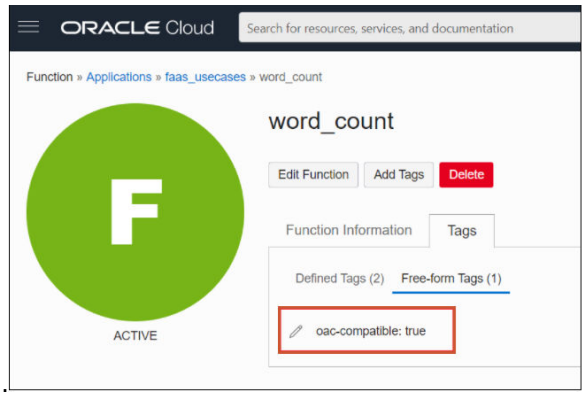
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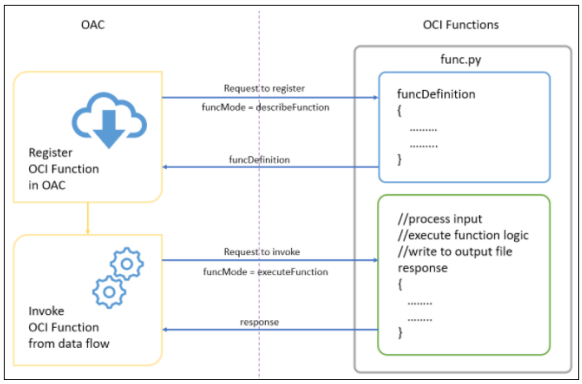
About Configuring OCI Functions to use in Oracle Analytics

OCI functions that you want to use in Oracle Analytics must have an `oac-compatible` tag and the function code must include the `funcMode` variable. Configure these settings in OCI Console:

- **oac-compatible** - Add a free form tag to the function with the name `oac-compatible` and set the value to `true`.



- **funcMode** - Include the `funcMode` variable in your function code. `Oracle Analytics` sends a request to register an OCI function with `funcMode=describeFunction` and a request to invoke an OCI function with `funcMode=executeFunction`. The handler function in func.py should operate in describeFunction mode or executeFunction mode. This can be done based on the value of the input variable `funcMode` from the request as shown below.



Here's the request and response format of OCI Functions for Word Count example in python.

funcMode = describeFunction

```
{ "funcMode": "describeFunction"}
```


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When funcMode in the request is 'describeFunction', the function should return the function definition with status (returnCode & errorMessage), outputs(name, dataType of output column), parameters (name, description, type and so on of the input parameter), bucketName and so on as a JSON object in the following format (example of word count):

```
funcDefinition = {
    "status": {
        "returnCode": 0,
        "errorMessage": ""
    },
    "funcDescription": {
        "outputs": [
            {"name": "word_count", "dataType": "integer"}
        ],
        "parameters": [
            {"name": "textColumn", "displayName": "Text Column",
             "description": "Choose column to count words", "required":
True,
             "value": {"type": "column"}}
        ],
        "bucketName": "bucket-OCI-FAAS",
        "isOutputJoinableWithInput": True
    }
}
```

Add the following code in func.py to return funcDefinition when funcMode in the request is 'describeFunction'.

```
def handler(ctx, data: io.BytesIO = None):
    response_data = ""
    try:
        body = json.loads(data.getvalue())
        funcMode = body.get("funcMode")
        if funcMode == 'describeFunction':
           response_data = json.dumps(funcDefinition)
    except (Exception, ValueError) as ex:
        response_data = json.dumps(
            {"error": "{0}".format(str(ex))})
    return response.Response(
        ctx, response_data,
        headers={"Content-Type": "application/json"}
    )
```

funcMode = executeFunction - When funcMode is 'executeFunction', the actual function logic should be executed and the response should be sent back to Oracle Analytics with the output. When the registered function is invoked from dataflow in Oracle Analytics, the request object will be in the following format with the column name in args, input(bucketName, fileName, fileExtension, fileName, method & rowID) and output(bucketName, fileName & fileExtension).

```
{
    "args":
    {
        "textColumn": "REVIEW"
    },
```


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```
    "funcMode": "executeFunction",
    "input":
    {
        "bucketName": "bucket-OCI-FAAS",
        "fileExtension": ".csv",
        "fileName": "oac-fn-e99cd4fddb3844be89c7af6ea4bbeb76-input",
        "method": "csv",
        "rowID": "row_id"
    },
    "output":
    {
        "bucketName": "bucket-OCI-FAAS",
        "fileExtension": ".csv",
        "fileName": "oac-fn-e99cd4fddb3844be89c7af6ea4bbeb76-output"
    }
}
```

About Creating Functions in OCI

You can create functions using the OCI Console, command line (Fn Project CLI), or API. For example, in OCI Console, click **Developer Services**, then **Functions** and follow the on-screen instructions to create applications and one or more functions. For details, see Creating Functions in OCI Documentation. If you're creating functions for the first time, follow the steps in the end to end example Creating, Deploying, and Invoking a Helloworld Function. Any functions that you want to use in Oracle Analytics must include the free form tag `oac-compatible=true` (see *About Configuring OCI Functions to use in Oracle Analytics* above).

Tips on Creating Functions in OCI Console

- **Enable Logs** - By default, logs are disabled for functions. To enable logs for functions, on the **Applications** page, click **Logs**, and enable the log provided for the **Log Name**. Under **Resources**, you can now select **Explore Log**, and drill into log entries to debug and diagnose function issues.
- **Include Dependencies** - Include dependent packages in the requirements.txt file for the function.
- **Follow Indentation Rules**- Follow the Python indentation rules while coding Python functions.
- **Use Function Response Errors** - Use the error details listed on the Dataflow page to diagnose issues.
- **Test Functions Locally First** - Before creating a function in OCI, test the function locally in your development environment to ensure that the function is syntactically and logically correct.
- **Test functions in OCI** - Before integrating functions with Oracle Analytics, make sure that you can deploy and invoke them successfully as standalone functions in OCI.
- **Increase the Timeout**- By default, functions have a timeout of 30 seconds. If necessary, increase the timeout setting (for example, change it to 300 seconds) in the Edit Function page in OCI Console.
- **Increase the Memory**- By default, functions have a memory limit of 1024 MB. If necessary, increase the memory limit in the Edit Function page in OCI Console.
- **Optimize Space** - Delete unused files immediately after use.
- **Beware of Network Latency** - Bear in mind that network latency might cause a slight delay in overall processing.

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Policies Required to Integrate OCI Functions with Oracle Analytics

To integrate Oracle Analytics with OCI functions, make sure that you have the required security policies.

The OCI user that you specify in the connection between Oracle Analytics Cloud and your OCI tenancy must have read, write, and delete permissions on the compartment containing the OCI resources you want to use. Ensure that the OCI user belongs to a user group with the following minimum OCI security policies. When you connect to an OCI tenancy from Oracle Analytics, you can use either an OCI API key or resource principal.

> **Note**
>
> For resource principal, to include all Analytics instances under a compartment, specify: `{request.principal.type='analyticsinstance', request.principal.compartment.id='<compartmentA_ocid>'}` instead of `{request.principal.id='<analytics_instance_ocid>'}`.

API Key Policies	Resource Principal Policies
`Allow group <group_name> to use functions-family in compartment <compartment_name>`	`Allow any-user to use functions-family in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`
`Allow group <group_name> to read buckets in compartment <compartment_name>`	`Allow any-user to read buckets in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`
`Allow group <group_name> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	`Allow any-user to manage objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<staging_bucket_name>'}`
`Allow group <group_name> to read objectstorage-namespaces in tenancy`	`Allow any-user to read objectstorage-namespaces in tenancy where all {request.principal.id='<analytics_instance_ocid>'}`

Dynamic Group Policy	Description
`Allow dynamic-group <dynamic_group> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	Provides access to staging bucket for the dynamic group.

Example matching rule: `<dynamic_group>.{resource.type = 'fnfunc', resource.compartment.id = '<compartment_ocid>'}`, where `<compartment_ocid>` is the Oracle Cloud ID of the compartment that contains the functions.

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Typical Workflow for Transforming Data Using OCI Functions

Follow these high-level tasks in the order listed below to transform data in Oracle Analytics using OCI functions.

Task	Description	More Information
Create functions in OCI (requires functions developer privileges)	In your OCI tenancy, create your functions, and make sure that they comply with the prerequisites specified for use with Oracle Analytics.	About Configuring OCI Functions to Use in Oracle Analytics
Assign OCI policies	Make sure that you have the required OCI policies for connecting using API key or resource principal.	Policies Required to Integrate OCI Functions with Oracle Analytics
Connect Oracle Analytics to your OCI tenancy (requires admin or DV author privileges)	In Oracle Analytics, create a connection to your OCI tenancy.	Create a Connection to Your Oracle Cloud Infrastructure Tenancy
Register OCI functions in Oracle Analytics (requires admin or DV author privileges)	In Oracle Analytics, register your OCI functions so that you can call them from data flows.	Register OCI Functions in Oracle Analytics
Transform your data using the OCI functions (requires admin or DV author privileges)	Create a data flow, and use the **Apply Custom Script** step to invoke an OCI function.	Transform Data Using OCI Functions

Register OCI Functions in Oracle Analytics

Register OCI functions in Oracle Analytics so that you can use them in data flows to transform data. For example, you might register a language conversion function so that data analysts can convert English text into Spanish or German.

1. In Oracle Analytics, on the home page, click **Page Menu**, then **Register Model/Function**, then **OCI Functions**.
2. At the Register a Custom Function dialog, select a connection to the OCI tenancy where your functions are located.
3. At the Select Application dialog, select the application that contains your OCI functions.

   If you're not sure, ask the person who created the functions in OCI.
4. At the Select a Function dialog, select a function, then click **Register**.

   If the function you want to use is grayed out, ask the administrator to make sure that it's configured for Oracle Analytics. See About Configuring OCI Functions to Use in Oracle Analytics.

You can use registered OCI functions in data flows to transform data. To verify which functions are registered, you can view registered functions on the Scripts tab of the Machine Learning page (from the Home page, click **Navigator**, then **Machine Learning**, then **Scripts**).

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Integrate Oracle Analytics with Oracle Cloud Infrastructure Data Science

Integrate Oracle Analytics with Oracle Cloud Infrastructure (OCI) Data Science to perform machine learning and artificial intelligence without needing data scientist expertise. For example, with healthcare data, you might use a predictive model to identify risk factors and predict the risk of patient readmission after discharge.

Topics:

- Prerequisites for Integrating OCI Data Science Models With Oracle Analytics
- Policies Required to Integrate OCI Data Science with Oracle Analytics
- Prerequisites for Integrating OCI Data Science Models With Oracle Analytics

Prerequisites for Integrating OCI Data Science Models With Oracle Analytics

You need these prerequisites to integrate OCI Data Science with Oracle Analytics.

- **Create a connection between your Oracle Analytics instance and your OCI service** - See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.
- **In OCI, save the machine learning models in the OCI Data Science Model Catalog.** These models should be created and saved using Oracle Accelerated Data Science Software Development Kit 2.6.1 or higher to be compatible with Oracle Analytics.

Policies Required to Integrate OCI Data Science with Oracle Analytics

To integrate Oracle Analytics with OCI Data Science, make sure that you have the required security policies.

The OCI user that you specify in the connection between Oracle Analytics Cloud and your OCI tenancy must have read, write, and delete permissions on the compartment containing the OCI resources you want to use. Ensure that the OCI user belongs to a user group with the following minimum OCI security policies. When you connect to an OCI tenancy from Oracle Analytics, you can use either an OCI API key or resource principal.

> **Note**
>
> Oracle Cloud IDs (OCIDs) are resource identifiers used in OCI.

> **Note**
>
> For resource principal, to include all Analytics instances under a compartment, specify `{request.principal.type='analyticsinstance', request.principal.compartment.id='<compartmentA_ocid>'}` instead of `{request.principal.id='<analytics_instance_ocid>'}`.

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API Key Policies	Resource Principal Policies
Allow group <group_name> to read data-science-projects in compartment <compartment_name>	Allow any-user to read data-science-projects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to read data-science-models in compartment <compartment_name>	Allow any-user to read data-science-models in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to manage data-science-jobs in compartment <compartment_name>	Allow any-user to manage data-science-jobs in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to inspect instance-family in compartment <compartment_name>	Allow any-user to inspect instance-family in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to manage data-science-job-runs in compartment <compartment_name>	Allow any-user to manage data-science-job-runs in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to inspect virtual-network-family in compartment <compartment_name>	Allow any-user to inspect virtual-network-family in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow service datascience to use virtual-network-family in compartment <compartment_name>	Allow service datascience to use virtual-network-family in compartment <compartment_name>
Allow group <group_name> to manage log-groups in compartment <compartment_name>	Allow any-user to manage log-groups in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to read buckets in compartment <compartment_name>	Allow any-user to read buckets in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}
Allow group <group_name> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'	Allow any-user to manage objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<staging_bucket_name>'}

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API Key Policies	Resource Principal Policies
`Allow group <group_name> to read objectstorage-namespaces in compartment <compartment_name>`	`Allow any-user to read objectstorage-namespaces in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`

Dynamic Group Policy	Description
`Allow dynamic-group <dynamic_group> to read data-science-models in compartment <compartment_name>`	Provides Data Science model access to the Data Science job run.
`Allow dynamic-group <dynamic_group> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	Provides Object Storage access to the Data Science job run.
`Allow dynamic-group <dynamic_group> to use log-content in compartment <compartment_name>`	Provides Log access to the Data Science job run.

> **Note**
>
> When you specify `<dynamic_group>`, use a matching rule with this format: `all { resource.type='datasciencejobrun', resource.compartment.id='<compartment_ocid>' }`, where `<compartment_ocid>` is the Oracle Cloud ID of the compartment that contains the Data Science models.

Make an OCI Data Science Model Available in Oracle Analytics

Before you can use Oracle Cloud Infrastructure (OCI) Data Science models to analyze data, you register them in Oracle Analytics.

Register OCI Data Science Models in Oracle Analytics to build machine learning (ML) into your applications without requiring ML expertise.

Before you start, create a connection between your Oracle Analytics instance and your OCI service. See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

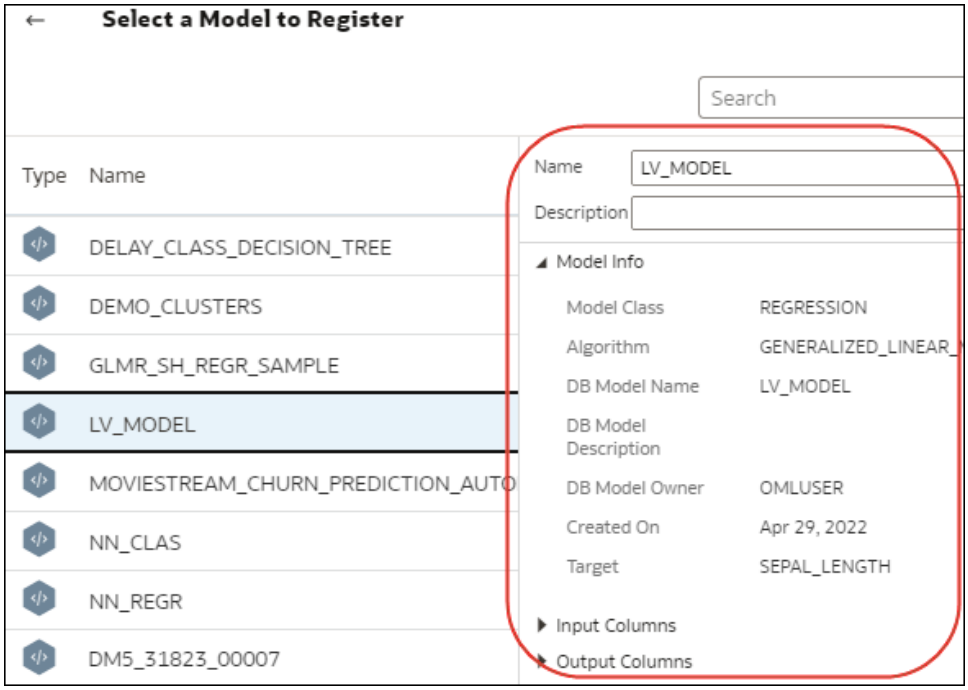
In addition, make sure that you log into Oracle Analytics as a user with the BI Service Administrator or DV Content Author role.

1. On the Home page, click **Page Menu**, then **Register Model/Function**, then **Machine Learning Models**.

   This option is available for users with the BI Service Administrator or DV Content Author role.
2. On the Register an ML Model dialog, select the connection to your OCI tenancy.
3. In Select a Project page, click **Select.**
4. In Search Compartment, navigate to your stored model, and then click the model name.

   When you select a model, you can review the details in the right-hand panel, for example, name, description, algorithm, and input and output columns.

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5. Click **Next** to display the Enter Resource Parameters dialog, and configure the model:

   - **Staging Bucket Compartment** - Staging bucket's compartment name. Click **Select** to navigate to and select the compartment of the staging bucket.

     Staging Bucket - Staging bucket name is required for data transfer.

     Compute Shape - Compute shape is the virtual machine configuration, which is required for Data Science job creation.

     OCPUs - Required only if the compute shape is a Flex shape.

     Memory (GB) - Required only if the compute shape is a Flex shape.

     Storage (GB) - Size of block storage required for the Data Science job.

     Use default networking - Option to configure the network configuration. If you're not sure whether to use default networking, ask your Oracle Analytics administrator.

     – Select this option to use default networking, which provides default egress to the public internet. With a default network option, you can skip creating a network and setting up subnets and gateways. If you use the default network configuration, you can’t access or modify the provided default network for other purposes.

     – Deselect this option to configure subnets and Network Address Translation (NAT) gateways. For egress access to the public internet, OCI recommends a private subnet with a route to a NAT Gateway. A NAT gateway gives instances in a private subnet access to the internet. The Virtual Cloud Network (VCN) that is created in this step creates a private subnet with egress access to the internet through the VCN's NAT Gateway.

     VCN Compartment - Name of the compartment containing the VCN you want to use. Required only when **Use default networking** is deselected.

     VCN - The name of an existing VCN. Required only when **Use default networking** is deselected.

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Subnet Compartment - Name of the compartment containing the subnet you want to use. Required only when **Use default networking** is deselected.

Subnet - Name of an existing subnet. Required only when **Use default networking** is deselected.

Enable Logging - Option to enable logging in OCI Data Science.

Log Group Compartment - Name of the compartment containing the log group in which Data Science logs are stored. Required only when logging is enabled.

Log Group - Name of an existing log group in which to store logs. Required only when logging is enabled.

6. Click **Register**.
7. Optional: To confirm that the model was registered successfully, from the Home page, click **Navigator**, click **Models**, then click **Machine Learning** to display registered models and confirm that the model was registered successfully. Click **Inspect** to check that you've configured the model correctly.

Integrate Oracle Analytics with Oracle Cloud Infrastructure Document Understanding

Integrate Oracle Analytics with Oracle Cloud Infrastructure (OCI) Document Understanding to perform document classification and key value extraction without needing machine learning or artificial intelligence expertise. For example, you might want to identify passport numbers in documents.

Topics:

- Typical Workflow to Integrate Oracle Analytics with OCI Document Understanding
- Policies Required to Integrate OCI Document Understanding with Oracle Analytics
- Make a OCI Document Understanding Model Available in Oracle Analytics

Typical Workflow to Integrate Oracle Analytics with OCI Document Understanding

Perform these tasks to integrate Oracle Analytics with OCI Document Understanding.

When you've completed this integration, analysts can then use data flows to perform document classification and key value extraction. See Perform Document Classification and Key Value Extraction.

Task	Description	More Information
Review prerequisites	Make sure that the user connecting from Oracle Analytics to the OCI tenancy has the required security policies.	Policies Required to Integrate OCI Document Understanding with Oracle Analytics
Connect to OCI Document Understanding	Create a reusable connection to our OCI Tenancy.	Create a Connection to Your Oracle Cloud Infrastructure Tenancy
Make a model available in Oracle Analytics	Register an OCI Document Understanding model in Oracle Analytics to make it available to data flows.	Make a OCI Document Understanding Model Available in Oracle Analytics

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Policies Required to Integrate OCI Document Understanding with Oracle Analytics

To integrate Oracle Analytics with OCI Document Understanding, make sure that you have the required security policies.

The OCI user that you specify in the connection between Oracle Analytics Cloud and your OCI tenancy must have read, write, and delete permissions on the compartment containing the OCI resources you want to use. Ensure that the OCI user belongs to a user group with the following minimum OCI security policies. When you connect to an OCI tenancy from Oracle Analytics, you can use either an OCI API key or resource principal.

> **Note**
>
> Oracle Cloud IDs (OCIDs) are resource identifiers used in OCI.

> **Note**
>
> For resource principal, to include all Analytics instances under a compartment, specify `{request.principal.type='analyticsinstance', request.principal.compartment.id='<compartmentA_ocid>'}` instead of `{request.principal.id='<analytics_instance_ocid>'}`.

API Key Policies	Resource Principal Policies
`Allow group <group_name> to manage ai-service-document-family in tenancy`	`Allow any-user to manage ai-service-document-family in tenancy where all {request.principal.id='<analytics_instance_ocid>'}`
`Allow group <group_name> to read buckets in compartment <compartment_name>`	`Allow any-user to read buckets in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`
`Allow group <group_name> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	`Allow any-user to manage objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<staging_bucket_name>'}`
`Allow group <group_name> to read objects in compartment <compartment_name> where target.bucket.name='<document_bucket_name>'`	`Allow any-user to read objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<document_bucket_name>'}`

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API Key Policies	Resource Principal Policies
`Allow group <group_name> to read objectstorage-namespaces in tenancy`	`Allow any-user to read objectstorage-namespaces in tenancy where all {request.principal.id='<analytics_instance_ocid>'}`

Make a OCI Document Understanding Model Available in Oracle Analytics

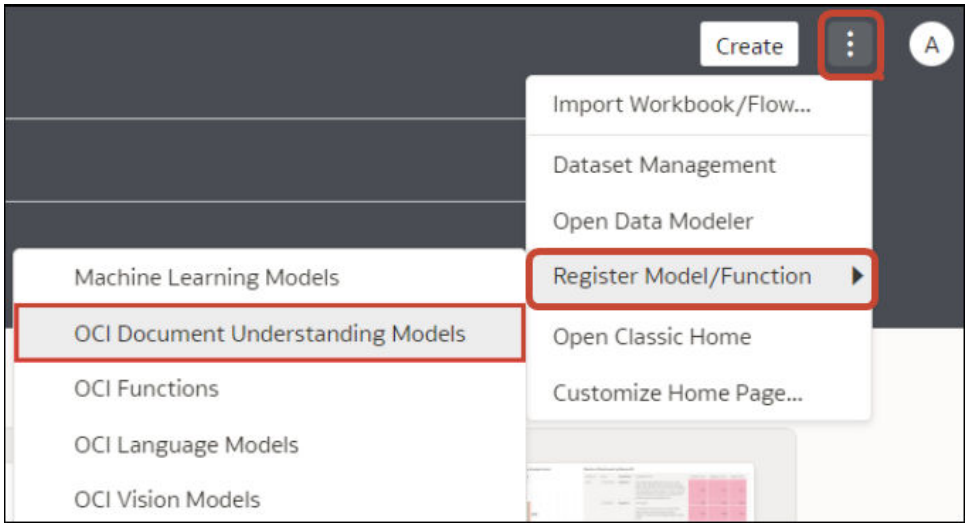
Make an OCI Document Understanding model available in Oracle Analytics so that you can perform document classification and key value extraction using data flows.

1. In OCI Object Storage, create a bucket in a compartment using a suitable name (for example, `MyDocumentsModelStagingBucket`).

   This staging bucket:

   - Must be created in the accessible compartment.
   - Must be created before registering a model.
   - Can have private visibility.
   - Can be used for multiple models.
   - Can be changed in the Inspect screen.

2. In the Oracle Analytics home page, click **Page Menu** ⋮, select **Register Model/Function**, and then select **OCI Document Understanding Models**.



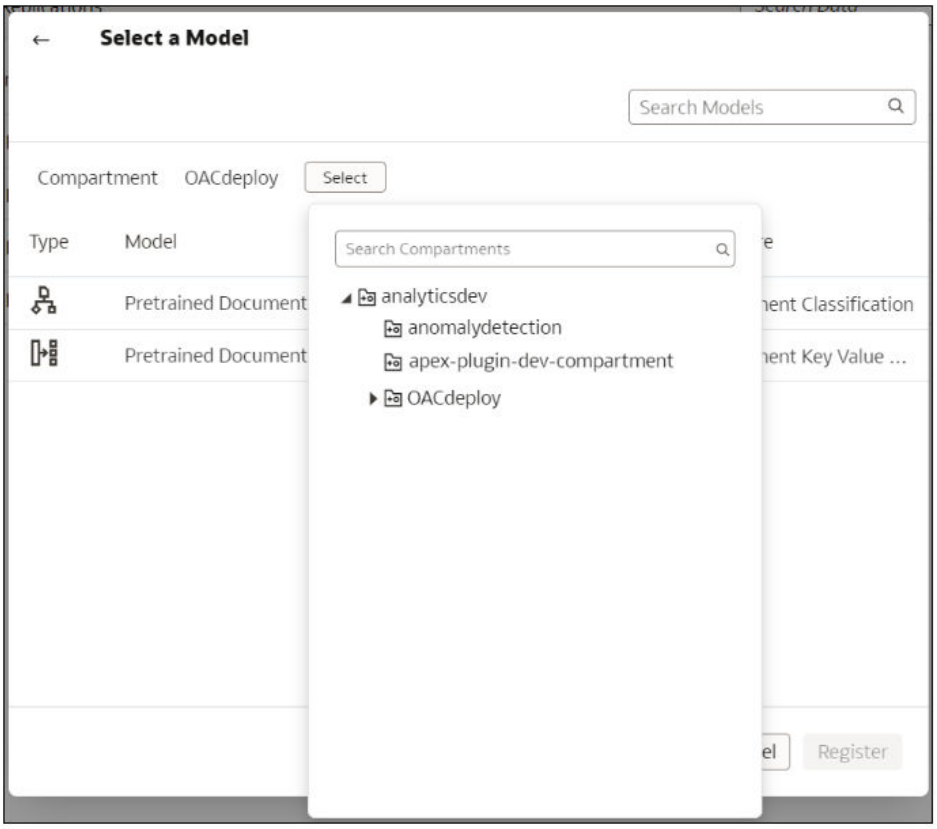
3. At the Register a Model dialog, under **From a Connection** click the connection that you created in Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

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Oracle Analytics displays a list of available models in the default compartment.

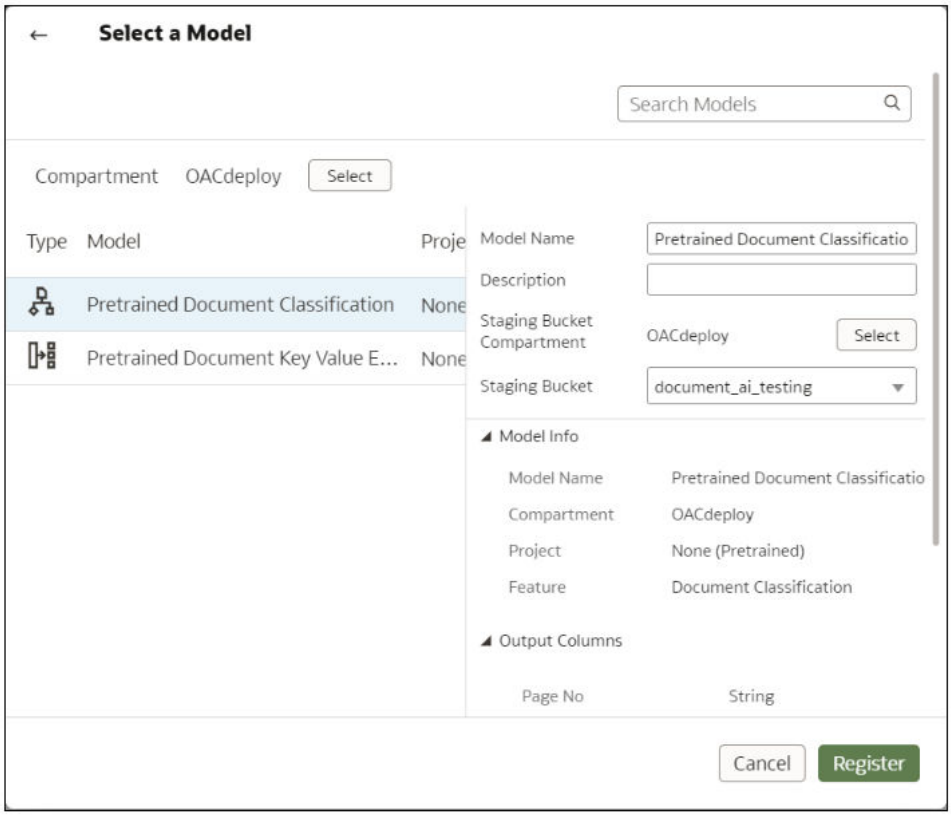
To register models in a different compartment, click **Select** adjacent to the compartment name, and select a different compartment.



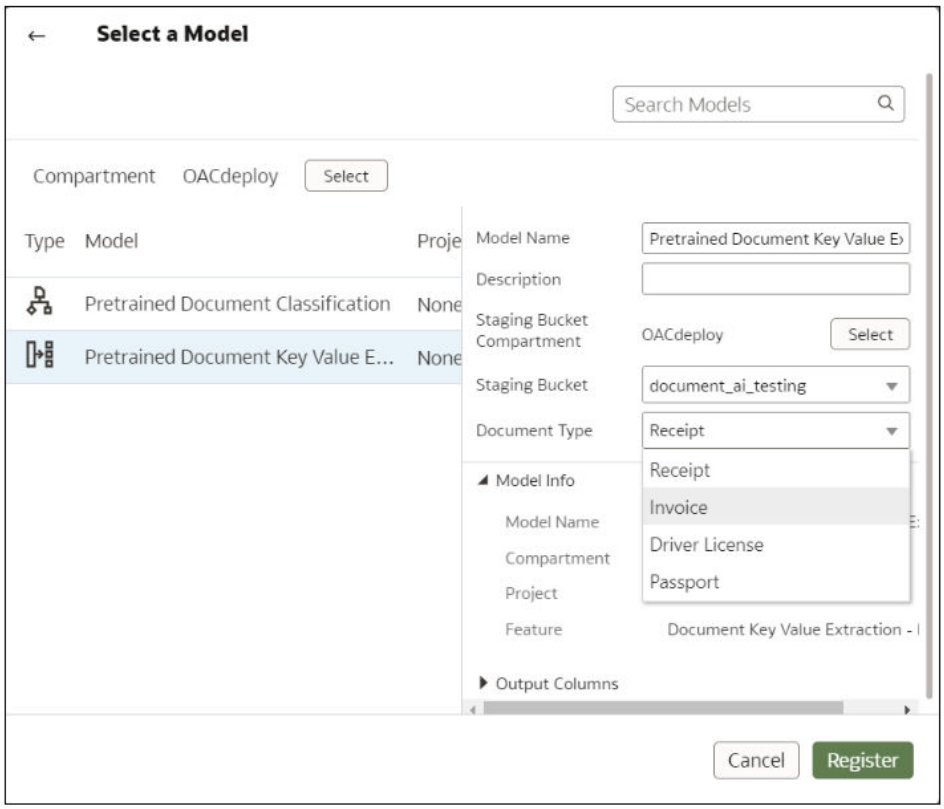
4. Select the model you want to use.

   Select a document classification model to identify documents.

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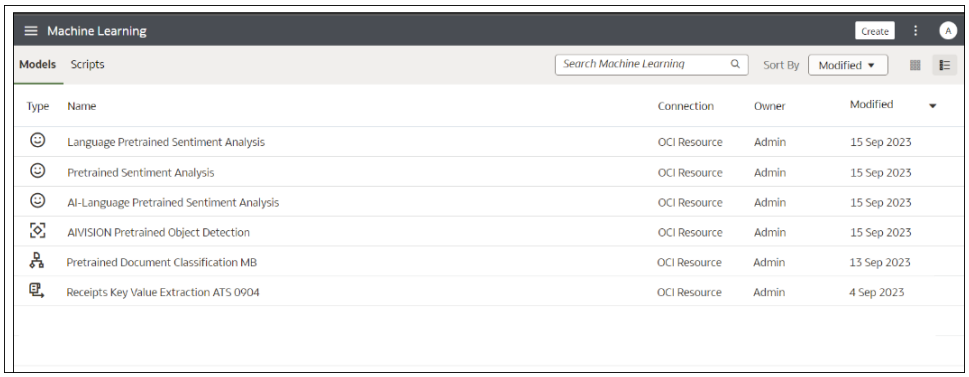
Select a key value extraction model to extract information from documents, then select **Receipt**, **Invoice**, **Driver License**, or **Passport** from the **Document Type** list.



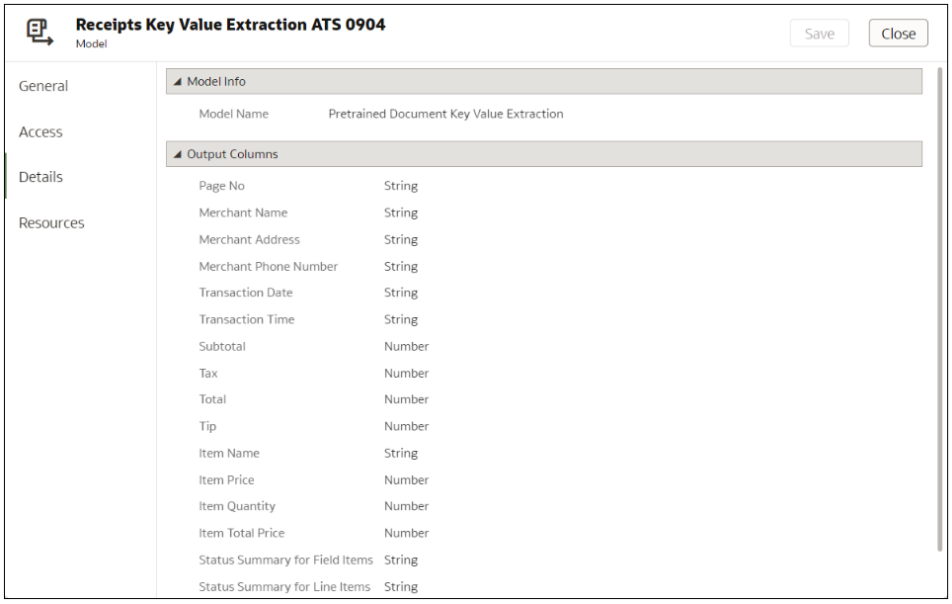
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5. In **Model Name**, specify a name to identify the model in Oracle Analytics.
6. In **Staging Bucket Compartment**, select the location of your staging bucket.
7. In **Staging Bucket Name**, select the bucket that you specified in Step 1 (for example, `MyDocumentsModelStagingBucket`).
8. Click **Register**.

To review the registered model, from the Oracle Analytics home page, navigate to **Machine Learning**, then **Models**.



Hover over a model, click ⋮, then click **Inspect** to review the model. For example, click **Details** to review the ouput columns that are generated for that type of model.



Integrate Oracle Analytics with Oracle Cloud Infrastructure Language

Integrate Oracle Analytics with Oracle Cloud Infrastructure (OCI) Language to perform machine learning and artificial intelligence without needing data scientist expertise. For

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example, with customer data, you might perform sentiment analysis to analyze reviews that customers have typed into a feedback portal.

Topics:

- Prerequisites for Integrating OCI Language Models With Oracle Analytics
- Policies Required to Integrate OCI Language with Oracle Analytics
- Make an OCI Language Model Available in Oracle Analytics

Prerequisites for Integrating OCI Language Models With Oracle Analytics

You need these prerequisites to integrate OCI Language with Oracle Analytics.

- **Create a connection between your Oracle Analytics instance and your OCI service** - See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

Policies Required to Integrate OCI Language with Oracle Analytics

To integrate Oracle Analytics with OCI Language, make sure that you have the required security policies.

The OCI user that you specify in the connection between Oracle Analytics Cloud and your OCI tenancy must have read, write, and delete permissions on the compartment containing the OCI resources you want to use. Ensure that the OCI user belongs to a user group with the following minimum OCI security policies. When you connect to an OCI tenancy from Oracle Analytics, you can use either an OCI API key or resource principal.

> **Note**
>
> Oracle Cloud IDs (OCIDs) are resource identifiers used in OCI.

> **Note**
>
> For resource principal, to include all Analytics instances under a compartment, specify: `{request.principal.type='analyticsinstance', request.principal.compartment.id='<compartmentA_ocid>'}` instead of `{request.principal.id='<analytics_instance_ocid>'}`, which will include all Analytics instances under compartmentA.

Policies Required to Integrate OCI Language with Oracle Analytics

Number	API Key Policy	Resource Principal Policy	Purpose
1	`allow group <group_name> to use ai-service-language-family in compartment <compartment_name>`	`allow any-user to use ai-service-language-family in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`	Provides access to OCI Language service.

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Number	API Key Policy	Resource Principal Policy	Purpose
2	`allow group <group_name> to manage ai-service-language-job in compartment <compartment_name>`	`allow any-user to manage ai-service-language-job in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`	Provides manage access to JOBS Language sub resource for Async processing.
3	`allow group <group_name> to read buckets in compartment <compartment_name>`	`allow any-user to read buckets in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`	Provides access to the bucket details.
4	`allow group <group_name> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	`allow any-user to manage objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<staging_bucket_name>'}`	Provides read, write and delete access to objects in the staging bucket.
5	`allow group <group_name> to read objectstorage-namespaces in compartment <compartment_name>`	`allow any-user to read objectstorage-namespaces in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`	Provides access to object storage namespace. Used for validation purposes.

OCI Language - Dynamic Group policies (For Async processing)

Policy	Purpose
`allow dynamic-group <dynamic_group> to manage objects in compartment <compartment_name>`	Provides access to objects sub-resource in a specific compartment.

Make an OCI Language Model Available in Oracle Analytics

Before you can use Oracle Cloud Infrastructure (OCI) Language models to analyze data, you register them in Oracle Analytics.

Register OCI Language Models in Oracle Analytics to build key phrase extraction, sentiment analysis, classification, named entity recognition, and language recognition into your applications without requiring artificial intelligence (AI) expertise.

Oracle Analytics supports these models:

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- Custom Named Entity Recognition (uses asynchronous APIs)
- Custom Text Classification (uses asynchronous APIs)
- Key Phrase Extraction
- Language Detection
- Named Entity Recognition
- Personal Identifiable Information
- Sentiment Analysis
- Text Classification

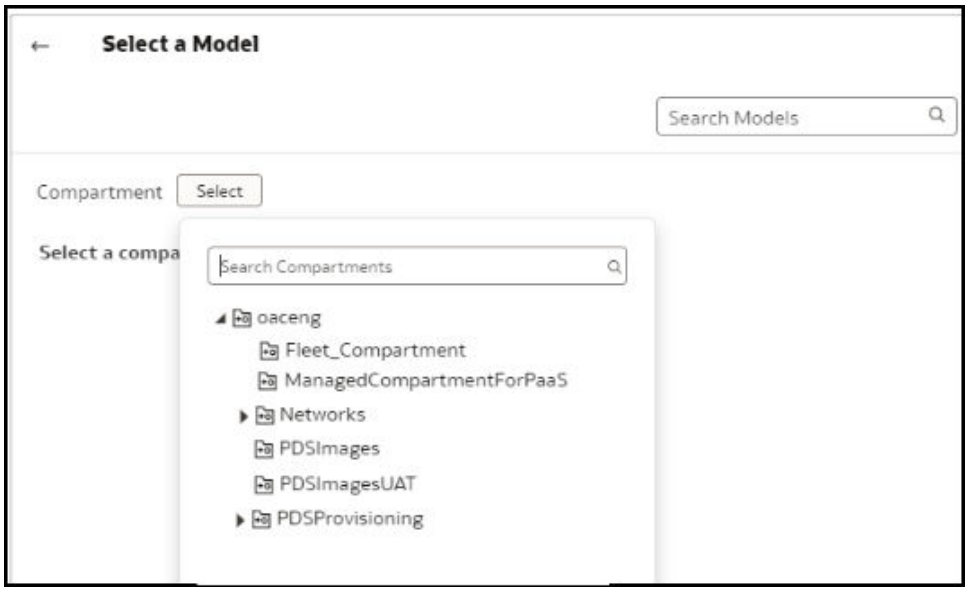
Note: While Language Detection supports 100+ languages, Key Phrase Extraction, Named Entity Recognition, and Sentiment Analysis support English and Spanish only. See OCI Language Pre-trained models.

Note: Oracle Analytics
Oracle Analytics supports custom models for Named Entity Recognition and Text Classification, but not for the other OCI Language models.

Before you start, create a connection between your Oracle Analytics instance and your OCI service. See Create a Connection to Your Oracle Cloud Infrastructure Tenancy.

In addition, make sure that you log into Oracle Analytics as a user with the BI Service Administrator or DV Content Author role.

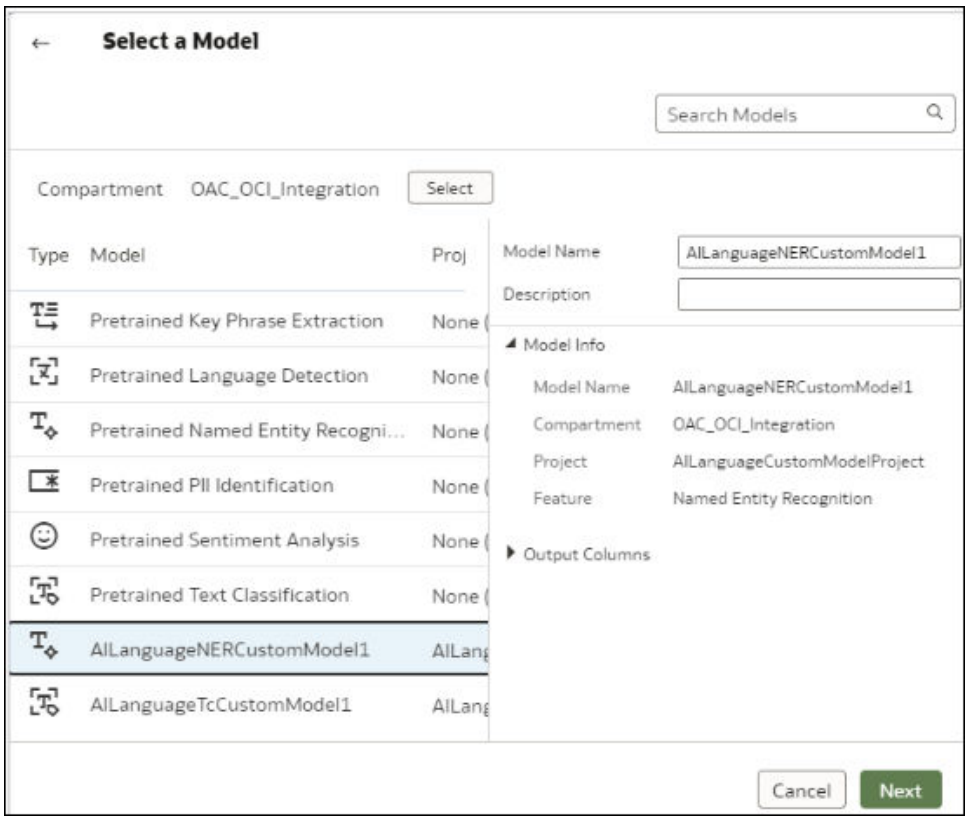
1. On the Home page, click **Page Menu**, then **Register Model/Function**, then **OCI Language Models**.
2. On the Register a Language Model dialog, click the name of a connection to your OCI tenancy.
3. On the Select a Model dialog, navigate to the compartment where your AI language model resides.



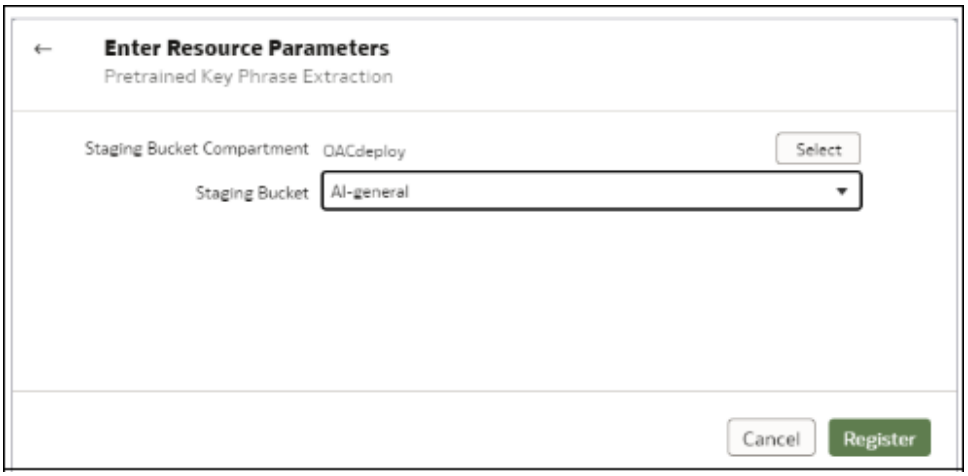
If you're registering a custom AI language model, you need to provide both a staging bucket and a dedicated end-point.

4. Select the model that you'd like to make available in Oracle Analytics.

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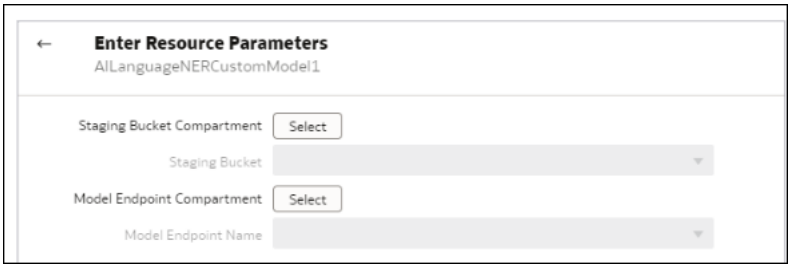


- If you're registering a pretrained model, select the staging bucket compartment for the model.



- If you're registering a custom model, select the staging bucket and model endpoint for the model.

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5. Click **Register**.
6. Optional: To confirm that the model was registered successfully, from the Home page, click **Navigator**, click **Models**, then click **Machine Learning** to display registered models and confirm that the model was registered successfully. Click **Inspect** to check that you've configured the model correctly.

Integrate Oracle Analytics with Oracle Cloud Infrastructure Vision

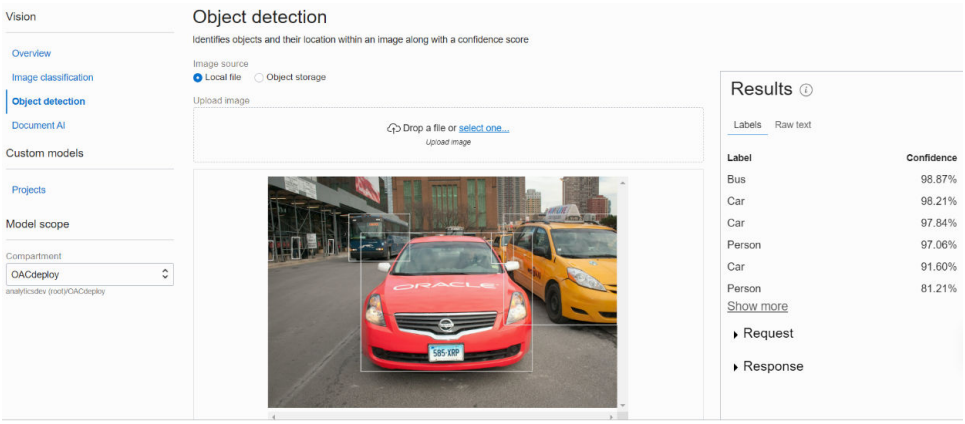
Integrate Oracle Analytics with Oracle Cloud Infrastructure (OCI) Vision to perform object detection, image classification, and text detection without needing machine learning or artificial intelligence expertise. For example, you might want to identify cars in photographs.

Topics:

- Overview to Integrating Oracle Analytics with Vision
- Policies Required to Integrate OCI Vision with Oracle Analytics
- Typical Workflow to Integrate Oracle Analytics with Vision
- Create a Connection to Your Oracle Cloud Infrastructure Tenancy
- Prepare Images for Analysis With an Vision Model
- Make a Vision Model Available in Oracle Analytics

Overview to Integrating Oracle Analytics with Vision

Vision is one of several artificial intelligence (AI) services provided by Oracle Cloud Infrastructure. It gives you the power to apply machine learning and artificial intelligence without needing data science expertise.



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Integrating Oracle Analytics Cloud with Vision enables object detection, image classification, and text detection from within Oracle Analytics Cloud. You perform this AI analysis by invoking the Vision service from a data flow in Oracle Analytics Cloud.

Vision includes pre-trained models and custom-trained models.

Pre-trained models

Pre-trained models allow users to perform image analysis tasks on generic datasets.

- **Face Detection** - Identify the existence of faces in images. For example, you might want to hide the identity of people in images by adding a blur to the image using face location information returned by this model.
- **Image Classification** - Use a fixed category set to assign labels to images.
- **Object Detection** - Finds instance of real-world objects or specific patterns in images or videos, for example, cats, dogs, bicycles, or aircraft.
- **Text Detection** - Convert printed or handwritten text into a digital format.

Custom-trained model

Custom-trained models are calibrated and fine-tuned to detect images and patterns for specific purposes. For example, whereas a pre-trained model might identify electric circuits, you can design a custom-trained model to identify the electric components that make up an electric circuit, for example, resistors, LEDs, diodes, and capacitors. See Vision Tutorials.

Policies Required to Integrate OCI Vision with Oracle Analytics

To integrate Oracle Analytics with OCI Vision, make sure that you have the required security policies.

The OCI user that you specify in the connection between Oracle Analytics Cloud and your OCI tenancy must have read, write, and delete permissions on the compartment containing the OCI resources you want to use. Ensure that the OCI user belongs to a user group with the following minimum OCI security policies. When you connect to an OCI tenancy from Oracle Analytics, you can use either an OCI API key or resource principal.

> **Note**
>
> Oracle Cloud IDs (OCIDs) are resource identifiers used in OCI.

> **Note**
>
> For resource principal, to include all Analytics instances under a compartment, specify `{request.principal.type='analyticsinstance', request.principal.compartment.id='<compartmentA_ocid>'}` instead of `{request.principal.id='<analytics_instance_ocid>'}`.

API Key Policies	Resource Principal Policies
`Allow group <group_name> to manage ai-service-vision-family in tenancy`	`Allow any-user to manage ai-service-vision-family in tenancy where all {request.principal.id='<analytics_instance_ocid>'}`

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API Key Policies	Resource Principal Policies
`Allow group <group_name> to read buckets in compartment <compartment_name>`	`Allow any-user to read buckets in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>'}`
`Allow group <group_name> to manage objects in compartment <compartment_name> where target.bucket.name='<staging_bucket_name>'`	`Allow any-user to manage objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<staging_bucket_name>'}`
`Allow group <group_name> to read objects in compartment <compartment_name> where target.bucket.name='<images_bucket_name>'`	`Allow any-user to read objects in compartment <compartment_name> where all {request.principal.id='<analytics_instance_ocid>', target.bucket.name='<images_bucket_name>'}`
`Allow group <group_name> to read objectstorage-namespaces in tenancy`	`Allow any-user to read objectstorage-namespaces in tenancy where all {request.principal.id='<analytics_instance_ocid>'}`

Typical Workflow to Integrate Oracle Analytics with Vision

Perform these tasks required to integrate Oracle Analytics with Vision and perform object detection, image classification, or text detection.

Task	Description	More Information
Review prerequisites	Make sure that the user connecting from Oracle Analytics to the OCI tenancy has the required security policies.	Policies Required to Integrate OCI Vision with Oracle Analytics
Connect to OCI Vision	Create a reusable connection to your Vision service.	Create a Connection to Your Oracle Cloud Infrastructure Tenancy
Prepare images to analyze	Create a dataset for the source images that you want to analyze, and upload it to Oracle Analytics.	Prepare Images for Analysis With an Vision Model
Make a model available in Oracle Analytics	Register a Vision model in Oracle Analytics to make it available to data flows.	Make a Vision Model Available in Oracle Analytics
Process your images	Use a data flow to perform object detection, image classification, or text detection.	Use Oracle Cloud Infrastructure Vision Models in Oracle Analytics
Analyze the results	Use the dataset generated by your data flow to analyze the results.	Output Data Generated for Face Detection, Object Detection, Image Classification, and Text Detection Analysis Models

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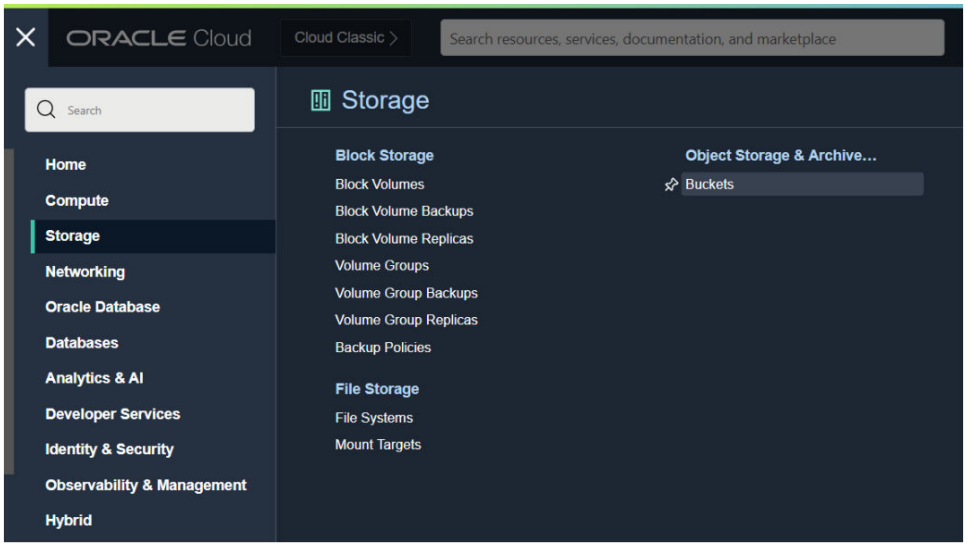
Prepare Images for Analysis With an Vision Model

You use buckets in OCI Object Storage to store the images that you want to analyze, then create a dataset to access these images in Oracle Analytics.

In most cases, input images and Vision models are stored in the *same* Oracle Cloud account (tenancy). If your input images and Vision model are stored on *different* tenancies, you must ensure that the visibility of the storage bucket containing your input images is **public** and the input dataset for the data flow contains individual image URLs (as described in step 4). To learn how to make a bucket public, see Change the visibility of a bucket.

Data flows in Oracle Analytics can process up to 20,000 images in one run. If you have more than 20,000 images to process, in OCI's Object Storage & Archive Storage create multiple buckets containing no more than 20,000 images in each one. Then, create a separate dataset and data flow for each bucket, and use a Sequence to sequentially process multiple data flows.

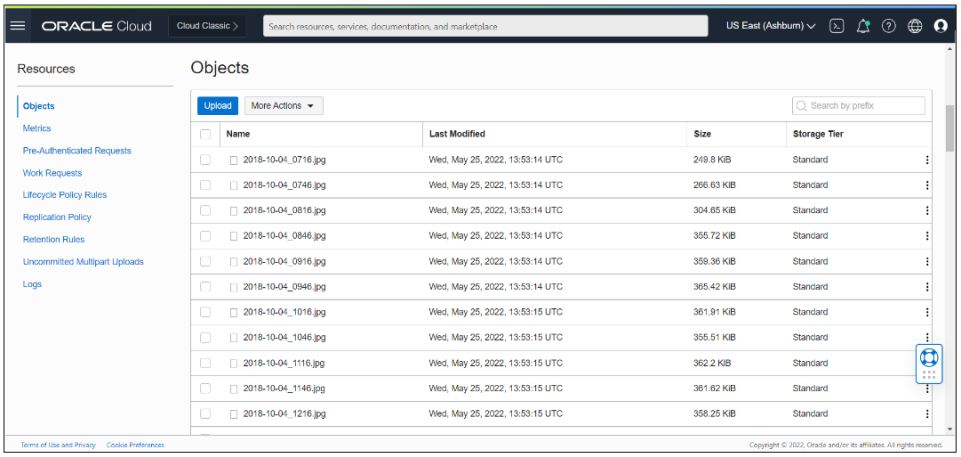
1. In OCI Console, navigate to **Object Storage & Archive Storage**, and create a bucket to store your images.



2. Upload your images to the bucket.

   Make sure that the bucket contains no extraneous files. Oracle Analytics processes every file in the bucket.

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The bucket can be private or public, but must be accessible to the OCI user and comply with OCI's generic limits on images. See OCI documentation.

3. To process every image in a bucket, add the bucket URL to a CSV file.
   a. In Object Storage, select the bucket to display the images in the Objects dialog.
   b. Copy the URL from the browser's URL bar.
   c. Create a CSV file with fields for `ID`, `Bucket Name`, and `Bucket URL`.
   d. Paste the bucket URL into the CSV file as the `Bucket URL` value.

ID	Bucket Name	Bucket URL
1	Car_Parking	https://cloud.oracle.com/object-storage/buckets/analyticsdev/Car_Parking/objects?region=us-ashburn-1

4. To process images individually, add image URIs to a CSV file.
   a. Create a CSV file with fields for `ID`, `Image Name`, and `File Location`.
   b. For each image in Object Storage, click the ellipsis icon ⋮, and select **View Object Details**.
   c. Copy the **Name** value and **URL Path (URI)** value.
   d. Paste the **Name** value into `Image Name`, and paste the **URL Path (URI)** value into `File Location`.

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Id	Image Name	File Location	Uploaded	Size	Type
1	Car_Parking_001.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_001.jpg	Fri, Feb 18,	109.87 KiB	Standard
2	Car_Parking_002.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_002.jpg	Fri, Feb 18,	70.29 KiB	Standard
3	Car_Parking_003.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_003.jpg	Fri, Feb 18,	139.07 KiB	Standard
4	Car_Parking_004.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_004.jpg	Fri, Feb 18,	605.48 KiB	Standard
5	Car_Parking_005.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_005.jpg	Fri, Feb 18,	2.43 MiB	Standard
6	Car_Parking_006.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_006.jpg	Fri, Feb 18,	239.33 KiB	Standard
7	Car_Parking_007.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_007.jpg	Fri, Feb 18,	136.87 KiB	Standard
8	Car_Parking_008.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_008.jpg	Fri, Feb 18,	7.54 MiB	Standard
9	Car_Parking_009.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_009.jpg	Fri, Feb 18,	23.79 KiB	Standard
10	Car_Parking_010.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_010.jpg	Fri, Feb 18,	107.99 KiB	Standard
11	Car_Parking_011.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_011.jpg	Fri, Feb 18,	30.08 KiB	Standard
12	Car_Parking_012.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_012.jpg	Fri, Feb 18,	34.93 KiB	Standard
13	Car_Parking_013.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_013.jpg	Fri, Feb 18,	72.15 KiB	Standard
14	Car_Parking_014.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_014.jpg	Fri, Feb 18,	50.02 KiB	Standard
15	Car_Parking_015.jpg	https://objectstorage.us-ashburn-1.oraclecloud.com/n/ifuyfa/b/pm-public/o/Car_Parking_015.jpg	Fri, Feb 18,	40.58 KiB	Standard

5. In Oracle Analytics, click **Create**, then **Dataset**.

You can now create a dataset by uploading the CSV file. See Create a Dataset from a File Uploaded from Your Computer.
If you have more than 20,000 images, you typically create multiple buckets of up to 20,000 images and create a separate dataset for each bucket.

Make a Vision Model Available in Oracle Analytics

Make a Vision model available in Oracle Analytics so that you can perform object detection, image classification, or text detection using data flows.

1. In OCI Object Storage, create a bucket in a compartment using a suitable name (for example, `MyVisionModelStagingBucket`).

   This staging bucket:

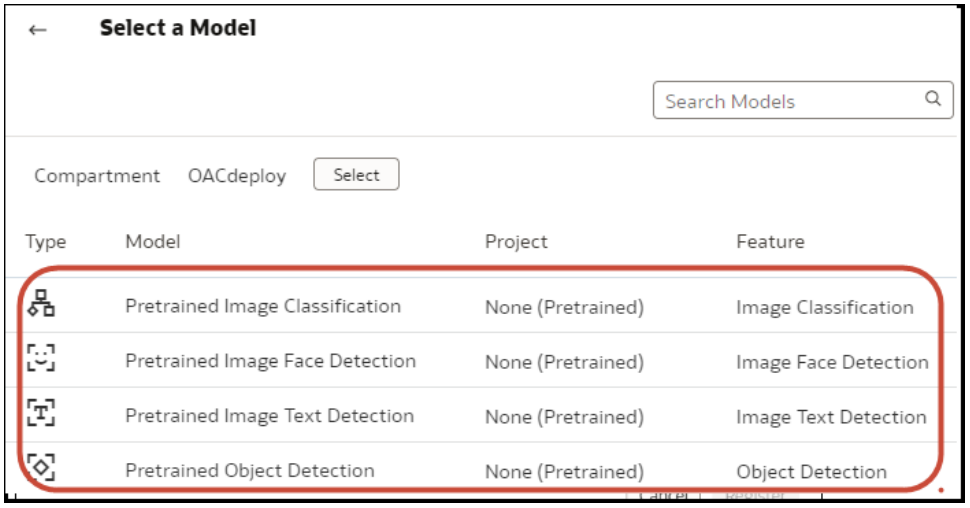
   - Must be created in the accessible compartment.
   - Must be created before registering a model.
   - Can have private visibility.
   - Can be used for multiple models.
   - Can be changed in the Inspect screen.

2. In the Oracle Analytics home page, click **Page Menu** ⋮, select **Register Model/Function**, and then select **OCI Vision Models**.
3. At the Register a Vision Model dialog, under **From a Connection** click the connection that you created in Create a Connection to Your Oracle Cloud Infrastructure Tenancy.



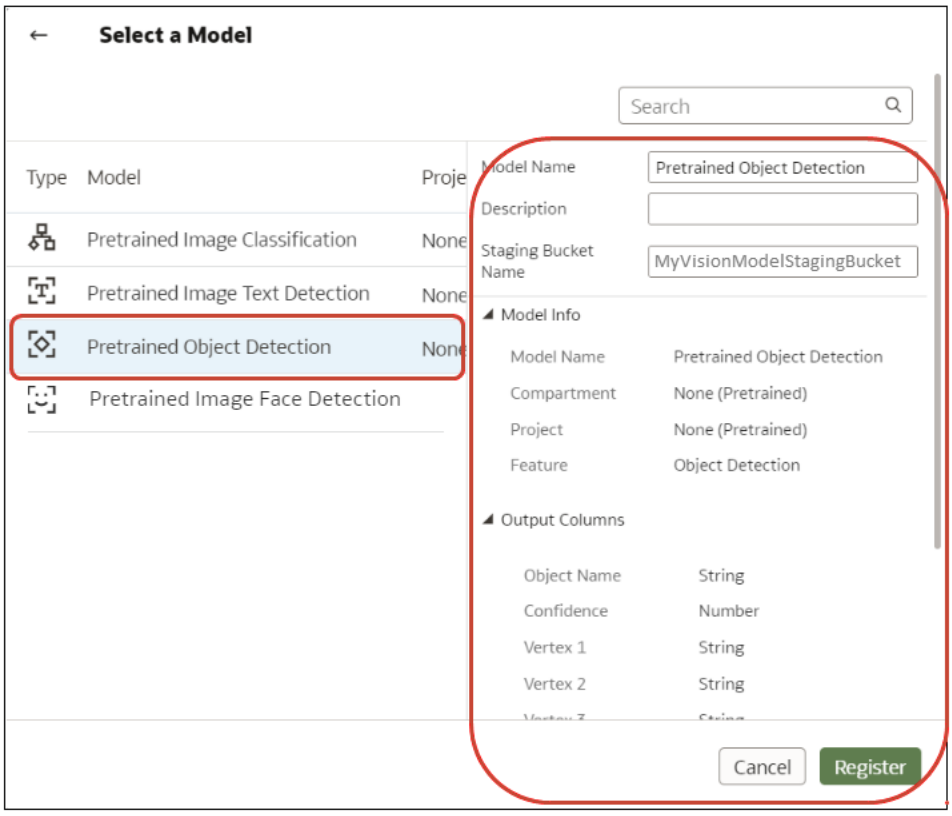
A list of available models is displayed.

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4. In the list of available models, click the model you want to apply to your image data.

   For example, to detect cars in photographs, select **Pretrained Object Detection**. An information panel pops up displaying the model details.



5. In **Model Name**, specify a name to identify the model in Oracle Analytics.
6. In **Staging Bucket Name**, enter the name that you specified in Step 1 (for example, `MyVisionModelStagingBucket`).
7. Click **Register**.

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To review the registered model, from the Oracle Analytics home page, navigate to **Machine Learning**, then **Models**.

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Expression Editor Reference

This section describes the expression elements that you can use in the Expression Editor.

Topics:

- Semantic Model Objects
- SQL Operators
- Conditional Expressions
- Functions
- Constants
- Types
- Variables

Semantic Model Objects

You can use semantic model objects in expressions, like time levels, dimension columns, and fact columns.

To reference a semantic model object, use the syntax:

"Fact/Dimension Table Name"."Column Name"

For example: `"Order Metrics"."Booked Amount"-"Order Metrics"."Fulfilled Amount"`

The Expression Elements section includes only items that are relevant for your task, so not all fact tables and dimension tables might be listed. Similarly, time hierarchies are included only if the Time fact table is joined to the current table.

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"."PROD_NAME" IS NULL`	Determines if a value is null.	`IS NULL`

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Operator	Example	Description	Syntax
LIKE	`"PRODUCTS"."PROD_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.	-
* *or* X	`SUPPORT_SERVICES_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.	>=

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Operator	Example	Description	Syntax
<=		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.	,

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)	`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`
		Evaluates each `WHEN` condition and if satisfied, assigns the value in the corresponding `THEN` expression.
		If none of the `WHEN` conditions are satisfied, it assigns the default value specified in the `ELSE` expression. If no `ELSE` expression is specified, the system automatically adds an `ELSE NULL`.
		Note: See *Best Practices for using CASE statements in Analyses and Visualizations*.
			`CASE WHEN request_condition1 THEN expr1 ELSE expr2 END`

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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 *Best Practices for using CASE statements in Analyses and Visualizations*.
			`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.

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- 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:

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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

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

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- Display Functions
- Evaluate Functions
- Mathematical Functions
- Running Aggregate Functions
- Spatial 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 BI Server (such as the rule that is defined in the semantic model). The aggregation is performed within Oracle BI Server 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.
- **Server Complex Aggregate** — Applies the aggregation rule that is determined by the Oracle BI Server (such as the rule that is defined in the semantic model). The aggregation

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is performed by the Oracle BI Server, rather than within Presentation Services. Not available for calculated items in analyses.

- **Report-Based Total (when applicable)** — If not selected, specifies that the Oracle BI Server 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. • *measure* is the name of a measure column. • `level` 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 *month* is from the same time dimension used as the measure level for *yearly_sales*.	`AGGREGATE(measure AT level [, level1, levelN])`
AGGREGATE BY	`AGGREGATE(sales BY month, region)`	Aggregates a measure based on one or more dimension columns. • *measure* is the name of a measure column to aggregate. • `column` 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)`
BIN	`BIN(revenue BY productid, year WHERE productid > 2 INTO 4 BINS RETURNING RANGE_LOW)`	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. numeric_expr is the measure or numeric attribute to bin. BY grain_expr1,…, grain_exprN is a list of expressions that define the grain at which the numeric_expr is calculated. BY is required for measure expressions and is optional for attribute expressions. WHERE a filter to apply to the numeric_expr before the numeric values are assigned to bins INTO number_of_bins BINS is the number of bins to return BETWEEN min_value AND max_value is the min and max values used for the end points of the outermost bins RETURNING NUMBER indicates that the return value should be the bin number (1, 2, 3, 4, etc.). This is the default. RETURNING RANGE_LOW indicates the lower value of the bin interval RETURNING RANGE_HIGH indicates the higher value of the bin interval	`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}])`

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Function	Example	Description	Syntax
BottomN		Ranks the lowest n values of the expression argument from 1 to n, 1 corresponding to the lowest numerical value. *expr* is any expression that evaluates to a numerical value. integer is any positive integer. Represents the bottom number of rankings displayed in the result set, 1 being the lowest rank.	`BottomN(expr, integer)`
COUNT	`COUNT(Products)`	Determines the number of items with a non-null value.	`COUNT(expr)`
COUNTDISTINCT		Adds distinct processing to the COUNT function. *expr* is any expression.	`COUNT(DISTINCT expr)`
COUNT*	`SELECT COUNT(*) FROM Facts`	Counts the number of rows.	`COUNT(*)`
First	`First(Sales)`	Selects the first non-null returned value of the expression argument. The `First` function operates at the most detailed level specified in your explicitly defined dimension.	`First([NumericExpression)]`
Last	`Last(Sales)`	Selects the last non-null returned value of the expression.	`Last([NumericExpression)]`
MAVG		Calculates a moving average (mean) for the last n rows of data in the result set, inclusive of the current row. *expr* is any expression that evaluates to a numerical value. integer is any positive integer. Represents the average of the last n rows of data.	`MAVG(expr, integer)`
MAX	`MAX(Revenue)`	Calculates the maximum value (highest numeric value) of the rows satisfying the numeric expression argument.	`MAX(expr)`
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). *expr* is any expression that evaluates to a numerical value. numTiles is a positive, nonnull integer that represents the number of tiles.	`NTILE(expr, numTiles)`

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Function	Example	Description	Syntax
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). *expr* 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'reare assigned the same rank (for example, 1, 1, 1, 4, 5, 5, 7...). *expr* 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. *expr* is any expression that evaluates to a numerical value.	`SUM(DISTINCT expr)`
TOPN		Ranks the highest n values of the expression argument from 1 to n, 1 corresponding to the highest numerical value. *expr* is any expression that evaluates to a numerical value. integer is any positive integer. Represents the top number of rankings displayed in the result set, 1 being the highest rank.	`TOPN(expr, integer)`

Tips on Using Aggregate Functions

Here're some tips on getting the best results when using aggregate functions in your workbooks.

Tips:

- `First`, `Last`. Avoid using the First and Last aggregations with a 100% stacked bar chart type. Adding current date to `By` adds grain to the query, which fetches all rows for the visualization plus the current date. The `Last` function then returns the last row in that result set, which varies depending on how the data is returned from the source.
- `Min` - Use `Min` to calculate the smallest value in a set of rows. To find the smallest value in a set of columns, use `Evaluate`. For example:
  `evaluate('least(%1,%2,%3)',column date 1,date 2,date 3)`

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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;enablePartitioning=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])`

FORECAST	**Revenue Forecast by Day Example**
	This example selects revenue forecast by day.
	`FORECAST("A - Sample Sales"."Base Facts"."1-Revenue" Target, ("A - Sample Sales"."Time"."T00 Calendar Date"),'forecast', 'numPeriods=30;predictionInterval=70;') ForecastedRevenue`
	Revenue Forecast by Year and Quarter Example
	This example selects revenue forecast by year and quarter.
	`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`
		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 *numPeriods* argument.
		See also additional FORECAST Function Options below.
			`FORECAST(measure, ([series]), output_column_name, options, [runtime_binded_options]))`
			Where:
			• *measure* represents the measure to forecast, for example, revenue data.
			• *series* 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.
			• *output_column_name* represents the valid column names of *forecast*, *low*, *high*, and *predictionInterval*.
			• *options* represents a string list of name/value pairs separated by a semi-colon (;). The value can include *%1 ... %N* specified in `runtime_binded_options`.
			• *runtime_binded_options* 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	`OUTLIER((product, company), (billed_quantity, revenue), 'isOutlier', 'algorithm=kmeans')`	Classifies a record as Outlier based on one or more input expressions using K-Means or Hierarchical Clustering or Multi-Variate Outlier detection Algorithms.	`OUTLIER((dimension_expr1 , ... dimension_exprN), (expr1, ... exprN), output_column_name, options, [runtime_binded_options])`

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Function	Example	Description	Syntax
REGR	`REGR(revenue, (discount_amount), (product_type, brand), 'fitted', '')`	Fits a linear model and returns the fitted values or model. This function can be used to fit a linear curve on two measures.	`REGR(y_axis_measure_expr, (x_axis_expr), (category_expr1, ..., category_exprN), output_column_name, options, [runtime_binded_options])`
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 *numeric_expr* represents the Y value for the trend and the *series* (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 *TRUE*, then use Box-Cox transformation.
lambdaValue	Not applicable	The Box-Cox transformation parameter. Ignore if NULL or when `useBoxCox` is *FALSE*. Otherwise the data is transformed before the model is estimated.
trendDamp	TRUE FALSE	This is specific to the Exponential Smoothing model. If *TRUE*, then use damped trend. If FALSE 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

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Option Name	Values	Description
seasonType	N (none) A (additive) M (multiplicative) Z (automatically selected)	This is specific to the Exponential Smoothing model
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 *customer_name* (a data type of CHAR or VARCHAR) or *birthdate* (a datetime literal). Use CAST to change to a *Date* data type. Don't use TODATE.	`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"."GEOGRAPH Y_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 ('2009-03-0301:01:00', 'yyyy-mm-dd hh:mi:ss') FROM sales`	Converts string literals of *DateTime* format to a *DateTime* 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 *expr* variables as arguments of the VALUEOF function. Refer to static semantic model variables by name.	`VALUEOF(expr)`

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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()`

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Function	Example	Description	Syntax
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)`
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: *SQL_TSI_SECOND*, *SQL_TSI_MINUTE*, *SQL_TSI_HOUR*, *SQL_TSI_DAY*, *SQL_TSI_WEEK*, *SQL_TSI_MONTH*, *SQL_TSI_QUARTER*, *SQL_TSI_YEAR*	`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)`

Tips on Using Date Functions

Here're some tips on getting the best results when using date functions in your workbooks to calculate fiscal periods, convert strings to dates, show a date and time in a specific time zone, and calculate differences over time.

Calculate fiscal year, quarter and month:

Subject areas typically have a time dimension, so you can use the pre-configured periods such as fiscal quarter, fiscal month, and fiscal week. If you only have a date field, you can calculate these periods yourself using date functions.

This example calculates fiscal quarter:

```
'FY'||cast(YEAR(TIMESTAMPADD(SQL_TSI_MONTH, 7,<date field>)) as char)||'Q'||
cast(QUARTER(TIMESTAMPADD(SQL_TSI_MONTH, 7,<same date field>)) as char)
```

This example calculates fiscal year and month:

```
'FY'||cast(YEAR(TIMESTAMPADD(SQL_TSI_MONTH, 7,<date field>)) as char)||
cast(MONTHNAME(<same date field>) as char)
```

Notes:

- `||` concatenates values.

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- `cast (xxx(date) as char)` extracts a portion of a date field.
- `TIMESTAMPADD` adds (or substracts) periods from a date. This example uses the parameter value SQL_TSI_MONTH to add months.

The calculations above work well in tables but when used in filters the spacing between returned values might look odd. In this case, use a cleaner but more complex calculation based on these examples:

```
'FY'||evaluate ('to_char(%1,%2)'as char,(EVALUATE('add_months(%1,%2)' as
date,<date field>,7)),'YY')||'-Q'||evaluate ('to_char(%1,%2)'as char,
(EVALUATE('add_months(%1,%2)' as date,<same date field>,7)),'Q')
```

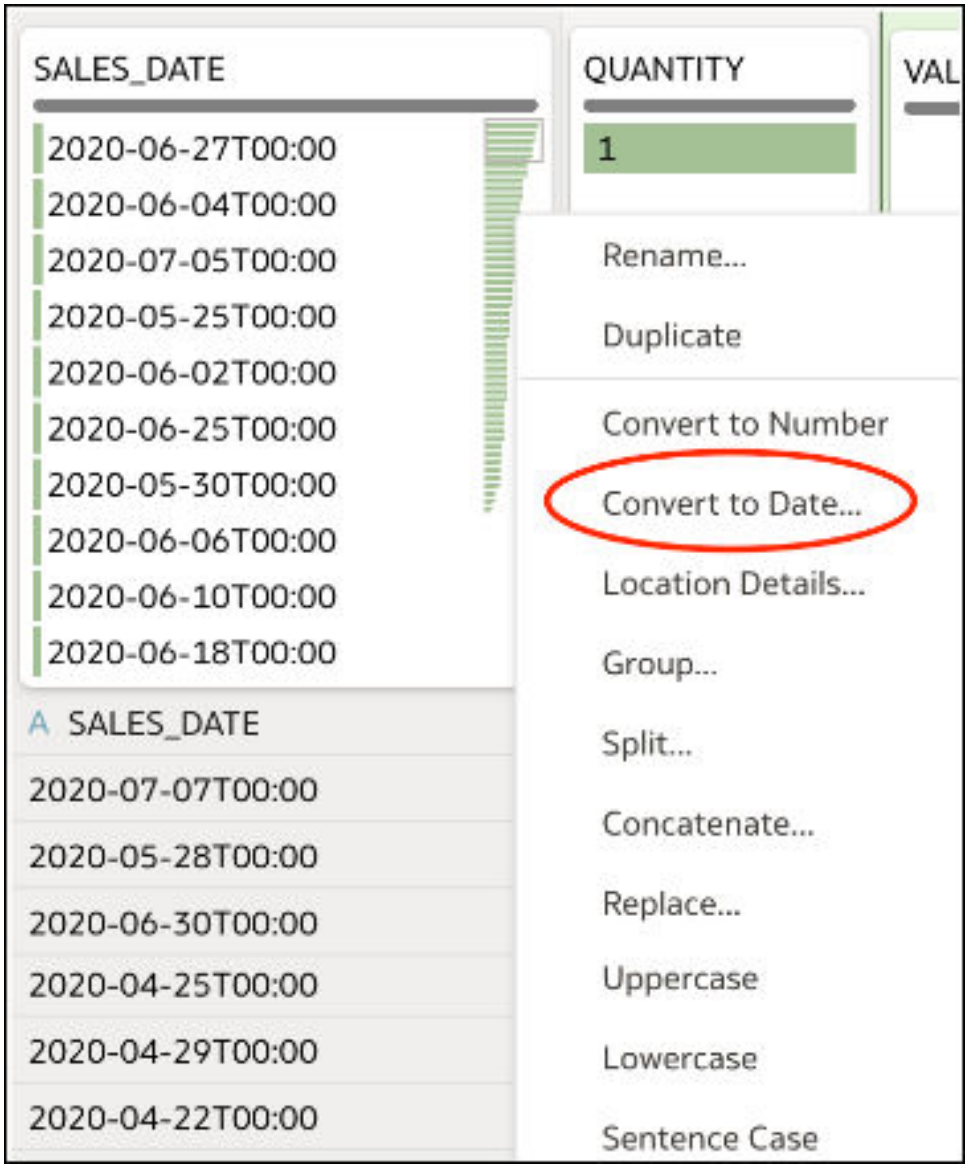
```
'FY'||evaluate ('to_char(%1,%2)'as char,(EVALUATE('add_months(%1,%2)' as
date,<date field>,7)),'YY')||'-'||evaluate ('to_char(%1,%2)'as char,<same
date field>,'MON')
```

Convert a string to a date:

Oracle Analytics profiles your data and provides enrichment recommendations for extracting and converting dates. If you need to convert a string to a date yourself, use these tips.

- In the workbook designer, navigate in the data pane to the column that you wish to convert, then right-click and select **Convert to Date**. Configure the date then click **Add Step**.

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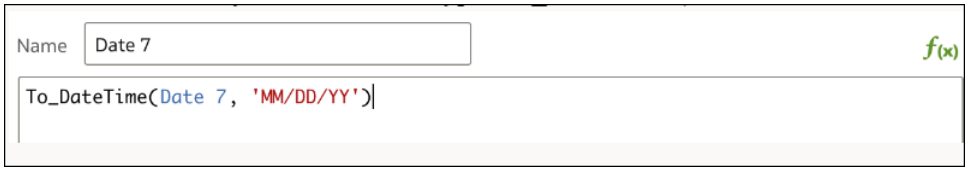
- In the workbook designer, navigate in the data pane to the column that you wish to convert, then right-click and select **Edit**. Configure the date then click **Add Step**.

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In the text box containing the name of your column in blue, insert `To_DateTime(` before the column name, then add the date format you want to use after the column name, followed by `)`, then click **Add Step**.

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When you use the Edit option to create your date-conversion function, you can also use `Allow_Variable_Digits` to process column values with one-digit or two digit numbers, and `Null_On_Error` arguments to discard rows that don't match the pattern required. See also REPLACE and CAST for alternative ways to process data that doesn't match the pattern required.

As an alterntive to using `To_DateTime()`, use CAST() to change a value's data type. For example, `CAST(SalesDate AS DATE)`.

Additionally, use the **Replace** option. In the workbook designer, navigate in the data pane to the column that you wish to convert, then right-click and select **Replace**. Configure the replacement type you want, then click **Add Step**.

Show a date and time field in a specific timezone:

Use the NEW_TIME function in the database in conjunction with EVALUATE. For example:

```
evaluate ('new_time(%1,%2,%3)' as char, "DV - Pipeline and
Forecast"."Opportunity"."Last Updated Date",'GMT','AST')
```

Make sure that the date field includes the time component.

Calculate difference over time:

To show the difference in number and percentage between now and yesterday create calculations based on these examples:

- Calculate a measure until yesterday: `filter (Measure using date <= TIMESTAMPADD(SQL_TSI_DAY,-1,CURRENT_DATE))`
- Calculate the difference: `Measure - filter (Measure using date <= TIMESTAMPADD(SQL_TSI_DAY,-1,CURRENT_DATE))`
- Calculate the difference percentage: `1-(filter (Measure using date <= TIMESTAMPADD(SQL_TSI_DAY,-1,CURRENT_DATE))/Measure` *`display as percentage`*

Notes:

- These examples use `SQL_TSI_DAY`, however you can alternatively use WEEK and MONTH week over week and month over month.
- These examples work with a normal or natural calendar. If you need fiscal months and quarters, use repository variables in your calculations instead of TIMESTAMPADD. Alternatively, combine this with the **Calculate fiscal year, quarter and month** tip.
- Some subject areas include pre-calculated Prior X measures like PY (prior year), PQ (prior quarter) that you can use to calculate differences over time.
- Alternatively, you can use the TIME SERIES functions: AGO, PERIODROLLING and TODATE. See Time Series Functions.

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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)`
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)`

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Function	Example	Description	Syntax
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)`
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. **Note**: If the first day of a week (i.e. Sunday) falls in a previous year and would therefore adversely affect the aggregation, the function returns the 7th day of the week (i.e. Saturday) in the current year instead of the first day of the week in the previous year. For example, 1/1/24, 1/2/24, and 1/3/24 all aggregate to Saturday 1/6/24, rather than Sunday 12/29/23.	`EXTRACTWEEK(expr)`

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Function	Example	Description	Syntax
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)`

Tips on Using Date Dimensions in Subject Areas

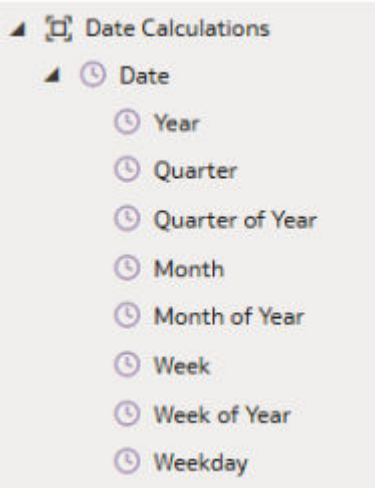
Here're some tips on getting the best results when using subject area dates in calculations.

Adding a Subject Area Date to a Calculation

If you drag a date from a subject area directly into a calculation and process it as a string or an integer, you'll get an error. This happens because the underlying date value is a timestamp.

Instead, use one of the Date Extraction Functions to interpret the date.

For example, you might have these subject area dates.



To extract months from these subject area dates, use the ExtractMonthOfYear function:

```
case when monthname(ExtractMonthOfYear("Date")) in ('Jan' ,'Feb', 'Mar')
THEN 'Q1'
ELSE 'Rest of the year' END
```

Display Functions

Display functions operate on the result set of a query.

Function	Example	Description	Syntax
BottomN	`BottomN(Sales, 10)`	Returns the *n* lowest values of expression, ranked from lowest to highest.	`BottomN([NumericExpression], [integer])`

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Function	Example	Description	Syntax
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 *n* 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 *n* 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 *n* th row is reached, the sum is calculated based on the last *n* 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([NumericExpresssion], [integer])`
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 *n* highest values of expression, ranked from highest to lowest.	`TOPN([NumericExpression], [integer])`

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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_AGGR	`EVALUATE_AGGR('REGR_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_AGGR('db_agg_function(%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. *expr* is any expression that evaluates to a numerical value.	`ABS(expr)`
ACOS	`ACOS(1)`	Calculates the arc cosine of a numeric expression. *expr* is any expression that evaluates to a numerical value.	`ACOS(expr)`
ASIN	`ASIN(1)`	Calculates the arc sine of a numeric expression. *expr* is any expression that evaluates to a numerical value.	`ASIN(expr)`
ATAN	`ATAN(1)`	Calculates the arc tangent of a numeric expression. *expr* is any expression that evaluates to a numerical value.	`ATAN(expr)`

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Function	Example	Description	Syntax
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(expr1, expr2)`
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(expr)`
COS	`COS(1)`	Calculates the cosine of a numeric expression. *expr* is any expression that evaluates to a numerical value.	`COS(expr)`
COT	`COT(1)`	Calculates the cotangent of a numeric expression. *expr* is any expression that evaluates to a numerical value.	`COT(expr)`
DEGREES	`DEGREES(1)`	Converts an expression from radians to degrees. *expr* is any expression that evaluates to a numerical value.	`DEGREES(expr)`
EXP	`EXP(4)`	Sends the value to the power specified. Calculates *e* raised to the n-th power, where *e* is the base of the natural logarithm.	`EXP(expr)`
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(expr)`
LOG	`LOG(1)`	Calculates the natural logarithm of an expression. *expr* is any expression that evaluates to a numerical value.	`LOG(expr)`
LOG10	`LOG10(1)`	Calculates the base 10 logarithm of an expression. *expr* is any expression that evaluates to a numerical value.	`LOG10(expr)`
MOD	`MOD(10, 3)`	Divides the first numeric expression by the second numeric expression and returns the remainder portion of the quotient.	`MOD(expr1, expr2)`
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(expr1, expr2)`
RADIANS	`RADIANS(30)`	Converts an expression from degrees to radians. *expr* is any expression that evaluates to a numerical value.	`RADIANS(expr)`
RAND	`RAND()`	Returns a pseudo-random number between 0 and 1.	`RAND()`

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Function	Example	Description	Syntax
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(expr)`
ROUND	`ROUND(2.166000, 2)`	Rounds a numeric expression to *n* digits of precision. *expr* is any expression that evaluates to a numerical value. *integer* is any positive integer that represents the number of digits of precision.	`ROUND(expr, integer)`
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(expr)`
SIN	`SIN(1)`	Calculates the sine of a numeric expression.	`SIN(expr)`
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. *expr* 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. *expr* is any expression that evaluates to a numerical value. *integer* 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 *n* rows of data in the result set, inclusive of the current row. *expr* is any expression that evaluates to a numerical value. *integer* is any positive integer. Represents the average of the last *n* 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 n rows of data, inclusive of the current row. *expr* is any expression that evaluates to a numerical value. *integer* is any positive integer. Represents the sum of the last n rows of data.	`MSUM(expr, integer)`

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Function	Example	Description	Syntax
RSUM	`SELECT month, revenue, RSUM(revenue) as RUNNING_SUM from sales_subject_area`	Calculates a running sum based on records encountered so far. *expr* 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. *expr* 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. *expr* is an expression of any datatype.	`RMAX(expr)`
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. *expr* is an expression of any datatype.	`RMIN(expr)`

Spatial Functions

Spatial functions enable you to perform geographical analysis when you model data. For example, you might calculate the distance between two geographical areas (known as shapes or polygons).

> **Note**
>
> You can't use these spatial functions in custom calculations for visualization workbooks.

Function	Example	Description	Syntax
GeometryArea	`GeometryArea(Shape)`	Calculates the area that a shape occupies.	`GeometryArea(Shape)`
GeometryDistance	`GeometryDistance(TRIP_START, TRIP_END)`	Calculates the distance between two shapes.	`GeometryDistance(Shape 1, Shape 2)`
GeometryLength	`GeometryLength(Shape)`	Calculates the circumference of a shape.	`GeometryLength(Shape)`
GeometryRelate	`GeometryRelate(TRIP_START, TRIP_END)`	Determines whether one shape is inside another shape. Returns TRUE or FALSE as a string (varchar).	`GeometryRelate(Shape 1, Shape 2)`
GeometryWithinDistance	`GeometryWithinDistance(TRIP_START, TRIP_END, 500)`	Determines whether two shapes are within a specified distance of each other. Returns TRUE or FALSE as a string (varchar).	`GeometryWithinDistance(Shape 1, Shape2, DistanceInFloat)`

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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. *expr* is any expression that evaluates to a character string.	`ASCII(expr)`
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). *expr* is any expression that evaluates to a character string.	`BIT_LENGTH(expr)`
CHAR	`CHAR(35)`	Converts a numeric value between 0 and 255 to the character value corresponding to the ASCII code. *expr* is any expression that evaluates to a numerical value between 0 and 255.	`CHAR(expr)`
CHAR_LENGTH	`CHAR_LENGTH(Customer_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. *expr* is any expression that evaluates to a character string.	`CHAR_LENGTH(expr)`
CONCAT	`SELECT DISTINCT CONCAT ('abc', 'def') FROM employee`	Concatenates two character strings. *exprs* are expressions that evaluate to character strings, separated by commas. You must use raw data, not formatted data, with `CONCAT`.	`CONCAT(expr1, expr2)`
INSERT	`SELECT INSERT('123456', 2, 3, 'abcd') FROM table`	Inserts a specified character string into a specified location in another character string. *expr1* is any expression that evaluates to a character string. Identifies the target character string. *integer1* 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. *integer2* is any positive integer that represents the number of characters in the target string to be replaced by the second string. *expr2* is any expression that evaluates to a character string. Identifies the character string to be inserted into the target string.	`INSERT(expr1, integer1, integer2, expr2)`

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Function	Example	Description	Syntax
LEFT	`SELECT LEFT('123456', 3) FROM table`	Returns a specified number of characters from the left of a string. *expr* is any expression that evaluates to a character string *integer* is any positive integer that represents the number of characters from the left of the string to return.	`LEFT(expr, integer)`
LENGTH	`LENGTH(Customer_Name)`	Returns the length, in number of characters, of a specified string. The length is returned excluding any trailing blank characters. *expr* is any expression that evaluates to a character string.	`LENGTH(expr)`
LOCATE	`LOCATE('d' 'abcdef')`	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. *expr1* is any expression that evaluates to a character string. Identifies the string for which to search. *expr2* is any expression that evaluates to a character string. Identifies the string to be searched.	`LOCATE(expr1, expr2)`
LOCATEN	`LOCATEN('d' 'abcdef', 3)`	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. *expr1* is any expression that evaluates to a character string. Identifies the string for which to search. *expr2* is any expression that evaluates to a character string. Identifies the string to be searched. *integer* is any positive (nonzero) integer that represents the starting position to begin to look for the character string.	`LOCATEN(expr1, expr2, integer)`
LOWER	`LOWER(Customer_Name)`	Converts a character string to lowercase. *expr* is any expression that evaluates to a character string.	`LOWER(expr)`
OCTET_LENGTH	`OCTET_LENGTH('abcdef')`	Returns the number of bytes of a specified string. *expr* is any expression that evaluates to a character string.	`OCTET_LENGTH(expr)`
POSITION	`POSITION('d', 'abcdef')`	Returns the numeric position of *strExpr1* in a character expression. If *strExpr1* isn't found, the function returns 0. *expr1* is any expression that evaluates to a character string. Identifies the string to search for in the target string. For example, "d". *expr2* is any expression that evaluates to a character string. Identifies the target string to be searched. For example, "abcdef".	`POSITION(expr1, expr2)`

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Function	Example	Description	Syntax
REPEAT	`REPEAT('abc', 4)`	Repeats a specified expression *n* times. *expr* is any expression that evaluates to a character string *integer* is any positive integer that represents the number of times to repeat the character string.	`REPEAT(expr, integer)`
REPLACE	`REPLACE('abcd1234', '123', 'zz')`	Replaces one or more characters from a specified character expression with one or more other characters. *expr1* is any expression that evaluates to a character string. This is the string in which characters are to be replaced. *expr2* is any expression that evaluates to a character string. This second string identifies the characters from the first string that are to be replaced. *expr3* is any expression that evaluates to a character string. This third string specifies the characters to substitute into the first string.	`REPLACE(expr1, expr2, expr3)`
RIGHT	`SELECT RIGHT('123456', 3) FROM table`	Returns a specified number of characters from the right of a string. *expr* is any expression that evaluates to a character string. *integer* is any positive integer that represents the number of characters from the right of the string to return.	`RIGHT(expr, integer)`
SPACE	`SPACE(2)`	Inserts blank spaces. *integer* is any positive integer that indicates the number of spaces to insert.	`SPACE(expr)`
SUBSTRING	`SUBSTRING('abcdef' FROM 2)`	Creates a new string starting from a fixed number of characters into the original string. *expr* is any expression that evaluates to a character string. *startPos* 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])`
SUBSTRINGN	`SUBSTRING('abcdef' FROM 2 FOR 3)`	Like SUBSTRING, creates a new string starting from a fixed number of characters into the original string. *SUBSTRINGN* includes an integer argument that enables you to specify the length of the new string, in number of characters. *expr* is any expression that evaluates to a character string. *startPos* 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(expr FROM startPos FOR length)`

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Function	Example	Description	Syntax
TrimBoth	`Trim(BOTH '_' FROM '_abcdef_')`	Strips specified leading and trailing characters from a character string. *char* is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. *expr* is any expression that evaluates to a character string.	`TRIM(BOTH char FROM expr)`
TRIMLEADING	`TRIM(LEADING '_' FROM '_abcdef')`	Strips specified leading characters from a character string. *char* is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. *expr* is any expression that evaluates to a character string.	`TRIM(LEADING char FROM expr)`
TRIMTRAILING	`TRIM(TRAILING '_' FROM 'abcdef_')`	Strips specified trailing characters from a character string. *char* is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. *expr* is any expression that evaluates to a character string.	`TRIM(TRAILING char FROM expr)`
UPPER	`UPPER(Customer_Name)`	Converts a character string to uppercase. *expr* is any expression that evaluates to a character string.	`UPPER(expr)`

Tips on Using String Functions

Here're some tips on getting the best results when using string functions in your workbooks.

Concatenate multiple values:

Use LISTAGG to concatentate multiple values into one cell and one row.

```
listagg(<column to concatenate> by <grouping column>)
```

Add `on overflow truncate` if the resulting string is too long, and add `distinct` if the values aren't unique.

For example:

```
listagg(distinct City_ID by STATE on overflow truncate)
```

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.	`DATABASE()`

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Function	Example	Description	Syntax
USER		Returns the user name for the semantic model to which you're logged on.	`USER()`

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: • *MEASURE* represents the measure to calculate, for example, revenue. • *TIME_LEVEL* represents the time interval, which must be Year, Quarter, Month, Week, or Day. • *OFFSET* 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: • *MEASURE* represents the name of a measure column. • *X* is an integer that represents the offset from the current time. • *Y* is an integer that represents the number of time units over which the function calculates. • *HIERARCHY* 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.

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Function	Example	Description	Syntax
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: • *MEASURE* represents an expression that references at least one measure column, for example, sales. • *TIME_LEVEL* 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.

Variables

Variables are used in expressions.

You can use a variable in an expression.

See Advanced Techniques: Reference Stored Values in Variables.

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Accessibility Features and Tips

These topics describe accessibility features and information for Oracle Analytics.

Topics:

- Keyboard Shortcuts for Visualizations
- Keyboard Shortcuts for Dashboards and Agents

For keyboard shortcuts for Publisher, see Keyboard Shortcuts in *Using Oracle Analytics Publisher in Oracle Analytics Server*.

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

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Task	Keyboard Shortcut
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
Cut	Ctrl/Cmd+X
Navigate backwards	Shift+tab
Navigate forwards	Tab
Paste	Ctrl/Cmd+V

Keyboard Shortcuts for Dashboards and Agents

You can use keyboard shortcuts to navigate and to perform actions in dashboards and agents.

Task	Keyboard Shortcut	Keyboard Shortcut available for Dashboards and Agents?
Close the menu that has the focus.	Esc	Dashboards and agents

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Task	Keyboard Shortcut	Keyboard Shortcut available for Dashboards and Agents?
Open Classic analysis from the data visualization catalog using the **Explore as Workbook** option.	Shift+F10	Dashboards only
Navigate to the current dashboard page Tab, if the Tab is displayed. If there is only one page in the dashboard, then the page Tab is not displayed.	Ctrl+Alt+P	Dashboards only
Navigate to the Dashboards popup menu in the global header. You can then press ENTER to display a menu from which you select a dashboard to display.	Ctrl+Alt+D	Dashboards only
Navigate to the first focusable element in the global header, which is the Skip to Content link. This link enables you to bypass the options that are available in the global header and to move to the features that available in the main part of the Home page.	Ctrl+Alt+G	Dashboards only
Navigate to the first focusable element in the next section. For a dashboard page, the first element is the collapse icon.	Ctrl+Shift+S	Dashboards only
Navigate to the first focusable element in the previous section. For a dashboard page, the first element is the collapse icon.	Ctrl+Shift+U	Dashboards only
Navigate to the next focusable element.	Tab	Dashboards and agents
Navigate to the next menu option.	Down Arrow	Dashboards and agents
Navigate to the previous focusable element.	Shift+Tab	Dashboards and agents
Navigate to the previous menu option.	Up Arrow	Dashboards and agents
Open drop-down and combo boxes.	Alt+Up or Down Arrow	Dashboards and agents
Show the next or previous item in a combo box.	Ctrl+Up or Down Arrow	Dashboards and agents
Trigger the activity, when the focus is on a link, an image, or a button with an associated URL or activity.	Enter	Dashboards and agents

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