

# **Oracle Utilities Advanced Spatial and Operational Analytics**

User's Guide

Release 2.4.0.3

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# Preface

This guide describes how to perform basic tasks using Oracle Utilities Advanced Spatial and Operational Analytics. The guide also identifies and describes the technical requirements to use the product, the architecture, and the user interface.

## Audience

This guide is intended for all users of Oracle Utilities Advanced Spatial and Operational Analytics.

## Related Documents

For more information, see the following documents:

- *Oracle Utilities Advanced Spatial and Operational Analytics Installation Guide*
- *Oracle Utilities Advanced Spatial and Operational Analytics Quick Install Guide*
- *Oracle Utilities Advanced Spatial and Operational Analytics Administration Guide*
- *Oracle Utilities Advanced Spatial and Operational Analytics Release Notes*

Oracle Utilities Business Intelligence Documentation Library:

- *Oracle Utilities Business Intelligence Quick Install Guide*
- *Oracle Utilities Business Intelligence Installation Guide*
- *Oracle Utilities Business Intelligence DBA Guide*
- *Oracle Utilities Business Intelligence User's Guide*

### See Also:

- *Oracle Utilities Business Intelligence V2.4.0 Server Administration Guide*
- *Oracle Utilities Application Framework V4.1 Business Process Guide*
- *Oracle Utilities Application Framework V4.1 Administration Guide*

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## Notational Conventions

The following notational conventions are used in this document:

Notation	Indicates
<b>boldface</b>	Graphical user interface elements associated with an action, terms defined in text, or terms defined in the glossary
<i>italic</i>	Book titles, emphasis, or placeholder variables for which you supply particular values
monospace	Commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter

# Chapter 1

## Overview Of Oracle Utilities Advanced Spatial and Operational Analytics

Oracle Utilities Advanced Spatial Analytics provides spatial and non-spatial analytics for Oracle Utilities Customer Care and Billing, Oracle Utilities Network Management System, Oracle Utilities Meter Data Management, Oracle Utilities Work and Asset Management, and Oracle Utilities Mobile Workforce Management data.

Oracle Business Intelligence Enterprise Edition built-in metaphors are utilized to display non-spatial information in tables, bar graphs, pie charts, and gauges. For spatial analytics, Oracle Map Viewer technology is integrated with Oracle Business Intelligence Enterprise Edition to display events, weather data, and other information that is geographically related.

### Application Requirements

The following table lists the system requirements necessary to access Oracle Utilities Advanced Spatial and Operational Analytics.

System/ Software	Requirement
Browser	IE 7.x IE 8.x Firefox 3.6.x (OBIEE only)
Operating System (Client)	Windows XP SP3 Windows 7
Operating System (Server)	AIX 6.1 (64-bit) Oracle Enterprise Linux 5.5 (64-bit) Red Hat Enterprise Linux 5.5 (64-bit) Sun Solaris 10 (64-bit) Windows 2008 Server SP2 (32-bit)
Application Server	WebLogic 10.3.5
Database	Oracle 11.2.0.2
Standard Resolution	1280 x 1024

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The following table lists down the supported source applications for Oracle Utilities Advanced Spatial and Operational Analytics.

Source Application	Requirement
Oracle Utilities Customer Care & Billing	2.2.0 2.3.1
Oracle Utilities Network Management System	1.9 1.10 1.11
Oracle Utilities Work & Asset Management	1.9
Oracle Utilities Meter Data Management	2.0.1
Oracle Utilities Mobile Workforce Management	2.1.0

## Oracle Utilities Advanced Spatial Analytics Fundamentals

This section describes fundamental Oracle Utilities Advanced Spatial Analytics concepts. See *Oracle Utilities Advanced Spatial and Operational Analytics Administration Guide* for a recommended approach to designing and setting up Oracle Utilities Advanced Spatial Analytics.

### General Data Warehousing Concepts

There is a great deal of theory and jargon that is unique to the data-warehousing world. Sometimes, just coming to grips with this theory can be overwhelming. The topics in this section summarize this theory and explain how it has been implemented in Oracle Utilities Business Intelligence.

#### Data Warehouse

The Oracle Utilities Business Intelligence data warehouse is a separate database from your operational database(s). This database is organized into a variety of star-schemas that contain data extracted from applications.

The following points describe the main uses of the Oracle Utilities Business Intelligence data warehouse:

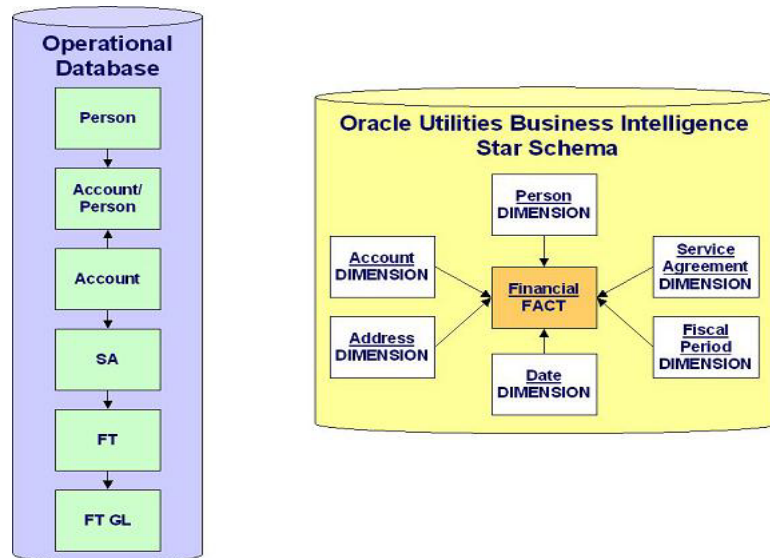
- Its data structures are designed to be easily accessible by end users for their reporting needs.
- Large volumes of data can be retrieved quickly. This allows for the fast rendering of the graphics that show key performance indicators (KPIs).

**You can add additional star schemas.** Oracle Utilities Business Intelligence is delivered with star schemas and graphics which suit data from various Oracle applications. Using development tools you can add additional star schemas and graphics.

#### Star Schema

All data that is extracted from your production system and transferred to the Oracle Utilities Business Intelligence data warehouse is held in "star schemas". A star schema is nothing more than the shape of the tables that hold a given type of factual data from your production system. Consider the following entity relationship diagrams (ERD).

The first figure shows the relational tables holding financial information in an operational database. The second figure shows the star schema that holds the equivalent data in a data warehouse.



The tables in a star schema are divided into two categories: facts and dimensions. Every star schema has a single fact table (at the center of the star) and one or more dimensions.

Fact tables contain individual rows for every occurrence of a fact in the production system. Fact tables contain columns called measures. It is these columns that are aggregated to calculate key performance indicators (KPIs). Refer to User Defined Measure (UDMs) for more information about measures.

Dimension tables are used to "slice" the facts in different ways. For example, the star schema above would allow users to "slice" the financial fact by the attributes on the 6 dimensions linked to it. Refer to User Defined Fields (UDFs) for more information about "slicing" facts using dimensional attributes.

**Cube = Star Schema.** Some refer to star schemas as "data cubes" due to their multi-dimensional nature (but cubes imply there are only 3 dimensions and most star schemas support more than 3 dimensions). The Fact ERD shown above implies that the Financial fact has 6 dimensions; in reality, it has more.

Contrast the operational database's ERD with that of the star-schema. Notice that the operational data structure has very "deep" relations (i.e., it has many levels of one-to-many's). Contrast this to the depth of a star-schema. Notice that a star schema is only one-level deep. This is no accident. Star-schemas are meant to be simple in structure to allow simple access paths.

A separate star-schema is maintained for every "fact" held in a data-warehouse. A fact is a record of an event that occurs in your operational system. For example, one fact might exist to record every bill and payment; whereas a different fact might exist to record every purchase order.

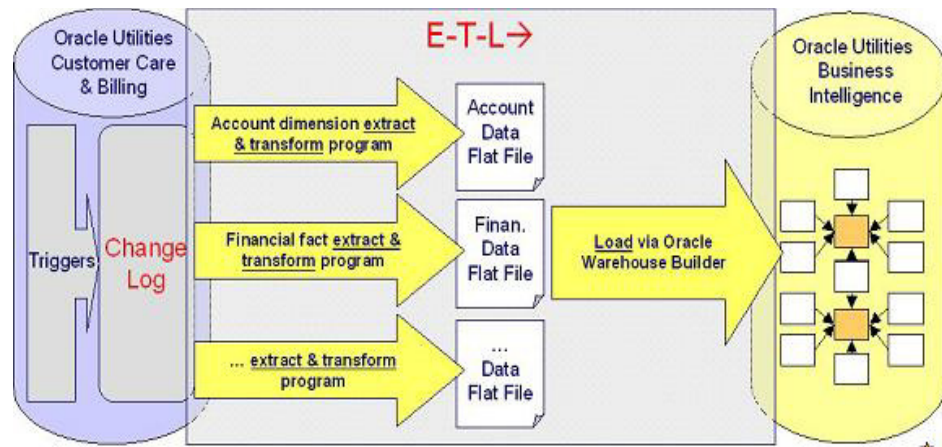
## Extract-Transform-Load (ETL)

The star schemas in a data warehouse are populated via a series of programs that do the following:

- Extract data from an operational system source system(s)
- Transform the data to suit the data warehouse
- Load the data into the warehouse's star schemas



Collectively, these programs are referred to by the acronym ETL. ETL programs are supplied for every fact and dimension in Oracle Utilities Business Intelligence. The following diagram provides an overview of these programs and how they are executed:



### Extract Programs

The extract programs execute in the operational database (as they are extracting operational data). A separate extract program is used for every distinct fact and dimension.

All extract programs extract their data into flat files. The flat files serve as input to Oracle Utilities Business Intelligence.

### Transform Programs

There are no programs dedicated to the transformation effort. This is because extract programs perform some transformation activities, while the load programs perform others.

### Load Programs

The flat files produced by the extract programs serve as input to the load programs. The load programs use this data to populate the star schemas in the data warehouse.

While any data warehouse product can be used to build the star schemas, Oracle Utilities Business Intelligence uses Oracle Warehouse Builder to perform this task. Oracle Utilities Business Intelligence is supplied with all of the metadata necessary to transform the extracted data and load the data warehouse.

### Materialized Views

Fact tables typically contain many rows. In order for the queries to perform adequately, the facts must be summarized.

While OLAP (online analytic processing) servers are designed to perform this task, we recommend a less costly approach - use "materialized views" to hold your summarized analytic data.

Materialized views are SQL statements whose results are saved on the database. Whenever the database receives an SQL statement that is the same (or similar) to a materialized view, it retrieves the data from the materialized view rather than performing the joins against the base tables. If you do not create materialized views to summarize your analytic data, the database must summarize the facts "on the fly" and this may have an adverse impact on performance. In other words, materialized views allow your end-users to have good response times.

Standard Materialized Views are provided in the Oracle Warehouse Builder metadata, and refresh process flows are provided that can be used to update materialized views after data is loaded into a fact table.

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The amount of time it takes to create materialized views is dependent on the number of rows in your facts and the variety of options in your zones. However, the payback can be large as whenever users need to access this data, the summarization of large volumes of data is obviated (i.e., response times will be fast). Note, materialized views only have to be generated after the data in the warehouse has changed (i.e., after having ETL'ed new operational data), and the existing process flows refresh the materialized view in incremental mode, so only new data will be added to the materialized views after a load.

If the associated materialized views do not get rebuilt after loading the data warehouse with new facts data, the associated materialized views will become "stale". The database will not use "stale" views and will have no choice but to summarize the facts "on the fly" if a query is received that requires this data (i.e., response times will be slower).

## **Capturing Changes In Source-Data**

Every production database table used to populate the data warehouse must be monitored for changes so that these changes can be reflected in the data warehouse. Triggers insert a row into the Change Log when the source tables change in Oracle Utilities Customer Care and Billing. Other edge apps, including Oracle Utilities Network Management System and Oracle Utilities Work and Asset Management have built in functionality that identifies changed data, which may not make use of the Change Log table. For Oracle Utilities Meter Data Management and Oracle Utilities Mobile Workforce Management, OUAF Business Objects are used to identify changed records, and this functionality may be used in future versions of the other edge apps.

Assuming that no extract changes are made, the product triggers in the edge apps do not have to change. However, if data is extracted from other tables, then triggers may need to be updated or added to capture the required data customizations.



# Chapter 2

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## Getting Started

Oracle Utilities Advanced Spatial and Operational Analytics comprises a set of answers and dashboards that are built on top of Oracle Business Intelligence Enterprise Edition and Oracle Utilities Business Intelligence v2.4.0.3.

This guide contains information that is specific to Oracle Utilities Advanced Spatial and Operational Analytics and does not cover common end user tasks for Oracle Business Intelligence Enterprise Edition and Oracle Utilities Business Intelligence. See **Related Documents** for a list of all available documents and the product library to which each document belongs.

## Accessing Oracle Utilities Advanced Spatial and Operational Analytics

This section explains how to perform the basic login and logout tasks.

### Logging In

To access Oracle Utilities Advanced Spatial and Operational Analytics, you use a URL, a user ID, and a password provided through your implementation. To login into the application, follow this procedure:

1. Type the URL into the address field on your browser (for example, `http://hostname:port/analytics`). The Oracle Utilities Advanced Spatial and Operational Analytics **Sign In** screen appears.
2. Type your user ID and assigned password.
3. Check the language displayed in the **Select a Language** drop-down box. By default, English is selected and the text displayed in the application appears in English. Choose a different language depending on your requirement.

**Note:** The dashboard analyses display translated text only if a customer has purchased and installed the language pack for Oracle Utilities Business Intelligence.

4. Click **Sign In**. After your credentials have been verified, the dashboard to which you have access rights will appear.

**Note:** The login credentials are provided by the system administrator. You are not privileged to change your login details. For any modifications, please contact your system administrator.

## Logging Out

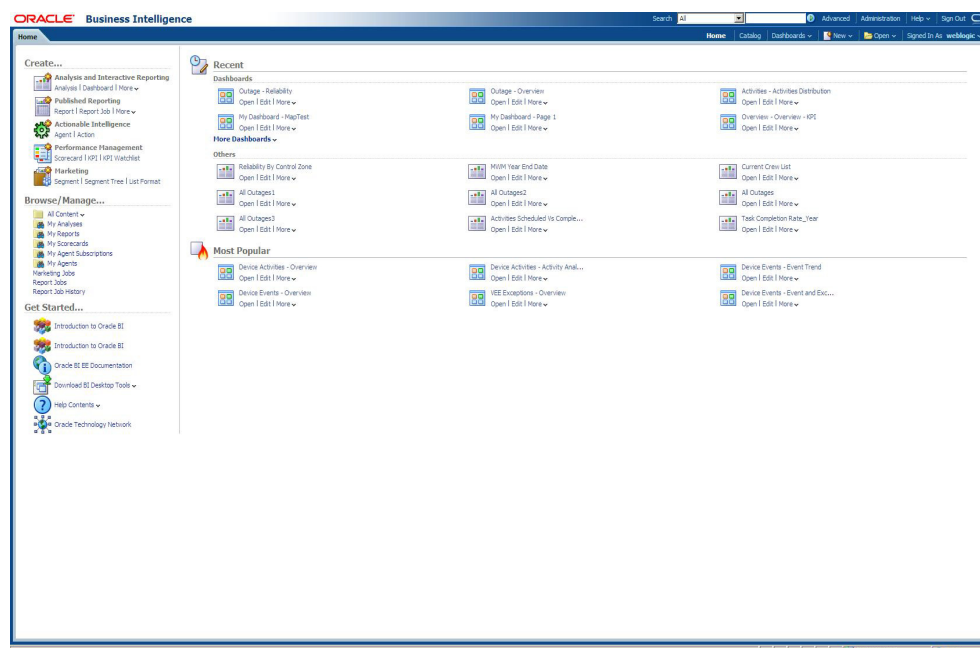
To logout of the Oracle Utilities Advanced Spatial and Operational Analytics application, click **Sign Out**. You are directed to the **Sign In** screen.

# Using Oracle Utilities Advanced Spatial and Operational Analytics

## About the Home Page

Home page is the first page you see when you log in. This page displays all the items (dashboards, tasks, reports, and more) you have recently accessed and also the reports most important or popular.

**Tip:** Because you are likely to return to the Home page very often, the application makes the navigation easier. From anywhere within the application, you can return to this page in a single click. The upper right corner of every screen features a **Home** link. Click it to return to your home base.



The administrator can set a dashboard as the default dashboard for different users. See OBIEE documentation for more details about customization.

## Using the Main Menu

The Main menu appears at the top of the application window.



The following table briefly describes the available menu options:

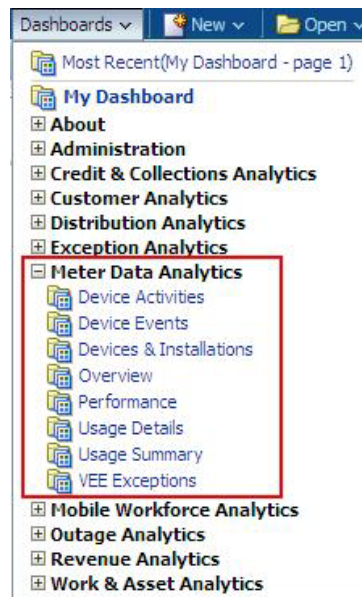
Menu	Description
Search	Allows you to search for various entities in the application. You can also use advanced search for specific search results.
Dashboards	Displays the Recent and Most Popular dashboards by default. From here, you can edit an existing dashboard depending on your logon privileges.
New	Allows you to create a new item, such as dashboard, filter, analysis, and more.
Administration	Allows you to display and edit application settings. Note that only authorized users will have access to this option.
Help	Opens the online help for the application.
Sign Out	Logs you out of the current session.

## Using the Dashboard Elements

Oracle Utilities Advanced Spatial and Operational Analytics comprises dashboards which are grouped by analytics. Use the **Dashboards** menu option to open the required dashboard.

**Note:** Not all answers and dashboards are accessible to all users. Based on your assigned role, only certain analytics (or dashboards) are available for you to access.

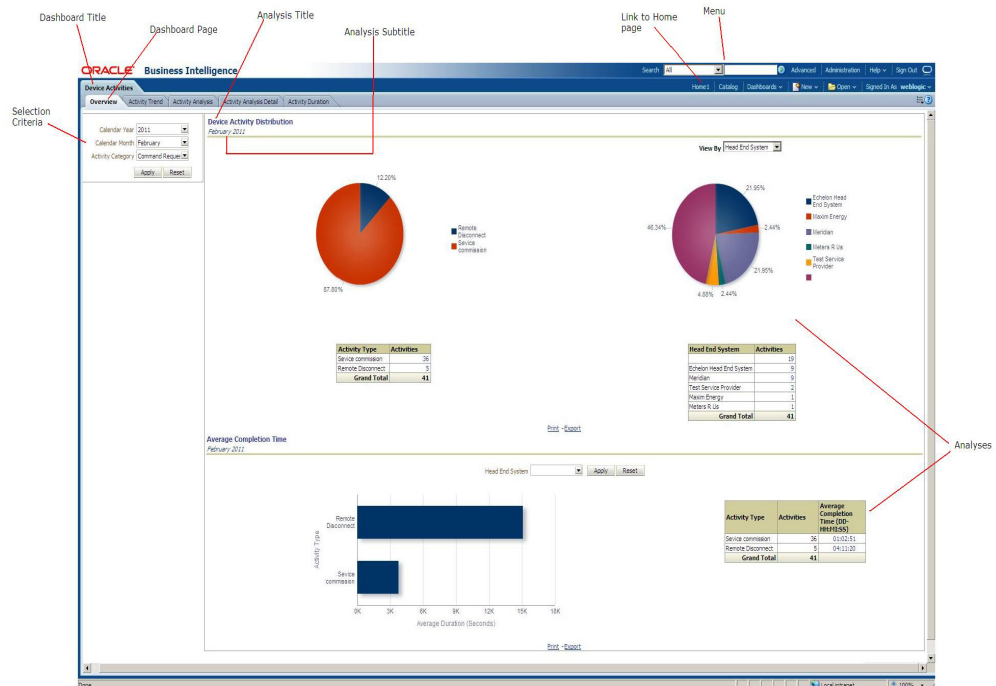
The following figure gives a snapshot of dashboards available in the Meter Data Analytics subject area.



## About the Dashboard Page

The Dashboard page is the first page you see when you open a dashboard. You can customize a dashboard page by generating custom analyses and reports. When you are working in an application, you can return to its Dashboard page at any time. To do so, click the application name on the upper left of the screen.

The figure below explains the elements in each dashboard page.



### Dashboard Title

The title bar contains the name of the dashboard you are viewing.

### Dashboard Page

Each dashboard comprises a set of dashboard pages segregated by the analytics. Each page, in turn, consists of analyses grouped per category.

### Analysis Title and Subtitle

Each analysis has a title and subtitle specifying what that analysis represents or denotes. Usually, the month (or over months) is displayed as a subtitle for an analysis, meaning the analysis displays data for that month.

### Selection Criteria

For an analysis to compile data, you need to select the criteria for which you want the data. The criteria details can include calendar year, calendar month, activity type, and more.

### Data Display

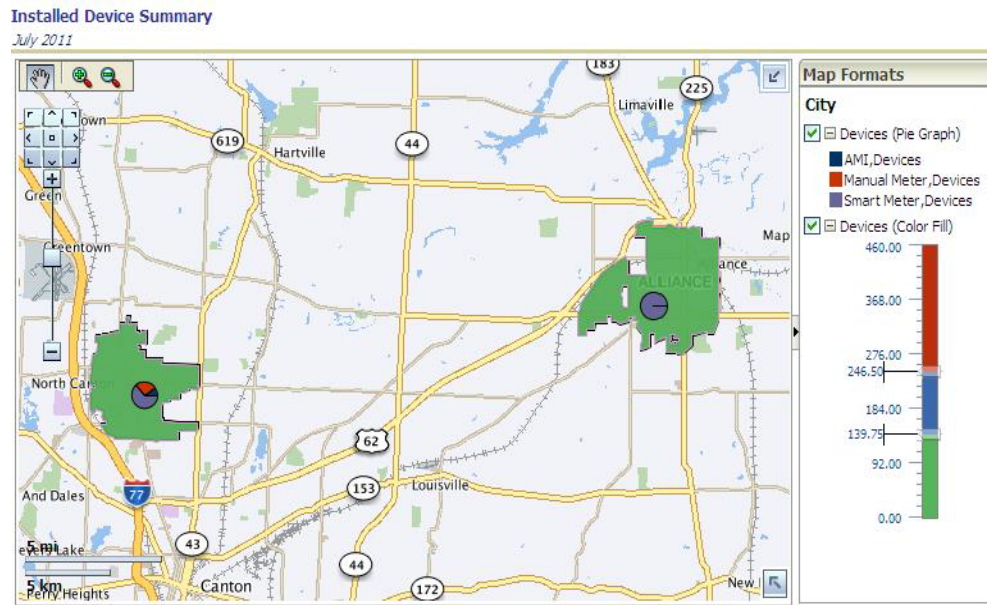
Based on your selection criteria, the application generates data as maps, pie charts, bar graphs, gauges, and tables.

### Geographic Maps

Geographic map zones are used to show geographic coordinate-oriented points of interest. For example, a map zone can show:

- The count of AMI meters installed
- The count of AMR meters installed
- Percentage of devices changed over the month
- ...

The following figure shows a geographic map zone that highlights device installation in a geographic area.



## Navigating the Map

Spatial data is displayed in a map view. Below is a list of icons in the navigation tool bar which appears on the top left corner of the map window.



Use the Pan icon to move the map around. Click the icon on the tool bar. The mouse pointer changes to the Pan tool and shows a hand when over the map. Click and drag the map in the required direction



Use to zoom in on the area currently displayed on the map.



Use to zoom out on the area currently displayed on the map.



Displays or removes the map legend. This button works like a toggle. Click once to hide the legend; click again to display the legend.

## Panning and Zooming.



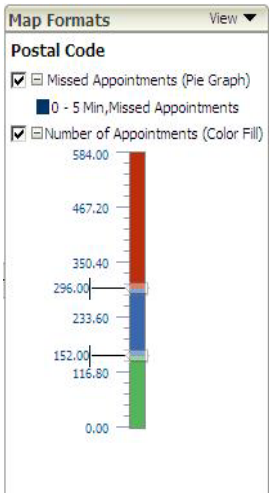
Pans the map. For example, click the > arrow to pan East.





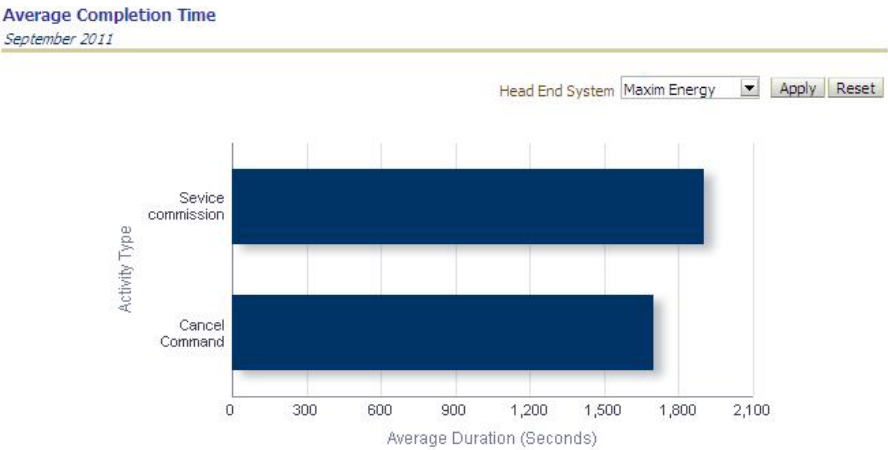
Slide the zoom bar to zoom in (slide towards the **+**) or out (slide towards the **-**). You can also click a map level, such as Street or City, to zoom to that level.

**Filtering Map Data.** Use checkboxes in the Legend panel to filter the contents of the page. When a legend object is checked, data corresponding to that level are included in the map; when a legend object is unchecked, the data for that level are not displayed.



### Graphs

A graph shows the value of a measure for a given dimensional attribute in a specific time-period (the x-axis shows the quantity, the y-axis shows the distinct values of the dimensional attribute). For example, you can set up a report graph that shows the average duration for each activity type.



The application displays data in the form of bar graphs, stacked bar graphs, pie charts, and also tables.

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## Gauges

Gauges highlight the state of a key performance indicator (KPI) in a given period. For example, you could use gauges to highlight:

- Revenue compared to budget revenue
- Outage duration compared to a target value
- Asset repair counts compared to the same time last year
- ...

The following figure shows a gauge that highlights the percentage of normal intervals that have been received.



## Hover text

Hover text is a brief description of what an analysis means or stands for. You can configure the application to show hover text when you mouse over any element.

## Drill Down/ Drill Back

Use the drill down option to navigate from one dashboard page to another dashboard page for granular level details.

You can drill back from a dashboard page in a dashboard to the respective edge application. An example to drill back would be navigating from Activity Analysis Detail dashboard page to Oracle Utilities Meter Data Management 360 Degrees View for specific device details.

## Column Sorter

You can sort the rows in a table depending on your requirement. Click the up or down arrow in the header row of the table to arrange records in ascending or descending order. The related values are swapped accordingly.

## Hierarchy Nodes

OBIEE 11gR introduces the concept of a “hierarchical column” which allows for encapsulating the presentation of a dimension hierarchy in an analysis report within a single column. The advantage of the hierarchical column is that it offers a better user experience in navigating within a hierarchy.

You can expand and collapse individual levels within the same report column using the plus (+) and minus (-) icons adjacent to display member values.

## Print

Use the Print option to print the contents of the current page. Select either PDF or HTML. A browser window opens, displaying the contents in the selected format. Use the Print option available from the browser window to print the contents.

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## Export

Use the Export option to export the results of an analysis or a view in various formats such as PDF, Excel, PowerPoint, etc. Once exported, the data can be customized per requirement.

## Using Page Options

Some dashboard pages support additional options available from the **Page Options** menu in the upper-right corner of the page. Examples of Page Options include:

- **Apply Saved Customization:** Allows you to select and apply a Saved Selection.
- **Save Current Customization:** Allows you to create a new Saved Selection based on your current settings.
- **Edit Saved Customization:** Allows you to delete or rename a Saved Selection or designate a Saved Selection as the default for the current dashboard page.
- **Clear My Customization:** Clears any unsaved selections.
- **Create Bookmark Link:** Creates a bookmark for this dashboard page and adds it to your browser's favorites or bookmarks list.

## Ad-hoc Reporting

You can create new analysis or customize existing analyses by using existing star schema or extending the schema. See *Oracle Utilities Advanced Spatial and Operational Analytics Administration Guide* for detailed information about OBIEE Customization.