Oracle Utilities Analytics Visualization

Oracle Utilities Analytics Visualization User Guide

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Oracle Utilities Analytics Visualization User Guide

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Get Started

Oracle Utilities Analytics Visualization is a suite of analytics applications that provides real-time access to data in the Oracle Utilities Customer Cloud Service (CCS), Oracle Utilities Meter Solution Cloud Service (MSCS), and Oracle Utilities Work and Asset Cloud Service (WACS). Oracle Utilities Analytics Visualization includes rich pre-built analytical subject areas, measures, key performance indicators, visualizations, and workbooks that allow you to derive strategic insights from your data through exploration, discovery, visualization, and analysis.

Audience and Scope

This guide is intended for consumers and creators of visualizations and workbooks using Oracle Utilities Analytics Visualization. Consumers work with their favorite visualizations and workbooks delivered with the application or built by your organization. Creators understand the business needs of the consumers and create visualizations and workbooks that answers their business questions.

This guide also covers configuration tasks that must be performed by an administrator or implementer. See Administer the Service for more information.

Subject Areas

One of the key benefits of Oracle Utilities Analytics Visualization is that it comes with predefined *subject areas* that are specific to the utilities industry. Subject areas are the building blocks of your visualizations and workbooks. A workbook is built by choosing an appropriate subject area that has information that answers the business question you're analyzing.

In more technical terms, a subject area is a data model that presents business data for analysis in a manner that reflects the structure of the business. Data models enable analysts to structure queries in the same intuitive fashion as they ask business questions. The data models of Oracle Utilities Analytics Visualization are simple and mask the complexity of the underlying data structure. For examples of questions that the Analytics Visualization subject areas can help you answer, see Subject Areas Out of the Box.

A subject area contains attributes, measures, and dimensions. See Terminology below for more information about these components.

Oracle Data Visualization

Analytics Visualization leverages Oracle Data Visualization, which is a component of Oracle Analytics Server. Oracle Data Visualization enables you to easily create visualizations and workbooks that reveal trends in your company's data and help you answer questions and discover important insights about your business.

Creating visualizations and workbooks is easy in Data Visualization, because the application is designed so that your data analysis work is flexible and exploratory. Additionally, exploring data in Data Visualization is different than using pre-built analytics and dashboards, since Data Visualization allows you to experiment with your data by adding or removing columns, creating filters, or applying different visualizations to your data. You can understand your data from

different perspectives and fully explore your data to find correlations, discover patterns, and see trends.

For more information, see Visualize and Analyze Data.

Terminology

There are several terms in the Analytics Visualization documentation that might be unfamiliar to you as you learn about the application. Review the information below to gain a better understanding of these terms, how they relate to the product interface, and the concepts behind them.

In this section:

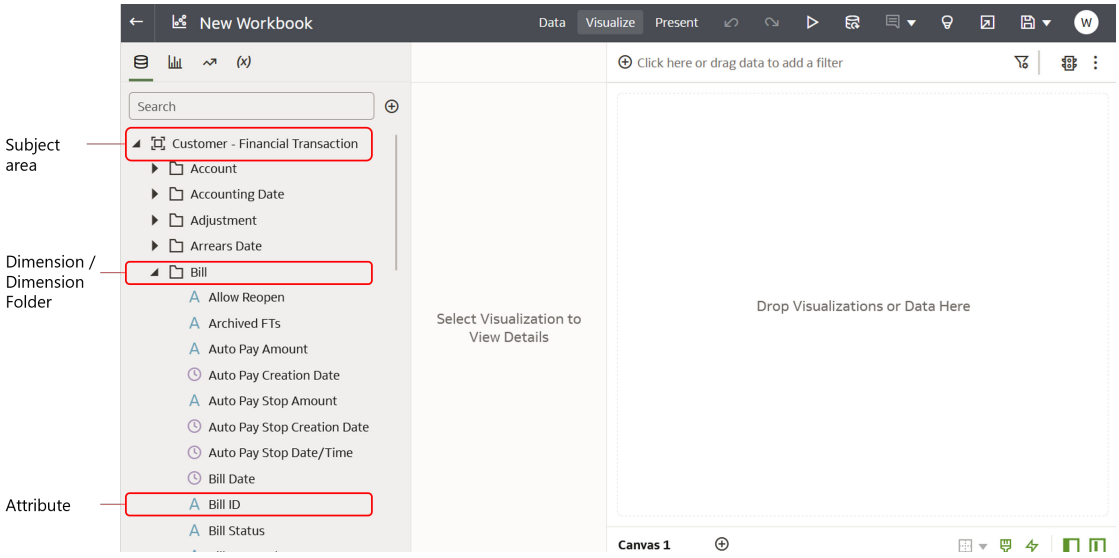
Measures, Attributes, and Dimensions

There are three common components within Analytics Visualization subject areas: measures, attributes, and dimensions.

Measures and attributes are data elements that you use to build your visualizations. You can think of a *measure* as a "numerator" with a quantitative number that can be divided or filtered by an attribute. Conversely, an *attribute* is a "denominator" that can divide or filter a measure. Dimensions are simply categories or folders that contain attributes.

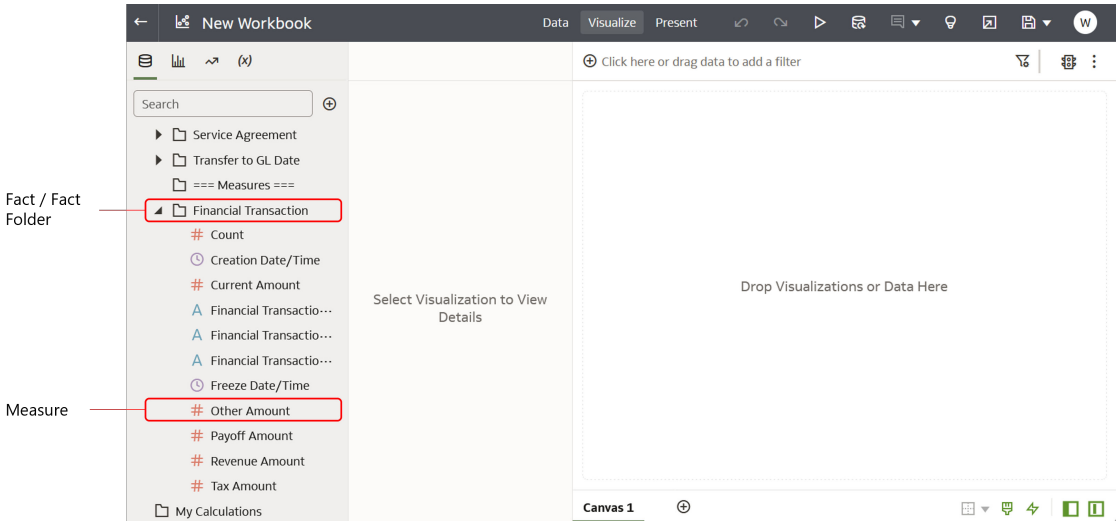
Example 1: Subject Area, Dimension Folder, and Attributes

Subject areas are shown at the top of the data panel in a workbook. Dimension folders are preceded by a folder icon, and attributes are preceded by an icon of the letter A.



Example 2: Fact Folder and Measures

Fact folders appear after the === Measures === section in the data panel, and are preceded by a folder icon. Individual measures are preceded by an icon of the pound symbol (#).



Common Terms

Attribute: An attribute is a single data element within a dimension or dimension folder in a subject area. Often, an attribute describes a business entity. For example, in the Customer - Financial Transaction subject area, there is a dimension called Bill. Within this dimension, there are attributes such as Bill ID, Bill Status, Due Date, and other attributes. See the screenshot above for an example.

Calculation: A calculation is a predefined SQL query that can be dragged and dropped onto a canvas to create visualizations for key areas of your business operations.

Canvas: A canvas is a page within a workbook that contains one or more visualizations.

Data Actions: Data actions are navigation links configured in a canvas. Data actions can be used to navigate to another canvas in the current workbook, to a canvas in another workbook, or to your source Oracle Utilities enterprise software-as-a-service application by specifying the appropriate an URL. See Use Data Actions to Connect Canvases and Launch Enterprise Applications for more information.

Data actions can be configured on any data element. The contextual value can be passed to a source application (such as the Oracle Utilities Customer Cloud Service) or to internal canvases with various interactions and context-passing options. Once configured, data actions appear in the right-click menu in Analytics Visualization where the data element is used.

Configuring data actions is a task that must be performed by a user with authoring privileges. See Role Types for more information.

Data Panel: The Data Panel is a side menu that displays in Analytics Visualization. From the Data Panel, you can select data elements and visualization options when creating a canvas.

Dataset: A dataset defines the structure of usable data that can be leveraged in a workbook in Analytics Visualization. There are a few different types of datasets:

- Subject areas that are constructed within a logical model
- Datasets based on a direct connection to a source (such as a database)
- Datasets from an imported file (such as a spreadsheet)

Dimension / Dimension Folder: A dimension is a category or folder that contains individual attributes. Attributes are often used to describe business entities (like Customer, Account, Service Point, or Asset) and also to provide context to numeric data, such as being able to categorize count of To Do Entries by To Do Type.

Fact / Fact Folder: Facts contain measures that have aggregations built into their definitions.

Measure: A measure is an individual data element that is typically a calculated value, such as a dollar value (amount billed) or a quantity (number of failed assets). For example, you might want to determine the sum of dollars for a given product in a given market over a given time period.

Each measure has its own aggregation rule, such as SUM, AVG, MIN, or MAX. A business might want to compare the values of a measure and need a calculation to express the comparison.

> **Note**
>
> The word “measure” can be used synonymously with “metric”.

Workbook: A workbook is a grouping of canvases which can include data from one or more subject areas.

Subject Area: A subject area is a logical grouping of data that can be analyzed in a manner that reflects the structure of the business. See Subject Areas above for details.

Visualization: Visualizations are graphical displays that help you to analyze your data in a productive and meaningful way.

Visualization Type: A visualization type refers to the type of graphic you want to create in your canvas, such as a pie chart, bar chart, or tree map.

Naming Conventions

Oracle Utilities Analytics Visualization uses prefixes in the names of workbooks and subject areas to indicate the type of data used or exposed in it.

Asset: This prefix is used in subject areas and workbook names to indicate that they only include asset-specific data such as asset types, work orders, and activities. See Asset Subject Areas.

Customer: This prefix is used in subject areas and workbook names to indicate that they only include customer-specific data. Examples of customer-specific data include Accounts, Persons, Premises, and Service Agreements. See Customer Subject Areas.

Meter: This prefix is used in subject areas and workbook names to indicate that they only include data specific to meters. Some examples of meter data are: Service Points, Usage Subscriptions, Devices, Events, and Activities. See Meter Subject Areas.

Common: This prefix is used in subject areas and workbook names to indicate that they are shared across all services. Some examples of common data are: To Do and Batch. See Common Subject Areas.

View Subject Area Metadata in the Analytics Table

Your Oracle Utilities SaaS application (Customer Cloud Service, Work and Asset Cloud Service, or Meter Solution Cloud Service) includes an **Analytics Table** portal that holds the metadata and definitions of each fact, dimension, and measure of every subject area available in Analytics Visualization. This information can be useful to see and understand as you work in the application.

> **Note**
>
> Changes to the Analytics Table metadata (such as editing the structure of the dimension and facts, or adding a new measure) can be made, but they will not be reflected in Analytics Visualization. It is recommended that you do not modify the metadata and use it for reference only.

To access the Analytics Table portal:

Do one of the following:

- Sign into the source application and then click **Admin Menu**, select **Analytics Configuration**, and then select **Analytics Table**.
- Search for "Analytics Table" using the search bar at the top of the screen.

For more information about the structure and content of the portal, go to the documentation library of any of the Oracle Utilities enterprise SaaS applications. Once there, search for and select the *Administrative User Guide* link, and then go to the section 'Defining Analytics Tables.'

- Customer Cloud Service Documentation Library
- Meter Solution Cloud Service Documentation Library
- Work and Asset Cloud Service Documentation Library

Base Data Visualization Workbooks

Oracle Utilities Analytics Visualization comes with a set of pre-built data visualization (DV) workbooks. See Base Data Visualization Workbooks for details.

Related Documentation

This section shows a list of guides that contain information related to the cloud services and product areas covered in this guide.

- Oracle Utilities Customer Cloud Service Documentation
- Oracle Utilities Meter Solution Cloud Service Documentation
- Oracle Utilities Work and Asset Cloud Service Documentation

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Administer the Service

Administrators can perform various setup and configuration tasks for Analytics Visualization. These tasks include granting access to the application and configuring the source applications that connect to Analytics Visualization.

> **Note**
>
> The tasks for setting up a user and configuring time and calendar dimensions must be done before Analytics Visualization can be used. The other tasks listed in this section can be performed later.

In this section:

General Configuration

Administrators can perform general configuration tasks, such as setting up new users and configuring the time and calendar dimensions in the source applications.

> **Note**
>
> The tasks for setting up a user and configuring time and calendar dimensions must be done before Analytics Visualization can be used. The other tasks listed in this section can be performed later.

In this section:

Set Up a User

Administrators must set up new users in Identity Cloud Service (IDCS) and assign them to the one or more Analytics Visualization roles that provide access rights to the available data sets and data visualization workbooks.

The steps for adding new users are described in the *Cloud Services Administration Guide* in Setting Up a User with Access to Analytics Publisher and Analytics Visualization. Use the information on this page to know what role types and data access permissions are available.

On this page:

Role Types

Analytics Visualization includes two role types that control what data sets and data visualization workbooks a user can view or edit.

Role Type	Description and Privileges
*X*ContentCreator	Users assigned to the *X*ContentCreator role (where *X* can be Customer, Meter, or Asset) can do the following: • View the data sets that the role has access to and create new workbooks from those data sets • View and open the sample workbooks available in `Shared Folders/Base DV Workbooks/X` • Save a sample workbook to a different folder so it can be customized **Warning** Do not save your custom workbooks to the folder `Shared Folders/Base DV Workbooks/X` where sample workbooks are placed by Oracle Utilities. If you do, your custom workbooks will be overwritten during an upgrade. • Create new data sets by using the available connection to the software-as-a-service enterprise application database (such as Customer Cloud Service, Meter Solution Cloud Service, or Work and Asset Cloud Service) • Create new custom folders in My Folders and Shared Folders • Delete custom workbooks and custom datasets • Create new folders, rename, duplicate, and delete folders • Move subfolders from one parent folder to another (excluding Base DV Workbooks)

Role Type	Description and Privileges
*X*ContentConsumer	Users assigned to the *X*ContentConsumer role (where *X* can be Customer, Meter, or Asset) can do the following: • View and open the sample workbooks available in `Shared Folders/Base DV Workbooks/X` • View and open the list of custom workbooks saved by your organization in other folders *X*ContentConsumers cannot do the following: • View data sets and subject areas • Edit sample or custom workbooks • Create new workbooks • Save an opened sample workbook to a different folder so it can be customized
*X*PowerUser	Users assigned to the *X*PowerUser role (where *X* can be Asset, Bill, Common, or Meter) can do the following: • View the data sets that role has access to and create new workbooks from those data sets • Create new folders in the `My Folders` and `Shared Folders/Custom` folders • Create, edit, and delete sample workbooks available in `Shared Folders/Base DV Workbooks/X` • Save a sample workbook to a different folder so it can be customized **Warning** Do not save your custom workbooks to the folder `Shared Folders/Base DV Workbooks/X` where sample workbooks are placed by Oracle Utilities. If you do, your custom workbooks will be overwritten during an upgrade.
ConfidentialReportAccess	Users assigned to this role are granted access to folders/reports that are deemed confidential by the customer. By default, this role is not assigned to any user or catalog content.
SensitveReportAccess	Users assigned to this role are granted access to folders/reports that are deemed sensitive by the customer. By default, this role is not assigned to any user or catalog content.
AuditReportAccess	Users assigned to this role can access reports that have been added to the Analytics Publisher catalog for audit purposes. By default, this role is not assigned to any user.

Role Names and Privileges

The user roles in Analytics Visualization come with different access privileges.

Role Name	Description and Access Privileges
BillPower**User**	**Data Sets with 'Customer' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Access **Data Sets with 'Meter' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Access **Data Sets with 'Common' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
BillingContent**Creator**	**Data Sets with 'Customer' Prefix'**: Access limited to Billing and Financial Transactions data sets. **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Access limited to Billing and Financial Transactions data sets. **Data Sets with 'Meter' Prefix'**: Access limited to the following: • Meter - Aggregated Measurement Count • Meter - Aggregated Measurement Quantity • Meter - Aggregated Timeliness Count • Meter - Aggregated Timeliness Quantity • Meter - Usage Exceptions • Meter - VEE Exceptions **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Access limited to the following: • Meter - Timeliness Count and Quality • Meter - Usage Exceptions • Meter - VEE Exceptions **Data Sets with 'Common' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access

Role Name	Description and Access Privileges
BillingContent**Consumer**	**Data Sets with 'Customer' Prefix'**: Read access limited to Billing and Financial Transactions data sets. **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Read access limited to Billing and Financial Transactions data sets. **Data Sets with 'Meter' Prefix'**: Read access limited to the following: • Meter - Aggregated Measurement Count • Meter - Aggregated Measurement Quantity • Meter - Aggregated Timeliness Count • Meter - Aggregated Timeliness Quantity • Meter - Usage Exceptions • Meter - VEE Exceptions **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Read access limited to the following: • Meter - Timeliness Count and Quality • Meter - Usage Exceptions • Meter - VEE Exceptions **Data Sets with 'Common' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
CustomerPower**User**	**Data Sets with 'Customer' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Access **Data Sets with 'Meter' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Access **Data Sets with 'Common' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: Access
CustomerContent**Creator**	**Data Sets with 'Customer' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Access **Data Sets with 'Meter' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access

Role Name	Description and Access Privileges
CustomerContent**Consumer**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: Read Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Read Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
MeterPower**User**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Access **Data Sets with 'Common' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
MeterContent**Creator**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Access **Data Sets with 'Common' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access

Role Name	Description and Access Privileges
MeterContent**Consumer**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: Read Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: Read Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
AssetPower**User**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
AssetContent**Creator**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access

Role Name	Description and Access Privileges
AssetContent**Consumer**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: Read Access **Data Sets with 'Operations' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: No Access
OperationsContent**Creator**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: Access
OperationsContent**Consumer**	**Data Sets with 'Customer' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix**: Read Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: Read Access

Role Name	Description and Access Privileges
CommonPower**User**	**Data Sets with 'Customer' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Customer**: No Access **Data Sets with 'Meter' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Meter**: No Access **Data Sets with 'Common' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Common**: No Access **Data Sets with 'Asset' Prefix'**: No Access **Workbooks in Shared Folders / Base DV Workbooks/Asset**: No Access **Data Sets with 'Operations' Prefix'**: Access **Workbooks in Shared Folders / Base DV Workbooks/Operations**: Access

Deprecated Roles

Note that the **CommonContentCreator** and **CommonContentConsumer** roles have been deprecated. No new users should be assigned these roles in Oracle Identity Cloud Service. If any existing users have been assigned these roles, they must be removed.

Configure the Calendar and Time Dimensions

In order to align Oracle Utilities Analytics Visualization with the calendars leveraged in the source business application, the Calendar Dimension and Time Dimension must be populated within the source application.

On this page:

Overview of the Calendar Dimension

The calendar dimension holds all the dates that can be used in a report or as a filter. The dates in the calendar dimension must be the same as the dates for which you have data in your transactional application. If the calendar dimension does not have all the dates that are in the data, reports will not show data for the dates missing from the calendar dimension

For example, consider a report that shows the number of bills created, each day, of a selected month. Below are some scenarios of how this information will be displayed based on whether the calendar dimension is configured properly.

- **Scenario 1**: Suppose your application has bill data for 2021 and 2022, and the calendar dimension is populated with dates for 2021 and 2022. In this case, users will be able to see the number of bills created, each day, of any month in 2021 or 2022
- **Scenario 2**: Suppose the calendar year 2023 starts, and the calendar dimension is not updated with dates for 2023. In this case, unless the calendar dimension is updated with dates from 2023, users will not be able to view data for 2023 in the report.

Load Time Dimension

1. Sign in to the source Oracle Utilities application.
2. In the search bar at the top of the screen, search for the "Add Batch Job Submission" menu.
3. Click on the search icon next to **Batch Control**.
4. In the **Description** field, search for the “Generate Time Dimension” batch.
5. Enter any other desired configuration for the batch run.
6. Run the batch.
7. To check that the batch loaded the data successfully, follow the steps in Check Loading of Dimensions below.

Load Calendar Dimension

Prerequisite: For each source application connected to Oracle Utilities Analytics Visualization, you must first populate one or more calendars (account, financial, or work calendar) for the entire calendar interval for which the Calendar Dimension will be loaded. For example, a calendar might need to be populated for 01-01-2014 to 12-31-2020. Failure to do this will result in a load error, and the calendar dimension will not be populated.

- For the Customer Cloud Service, the account and financial calendar must be populated.
- For the Meter Solution Cloud Service, the account calendar must be populated.
- For the Work and Asset Cloud Service, the work calendar must be populated.

For instructions on how to define the account and financial calendar, go to the documentation library of any of the Oracle Utilities enterprise SaaS applications. Once there, search for and select the *Administrative User Guide* link, and then go to the section ‘Defining the Account Calendar.'

- Customer Cloud Service Documentation Library
- Meter Solution Cloud Service Documentation Library
- Work and Asset Cloud Service Documentation Library

Once the calendar has been configured, proceed with the steps below.

1. Sign in to the SaaS Oracle Utilities application.
2. In the search bar at the top of the screen, search for the "Add Batch Job Submission" menu.
3. Click on the search icon next to **Batch Control**.
4. In the **Description** field, search for the “Generate Calendar Dimension” batch
5. Enter the three parameters for Period Start Date, Period End Date, and Fiscal Calendar that correspond to the desired calendar range and fiscal calendar.
6. Enter any other desired configuration for the batch run.
7. Run the batch.
8. To check that the batch loaded the data successfully, follow the steps in Check Loading of Dimensions below.

Check Loading of Dimensions

1. Sign in to the source Oracle Utilities application.

2. In the search bar at the top of the screen, search for the **Calendar and Time Dimensions** menu.
3. Ensure the data you're expecting is available by using the filter options available within each Zone.

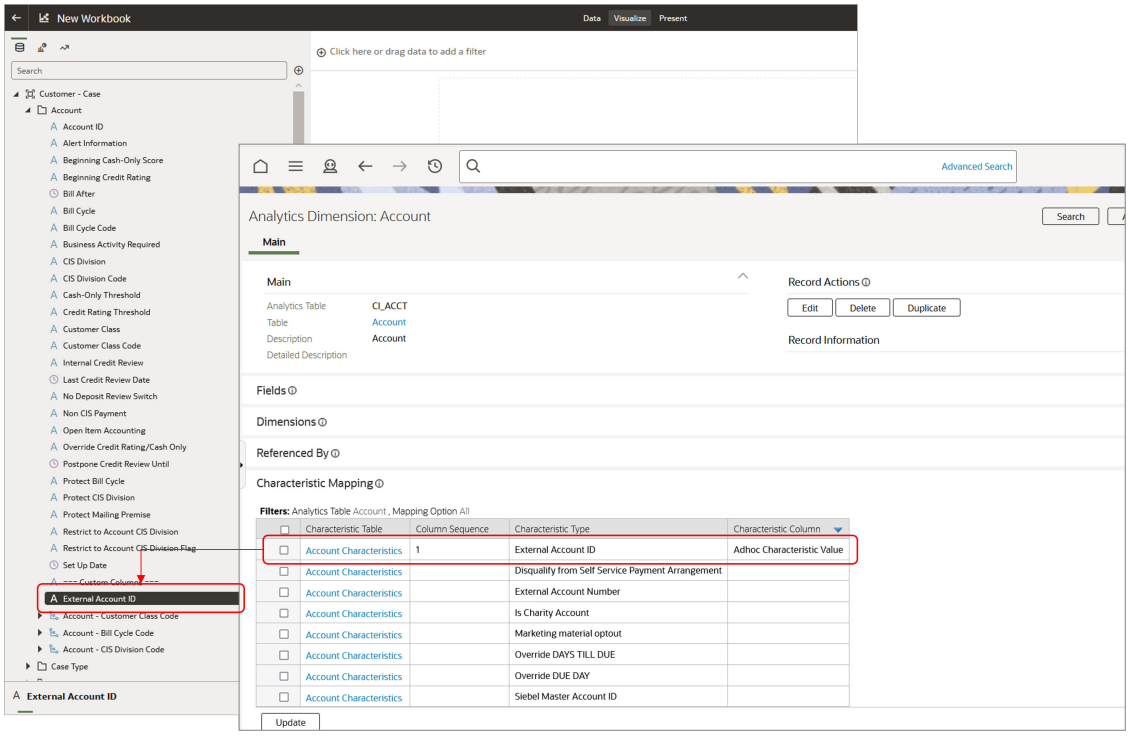
Enable Custom Attributes

Oracle Utilities business applications manage custom data in characteristics tables that are associated with a solution's maintenance objects. Characteristics of the type Predefined Value and Ad Hoc Value may also be exposed in Oracle Utilities Analytics Visualization subject areas so they can be used for analysis and data visualization.

On this page:

About Characteristics and Dimensions

Custom values defined by characteristics types appear as columns with data type VARCHAR in dimension tables after they have been mapped to target dimensions in Analytics Visualization. For example, in the image below, the Account dimension includes the characteristic type **External Account ID**. Characteristics are displayed at the end of the dimension folder below the separator **==Custom Columns==**.



For more information about mapping dimensions and characteristics, see the Oracle Utilities Analytics Visualization Characteristics video online.

Map Characteristics to Dimensions

The underlying maintenance object of each dimension supports a set of empty or free columns, which can be used by implementation teams to map characteristics. Each of these free columns has a unique identifier known as its Column Sequence. To map a characteristic to a target dimension in Analytics Visualization means to select a characteristic type of a table in the transactional application, and to map it to a free dimension column identified by its Column Sequence number.

The Column Sequence also determines the order in which characteristics are displayed in the dimension folder.

> **Warning**
>
> During implementation, it may necessary to change the Column Sequence number of characteristics or even remove mappings by changing or deleting the sequence number. However, be aware that c hanging the Column Sequence of a characteristic may break or modify analytic canvases that use the column's previous position. The mapping of characteristics in the transactional application to dimensions in the analytics application should be performed by application administrator.

To map a characteristic to a dimension:

1. In the **Search Menu** of your enterprise application (such as Customer Cloud Service, Meter Solution Cloud Service, or Work and Asset Cloud Service), enter "Analytics Table". The *Analytics Table Search* page displays.
2. Search for the dimension. A set of results displays.
3. Select the description link of the table where you want characteristics mapped. The description link takes you to the **Analytic Dimension** page shown in the screenshot above.
4. Expand the **Characteristic Mapping** zone. This zone manages characteristic mapping extensions for the dimensions. By default, only mapped characteristics are listed.
5. In the Characteristic Mapping zone, click the filter icon to search for a characteristic. To facilitate your search, you can use the options available to display all mapped and unmapped characteristics.
6. Select one or more characteristic types that you want to map and click **Update**. This allows you to adjust your mappings for a selected list of characteristics.
7. Specify a value for the Column Sequence to create a mapping.

   Note: Since Column Sequences are unique identifiers of dimension columns, the values that you specify must also be unique. It is best to start numbering your column sequence starting at 1 and increasing by 1.

   Tip: If the characteristic mapping was done while you were editing a project, then to view the new characteristics, click **Menu** on the project toolbar and click **Refresh Data Sets**.

To remove a characteristic mapping to a dimension:

1. In the Characteristic Mapping zone, press the filter icon to search for the characteristic.
2. Select the characteristic types that you want to unmap and click Update.
3. Delete the Column Sequence for the mapping and click Save.

> **Note**
>
> Removing the Column Sequence of a characteristic will break the analytics canvases that used it.

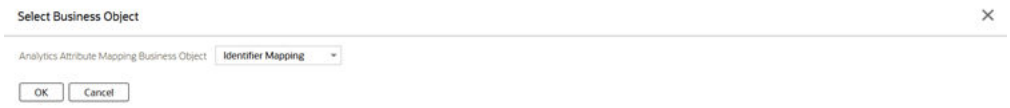
Map Custom Columns from Identifier Tables to Dimensions

Entities such as Service Point and Device Event can have child tables in which implementation teams can store customer-specific identifier information.

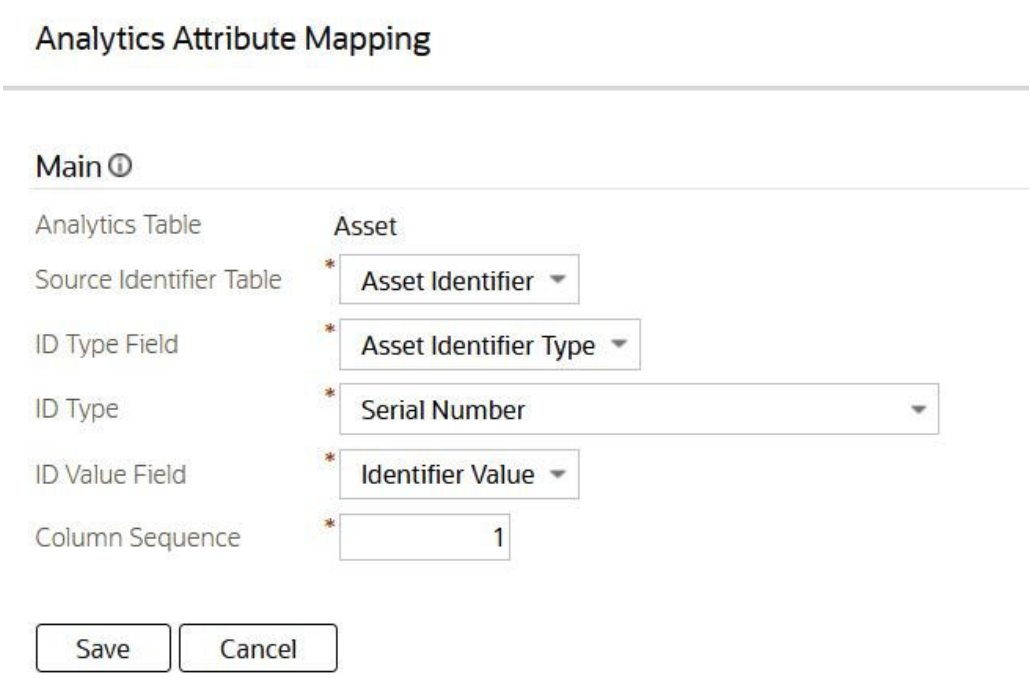
For example, during the implementation and configuration process for your cloud service application, your implementation team can create a child table to hold custom identifiers, such as a badge number for an asset like a meter, a set of IDs from a different asset management system, or a set of manufacturer IDs. You can then map these custom columns to a dimension in Analytics Visualization, where they can be added in a canvas to create a visualization, dashboard, or report. For example, you may wish to find assets with specific badge numbers and create a visualization to answer business questions about them.

To map a custom column from an identifier table to a dimension:

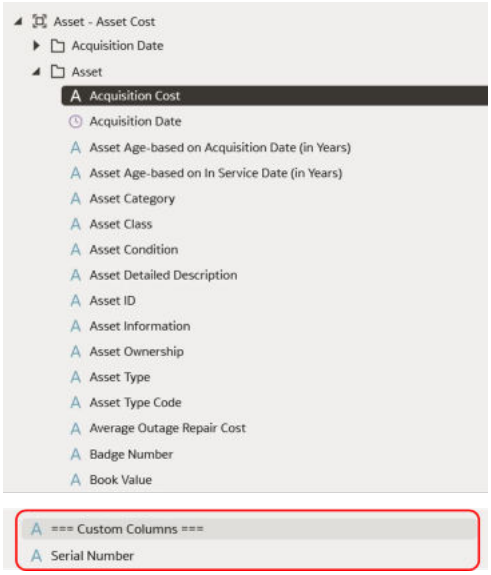
1. In the **Search Menu** of your enterprise application, enter “Analytics Attribute Mapping Table”. The *Analytics Attribute Mapping Table Search* page displays.
2. Click the **Add** button. The **Select Business Object** screen displays.
3. From the drop-down, select **Identifier Mapping** and click **OK**.



4. In the **Analytics Attribute Mapping** screen that displays, complete the following fields:
   - **Analytics Table**: Select the table containing the identifier table you want to map.
   - **Source Identifier Table**: Select the source table containing the identifier you want to map.
   - **ID Type Field**: Select the ID type field.
   - **ID Type**: This lists the available identifiers for the selected analytics table. Select the identifier you want to map.
   - **ID Value Field**: Select the ID value field.
   - **Column Sequence**: Specify the sequence in which the column should appear to create the mapping.



5. Click **Save**. The added field will be reflected under the **Custom Columns** section of the dimension in Analytics Visualization.



Asset Configuration

Administrators can perform configuration tasks in the Work and Asset Cloud Service to prepare data for Analytics Visualization.

In this section:

Configure Custom Buckets - Asset

Configure Custom Buckets - Asset

Facts and dimension attributes in the dimensional data model provided by Oracle Utilities Analytics Visualization may contain numerical attributes that become more useful when grouping them into categories that represent specific number intervals. This process is often referred to as "binning" or "bucketing." For example, an age attribute value may be assigned to an age bucket such as < 1 Year, 1-5 Years, 5-10 Years, 10-20 Years, or >=20 years.

Utilities business applications support a set of predefined bucket business objects that are used in Analytics Visualization. Intervals representing each bucket must be defined before the analytics solution can use bucket columns.

> **Note**
>
> Bucket configuration does not prevent the definition of multiple buckets for a predefined bucket business object. However, only one bucket definition per bucket business object is supported.

On this page:

Supported Buckets

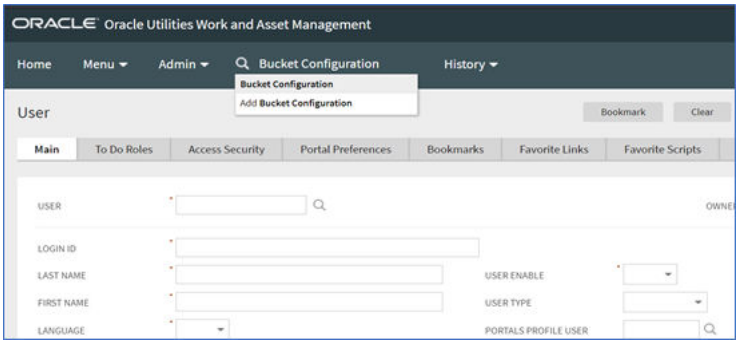
Buckets must be configured by an administrator before they can be used by the Oracle Utilities Analytics Visualization solution. The following buckets are currently supported.

Dimension	Importance	Bucket Value Ranges (Examples)	Column with Value to Be Bucketed	Column Details
Dimension: Asset **Attribute**: Condition Rating Bucket	Asset Condition rating is the assessment score that is calculated based on various assessments that are available for an asset.	Condition Rating Bucket will provide a meaningful illustration to users where condition rating can be structured in different buckets. Example: • 0 to 1: Unrated • 1 to 2: Very Good • 2 to 3: Good • 3 to 4: Average • 4 to 5: Poor • 5+: Very Poor	W1_ASSET.CONDITION_RATING Asset.Condition Rating	**Bucket Column**: Asset.Condition Rating Bucket **Business Object Name**: Asset Condition Score Bucket Configuration **Business Object Code**: W1-AssetConditionScoreBuckets

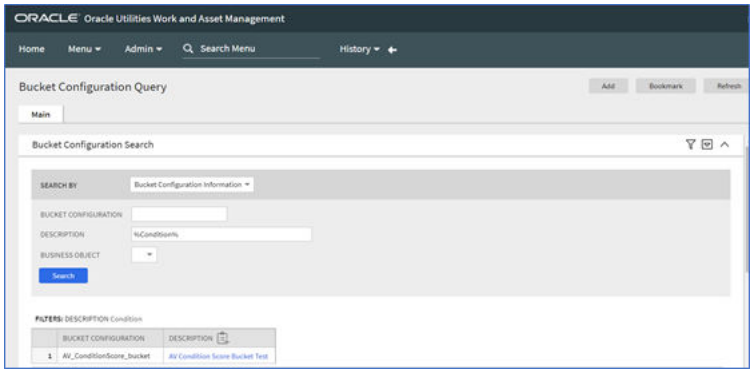
Dimension	Importance	Bucket Value Ranges (Examples)	Column with Value to Be Bucketed	Column Details
Dimension: Asset Location **Attribute**: Criticality Bucket	Criticality defines the importance of the location in terms of the potential impact of having issues or problems at that location.	Criticality Bucket will provide a meaningful illustration to users where criticality can be structured in different buckets. Example: • 0 to 4: Low • 4 to 7: Medium • 7 to 9: High • 9+: Critical	W1_NODE.CRITICALITY_FLG Location / Organization.Criticality Flag	**Bucket Column**: Location / Organization.Criticality Flag Bucket **Business Object Name**: Asset Criticality Bucket Configuration **Business Object Code**: W1-AssetCriticalityBuckets
Dimension: Work Orders **Attribute**: Work Priority Bucket	Work Priority defines the importance of the work in terms of the potential impact of not addressing issues. For example, emergency type work is a higher priority than routine maintenance work.	Work Priority Bucket will provide a meaningful illustration to users where work priority can be structured in different buckets. Example: • 0 to 5: Low • 5 to 6: Normal • 6 to 7: High • 7 to 9: Urgent • 9+: Emergency	W1_WO.WORK_PRIORITY_FLG Work Order.Work Priority Flag	**Bucket Column**: Work Order.Work Priority Flag Bucket **Business Object Name**: Work Priority Bucket Configuration **Business Object Code**: W1-WorkPriorityBuckets

Configure Custom Buckets

1. Sign in to the Oracle Utilities application.
2. In the search bar at the top of the screen, search for the "Bucket Configuration" menu and open it.

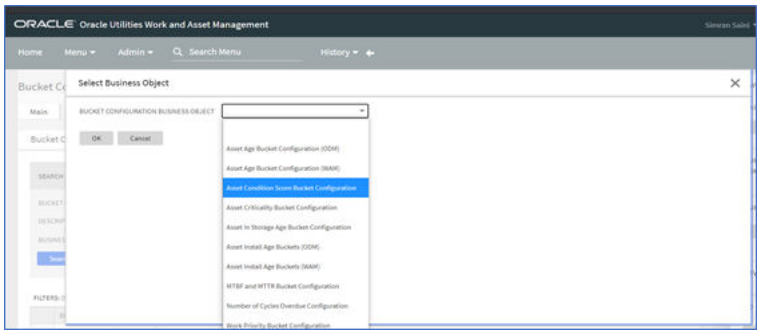


3. In the **Description** field, enter the percent symbol (%) to search for any predefined buckets.

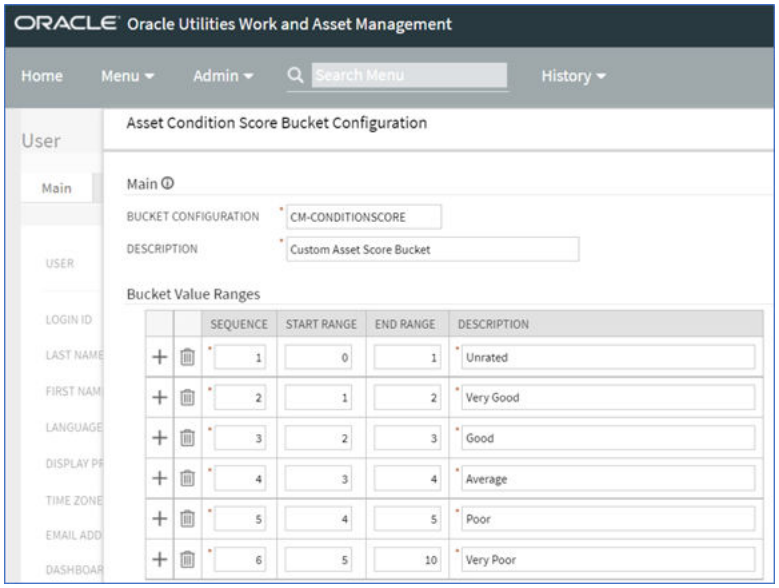


> **Note**
>
> A newly installed application will not have any default configurations. If there are any records available, results will be displayed based on the search criteria. Select any of the bucket configuration records returned from search results to navigate and view the configuration.

4. To add a new bucket configuration, click **Add** at the top right of the page.
5. Select an option from the **Bucket Configuration Business Objects** menu. These options represent the placeholder for the bucket definition.



6. In the **Bucket Configuration** field, define the bucket configuration code and its description. The code must be unique and should reflect the purpose of the bucket. For example, if the purpose of the bucket is for binning Asset Condition Scores, then your bucket configuration code could be CM-CONDITIONSCORE, where CM is a prefix that identifies that it is custom, and where CONDITIONSCORE represents that it is for binning Asset Condition Scores.
7. In the **Bucket Value Ranges** section, define a sequence of intervals for the start and end ranges that represents how the data should be grouped or binned. In most cases, the ranges must be continuous, and the start range must be the end range of the previous interval. The existing functionality will assign the attribute being binned into a range using the formula: Start Range <= x < End Range, where x is the numerical attribute being binned. The intervals must include all possible values of the underlying attribute that is binned into buckets. It is best practice to use a high value for the last end range to ensure that a large value is included in the interval defining the default bucket.



Important Constraints

Follow these guidelines to avoid incorrect behavior of buckets:

- Only one bucket configuration for each Bucket Business Object is supported by Analytics Visualization. Otherwise the application will return incorrect values and may double-count measures.
- The bucket definition must have intervals that do not overlap and must cover all possible values. Otherwise, the application will return incorrect values and may under- or double-count measures.

Customer Configuration

Administrators can perform configuration tasks in the Customer Cloud Service to prepare data for Analytics Visualization.

In this section:

Configure the Analytics Options Extendable Lookup

Configure Custom Buckets - Customer

Configure Batch Processes to Create Monthly Aggregates and Snapshots

Configure the Analytics Options Extendable Lookup

Oracle Utilities cloud service applications come with the ability to define and customize extendable lookups. Extendable lookups are a way of defining valid values that are more sophisticated than simple lookups. For Analytics Visualization, you must configure the Analytics Options extendable lookup that comes packaged with your application so that you can analyze and report on subject areas that are unique to your application.

In this section:

Configure the Analytics Options Extendable Lookup for High Bill Complaint Cases

Configure the Analytics Options Extendable Lookup for Revenue and Tax Amounts

Configure the Analytics Options Extendable Lookup for High Bill Complaint Cases

The Billing Overview subject area in the Customer Cloud Service includes the High Bill Complaint Cases Count metric. This metric is calculated by counting (1) cases associated with bills, (2) cases that have a case type that are classified as "High Bill Complaints," and (3) cases that are not in a specific case life cycle state (for example, cases in a "canceled," "rejected," or "resolved" state). Before this metric can be used, it is necessary to configure the Analytics Options extendable lookup. For example, you may want to do the following:

- Identify which characteristic type associated with a case can be used to identify the Bill ID on the case. This way, you can limit the cases to those associated with bills.
- Since case types vary by utilities, you must specify which case types should be classified as "High Bill Complaints".
- Identify life cycle states of High Bill Complaint cases (for example, cases in a "cancelled," "rejected," or "resolved" state) that should be excluded from the count.

To configure the lookup for High Bill Complaint cases:

1. Navigate to your instance of Oracle Utilities Customer Cloud Service and log in.
2. In the search menu, enter "Extendable Lookup."
3. Do one of the following:
   - In the Business Object field, enter F1-AVAnalyticsOptions
   - In the description field, enter Analytics Options
4. If this is the first time you are using this Analytics Options Extendable Lookup, click **Add** to create an extendable lookup for storing configurations that will be used by Oracle Utilities Analytics Visualization.
5. In the **Analytics Options** page that displays, enter the following:
   - **Option Name**: OUAV Extendable Lookup Config
   - **Description**: OUAV Extendable Lookup Config
   - **Detailed Description**: OUAV Extendable Lookup Config
6. Scroll down to the **Billing Overview** section.
7. From the **High Bill Complaint Case Type** drop-down list, select one or more case types you want classified as "High Bill Complaints". You can select one or more case types. The sequence number must be unique for each selected case type.
8. From the **Exclude High Bill Complaint Case States** drop-down list, select the life cycle states of these High Bill Complaint cases (for example, cases in a canceled, rejected, or resolved state) that should be excluded from the count.
9. From the **Bill ID Char Type on Cases** drop-down list, select the characteristic type associated with a case that can be used to identify the Bill ID on the case.
10. Save your configuration.

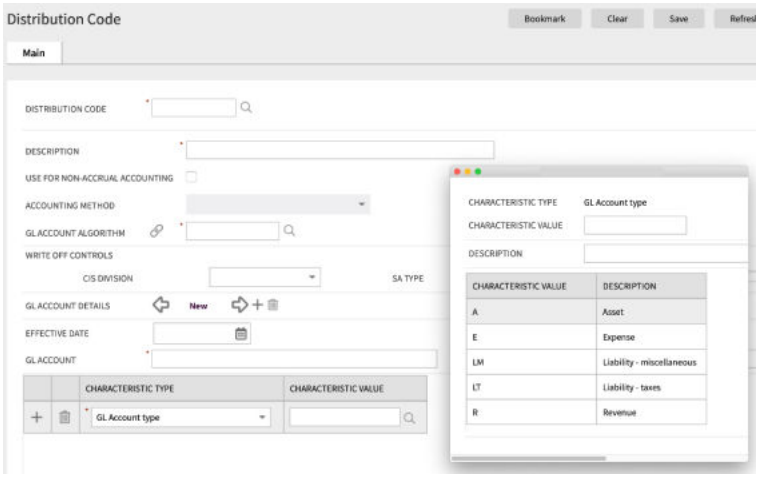
Configure the Analytics Options Extendable Lookup for Revenue and Tax Amounts

The Financial Transactions and Financial Transaction GL Details subject areas of the Customer Cloud Service include the Revenue Amount and Tax Amount metrics. These metrics are calculated based on revenue and tax characteristic values for the GL Account Type characteristic type specified for each Distribution Code GL Account. Each Distribution Code GL Account, in turn, identifies whether the GL record contributes to revenue or tax. Before these

metrics can be used, the values of the GL Account Type characteristic type must be configured for each Distribution Code's GL Account.

Step 1: Configure the Distribution Code GL Account Characteristic Type

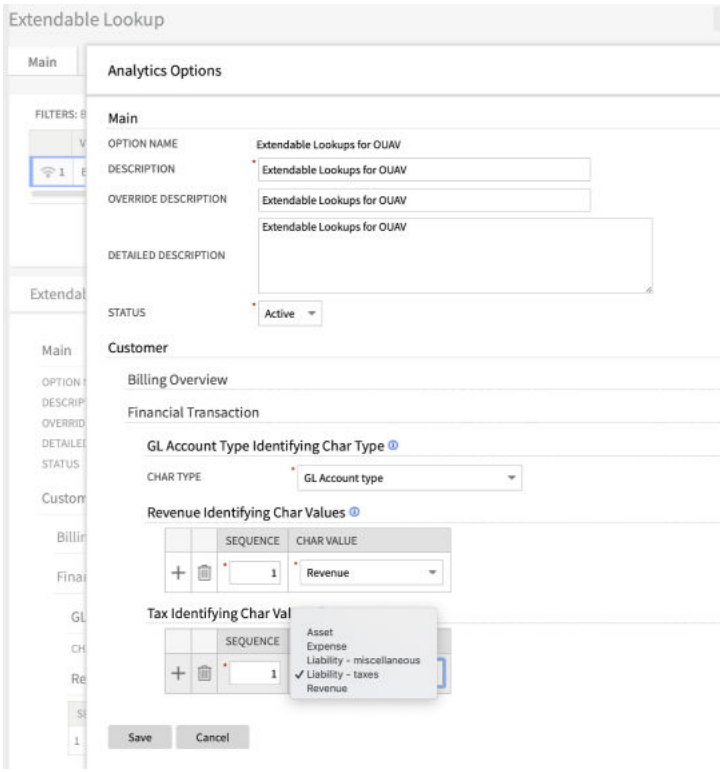
1. Navigate to your instance of Oracle Utilities Customer Cloud Service and log in.
2. In the search menu, enter "Distribution Code."
3. Select a distribution code.
4. In the **Distribution Code** page that displays, scroll down to the **GL Account** section.
5. In the **Characteristic Type** drop-list, select the **GL Account** type.
6. In the **Characteristic Value** field, click the search and choose a value to indicate whether the Distribution Code's GL Account will contribute to revenue or tax.



7. Repeat the above steps for each applicable distribution code, and click Save.

Step 2: Configure the Analytics Options Extendable Lookup for Revenue and Tax

1. Navigate to your instance of Oracle Utilities Customer Cloud Service and log in.
2. In the search menu, enter "Extendable Lookup."
3. Do one of the following:
   - In the Business Object field, enter F1-AVAnalyticsOptions
   - In the description field, enter Analytics Options
4. In the Analytics Options page that displays, go to the Financial Transactions section.
5. In the **GL Account Type Identifying Char Type** section, in the **CHAR TYPE** drop-down list, select **GL Account Type**.
6. In the **Revenue Identifying Char Values** section, enter a **Sequence** and a **Char Value** for the GL Account Type Characteristic Values that represent revenue to be included in this subject area. You can create additional entries as necessary for your implementation.
7. In the **Tax Identifying Char Values** section, enter a **Sequence** and a **Char Value** for the GL Account Type Characteristic Values that represent taxes to be included in this subject area. You can create additional entries as necessary for your implementation.



8. Click **Save**.

Configure Custom Buckets - Customer

Facts and dimension attributes in the dimensional data model provided by Oracle Utilities Analytics Visualization may contain numerical attributes that become more useful when grouping them into categories that represent specific number intervals. This process is often referred to as "binning" or "bucketing." For example, an age attribute value may be assigned to an age bucket such as 0-1 days, 1-2 days, 2-3 days, 3-4 days, or >=5 days.

Utilities business applications support a set of predefined bucket business objects that are used in Analytics Visualization. Intervals representing each bucket must be defined before the analytics solution can use bucket columns.

In this section:

Supported Buckets

Configure Custom Buckets

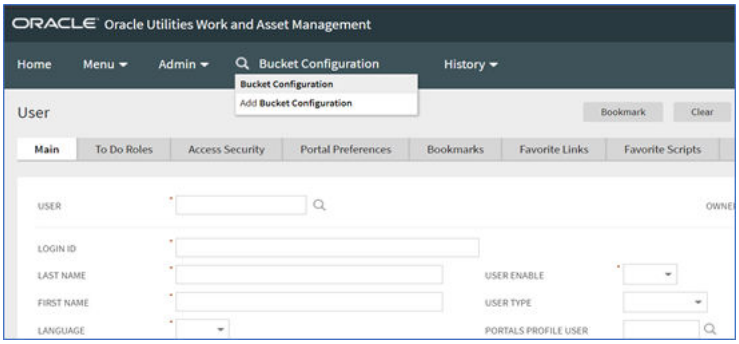
Supported Buckets

Buckets must be configured in the Customer Cloud Service application by an administrator before they can be used by Analytics Visualization. The following buckets are currently supported.

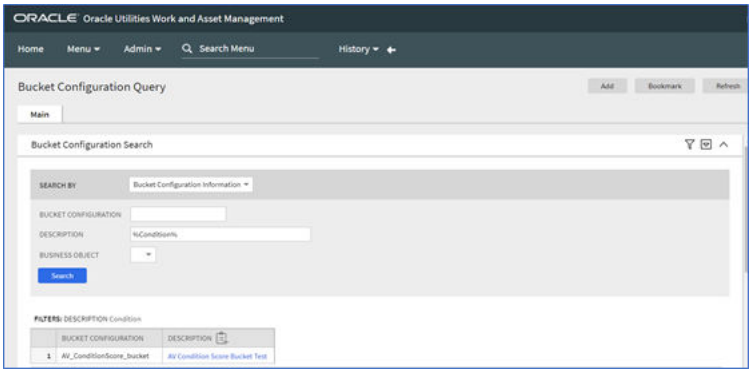
Dimension	Importance	Bucket Value Ranges (Examples)	Column with Value to Be Bucketed	Column Details
Dimension: Completed in Billing Day Window Bucket **Attributes**: • Bill Window Category • Bill Window Category Description • Billing Days in Window Bucket Config Code • End Range • Range Description • Sequence Number Code • Start Range	Identify the period in a bill cycle window when a bill was completed (for example, early in the bill cycle window).	Provides a meaningful illustration to users about when a bill was completed within its bill cycle window. Example: • 0 to 1: Day 1 • 1 to 2: Day 2 • 2 to 3: Day 3 • 3 to 4: Day 4 • 4 to 99999: Day 5+	DAYS_COMPLETED_AFTER_WIN_STARTDays Completed After Window Started	**Bucket Column**: Description **Business Object Name**: Billing Day In Window Configuration **Business Object Code**: C1-BillingDayInWindow
Dimension: Days Before Bill Window Closes Bucket **Attributes**: • Bill Window Category • Bill Window Category Description • Billing Days in Window Bucket Config Code • End Range • Range Description • Sequence Number Code • Start Range	Identifies how much time is left in an open bill cycle window for a bill to be completed.	Provides a meaningful illustration to users about the time remaining in an open bill cycle window for a bill to be completed. Example: • 0 to 1: Day 1 • 1 to 2: Day 2 • 2 to 3: Day 3 • 3 to 4: Day 4 • 4 to 99999: Day 5+	DAYS_BEFORE_BILL_WIN_CLOSESDays Before Bill Window Closes	**Bucket Column**: Description **Business Object Name**: Days Before Bill Window Closes Configuration **Business Object Code**: C1-DaysBeforeBillWindowCloses

Configure Custom Buckets

1. Sign in to the Oracle Utilities application.
2. In the search bar at the top of the screen, search for the "Bucket Configuration" menu and open it.

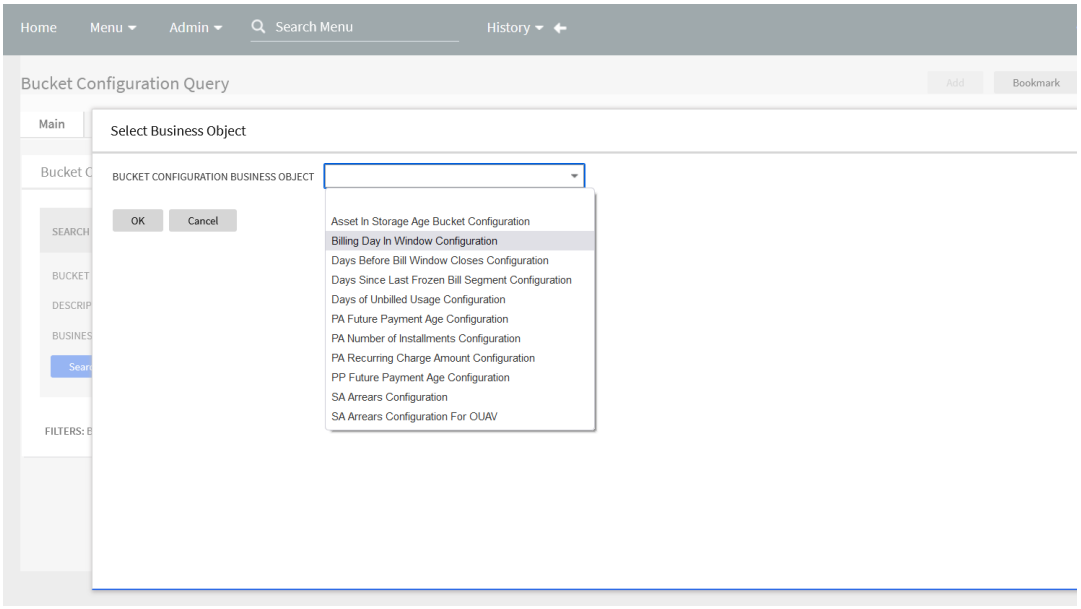


3. In the **Description** field, enter the percent symbol (%) to search for any predefined buckets.



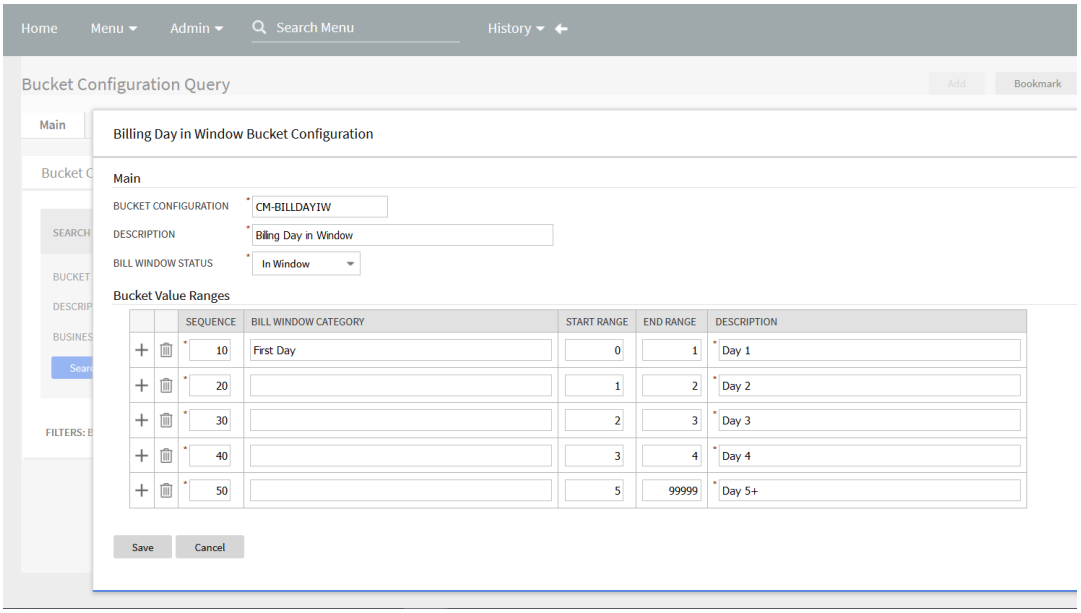
> **Note**
>
> A newly installed application will not have any default configurations. If there are any records available, results will be displayed based on the search criteria. Select any of the bucket configuration records returned from search results to navigate and view the configuration.

4. To add a new bucket configuration, click **Add** at the top right of the page.
5. Select an option from the **Bucket Configuration Business Objects** menu. These options represent the placeholder for the bucket definition.



6. In the **Bucket Configuration** field, define the bucket configuration code and its description. The code must be unique and should reflect the purpose of the bucket. For example, if the purpose of the bucket is for binning when a bill was completed within a bill cycle window, then your bucket configuration code could be CM-BILLDAYIW, where CM is a prefix that identifies that it is custom, and where BILLDAYIW represents that it is for binning Billing Day In Window.

7. In the **Bucket Value Ranges** section, define a sequence of intervals for the start and end ranges that represents how the data should be grouped or binned. In most cases, the ranges must be continuous, and the start range must be the end range of the previous interval. The existing functionality will assign the attribute being binned into a range using the formula: Start Range <= x < End Range, where x is the numerical attribute being binned. The intervals must include all possible values of the underlying attribute that is binned into buckets. It is best practice to use a high value for the last end range to ensure that a large value is included in the interval defining the default bucket.



Important Constraints: Follow these guidelines to avoid incorrect behavior of buckets.

- Only one bucket configuration for each Bucket Business Object is supported by Analytics Visualization. Otherwise the application will return incorrect values and may double-count measures.
- The bucket definition must have intervals that do not overlap and must cover all possible values. Otherwise, the application will return incorrect values and may under- or double-count measures.

Configure Batch Processes to Create Monthly Aggregates and Snapshots

You can configure Customer Cloud Service (CCS) batch processes to aggregate financial transaction data and financial transaction general ledger data by month. This allows you to improve the query performance of visualizations that use monthly aggregates.

You can also configure batch processes to do the following:

- Take monthly snapshots of service agreement arrears. This enables you to capture arrears data at a specific point in time.
- Populate the C1_BI_BILL_OVERVIEW table. This is required to view data in the Billing Overview workbook.

In this section:

Aggregate Financial Transactions by Month

Aggregate Financial Transaction General Ledges by Month

Take Monthly Snapshots of Service Agreement Arrears

Populate Data for the Billing Overview Workbook

Aggregate Financial Transactions by Month

You can configure a batch process to aggregate financial transactions by month so that the application does not need to sum up the transactions every time a query is issued. Using your scheduler of choice, configure and schedule the following batch process to run monthly:

- **Batch Control**: C1-FTMA
- **Batch Name**: Aggregate Financial Transactions Monthly
- **Parameters**: The following parameters are used to determine the start and end dates of an aggregation period.
  - **Aggregation Horizon**: The number of months in which financial data will be included in the aggregation.
  - **Aggregation Lag**: The number of months in which financial data will be excluded in the aggregation as calculated from the current month.

Example Steps and Parameters

1. Run a one-time batch process to aggregate historical financial transaction data.
   For example, let's say you are currently in the month of April, 2022. If you have historical financial transaction data going back three years and four months, then set the Aggregation Horizon to 38 months. This means data would be aggregated by month from January 2019 through February 2022. Then set the Aggregation Lag for one month, which excludes the data for March 2022. (March is excluded in this case because updates may still be made to the financial transactions of that month.)

> **Note**
>
> This one-time batch process covers a long period of time, and so it may take a while to run. Wait until the process is finished before beginning the next step.

2. Use a batch scheduler of your choice to run the batch process on a recurring monthly basis. In this case, you would set the Aggregation Horizon to 2 (for two months prior to the current month of April), and the Aggregation Lag to 1 (for one month prior to the current month of April, so that any financial data that is still in progress would be excluded). This means that for the next month (May), the aggregation period would shift to February through March.

Aggregate Financial Transaction General Ledgers by Month

You can configure a batch process to aggregate financial transaction general ledger (GL) data by month so that the application does not need to sum up the transactions every time a query is issued. Using your scheduler of choice, configure and schedule the following batch process to run monthly:

- **Batch Control**: C1-FTGMA
- **Batch Name**: Aggregate FT GLs Monthly
- **Parameters**: The following parameters are used to determine the start and end dates of an aggregation period.
  - **Aggregation Horizon**: The number of months in which financial data will be included in the aggregation.
  - **Aggregation Lag**: The number of months in which financial data will be excluded in the aggregation as calculated from the current month.

Example Steps and Parameters

1. Run a one-time batch process to aggregate historical financial transaction GL data.

   For example, let's say you are currently in the month of April 2022. If you have historical financial transaction GL data going back three years and four months, then set the Aggregation Horizon to 38 months. This means data would be aggregated by month from January 2019 through February 2022. Then set the Aggregation Lag for one month, which excludes the data for March 2022. (March is excluded in this case because updates may still be made to the financial transactions of that month.)

> **Note**
>
> This one-time batch process covers a long period of time, and so it may take a while to run. Wait until the process is finished before beginning the next step.

2. Use a batch scheduler of your choice to run the batch process on a recurring monthly basis. In this case, you would set the Aggregation Horizon to 2 (for two months prior to the current month of April), and the Aggregation Lag to 1 (for one month prior to the current month of April, so that any financial data that is still in progress would be excluded). This means that for the next month (May), the aggregation period would shift to February through March.

Take Monthly Snapshots of Service Agreement Arrears

The monthly Service Agreement Arrears subject area allows you to answer questions about customers who have outstanding debt. The batch process below must be configured and scheduled using your scheduler of choice to run on a monthly basis so that you can capture a snapshot of the service agreement arrears for the previous month.

- **Batch Control**: C1-SASNM
- **Batch Name**: Capture Monthly SA Arrears Snapshot

  This batch process captures the service agreement (SA) arrears snapshot for the previous month. For example, if the job was submitted on any day in January, 2022, it would take the previous month's snapshot through December 31, 2021. The following criteria are used to select SAs and include them in the snapshot:

  – Exclude cancelled SAs.

  – Exclude SAs whose start date is later than the snapshot's end date. For example, if you ran a batch on May 5, a snapshot would be generated for the month of April. Any SA created after April 30 would be excluded.

  – Exclude closed SAs whose end date is before the snapshot date and where the difference, in days, between the snapshot end date and SA end date is greater than the configured number of days to exclude closed SAs. The configured number of days to exclude closed SAs is based on the daysSinceClosed parameter below. See the parameter description for details and examples.

- **Parameters**:

  – **daysSinceClosed**: Number of days to include closed SAs relative to the snapshot's end date. Any SAs that closed within the number of days provided will be included in the snapshot. A closed SA is one whose arrears balance is 0, meaning there are no more financial responsibilities.

    For example, let's say you configure daysSinceClosed to 7, and then you run a batch on May 5. A snapshot would be generated for the month of April. Since daysSinceClosed was set to 7, then any SAs that were closed within 7 days dating backwards from April 30 (that is, from April 23-30) would be included in the snapshot. Any SAs closed before April 23 would be excluded.

    It is recommended that you set the daysSinceClosed parameter to 0. This way, the snapshot will not include any SAs that were closed within the previous month. If you want to include SAs that were closed in the previous month in your snapshot, then set the parameter to 30.

Example Steps and Parameters

You can run the batch process to generate a snapshot of the previous month. You can also run the batch process to generate a snapshot of a month in the past prior to the previous month.

To generate a snapshot of the previous month:

1. Set the daysSinceClosed parameter to the desired number of days within which to include closed SAs as part of the snapshot. It is recommended that you set the parameter to 0. This way, the snapshot will not include any SAs that were closed within the previous month. If you want to include SAs that were closed in the previous month in your snapshot, then set the parameter to 30.
2. Run the batch process. It will generate a snapshot of the previous month.

3. Use a batch scheduler of your choice to run the batch process on a recurring monthly basis.

To generate a snapshot of a month other than the previous month:

1. Set the business date of the batch process to a date in the month that follows the month for which you want a snapshot. For example, let's say you are in the month of May, and you want a snapshot for the month of February. You would set the business date of the batch process to March 1 or any other day in March.
2. Set the daysSinceClosed parameter to the desired number of days within which to include closed SAs as part of the snapshot. See the procedure above for an example of the values you might want to use.
3. Run the batch process. It will generate a snapshot of the month prior to the business date you set.

> **Note**
>
> When you follow this procedure, the status of the SAs included in the snapshot may not be accurate. This is because the system always uses the latest status of an SA. This means that your historical snapshot may include SAs that were active in the past, but have since been closed. However, the arrears amount of the historical snapshot will still be accurate.

Populate Data for the Billing Overview Workbook

You can run a batch process to populate data in the C1_BI_BILL_OVERVIEW table, which is required to view data in the Billing Overview workbook.

- **Batch Control**: C1-BOVR
- **Batch Name**: Capture Billing Overview
- **Required Parameter**: horizon

Example Steps and Execution

1. Run a one-time batch process responsible for loading data into the Billing Overview table. This process handles both daily and historical loads (based on the horizon parameter). For example, if the current month is *April 2022* and historical bills exist for the past two years, set the horizon to *730 days*—either as a batch parameter or through an extendable lookup. The system will prioritize the batch parameter if both are provided. This will load billing data by day, covering the period from *April 2019 to April 2022*. All bills within this range will then be inserted into the Billing Overview table.
2. Use a batch scheduler of your choice to run the batch process on a recurring basis. The frequency you choose will depend on how often you need to reference the Billing Overview workbook. For example, if you need to reference the workbook on a daily, weekly, or monthly basis, then configure the batch scheduler to run the batch process on one of those frequencies if the system load allows for it.

Meter Configuration

Administrators can perform configuration tasks in the Meter Solution Cloud Service to prepare data for Analytics Visualization.

In this section:

Configure Aggregated Timeliness and Measurement Subject Areas

The standard timeliness and quality aggregation process available within the Customer Cloud Service and Meter Solution Cloud Service aggregates measurement data (including quantities and counts) for constituent measuring components based on the following dimensions: Postal, City, Head-End, Device Type, Usage Calculation Group, Market and Service Provider, and Service Type. The aggregated measurement data is accessed by the following subject areas:

- Meter - Aggregated Measurement Quantity
- Meter - Aggregated Measurement Count
- Meter - Aggregated Timeliness Quantity
- Meter - Aggregated Timeliness Count

Before the above four subject areas can be used, it is necessary to aggregate the measurement data in the Customer Cloud Service and Meter Solution Cloud Service. For instructions, see Configuring Timeliness and Quality Aggregation in the Oracle Utilities Meter Solution Administrative User Guide.

Configure Consumption Analytics

Some prerequisite aggregation configuration is required in the Meter Solution Cloud Service before you can analyze usage by network location, customer classification, region, and unaccounted for losses. For instructions, see Consumption Analytics Aggregations Overview in the Oracle Utilities Meter Solution Administrative User Guide. These aggregations populate the following OUAV subject areas:

- Meter - Customer Classification
- Meter - Distribution Nodes
- Meter - Downstream Service Points
- Meter - Downstream Usage
- Meter - Facilities
- Meter - Facility Usage

4

Connect to Your Data

You can connect to your data in several ways. First, you must initiate a connection to your database data source. You can also add a spreadsheet as a data source or connect to data using datasets.

Connect to Your Database Source

Analytics Visualization comes with a connection to your software-as-a-service (SaaS) database data source. However, the connection must be initiated.

1. Sign in to Oracle Utilities Analytics Visualization.
2. Click the **Create** button from the menu bar, and then click **Connection**.
3. In the dialog that displays, click **OK**.

Add a Spreadsheet as a Data Source

You can add a spreadsheet as a data source in Analytics Visualization. See the external topic Create Datasets from Files for details on performing this task.

Connect to Data Using Datasets

You can connect to your data using datasets and perform a variety of data visualization and analysis tasks. Datasets are self-service data models that you build specifically for your data visualization and analysis requirements. See the external topic Connect to Your Data Using Datasets for more information, and review the following applicable topics:

- About Opening Datasets
- What Are Datasets?
- Create a Dataset from a Connection
- Create Datasets from Files
- 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 Table to a Dataset Using a SQL Statement

> **Note**
>
> Analytics Visualization only supports creating or opening datasets from spreadsheets and the source database. See the restrictions below for more information.

Restrictions

As described in the external topic About Data Sources, there are various options for connecting to data sources. However, some of these options are restricted in Oracle Utilities Analytics Visualization. The restrictions include:

- You *can* create a connection to the Customer Cloud Service (CCS) database, Work and Asset Cloud Service (WACS) database, or Meter Solution Cloud Service (MSCS) database and use it as your data source. Only one connection can be created for each cloud service that you have purchased. For example, if you have purchased CCS, you can create a connection to the CCS source database.
- You *can* add data from a spreadsheet or csv file data source.
- You *cannot* edit or delete the connection details to your CCS, WACS or MSCS database data source
- You *cannot* create a connection to a database that is not the CCS, MSCS or WACS database
- You *cannot* connect to Oracle Applications Data Sources. This means the following tasks are not supported:
  - Connect to Data Sources
  - Connect to an Oracle Database

5

Subject Areas Out of the Box

Subject areas are the building blocks of your visualizations and canvases in Oracle Utilities Analytics Visualization. A visualization is built by choosing an appropriate subject area that has information that answers the business question you're analyzing.

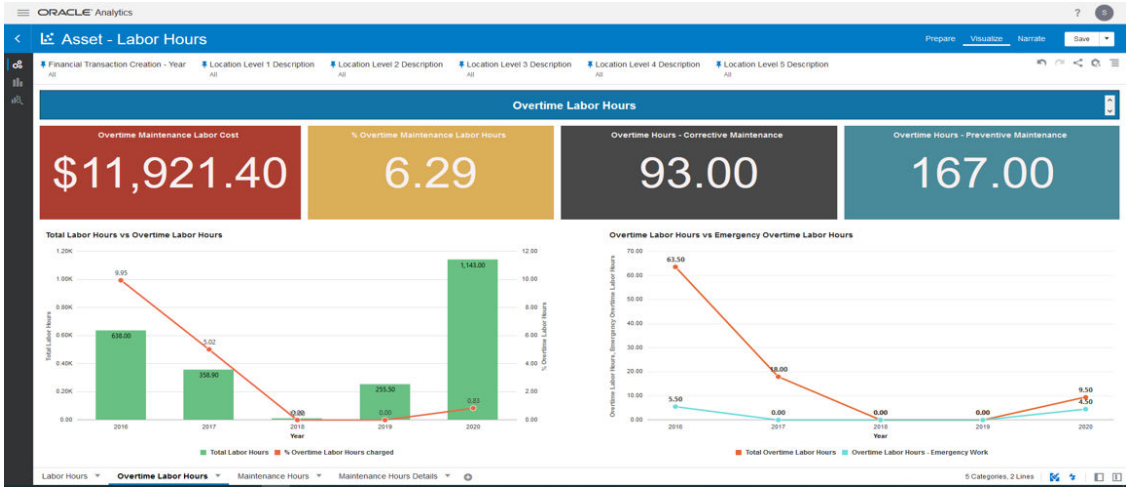
Technically, subject areas are groupings of information, called data objects, that relate to each other in a particular context. The subject area data comes from data objects pulled from your transactional database. The data is then grouped in a way that is intended to answer a specific set of questions about your organization. Any information your organization tracks can be grouped into a subject area and then used to build analytics.

There are multiple subject areas available in Oracle Utilities Analytics Visualization: asset, meter, and customer subject areas. Each subject area has a prefix to indicate the type of data exposed by it. For example, an asset subject area is prefixed with the word "Asset." See Naming Conventions for more information.

In this section:

Asset Subject Areas

The Asset subject areas are based on data from the Oracle Utilities Work and Asset Cloud Service, such as activities, asset costs, and labor hours. The image below is an example of how data could look in the Labor Hours subject area.



Asset - Activities

This subject area exposes all data directly related to activities. The metrics and attributes of this model can be used for various types of business analysis.

Answer questions like these:

- How many corrective work activities are in my backlog?
- How many preventive work activities are in my backlog?
- What is my breakdown by work priority of corrective and preventive work?
- What is my planned activity backlog by work type or status?
- What is my non-planned activity backlog by work type or status?
- What is the distribution and performance of compliance-related activities?

Asset - Activity Cost

This subject area can be used to analyze Failure Repair Costs, Maintenance Costs, Renewal Cost and Total Costs by Activity, Asset, Asset Location, Location Hierarchy, and Work Order.

Answer questions like these:

- What is the failure count by activity?
- What is the failure repair cost?
- What is the total maintenance cost?
- What is the total renewal cost?
- What is the total cost of all work activities?
- How is the performance of different organizations or departments in terms of Maintenance Cost, Renewal Cost, and Total Cost?
- What is the estimated and actual cost for different maintenance types, and how does it break down by resource class, cost category, or cost center?
- What is the corrective maintenance cost compared to the maintenance cost and its trend?
- What is the Estimate versus Actual Activity Cost trend?

Asset - Asset Availability Based on Downtime Service History

This subject area uses Downtime Service History to determine the number of hours or days an asset has been down due to failure. However, it only uses Downtime Service Histories associated to Work Activities with an unplanned downtime reason. This model can be used to analyze failures by the attributes of Activity, Asset, Asset Location, Crew, Failure Service History, Location Hierarchy, and Work Order.

Answer questions like these:

- What is the failure rate of assets based on downtime service history?
- What are the lifetime failures for an asset based on downtime service history?
- What is the count of asset failures for the last 12, 24, and 60 months based on downtime service history?

- What is the lifetime mean time between failure for assets based on downtime service history?
- What is the asset mean time between failure for the last 12, 24, and 60 months based on downtime service history?
- What is the mean time to repair by hours or days for assets based on downtime service history?
- What is the total failure downtime based on downtime service history?
- What is the total uptime by hours or days for assets based on downtime service history?

Asset - Asset Availability Based on Work Order

This subject area is based on the duration of asset-related work activity that has an associated Failure Service History. Note that if a work request is related to a failure work activity, then the creation date of the work request (rather than the work order) is used to calculate the duration of the downtime. This model can be used to analyze failures by the attributes of Activity, Asset, Asset Location, Crew, Failure Service History, Location Hierarchy, and Work Order.

Answer questions like these:

- What are the lifetime failures for an asset based on work order failure history?
- What is the count of asset failures for the last 12, 24, and 60 months based on work order failure history?
- What is the lifetime mean time between failure for assets based on work order failure history?
- What is the asset mean time between failure for the last 12, 24 and 60 months based on work order failure history?
- What is the mean time to repair by hours or days for assets based on work order failure history?
- What is the total failure downtime based on work order failure history?
- What is the total uptime by hours or days for assets based on work order failure history?

Asset - Asset Cost

This subject area can be used to analyze metrics and key performance indicators related to asset cost.

Answer questions like these:

- What is the asset life-to-date cost?
- What is the annual asset maintenance cost for the last three years?
- What is the average failure repair cost?
- What is the average outage repair cost?
- What is the total failure repair cost, maintenance cost, or renewal cost for assets?

Asset - Financial Transaction GL Detail

This subject area exposes all data directly related to financial transaction details. The metrics and attributes of this model can be used for various types of business analysis.

Answer questions like these:

- What is my budget amount by cost center?
- What are my costs by expense code?
- What are my costs by cost center?

Asset - Forecasted Activity Hours

This subject area can be used to determine the forecasted hours for activities along with related dimensions.

Answer questions like these:

- What is the forecasted number of labor hours on all open work activities?
- What is the forecasted number of labor hours for planned maintenance work activities?
- What is the forecasted number of labor hours for planned construction work activities?
- What is the number of planned versus unscheduled labor hours for maintenance work activities?

Asset - Forecasted Asset Cost

This subject area can be used to analyze the information about forecasted preventive maintenance and forecasted failure costs.

Answer questions like these:

- What is the forecasted preventive maintenance cost for the first year and next 2, 5, and 10 years?
- What is the forecasted preventive maintenance cost for the remaining life of an asset?
- What is the forecasted failure cost for the next 5 and 10 years?
- What is the forecasted failure cost for the remaining life of an asset?

Asset - Forecasted Asset / Resource Hours Fact

This subject area can be used to determine the forecasted preventive maintenance labor hours for each asset along with related dimensions.

Answer questions like these:

- What is the number of forecasted preventive maintenance labor hours needed for an asset in the next 1, 2, 5, or 10 years?
- What are the hours needed, by different resource type, for preventive maintenance work in the next 1, 2, 5, and 10 years?

Asset - Labor Hours

This subject area includes information related to labor hours against different charge types like activity, cost center, employee unavailability, or project in timesheet. You can get details about regular and overtime labor hours charged for different maintenance types.

Answer questions like these:

- What is the total labor cost, total labor hours, total regular labor hours, or total overtime labor hours distributed across departments or organizations?
- What is the breakdown of labor hours by regular versus overtime?

- What is the breakdown of labor hours by preventive maintenance versus corrective maintenance?
- What are the top ten Asset Type, Activity Type, Resource Type consuming maximum labor hours?
- What is the trend of total labor hours and overtime hours?

Asset - Service History

This subject area can be used to analyze service history by Activity, Asset, Failure Cause, Failure Component, Failure Mode, Failure Repair, Asset Location, User, and more.

Answer questions like these:

- What is my count of service history by category?
- What is my count of service history by type?
- What is my failure count by failure cause, failure mode, failure component, and failure repair?

Asset - Stock Item Details

This subject area enable organizations to monitor and analyze their asset inventory by providing visibility on the key attributes of a stock item.

Answer questions like these:

- How are stock items distributed across storerooms and their availability?
- What is the dollar value of the inventory?
- How many capital spares are available?
- How are vendors distributed across geography and insights related to supplied stock items?
- What is the overall A-B-C categorization across storerooms?
- How much is the value of inventory over max?

Asset - Stock Transactions

This subject area provides insights on stock transactions, such as the location and status of stock items.

Answer questions like these:

- How many stock items are in transfer, in reserve, or on demand?
- What stock items are understocked, high on demand, or currently have open orders?
- Which top stock items have the highest utilization?

Asset - Timesheet Detail

This subject area exposes all data directly related to timesheet details. The metrics and attributes of this model can be used for various types of business analysis.

Answer questions like these:

- What is my labor hour breakdown by overtime verses regular time?

- What is my labor cost breakdown by overtime versus regular time?
- What is my labor hour breakdown by activity type for corrective and regular time?
- What are the top 10 crews with the most labor hours?
- What is the labor hour breakdown by employee for regular and overtime?

Asset - Work Orders

This subject area exposes all data directly related to work orders. The metrics and attributes of this model can be used for various types of business analysis.

Answer questions like these:

- What is the total count of all work orders?
- What is the count breakdown by regular and preventive work orders?
- What is the count of completed work orders, open work orders, or canceled work orders?
- What is the count of work orders by status for regular versus preventive work orders?
- What is the count of overdue work orders?
- What is the trend of maintenance work order creation versus completion?
- What is the backlog distribution across Asset Criticality and Work Priority?
- What is the overall work order backlog and how much planned work is unscheduled?
- What is the count of total work orders by asset location?

Meter Subject Areas

The meter subject areas are based on data objects available in the Oracle Utilities Meter Solution Cloud Service, such as device events and device commands. The image below is an example of how data could look in the Service Orders subject area.

Meter - Activities

This subject area can be used to answer a variety of business questions related to device commands, service orders, and field work activities.

Device Commands: This section of Meter - Activities can be used to visualize Smart Grid Gateway commands issued. These analytics will examine smart meter (AMI) command counts and duration. Answer questions like these:

- Is there a particular time of day when the AMI network is over-saturated? Are we calling a lot of commands at this time? Could we move the time when these commands are called?
- How many AMI commands are being called?
- How many disconnects are being called? Are we disconnecting people during very cold or hot weather periods?

You can also use maps to review and analyze device command activities data (such as over-saturated AMI networks, total disconnections per month, and more) in high-level summaries and detailed street views. Answer questions like these:

- Are commands failing in a particular area?
- Where are the customers with pending commands?

Service Orders: This section of Meter - Activities can be used to visualize Service Order Management activities. These analytics will examine service orders issued, trends, duration, and problem orders. Each of these analytics will include counts, duration, and tools to create additional calculations. Answer questions like these:

- How many service orders are we doing?
- How long does it take to enable service for a customer?
- How many open service orders do we have?

You can also use maps to review and analyze service orders data in high-level summaries and detailed street views. Answer questions like these:

- Where are the customers with open service orders?
- Where are the water leak service investigative orders?

Field Work Activities: This section of Meter - Activities can be used to visualize field work tasks. These analytics will examine counts and duration, and included tools to create additional calculations. Answer questions like these:

- How much field work are we requesting?
- How many open field work orders do we have?
- How long does field work take by field task type?

You can also use maps to review and analyze field work data in high-level summaries and detailed street views. Answer questions such as: Where are the customers with outstanding field work?

Meter - Timeliness, Count, and Quality

The following subject areas enable an analysis of your AMI system's quality and timeliness.

- Meter – Aggregated Measurement Count
- Meter – Aggregated Measurement Quantity
- Meter – Aggregated Timeliness Count
- Meter – Aggregated Timeliness Quantity

Meter - Aggregated Measurement Count

This subject area can be used to review and analyze the quality of interval reads.

Answer questions like these:

- Which AMI system has the most estimated measurements?
- Which meter type has the most missing measurements?

Meter - Aggregated Measurement Quantity

This subject area can be used to review and analyze the quantity of interval reads based on quality. For example, the quantity of estimated or regular interval data.

Answer questions like these:

- What is the quantity of estimated measurements?
- What is the quantity of regular measurements?

Meter - Aggregated Timeliness Count

This subject area can be used to review and analyze AMI timeliness delivery of interval reads.

Answer questions like these:

- Which AMI system has the most late measurements?
- Which meter type has the most on-time measurements?

Meter - Aggregated Timeliness Quantity

This subject area can be used to review and analyze the quantity of interval reads based on timeliness. For example, the quantity on-time or the quantity late.

Answer questions like these:

- What is the quantity of late measurements?
- What is the quantity of on-time measurements quantities?

Meter - Customer Classification

This subject area can be used to review and analyze usage consumption by customer classification. This helps you analyze water, gas, or electricity usage consumption by various dimensions like profile class and usage subscription class and type. This data is useful for regulatory reporting, revenue analysis, rate design, and planning.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- What is total consumption by region and customer type?
- What is the total consumption for residential customers?
- How does usage break down by usage subscription class (electricity, gas, or water) and usage subscription type (commercial, industrial, or residential)?

Meter - Device Event

This subject area can be used to count, visualize, and analyze device events coming from smart meters. You can also look at meter read remarks from legacy meter systems.

Answer questions like these:

- How many device events am I getting?
- How are the device events trending?
- Which meters have critical events (low battery, outage, high temperature) that must be evaluated quickly?
- Which service points have the most theft events?
- Which service points have the most diagnostics events?

You can also display device events on a map to review and analyze event data such as power outages, diagnostics, thefts, leaks, and low batteries in high-level views or detailed street views. Answer questions like these:

- Which areas have leak events?
- Where are most theft events occurring?
- Which geographical areas are having the most device communication failures?
- Which geographical areas are having the most device diagnostic failures?

Meter - Distribution Nodes

This subject area can be used to review and analyze usage consumption by distribution node or region. It helps you analyze usage by various nodes like substation, feeder, and transformers (facilities). This data is useful for regulatory reporting, distribution analysis, planning, and grid analysis.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- What is the usage consumption by distribution node (such as substation, feeder, and transformer or facility)?
- Which are the top N loaded transformers for a particular region?
- What is the usage consumption by region (such as city or postal code)?

Meter - Install Event and Usage Subscription Service Point

These subject areas together provide a multidimensional analysis of an organization's Meter Master Data counts within the Meter Solution Cloud Service, including devices, service points, and usage subscriptions. This data can reduce project times and improve efficiency by providing standard views to: verify data counts post conversion, track device installations during AMI rollouts, identify connected or disconnected devices and service points, and review and analyze active service points and any associated devices geographically.

Answer questions like these:

- How do I verify master data counts post conversion?
- How many devices or service points were installed or removed within the last seven days?

- How many devices were installed during an AMI rollout?
- How many connected or disconnected devices are there, and where are they located?
- How many connected or disconnected service points are, and where are they located?

Meter - Losses

The following subject areas enable a multidimensional analysis of your organization's meter losses. This helps you to identify possible losses, identify meters assigned to the wrong district meter or transformer, and identify where losses are happening (such as water leaks and electric revenue protection issues). It also helps work crews by providing the possible loss amounts and loss areas.

- Meter – Facilities
- Meter – Facility Usage
- Meter – Downstream Usage
- Meter – Downstream Service Points

Meter – Facilities

This subject area can be used to review and analyze individual service points mapped with facility.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- Is a facility (transformer) installed in an optimal geographical location with respect to connected downstream service points, or is there another facility that is better located?
- Are there facilities with incorrect geo coordinates?

Meter – Facility Usage

This subject area can be used to review and analyze the relationship of usage between a facility and downstream service points.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- What is the usage by facility?
- (When combined with Meter - Downstream Usage) What is the difference between the usage of the facility and the sum of the usage of the connected service points?

Meter – Downstream Usage

This subject area can be used to review and analyze the total downstream usage along with the percentage downstream usage by date.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- What is the downstream usage by day and location?
- What is the average downstream usage?
- (When combined with Meter - Facility Usage) What is the difference between the usage of the facility and the sum of the usage of the connected service points?

Meter – Downstream Service Points

This subject area can be used to review and analyze a downstream service point's physical location in a map, along with other details such as geographic latitude, longitude, address, and so on.

Prerequisite: Configure Consumption Analytics

Answer questions like these:

- What is the physical location (such as address and postal code) of a service point on a map?
- How many downstream service points are connected to a facility in a particular area or location?

Meter - Usage Exceptions

This subject area can be used to review and analyze usage exception data.

Answer questions like these:

- How many billing determinant exceptions per customer type are there?
- Which usage exceptions are holding up billing?

Meter - VEE Exceptions

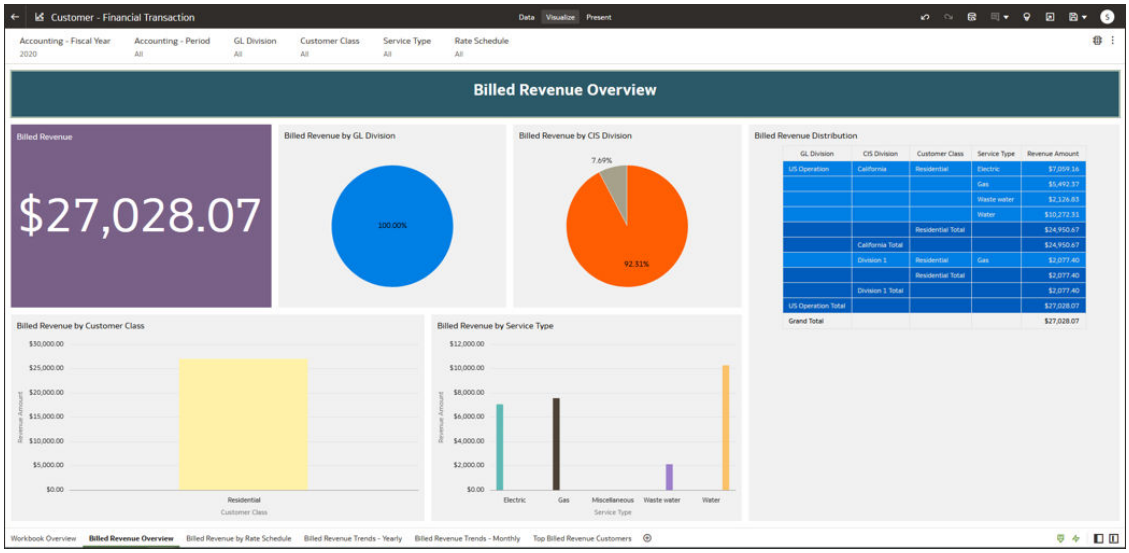
This subject area can be used to review and analyze validation, edit, and estimation (VEE) data.

Answer questions like these:

- Which VEE rules generate the most exceptions?
- Which service points / accounts have the most VEE errors?

Customer Subject Areas

The customer subject areas are based on customer data objects available in Oracle Utilities Customer Cloud Service, such as billed usage, financial transactions, and service agreement arrears. The image below is an example of how data could look in the Financial Transactions subject area.



Customer - Adjustment

The Adjustment subject area can be used to analyze count and current amount of adjustment data by adjustment status, cancel reason, and adjustment type.

Answer questions like these:

- Which adjustments are not yet finalized and therefore have not impacted a customer's account balance (e.g., not frozen)?
- What is the trend (e.g., volume, current amount) and current status of created adjustments over the past 12 months?
- What is the trend (e.g., volume, current amount) and current status of created adjustments over the past 31 days?
- What are the main reasons adjustments have been cancelled?
- What is the distribution of created adjustments by adjustment type over the past 12 months?
- Which adjustments are still waiting to be approved by a business user?

Customer - Billed Usage

The Billed Usage subject area can be used to visualize, review, and analyze billed usage information.

Answer questions like these:

- What are the billed amounts and billed quantities by Customer Class?
- What is the month by month comparison of billed amounts and billed quantities over a period of time?
- What were the highest billed amounts and billed quantities by Rate?

Customer - Billing Overview

The Billing Overview subject area can be used to visualize, review, and analyze billing information.

Answer questions like these:

- What is the number of pending and completed bills within a period of time?
- What are the trends in bill completions and bill amounts over a period of time?
- How many pending bills are without exceptions?

Customer - Cases

The Cases subject area can be used to analyze case data by attributes of Account, Case Type, Person, Premise, and User.

Answer questions like these:

- What is the distribution of open cases across customer classes and case types?
- Which business users have the most number of open cases and what state are these cases in?
- Which persons / addresses have had the most number of cases opened against them?
- What is the trend (e.g., volume) and case condition of created cases over the past 12 months?
- What is the trend (e.g., volume) and case condition of created cases over the past 31 days?
- For a specific case type, how long were cases in the previous state for?
- For a specific case type, what is the distribution across the final states the cases ended up in?
- For a specific case type, what was the average case completion duration?

Customer - Collectible Process

The Collectible Process subject area can be used to review and analyze collectible processes. A collectible process is a collection process and the severance processes it initiates.

A collection process is a series of events meant to encourage a customer to make payments for overdue debt for an account. A severance process is a more encouraging series of events to get a customer to make payments for overdue debt for a service agreement which may lead to a disconnection of service.

Answer questions like these:

- How many accounts are there, and what is the overall overdue debt under collectible and collection processing?
- What are the trends in the creation of collectible processes?
- Which Collection Process Templates were the most commonly and least commonly used?
- How effective were collectible processes in reducing a customer’s overdue debt?
- Which customers have the highest levels of debt under collectible processing?

Customer - Collection Process

The Collection Process subject area can be used to analyze the count and arrears amount of collection process data by collection status, collection status reason, collection process template, and attributes of account.

> **Note**
>
> The Collection Process subject area is superseded by the Collectible Process subject area, which may be used to review and analyze collection processes.

Answer questions like these:

- How are currently active collection processes, by count and initiated arrears amounts, distributed across customer classes and collection process templates?
- What is the distribution of active collection processes by initiated arrears amount and process age?
- Over the past 12 months, what is the current status of created collection processes by volume and initiated arrears amounts?
- Over the past 12 months, what is the distribution across Collection Status Reasons why collection processes were made inactive by volume and initiated arrears amounts?
- Based on Collection Status Reason, what were the most and least effective collection process templates that encouraged customers to make payment?
- Which accounts have had the most number of collection processes initiated against them over the past 12 months?

Customer - Customer Contacts

The Customer Contacts subject area can be used to analyze customer contact data by attributes of Account, Person, Premise, and User.

Answer questions like these:

- How are customer contacts distributed across Customer Contact Classes and Customer Contact Types?
- What is the monthly trend for customer contacts?
- What is the daily trend for customer contacts?

Customer - Deposit Control

The Deposit Control subject area can be analyzed to find unexpected anomalies with their ending balance. For example, this model can be used to find whether there are balanced deposit controls with a non-zero ending balance, or if deposit controls created in the past have still not been balanced.

Answer questions like these:

- Which deposit controls are unbalanced?
- What are the Ending Balances for balanced deposit controls?

Customer - Financial Transaction

The Financial Transaction subject area can be used to visualize, review, and analyze financial transaction information. You can configure a batch process to aggregate this data by month.

Answer questions like these:

- What is the billed revenue by Customer Class and General Ledger Division?

- What is the billed revenue by Rate?
- What is the yearly and monthly trend in billed revenue?

Customer - Financial Transaction General Ledger

The Financial Transaction General Ledger subject area can be used to visualize, review, and analyze financial transaction general ledger information. You can configure a batch process to aggregate this data by month.

Answer questions like these:

- What is the billed revenue and tax amount by General Ledger Division?
- What is the general ledger accounts summary over a period of time?

Customer - Payment Header

This subject area can be used to analyze the count and payment amount of payment header data by payment status, pay cancel reason, and customer class.

Answer questions like these:

- What is the extent of payments not yet finalized and therefore have not yet impacted a customer's account balance (e.g., not frozen)?
- What is the age distribution for payments that have not yet been finalized based on payment date?
- What is the trend (e.g., volume, payment amount) and payment status of created payments over the past 12 months?
- What is the trend (e.g., volume, payment amount) and payment status of created payments over the past 31 days?

Customer - Payment Tender

This subject area can be used to analyze count and tender amount of payment tender data by tender status, tender type, cancel reason and customer class.

Answer questions like these:

- What is the trend (e.g., volume, tender amount) and tender status of created payment tenders (i.e., how payments were made) over the past 12 months?
- What is the trend (e.g., volume, tender amount) and tender status of created payment tenders (i.e., how payments were made) over the past 31 days?
- Over the past 12 months, what is the distribution of payments across how payments were made (e.g., check, cash, etc.)?
- Which accounts had the most number of payment cancellations due to non-sufficient funds?

Customer - Service Agreement Arrears

The Service Agreement Arrears subject area can be used to review and analyze arrears (outstanding debt). You can configure a batch process to take monthly snapshots of this information.

Answer questions like these:

- What is the distribution of outstanding debt by age (for example, by 30, 60, or 90 days)? This can be further analyzed by Customer Class, Service Type, and Service Agreement Type.
- What is the trend over the past 15 months of outstanding debt by age (for example, by 30, 60, or 90 days)?
- Who are the top 100 customers with the highest amount of outstanding debt older than 30 days?

Customer - Severance Process

The Severance Process subject area can be used to analyze the count and arrears amount of severance process data by customer class, service type, and attributes of account and service agreement.

Answer questions like these:

- What are the trends in the creation of severance processes?
- Which Severance Process Templates were the most-commonly used and least-commonly used?
- What is the trend in service disconnections and reconnections?
- How effective were severance processes in reducing a customer's overdue debt?
- Which customers have the highest levels of debt under severance processing?

Customer - Tender Control

This subject area can be used to analyze the starting and ending balances of balanced and open tender controls by batch control, deposit control, tender source, and user.

Answer questions like these:

- Which tender controls are unbalanced?
- What are the Ending Balances for balanced tender controls?

Customer - Write-Off Process

The Write-Off Process subject area can be used to review and analyze outstanding debt associated with write-off processes.

Answer questions like these:

- How many active write-off processes exist, and what amount of outstanding debt initiated these processes?
- What is the trend in the effectiveness of write-off processes collecting outstanding debt over time?
- How many write-off processes are being created over time?
- What is the trend in the amount of outstanding debt initiating write-off processes (active and inactive) over time?
- Has the amount of outstanding debt to be written off been increasing or decreasing over time?
- Has the time it takes to complete or cancel a write-off process (debt written off / debt collected) been increasing or decreasing over time?

Common Subject Areas

Common subject areas are based on data objects that are shared across multiple Oracle Utilities cloud service applications, such as batches and To Dos.

Common - Batch

The Batch subject areas leverage the batch run, submission, and execution objects.

Common - Batch Performance

This subject area exposes common metrics based upon batch control. These can be used as reference metrics in conjunction with other subject areas in this family.

Answer questions like these:

- What is the average execution time for a particular batch control?
- What is the confidence interval for execution times?
- How many executions are used in this metric?

Common - Batch Run History

Every time a batch process is executed, a number of objects are created and updated to track the progress of the process during and after execution. This subject area is provided to allow for strategic analysis using history of execution at the batch run level.

Answer questions like these:

- What is the trend for executing a particular batch control?
- What method is used to initiate batches and when?
- Are there particular users overly contributing to my batch workload by manual submission?
- Is volume a factor in run-time overruns?
- What types of batch processes are executing over time?
- What is the trend of the executions over the last few months?
- Is my execution failing regularly or are there sporadic failures?
- Is my batch workload using the service functionality or predominately extensions?

Common - Batch Run Thread History

Every time a batch process is executed, a number of objects are created and updated to track the progress of the process during and after execution. Each thread of execution is recorded for post-execution analysis.

Answer questions like these:

- Are the threads of a batch process ending at the same time or is there data skew in processing? If some threads are ending later, what could be the cause?
- Are there any threads that are outliers in terms of elapsed time?
- Are certain threads consistently using up the resources over other threads?
- Is thread processing consistent over time?

Common - Batch Thread Capacity History

Every time a batch process is executed, a number of objects are created and updated to track the progress of the process during and after execution. This subject area allows you to subdivide a date into desired time intervals (for example, 10- or 15-minute intervals), and tells you what was running during that period for capacity analysis.

Answer questions like these:

- Are there peaks in my daily thread processing that I can move to other times?
- Am I running too many batches at the same time?
- Can I distribute workload evenly over the period to reduce capacity requirements over time?
- What type of workload is being executed at any time in my physical day?

Common - To Do Entry

This subject area includes pre-built metrics that can be used to analyze To Dos by attributes of Account, Contact, Device, Person, Premise, Service Agreement, Service Point, Measuring Component, and Usage Subscription.

Answer questions like these:

- How many incomplete To Do Entries are currently not being worked on / being worked on by users?
- What is the trend (volume and current incomplete state) of created To Do Entries over the past 24 months?
- Which accounts / premises have the highest number of incomplete To Do Entries?
- Which users have the highest number of incomplete To Do Entries?
- What is the average unassigned duration trend, based on creation date, for open To Do Entries belonging to a specific To Do Type?
- What is the average assigned duration trend, based on assigned date, for To Do Entries being worked on belonging to a specific To Do Type?

6

Base Data Visualization Workbooks

Analytics Visualization comes with a catalog of sample data visualization (DV) workbooks. The catalog can be viewed at **Catalog > Shared Folders > Base DV Workbooks**. The workbooks include:

- **Getting Started**: Information about the administrative tasks that must be performed before the pre-built workbooks can be return results.
- **Asset**: Data visualization workbooks based on asset data, such as work orders and activities.
- **Common**: Data visualization workbooks based on shared data, such as To Dos.
- **Customer**: Data visualization workbooks based on customer data, such as billing and financial transactions.
- **Meter**: Data visualization workbooks based on meter data, such as device events and usage exceptions.
- **Operations**: Information about how the Analytics Visualization application is used, such as which workbooks are being accessed.

> **Note**
>
> To view the workbook catalog on a mobile device, you must use the desktop site view. Consult your device's help for instructions on how to enable this view. For example, if you are using the Safari browser on an Apple device, go to any website and click the **aA** icon that appears before the address bar. From the options that display, choose **Request Desktop Website**.

To customize a base DV workbook:

If you want to customize any of the sample workbooks, you must first create a copy of a workbook and store it in a different folder. This is because any customizations made to the workbooks in the Base DV Workbooks folder will be lost when the application is patched or upgraded.

1. Navigate to the **Base DV Workbooks** folder, open the workbook you want to customize, and click **Save As**.
2. In the **Save Workbook** dialog, edit the **Location** section to move the workbook to a new folder, and click **Save**.

7

Data Modeling and Preparation

You can use Oracle Utilities Analytics Visualization to perform various data modeling and preparation tasks.

Task	Description
Analyze the performance of visualization components	Use built-in Performance Tools to analyze statistics such as query time, server time, and streaming time for visualization components in workbooks. See Developer Options.
Auto-join option in datasets with multiple tables	Use the Auto Join Tables option to turn off or on automatic join creation in datasets. By default, joins are created automatically when you drag and drop tables onto the Join Diagram. In some cases it's useful to turn auto joins off and build joins manually. See Disable Auto Joins in Datasets.
Add multiple tables to a data set	Perform self-service data modeling with datasets by adding multiple tables to a dataset from one or more relational data source connections. See Data Sources Available for Use in Datasets and Create a Dataset from a Connection.
Add local subject area data sources to datasets that contain multiple tables	Add local subject area data sources to datasets that contain multiple tables. See Create a Dataset from a Local Subject Area.
Reload datasets on a schedule	Schedule data reloads for any dataset with one or more tables set to automatically cache data. View information about the dataset reloads, such as history and schedule details. See Schedule a Dataset Reload and View a Dataset Reload Schedule's Details.

8

Visualize and Analyze Data

There are many ways that you can explore, visualize, and analyze data in Oracle Utilities Analytics Visualization. You can create workbooks, add data elements, create and apply filters, and more. See Visualize and Analyze Data for more information.

Task	Description
Add notes to canvases and tie notes to specific data points	You can add notes to canvases and tie notes to specific data points. See Add Notes to a Visualization.
Use conditional formatting to highlight important data events in your visualizations	Use conditional formatting to highlight important data events in your visualizations so that you can take action. See Format Data with Existing Conditional Format Rules.
Update the settings for multiple columns of a dataset at the same time	Save time when changing settings for multiple columns. Multi-select columns in the Metadata view to change the Data Type, the Treat As setting, the aggregation type, and the hide setting for more than one column at once. See Configure Columns Properties in a Dataset.
Update the shared properties of all visualizations on a canvas at the same time	Multi-select visualizations on a canvas to easily change shared properties for groups of content. See Work with Multiple Visualizations on a Canvas.
Use improved sort options in Visualizations to clearly see the sort order and any sort conflicts	Sort data in a visualization by a column that's not included in the visualization. See Sort, Drill, and Select Data in Visualizations.
Enter your own tooltip text to display when you hover over a visualization title	Enter your own tooltip text to display when you hover over a visualization title. See About Visualization Properties.

9

Filter Your Data

Filters reduce the amount of data shown in visualizations, canvases, and workbooks. You can use filters to find and focus on the data you want to explore. Some of the filter types available include Range, Top / Bottom N filter, List, Date, and Expression. See Filter Your Data for more information and instructions.

10

Use Data Actions to Connect Canvases and Launch Enterprise Applications

A data action link can pass context values as parameters to external URLs or filters to other canvases in the same or different workbooks.

In this section:

Create Data Actions to Connect Canvases

You can create data actions to navigate to a canvas in the current workbook or to a canvas in different workbook. 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.

To create a data action to connect canvases:

1. Create or open a workbook and confirm that you're working in the Visualize canvas.
2. Click **Menu** on the workbook toolbar and click **Data Actions**.
3. Click **Add Action** and enter a name for the new navigation link. **Note**: You can use only letters and numbers in the navigation link's name, and you can add multiple navigation links.
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. Click the **Target** field and select the workbook you want to use for the anchor:
   - **Use This Workbook**: Select this to link to a canvas in the active workbook. Columns that you select must be in the current visualization.
   - **Select from Catalog**: Select this to browse for the workbook that you want to use.
7. Click the **Canvas Link** field and select the canvas that you want to use.
8. Click the **Pass Values** field and select which values you want the data action to pass. For example, if you specified the Account ID column in the **Anchor To** field, 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.
   - **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. **Custom** - Enables you to specify a custom set of columns to pass.

9. Click **OK**.

Launch an Enterprise Application from a Canvas

You can use data actions to launch an Oracle Utilities software-as-a-service (SaaS) enterprise application to a particular page, in the context of a selected identifier, from a canvas.

For example, say you are looking at a workbook about Cases in Oracle Utilities Analytics Visualization and want to look at the details of a specific Case ID in Customer Cloud Service. This can be done by creating a data action link that dynamically passes the selected Case ID to the URL that opens Customer Cloud Service directly in the Case page, populated with the details of the selected Case ID.

Form the URL to Launch an Enterprise Application to a Particular Page

The online help available in your enterprise applications has good guidance on the topic of deep linking. Open the online help of a given enterprise application and search for the topic 'Creating Application Links in External Applications.' The topic suggests adding the following parameters to URL deep link calls to enterprise applications:

- `initNav=false`: This parameter skips launching the default home page for the user to speed up launching the intended deep linked page.
- `minDashboard=true`: This parameter minimizes the right dashboard for the user to speed up launching the intended deep linked page.

Taking this guidance results in one of the following URL schemes below. There is a slight difference depending on which release version is used.

https://{Saas enterprise app URL}/cis.jsp?minDashboard=true&initNav=false&script={product specific script}&FLAG={script specific flag}&PKVALUE1=${keyValuesForColumn:your ID}

- The `{Saas enterprise app URL}` section is where you insert your enterprise application environment URL.
- The `minDashboard=true&initNav=false` section has extra parameters added to speed up the quick launch of the specific page.
- The `&script={product specific script}&FLAG={script specific flag}&PKVALUE1=` section is where you insert the script that's specific to your entity to direct you to the appropriate page. See examples below.
- The `${keyValuesForColumn:your ID}` section will be the parameter type and name that needs to be passed in to the URL.

Deep Link Examples

Customer Solution Cloud Service

Product Specific Script	Script Specific Flag	ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp??minDashboard=true&initNav=false
C1-GoToCCB	FLAG=C1CC (Control Central Account)	Account ID	&script=C1-GoToCCB&FLAG=C1CC&PKVALUE1=${keyValuesForColumn:your Account ID}
C1-GoToCCB	FLAG=C1CP (Control Central Person)	Person ID	&script=C1-GoToCCB&FLAG=C1CP&PKVALUE1=${keyValuesForColumn:your Person ID}
C1-GoToCCB	FLAG=C1CR (Control Central Premise)	Premise ID	&script=C1-GoToCCB&FLAG=C1CP&PKVALUE1=${keyValuesForColumn:your Premise ID}

Tip

The values above are from the C1_TARGET_PORTAL_FLG lookup in the Oracle Utilities Customer Care and Billing application. Go to that lookup if you want to review the full set of options.

Other Deep Link URL Examples for Customer Cloud Service

ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp??minDashboard=true&initNav=false
Case ID	&location=caseMaint&CASE_ID=${keyValuesForColumn:your Case ID}
To Do ID	&location=toDoEntryMaint&TD_ENTRY_ID={your To Do ID} &location=toDoEntryMaint&TD_ENTRY_ID=${keyValuesForColumn:your To Do ID}

Meter Solution Cloud Service

Note

The URL Additions below are not limited to Meter Solution Cloud Service. They can be used to launch Customer Cloud Service from meter data that is available in OUAV for the Customer Cloud Service.

Product Specific Script	Script Specific Flag	ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp??minDashboard=true&initNav=false
D1-GotoMDM	FLAG=D1DV (360 View for Device)	Device ID	&script=D1-GotoMDM&FLAG=D1DV&PKVALUE1=${keyValuesForColumn: your Device ID}
D1-GotoMDM	FLAG=D1MC (360 View for Measuring Component)	Measuring Component ID	&script=D1-GotoMDM&FLAG=D1MC&PKVALUE1=${keyValuesForColumn: your Measuring Component ID}
D1-GotoMDM	FLAG=D1SP (360 View for Service Point)	Service Point ID	&script=D1-GotoMDM&FLAG=D1SP&PKVALUE1=${keyValuesForColumn: your Service Point ID}

Tip

The values above are from the DRILL_ENTITY_FLG lookup in the Oracle Utilities Meter Data Management application. Go to that lookup if you want to review the full set of options.

Work and Asset Cloud Service

Product Specific Script	Script Specific Flag	ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp??minDashboard=true&initNav=false
F1-GoToPrtl	mo=W1-ACT	Activity ID	&script=F1-GotoPrtl&mo=W1-ACT&pkValue1=${keyValuesForColumn: your Activity ID}
F1-GoToPrtl	mo=W1-ASSET	Asset ID	&script=F1-GotoPrtl&mo=W1-ASSET& pkValue1=${keyValuesForColumn: your Asset ID}
F1-GoToPrtl	mo=W1-NODE	Location ID	&script=F1-GotoPrtl&mo=W1-NODE& pkValue1=${keyValuesForColumn: your Location ID}

Product Specific Script	Script Specific Flag	ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp?? minDashboard=true&initNav=false
F1-GoToPrtl	mo=W1-WORKORDER	Work Order ID	&script=F1-GotoPrtl&mo=W1-WORKORDER&pkValue1=${keyValuesForColumn:your Work Order ID}

Other Deep Link URL Examples for Batch Run Analytics

ID	Addition to URL: https://{Saas enterprise app URL}/cis.jsp?? minDashboard=true&initNav=false
Batch Control Code and Batch Run Number	**21C and Later**: &location=CI0000001053&BATCH_CD=${keyValuesForColumn:Batch Control Code}&BATCH_NBR=${keyValuesForColumn:Batch Number Code}&BATCH_RERUN_NBR=0[RR1]

Create a Data Action to Launch an Enterprise Application in the Context of a Selected Column

1. Create or open a workbook and confirm that you're working in the **Visualize** canvas.
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.

   https://{environment base URL}/cis.jsp?minDashboard=true&initNav=false&script={product specific script}&FLAG={script specific flag}&PKVALUE1=${keyValuesForColumn:your ID}

   The column ID/names that you select are replaced with values when you invoke the data action.
7. Click **OK** to save.
8. In the **Canvas**, click a cell, or use Ctrl-click to select multiple cells.
9. 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).

11

Import, Share, and Export Workbooks

You can view, modify, and add access permissions for folders and workbooks, and share permissions for workbooks. Permissions determine the actions a user can perform when working with folders and workbooks. See Assign Shared Catalog Folder and Workbook Permissions for more information.

You can also import workbooks from other users or share workbooks with other users. See Import, Export, and Share for more information. The import and share features can also be used to migrate custom workbooks created in your Development environment to Test and Production environments in Analytics Visualization. However, note that the following tasks are not supported in Oracle Utilities Analytics Visualization:

- Share a Visualization, Canvas, or Dashboard to Social Media
- Delete Links Shared to Social Media

12

Extend and Customize

You can create your own datasets and data flows, and review the available data mapping sheets for your subject areas. You can also extend a subject area's dimensions by joining them to custom datasets.

A dataset defines the structure of usable data that can be leveraged in a workbook. There are a few different types of datasets:

- Subject areas that are constructed within a logical model. Oracle Utilities Analytics Visualization includes pre-built subject areas that span customer, meter, and asset data. See Subject Areas Out of Box for details.
- Datasets based on a direct connection to a source database
- Datasets from an imported file

Enrich and Transform Data

Data preparation involves cleansing, standardizing, and enriching your dataset before you visualize the data. See Enrich and Transform Data for more information.

Create Datasets Using Data Flows

You can use data flows to create datasets by combining, organizing, and integrating data. See Create Datasets Using Data Flows for more information.

Note that Oracle Utilities Analytics Visualization does not support Graph Analytics Functions.

Manage Datasets

You can manage datasets in a variety of ways, such as renaming a dataset, viewing a dataset's elements, and downloading or duplicating a dataset. See Manage Datasets for more information. Oracle Utilities Analytics Visualization supports the following features described on that page:

- Dataset Type Icons

  > **Note**
  >
  > The following icons are not applicable to Analytics Visualization: The icon representing two or more database connections, and the icon representing an Oracle Applications connection.

- View a List of Datasets and Information About Them
- Inspect a Dataset's Properties
- Rename a Dataset and Change Its Description
- View a Dataset's Data Elements

The other features described on Manage Datasets are not applicable to Analytics Visualization.

Data Mapping Sheets

Use the data mapping spreadsheets linked below for a list of the Analytics Visualization subject areas, dimensions, and attributes. This information will allow you to gain a deeper understanding of each subject area's attributes and which attributes they are mapped to in your Oracle Utilities source application (such as Customer Cloud Service or Meter Solution Cloud Service).

Subject Area	Data Mapping Sheet
Asset	Data Mapping Sheet - Asset.xlsx
Common	Data Mapping Sheet - Common.xlsx
Customer	Data Mapping Sheet - Customer.xlsx
Meter	Data Mapping Sheet - Meter.xlsx
Operations	Data Mapping Sheet - Operations.xlsx