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Preface

Learn how to load and model data, manage users, and administer the service.

Topics:
• Audience
• Documentation Accessibility
• Related Documents
• Conventions

Audience

Preparing Data in Oracle Analytics Cloud is intended for business intelligence analysts and administrators who use Oracle Analytics Cloud:

• **Administrators** manage access to Oracle Analytics Cloud and perform other administrative duties such as backing up and restoring information for others.

• **Analysts** load and model data and create reports for consumers. Data integration options range from self-service import to operational ETL updates. Analysts can select interactive visualizations and create advanced calculations to reveal insights in the data.

• **Consumers** customize dashboard pages and work with their favorite reports. Dashboards allow consumers to quickly analyze and manage activity across their system.

Documentation Accessibility

Oracle is committed to accessibility.


Access to Oracle Support

Related Documents

These related Oracle resources provide more information.

- For a full list of guides, refer to the Books tab in the Oracle Analytics Cloud Help Center.
- Oracle Public Cloud
  [http://cloud.oracle.com](http://cloud.oracle.com)
- *Getting Started with Oracle Cloud*
- *Managing and Monitoring Oracle Cloud*

Conventions

This document uses the standard Oracle text and image conventions.

**Text Conventions**

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
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<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><strong>italic</strong></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td><strong>monospace</strong></td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
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**Videos and Images**

Skins and styles customize the look and feel of Oracle Analytics Cloud, dashboards, reports, and other objects. Videos and images used in this guide may not have the same skin or style that you're using, but the behavior and techniques shown are the same.
Part I

Introducing Data Preparation in Oracle Analytics Cloud

This part introduces you to data preparation.

Chapters:

• Get Started with Data Preparation in Oracle Analytics Cloud
Get Started with Data Preparation in Oracle Analytics Cloud

This topic describes how to get started with data preparation.

Topics:
• Prepare Your Data
• Access Oracle Analytics Cloud
• Typical Workflow to Prepare Data
• Top Tasks to Prepare Data

Prepare Your Data

Oracle Analytics Cloud is a business intelligence platform in the cloud that makes analytics available to everyone, from the workgroup to the enterprise.

Preparing business data for analysis is easy:
• Use simple ETL tools to import your curated data into an Oracle cloud database and perform ongoing updates. Allow others to load data self-service.
• Connect to on-premises data sources directly without having to load the data into the cloud.
• Build data models to present data for analysis that better reflects the structure of your business.
• Assemble compelling analytics from your business data with dozens of interactive visualizations and automatic suggestions.
• Manage what people can see and do. Determine who can load and model data, who can create reports and dashboards from the data model, and who can build ad-hoc visualizations based on the same data or any alternative data source they choose to upload.
• Take regular snapshots to back up the data model, content that analysts save to the catalog, and security information.

Typical Workflow to Prepare Data

Administrators, data loaders, and data modelers each play a part in preparing business data for analysis.

When your business data is ready for analysis, publish the data model so that content developers can start to visualize the data and share analytics with co-workers, clients, and business partners. You can also connect directly to on-premises data sources so that you don't have to load the data to the cloud.
### Task

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<th>User</th>
<th>More Information</th>
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<td>Enable other users to load and model data through application roles</td>
<td>Administrator</td>
<td>Manage What Users Can See and Do</td>
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<td>Connect directly to on-premises data sources</td>
<td>Administrator</td>
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<tr>
<td>Connect to data sources</td>
<td>Administrator</td>
<td>Manage Database Connections for Data Models</td>
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<td>Model the data so content developers can visualize the data through reports and dashboards</td>
<td>Data modelers</td>
<td>Understand Data Modeling</td>
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<td>Take regular snapshots, and more</td>
<td>Administrators</td>
<td>Take Snapshots and Restore Information</td>
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### Access Oracle Analytics Cloud

Your "Welcome to Oracle Analytics Cloud" email contains a direct link to the service. Simply click this link and sign in. Alternatively, sign in to Oracle Cloud at cloud.oracle.com and then select Oracle Analytics Cloud.

When you sign in for the first time Oracle Analytics Cloud displays a product tour. At the end of the tour, you see your Home page, which has links to all of the features available to you. To dive straight into Data Visualization, click Explore Your Data or Connect to Your Data.
Use the **Navigator** option to display the navigator, which provides an alternative way to access commonly used options.

To work with content for reporting, mobile, actionable intelligence, or pixel-perfect reporting, click the **Page Menu** and select **Open Classic Home**.

**Top Tasks to Prepare Data**

Here are the top tasks for data loading, data modeling, and managing.

**Tasks:**

- **Top Tasks to Connect to Data**
- **Top Tasks to Model Data**
- **Top Tasks to Manage Data**
Top Tasks to Connect to Data

The top tasks for connecting to data are identified in this topic.

- Typical Workflow to Connecting to On-premises Data Sources

Top Tasks to Model Data

The top tasks for data modeling are identified in this topic.

- Create a Data Model
- Review Source Tables and Data
- Add Your Own Source Views
- Create Fact and Dimension Tables from a Single Table or View
- Create Fact Tables Individually
- Create Dimension Tables Individually
- Join Fact and Dimension Tables
- Create Calculated Measures
- Create Derived Attributes
- Create a Time Dimension
- Edit Hierarchies and Levels
- Secure Access to Objects in the Model
- Publish Changes to the Data Model

Top Tasks to Manage Data

The top tasks for managing your Cloud service are identified in this topic.

- Assign Application Roles to Users
- Add Your Own Application Roles
- Take Snapshots
- Restore from a Snapshot
- Manage Database Connections
- Free Up Storage Space
- Whitelist Safe Domains
- Manage How Content Is Indexed and Searched
- Upload Data Models from Oracle BI Enterprise Edition
Part II

Connect to Data

This part explains how to connect to on-premises data that you want to analyze.

Chapters:

• Connect to On-premises Data Sources
Connect to On-premises Data Sources

Oracle Analytics Cloud Data Gateway (which supersedes Remote Data Connector) enables you to query on-premises data sources from Oracle Analytics Cloud.

Topics:
• Overview to Connecting to On-premises Data Sources
• Typical Workflow to Connecting to On-premises Data Sources
• Before You Start with Data Gateway
• Frequently Asked Questions about Data Gateway
• Configure and Register Data Gateway for Visualization
• Configure and Register Data Gateway for Reporting
• Connect to an On-premises Database from Oracle Analytics Cloud
• Maintain Data Gateway
• Frequently Asked Questions about Data Gateway
• Troubleshoot Data Gateway
• Install the Legacy Remote Data Connector

Overview to Connecting to On-premises Data Sources

Use Oracle Analytics Cloud Data Gateway to connect to on-premises data sources. Data Gateway enables you to deploy Oracle Analytics Cloud with large on-premises data sets without migrating the data to the cloud. Users can analyze the data in data visualizations, and in reporting dashboards and analyses.

There are two types of Data Gateway deployment:
• Server - Install Data Gateway using the Oracle Universal Installer onto a Linux platform.
• Personal - Install Data Gateway by copying the Data Gateway binaries onto a Windows or MacOS machine.

Data Gateway works in the same way for server and personal deployments, but there are differences in how you maintain and upgrade them.

Data Gateway replaces the Remote Data Connector utility that was used in earlier releases. Oracle recommends using Data Gateway for remote connections, except when connecting to remote Oracle Essbase data sources, in which case you should continue to use Remote Data Connector. See Install the Legacy Remote Data Connector.
Architecture

This diagram shows a typical architecture for a deployment of Data Gateway with Oracle Analytics Cloud. You install Data Gateway in the remote network and configure the Data Gateway agent for communication with your Oracle Analytics Cloud instance.

![Diagram of architecture](image)

Functionality and Limitations

- Data Gateway agents poll Oracle Analytics Cloud for queries to run against your on-premises data sources. The results of these queries are returned to Oracle Analytics Cloud.
- For secure communication, Data Gateway traffic is signed with an encryption key and each packet is additionally encrypted by Transport Layer Security (TLS)/Secure Sockets Layer (SSL).
- Data flows can source data from remote connections. However, data flows can’t save data to data sets that use remote connections.

Deploying Multiple Data Gateway Agents

You can deploy multiple Data Gateway agents so that there’s no single point of failure. Deploying multiple Data Gateway agents might also improve performance if an agent was short of resources. When you register an agent using the Data Gateway Agent Configuration dialog, note the following:

- You should configure each agent in the same way.
- Each agent is capable of serving all remote queries. You can’t target specific queries at specific agents.
- If you leave the Allowed Hosts field blank, the agent tries to reach a data source on any host based on the connection information it retrieves from a connection in Oracle Analytics Cloud. If you specify hosts in the Allowed Hosts field, the agent can only address those hosts specified.

Typical Workflow to Connecting to On-premises Data Sources

Here are the common tasks for connecting to on-premises data sources.

You can review frequently asked questions before you start. See Frequently Asked Questions about Data Gateway.
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### Before You Start with Data Gateway

Download and install the required software.

- Download the latest version of Oracle Analytics Cloud Data Gateway from Oracle Technology Network.

- (Optional) If you are creating remote connections for analyses and dashboards, download and install the latest Developer Client Tool for Oracle Analytics Cloud from Oracle Technology Network on a Windows machine. If you have a visualization-only deployment (for example, Oracle Analytics Cloud Standard Edition), you don't need Developer Client Tool.

- If you want to install the legacy version of Remote Data Connector, follow the instructions in Install the Legacy Remote Data Connector.

- If you're deploying Data Gateway on Linux, unless you're performing a silent installation, make sure you have an X server set up with the correct DISPLAY variable setting.

### Download Data Gateway

Download Data Gateway from Oracle Technology Network (OTN) to a Linux, MacOS, or Windows machine where you want to install Data Gateway.

To find out the supported versions of operating systems, refer to the OTN download page.

1. Navigate to the OTN download page for Oracle Analytics Cloud.

   [Download page for Oracle Analytics Cloud Data Gateway](https://otn.oracle.com)

2. Under Oracle Data Gateway `<version>`, click the OAC Data Gateway version for the deployment type and version of Oracle Analytics Cloud that you have.
   - For server deployments, download **OAC Data Gateway Self-contained Installer for Linux**.
• For personal deployments, download the appropriate Data Gateway binaries and copy them onto a Windows or MacOS machine.

3. Accept the Oracle license agreement if prompted, and click the download link to download the software to your local machine.

Download and Install Developer Client Tool for Oracle Analytics Cloud

Download and install Developer Client Tool for Oracle Analytics Cloud if you want to enable remote connections from reporting dashboards and analyses. You install Developer Client Tool for Oracle Analytics Cloud on a Windows machine on the same network as your database.

1. Download the latest Developer Client Tool for Oracle Analytics Cloud.
   a. Navigate to: Download page for Developer Client Tool for Oracle Analytics Cloud
   b. To start the download, click the Oracle Analytics Developer Client Tool link for the version that matches your Oracle Analytics Cloud version.
   c. Accept the Oracle license agreement if prompted, and click the download link to download the software to your local machine.

2. Install Oracle Analytics Developer Client Tool.
   a. From the downloaded ZIP file, extract the setup_bi_client-<version number>-win64.exe file.
   b. In the local download area, double-click the setup_bi_client-<version number>-win64.exe file to start the installer.
   c. Follow the on-screen instructions.

To start the applications, from the Windows Start menu, click Oracle Business Intelligence Client, click <BI Client Home Name>, and then click Administration.

Install Data Gateway

Install Data Gateway in your on-premises environment interactively or silently using an Oracle Universal Installer response file.

1. Download Data Gateway from OTN (see Before You Start with Data Gateway).
2. To install Data Gateway for a server deployment:
   a. Extract the datagateway-linux64-<version>.zip file to a Linux machine. Make the datagateway-linux64-<version>.bin file executable (for example, using chmod 777).
   b. Use the datagateway-<platform>-<version>.bin file to start the installer.
      Alternatively, install Data Gateway silently using an Oracle Universal Installer response file and skip to Step 4.
   c. If a Welcome dialog is displayed, click Next.
   d. At the Installation Location dialog, specify where you'd like to install Data Gateway on the local machine, then click Next.
   e. At the Select Remote Data Version dialog, select Remote Data Gateway.
f. At the Credentials dialog, create a username and password for logging into the Data Gateway Agent Configuration page.

g. Under **Next Steps**, click **Start Jetty**, then click **Finish**. Skip step 3.

3. To install Data Gateway for a personal deployment, unzip to a folder (Windows) or install the package to the **Applications** folder (MacOS).

4. (Optional) After you've installed or Data Gateway, if you're using an internet proxy for Data Gateway, perform these additional steps:

   a. Stop the Data Gateway agent.

   b. On the machine where you've installed Data Gateway, configure the Data Gateway properties:
      - In a server deployment, edit this file:
        
        ```
        <Installed location>/jetty/obiee_rdc_agent.properties
        ```
      - In a personal deployment, edit this file:
        
        ```
        <Installed location>/obiee_rdc_agent.properties
        ```

   c. Update the following properties with the details of your internet proxy host:
      - proxyUserName
      - proxyPassword
      - proxyHost (for example, www-proxy.us.oracle.com)
      - proxyPort (for example, 80)

   d. Start the Data Gateway agent.

In a server deployment, you can review the details at any time using the status.sh/bat command located in the `<Data Gateway install folder>/domain/bin/` folder. Example output:

```
Data Gateway Jetty Home: <Jetty home>
Data Gateway Domain Home: <Domain home>
Data Gateway Jetty HTTP Port: <Port>
Data Gateway Status: <Data Gateway status> (For example, UP.)
URL: <URL for Data Gateway Agent Configuration page> (For example, http://example.com:8080/obiee/config.jsp.)
```

---

## Configure and Register Data Gateway for Visualization

After you've installed Data Gateway, you configure your on-premises environment and register one or more Data Gateway agents for remote connectivity from visualization projects.

To deploy multiple Data Gateway agents, repeat steps 4 to 9 for each agent.

1. Log into Oracle Analytics Cloud as an administrator.

2. Copy your Oracle Analytics Cloud URL:
   a. In a browser, navigate to Oracle Analytics Cloud.
   b. In the browser's address bar, copy the URL up to and including `<domain>` (not the text after that).
The URL will be in the format https://hostname.domain:port. You'll use this URL in Step 3 when you set up Data Gateway in Agent Configuration.

3. Enable Data Gateway in Console:
   a. From the Oracle Analytics Cloud Home page, click Console.
   b. Click Remote Data Connectivity.
   c. Enable the Enable Data Gateway option.

4. For each deployment of Data Gateway, use Data Gateway Agent Configuration to generate an authorization key for that machine:
   If you're asked to log in, enter the same username and password that you specified in the Credentials page of the Data Gateway installer.
   a. Start the Data Gateway Configuration page.
      • In a server deployment, open a web browser and enter the URL: `<Local hostname>:<port>/obiee/config.jsp`. To obtain the URL used to start Data Gateway Agent Configuration, use the `/<Data Gateway install folder>/domains/bin/status.sh` command and refer to the URL output value displayed.
      • For a personal deployment on Windows, from your local installation folder, click `datagateway.exe`.
      • For a personal deployment on MacOS, from your local installation folder, click `datagateway`.
   b. In the URL field, enter the Oracle Analytics Cloud server URL that you copied in Step 1.
   c. Click Generate Key, then click Copy to Clipboard.
      Tip: Don't click Test, Save, or Enable yet.
      Leave the other fields blank.

5. Switch to the browser session where you have the Console page Remote Data Connectivity displayed, and add a Date Gateway agent.
   a. Under Data Gateway, click Add.
   b. In Public Key, paste in the key that you copied using the Copy to Clipboard option in Step 4.c.
      When you paste in the key, the Name, ID, and Host fields are completed with the details of the on-premises machine where you've installed Data Gateway.
   c. Click OK to save the details.

6. Switch to the Data Gateway Configuration page.
7. (Optional) Use the Allowed Hosts field to restrict Data Gateway access to specific host machines. Leave the field blank to enable Data Gateway to access any host machine.
   For example, cxdb.example.com.
   By default the Data Gateway agent will attempt to connect to a data source on any host specified in a remote connection in Oracle Analytics Cloud. The Allowed Hosts field allows you to constrain the target hosts and IP addresses that Data Gateway can connect to. However, you must configure Data Gateway so that all agents can serve all remote queries.
8. (Optional) Use the **Allowed SQL Statements** field to restrict Data Gateway to specific SQL or data manipulation language (DML) constructs. Leave the field blank to enable Data Gateway to execute any SQL statements or DML constructs on the data source.

For example, specify `SELECT` to restrict Data Gateway to read-only access to the remote data source. Or specify `SELECT; ALTER SESSION` to restrict Data Gateway to using `SELECT` and `ALTER SESSION` operations.

9. Click **Test**, **Save**, then **Enable**.

To deploy multiple Data Gateway agents, repeat steps 4 to 9 for each agent.

If you also want to connect remotely from reporting dashboards and analyses, perform the additional configuration steps in Configure and Register Data Gateway for Reporting.

Then you're ready to test your deployment by connecting remotely to an on-premises database.

Configure and Register Data Gateway for Reporting

Perform these optional steps to enable remote connections from reporting dashboards and analyses.

If you have a visualization-only deployment (for example, Oracle Analytics Cloud Standard Edition), you don't need to follow these steps.

Before you start, follow the configuration steps in the previous topic Configure and Register Data Gateway for Visualization.

1. On the machine where you've installed a Data Gateway agent, obtain the machine name and port number.

   In a server deployment:
   a. Execute the command `/<Data Gateway install folder>/domain/bin/status.sh`.
   
   b. In the command output, note the machine name contained within the URL displayed under **Data Gateway Status**, and note the **Data Gateway Jetty HTTP Port** value.

   In a personal deployment:
   a. Open the file: `%localappdata%\Temp\DataGateway\ports.properties`.
   
   b. Note the machine name and port number.

2. Start the Data Gateway agent.

3. In Developer Client Tool, load the Java data source metadata:
   a. From the **File** menu, click **Open**, then **In the Cloud**, and use the Open in the Cloud dialog to specify the details of your Cloud data model.
   
   b. From the **File** menu, click **Load Java Data Sources**.
   
   c. At the Connect to Java Datasource Server dialog:
      
      • In the **Hostname** field, enter the machine name that you noted in Step 1. Fully qualify the hostname. For example, if you noted `machine` in Step 1, you might specify `machine.us.example.com`. 
• In the **Port** field, enter the port that you noted in Step 1. For example, 51811.

• In the **Username** and **Password** fields, enter dummy or any string (these credentials aren't validated because this is a public call to discover the capabilities advertised by the Data Gateway).

**4. In Developer Client Tool, set up a physical database connection:**

a. In the Physical layer, create a local (not remote) connection to your data source using the standard call interface appropriate for your data source, and model the data as required.

b. When you are happy with the data model and you are ready to make the connection remote and publish back to the cloud, edit the connection that you created.

c. On the General tab, in the **Call interface** field select JDBC (Direct Driver), and in the **Connection String** field, specify the JDBC string and credentials in the RPD connection. See **JDBC and JNDI Templates and Examples** below for a list of supported JDBC strings and driver classes.

d. On the Miscellaneous tab, in the **Use SQL Over HTTP** field enter true, and in the **RDC Version** field enter 2, and specify the JDBC driver class.

e. Publish the data model to the cloud.

You're now ready to test your deployment by connecting remotely to an on-premises database.

**JDBC and JNDI Templates and Examples**

When you set up remote connectivity for analyses and dashboards, you might have to specify JDBC strings and driver classes, and JNDI connection details and context details.

**JDBC String Patterns and Driver Classes**

**Oracle:**

- Driver Class: `oracle.jdbc.OracleDriver`
- `jdbc string: jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=tcps)(HOST=["host-name"]) (PORT=["port"])) (CONNECT_DATA=(SERVICE_NAME=["service-name"]))`

**Apache Hive**

- Driver Class: `com.oracle.bi.jdbc.hive.HiveDriver`
- `jdbc:oracle:hive://["host-name"]/:["port"];EncryptionMethod=SSL;ValidateServerCertificate=false`

**DB2**

- `com.oracle.bi.jdbc.db2.DB2Driver`
- `jdbc:oracle:db2://["host-name"]/:["port"];DatabaseName=["service-name"]`

**Impala**

- `com.oracle.bi.jdbc.impala.ImpalaDriver`
- `jdbc:oracle:impala://["host-name"]/:["port"];EncryptionMethod=SSL;ValidateServerCertificate=false`

**MySQL**

- `com.mysql.cj.jdbc.Driver`
- `jdbc:mysql://["host-name"]:["port"][/database][?properties]`

**SQL Server**

---

<sup>Chapter 2 Configure and Register Data Gateway for Reporting</sup>
com.oracle.bi.jdbc.sqlserver.SQLServerDriver
jdbc:oracle:sqlserver://["host-name":["port "]];DatabaseName=["service-name"]
Teradata
com.teradata.jdbc.TeraDriver
jdbc:teradata://["host-name"]/DBS_PORT=["port"]

JNDI Templates for Native Drivers

Oracle:
<Resource
name="jdbc/myoracle"
global="jdbc/myoracle"
auth="Container"
type="javax.sql.DataSource"
driverClassName="oracle.jdbc.OracleDriver"
url="jdbc:oracle:thin:@localhost:1521:orcl"
username="northwind"
password="n"
maxActive="15"
maxIdle="1"
maxWait="-1"
/>

<Resource
name="jdbc/oracleolap"
global="jdbc/oracleolap"
auth="Container"
type="javax.sql.DataSource"
driverClassName="oracle.jdbc.OracleDriver"
url="jdbc:oracle:thin:@localhost:1522:orcl112"
username="BIQA_AW_11g"
password="BIQA_AW_11g"
maxActive="15"
maxIdle="1"
maxWait="-1"
/>

<Resource
name="jdbc/oraclenorthwind"
global="jdbc/oraclenorthwind"
auth="Container"
type="javax.sql.DataSource"
driverClassName="oracle.jdbc.OracleDriver"
url="jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)
(HOST=example.com)(PORT=1234))
(CONNECT_DATA=(SERVICE_NAME=MATSDB.EXMAPLE.COM))"
username="ORA20104"
password="ORA20104"
maxActive="15"
maxIdle="1"
maxWait="-1"
/>
DB2
<Resource
    name="jdbc/db2northdb"
    global="jdbc/db2northdb"
    auth="Container"
    type="javax.sql.DataSource"
    driverClassName="com.ibm.db2.jcc.DB2Driver"
    url="jdbc:db2://example.com:58263/NORTHDB"
    username="db2admin"
    password="welcome1"
    maxActive="15"
    maxIdle="1"
    maxWait="-1" />

SQLServer:
<Resource
    name="jdbc/sqlservernorthwind"
    global="jdbc/sqlservernorthwind"
    auth="Container"
    type="javax.sql.DataSource"
    driverClassName="com.microsoft.sqlserver.jdbc.SQLServerDriver"
    url="jdbc:sqlserver://example.com:61045;DatabaseName=Northwind"
    username="sa"
    password="admin1-2"
    maxActive="15"
    maxIdle="1"
    maxWait="-1" />

Teradata:
<Resource
    name="jdbc/teranorthwind"
    global="jdbc/teranorthwind"
    auth="Container"
    type="javax.sql.DataSource"
    driverClassName="com.teradata.jdbc.TeraDriver"
    url="jdbc:teradata://10.246.64.217"
    username="northwind"
    password="northwind"
    maxActive="15"
    maxIdle="1"
    maxWait="-1" />

Mysql_community
<Resource
    name="jdbc/CEmysql"
    auth="Container"
    type="com.mysql.jdbc.jdbc2.optional.MysqlDataSource"
    factory="com.mysql.jdbc.jdbc2.optional.MysqlDataSourceFactory"
    user="root"
    password="Welcome1"
    serverName="example.com"
JNDI Templates for DD Drivers

The JNDI for DD Drivers.

**SQLServer:**
<Resource
name="jdbc/DDsqlserver"
auth="Container"
type="com.oracle.bi.jdbcx.sqlserver.SQLServerDataSource"
factory="com.oracle.bi.jdbcx.sqlserver.SQLServerDataSourceFactory"
user="sa"
password="admin1-2"
serverName="example.com\MSSQLSERVER16"
portNumber="61045"
databaseName="northwind" />

**DB2:**
<Resource
name="jdbc/DDdb2"
auth="Container"
type="com.oracle.bi.jdbcx.db2.DB2DataSource"
factory="com.oracle.bi.jdbcx.db2.DB2DataSourceFactory"
user="db2admin"
password="welcome1"
serverName="example.com"
portNumber="58263"
databaseName="northdb" />

**Impala:**
<Resource
name="jdbc/DDimpala"
auth="Container"
type="com.oracle.bi.jdbcx.impala.ImpalaDataSource"
factory="com.oracle.bi.jdbcx.impala.ImpalaDataSourceFactory"
user="hive"
password="hive"
serverName="example.com"
portNumber="21050"
databaseName="default" />

**Spark:**
<Resource
name="jdbc/DDspark"
auth="Container"
type="com.oracle.bi.jdbcx.sparksql.SparkSQLDataSource"
factory="com.oracle.bi.jdbcx.sparksql.SparkSQLDataSourceFactory"
user="hive"
password="hive"
serverName="example.com"
portNumber="10000"
Connect to an On-premises Database from Oracle Analytics Cloud

After you've installed and deployed Data Gateway, you can start analyzing data in your on-premises database.

1. Create a connection to your on-premises database:
   a. From the Home page, click Create, then Connection.
b. Click a connection type that supports remote connectivity. For example, Oracle Database.

c. Use the Create Connection dialog to specify the connection details of your on-premises database.
   For example, for an on-premises Oracle Database, specify the Host, Port, Service Name, and credentials.

d. Enable the **Use Remote Data Connectivity** option.
   If you don't see this option, make sure that the administrator has enabled one of the remote connectivity options in Console on the Remote Data Connectivity page.

2. Create a new visualization project based on the connection that you created in the Step 1, and add columns from your on-premises database to the project.

3. If you've also configured remote connection for reporting, in Classic Home, create a new analysis based on the connection that you created in Step 1, and add columns from your on-premises database to the analysis.

### Maintain Data Gateway

Here are the common tasks to maintain Data Gateway.

#### Maintenance Tasks for Data Gateway

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review installation details</td>
<td>Find out the Data Gateway URL and port.</td>
<td>In a server deployment, use the DOMAIN_HOME/bin/status.sh script to display the installation status and connection details. For example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Gateway Jetty Home: <code>&lt;Jetty home&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Gateway Domain Home: <code>&lt;Domain home&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Gateway Jetty HTTP Port: <code>&lt;Port&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Gateway Status: <code>&lt;Data Gateway status&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(For example, UP.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>URL: <code>&lt;URL for Data Gateway Agent Configuration page&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(For example, <a href="http://example.com:8080/obiee/config.jsp">http://example.com:8080/obiee/config.jsp</a>.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>In a personal deployment, use:</strong> `%localappdata%\temp\datagateway.**</td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>More Information</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Start and stop Data Gateway</td>
<td>Start and stop the Jetty application server.</td>
<td>In a server deployment use these commands: <code>&lt;Install folder&gt;/bin/startjetty.sh and stopjetty.sh</code> scripts. To restart an agent, execute the stopjetty script, then execute the startjetty script. In a personal deployment: To start the Data Gateway agent, use the <code>&lt;Install folder&gt;</code>\datagateway.exe command (on Windows) or datagateway command (on MacOS). To restart an agent, stop the Data Gateway agent (on Windows, click the Quit Data Gateway option on the Windows Taskbar; on MacOS, click Oracle Data Gateway Quit on the MacOS Menu Bar), then use the datagateway command to start the agent.</td>
</tr>
<tr>
<td>Configure a Data Gateway Agent</td>
<td>Start the Agent Configuration page for Data Gateway</td>
<td>In a server deployment, enter this URL in a browser: <code>&lt;Local hostname&gt;:&lt;port&gt;/obiee/config.jsp</code>. In a personal deployment: * On Windows, use the datagateway.exe command. * On MacOS, use the datagateway command.</td>
</tr>
<tr>
<td>Adjust the logging level</td>
<td>Change how much logging information is recorded for each Data Gateway agent. You perform this step separately for each agent.</td>
<td>In a server deployment: 1. In the installation folder, edit this file: <code>domain/jettybase/resources/jetty-logging.properties</code>. 2. Set the value of the following property: - org.eclipse.jetty.util.log.class=org.eclipse.jetty.util.log.StrErrLog - org.eclipse.jetty.LEVEL=&lt;level&gt; For example, set <code>&lt;level&gt;</code> to OFF to turn off logging, or set <code>&lt;level&gt;</code> to ALL to log all events. Review the logged events in <code>/domain/jettybase/logs/[date].jetty.log</code>. 3. Restart the Data Gateway agent. In a personal deployment: 1. In the installation folder, edit this file: <code>&lt;Install folder&gt;/war\datagateway\WEB-INF\classes\log4j2.properties</code>. 2. Change the line: <code>logger.rolling.level = ERROR</code> For example, change it to: <code>logger.rolling.level = TRACE</code> (or ALL or DEBUG). 3. Restart the Data Gateway agent.</td>
</tr>
</tbody>
</table>
### Frequently Asked Questions about Data Gateway

Here’s the answers to some frequently asked questions about Data Gateway.

**What operating systems does Data Gateway support?**

For a server deployment, you can use Oracle Universal Installer to install on Linux. For a personal deployment, you can copy the binary files onto MacOS or Windows.

**What is the Data Gateway Architecture?**

See [Overview to Connecting to On-premises Data Sources](#).

**What is the difference between Remote Data Connector and Data Gateway?**

Data Gateway replaces the Remote Data Connector utility that was used in earlier releases. Although you can still use Remote Data Connector, we recommend moving to Data Gateway, unless you’re connecting to Essbase. Using Data Gateway has many advantages over using Remote Data Connector:

- You can deploy multiple Data Gateway agents to query the same database. This provides failover and a highly-available architecture.
- In Remote Data Connector, the communication is initiated by Oracle Analytics Cloud. In Data Gateway, the communication is initiated by Data Gateway. As a result:
  - You don’t need to install anything in a network demilitarized zone (DMZ).
  - You don’t have to open ports for ingress traffic in the on-premises firewall.
  - You don’t have to whitelist Oracle Analytics Cloud.

**Where do I install Data gateway?**

You install Data Gateway in a subnet that gives visibility to both Oracle Analytics Cloud and the target data sources. Your network needs to allow outgoing (egress) traffic from the node where Data Gateway is installed to the public internet on port 443 so that Data Gateway can communicate with Oracle Analytics Cloud. In addition, the network needs to allow outgoing (egress) traffic from the Data Gateway agent to the data source. For example, you might test the network by opening a browser on the node where Data Gateway is installed and connect to Oracle Analytics Cloud. You might also test the connection from the same node to the data source using a generic JDBC tool.
Can I deploy multiple Data Gateway agents?

Yes. You can configure multiple Data Gateway agents to service the same Oracle Analytics Cloud service instance. However, all of these agents must be capable of servicing all remote queries (that is, you cannot configure one agent to service queries for one data source only, and another agent to service queries for a different data source). In addition, in server deployments you can have multiple Data Gateway agents on each node (physical or virtual). For High Availability, Oracle recommends at least two Data Gateways (that is, two VMs) per Oracle Analytics Cloud instance.

How do I configure High Availability for Data Gateway?

On the Oracle Analytics Cloud side, high availability is provided natively. On the Data Gateway side, you set up high availability by deploying two Data Gateways for each Oracle Analytics Cloud instance.

Why is Data Gateway traffic egress only?

Data Gateway regularly communicates with Oracle Analytics Cloud to see whether Oracle Analytics Cloud has queries that need processing, a process known as long-polling. Data Gateway makes a long-running TLS-encrypted HTTP request to Oracle Analytics Cloud and waits until Oracle Analytics Cloud has a query to process. If there're no queries from Oracle Analytics Cloud after two minutes, Data Gateway terminates and re-issues the request in order to avoid the request being identified and terminated as an idle or stale connection by the network.

How does Data Gateway manage SSL certificates?

The HTTPS communication between Data Gateway and Oracle Analytics Cloud leverages the SSL certificate of your Oracle Analytics Cloud service instance. The same certificate is used to encrypt your browser connections to Oracle Analytics Cloud.

How do I size Data Gateway?

To size the server that hosts Data Gateway, use Remote Data Connector sizing guidelines, which are based on 100Mbps bandwidth, 5000 result set rows, and 35ms latency. Data Gateway's performance and resource usage is similar to that of Remote Data Connector.

Where is Data Gateway running? Do I install it on a virtual machine (VM)?

- At the Oracle Analytics Cloud end, Oracle Analytics Cloud manages the Data Gateway queue, therefore there's nothing additional to install.
- At the data source end, the Data Gateway agent typically runs on a server or Virtual Machine next to the data source. You can also run Data Gateway from a laptop or a compute instance in the cloud, as long as Data Gateway can connect to the data source.

Can I use Data Gateway and Remote Data Connector with my Oracle Analytics Cloud instance at the same time?

No.
How is Data Gateway network traffic secured?

When you install and set up Data Gateway, you generate a public key. This public key is used in conjunction with the private key for Oracle Analytics Cloud to encrypt all communication between Oracle Analytics Cloud and Data Gateway. Data Gateway's security features prevent "replay attacks" and "man-in-the-middle" attacks. The TLS1.2 encryption deployed by the HTTPS connection provides a further layer of encryption.

Can Data Gateway limit queries that affect performance or security?

Data Gateway doesn't limit the query row size. The query row size limit is determined by the number of Oracle Compute Units (OCPUs) that your Oracle Analytics Cloud service has.

What is the timeout setting for Data Gateway?

Data Gateway uses the timeout setting applied by the Oracle Analytics Cloud query engine. If for any reason a query timeout isn't enforced by Oracle Analytics Cloud, Data Gateway queries apply a 15 minute timeout.

Troubleshoot Data Gateway

Here's how to troubleshoot common setup issues with Data Gateway.

<table>
<thead>
<tr>
<th>Issue reported</th>
<th>Do this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent state change failed with error: Agent name or OAC URL not specified or</td>
<td>Click <strong>Save</strong>, then <strong>Enable</strong>. If the problem persists, restart the application. If necessary, check your network.</td>
</tr>
<tr>
<td>the Key pair not generated</td>
<td>-----------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

Chapter 2

Trouble Data Gateway
### Issue reported

<table>
<thead>
<tr>
<th>Issue reported</th>
<th>Do this</th>
</tr>
</thead>
</table>
| Invalid OAC URL (Data Gateway can’t communicate with Oracle Analytics Cloud) | • Check that you’ve enabled and configured Data Gateway in Oracle Analytics Cloud Console.  
• Make sure you can reach the Oracle Analytics Cloud URL from the environment where Data Gateway is running. For example, on Linux you might use a `traceroute` command, such as `sudo traceroute -T -p443 <Fully qualified domain name of your Oracle Analytics Cloud instance>`.  
• Make sure there’s nothing else blocking communication through the firewall.  
• If you’re using a proxy:  
  1. Stop the Data Gateway agent.  
  2. On the machine where you’ve installed Data Gateway, configure the Data Gateway properties:  
     In a server deployment, edit this file:  
     `<Installed location>/jetty/obiee_rdc_agent.properties`  
     In a personal deployment, edit this file:  
     `<Installed location>/obiee_rdc_agent.properties`  
  3. Update the following properties with the details of your internet proxy host:  
     – proxyUserName  
     – proxyPassword  
     – proxyHost (for example, www-proxy.us.oracle.com)  
     – proxyPort (for example, 80)  
  4. Start the Data Gateway agent.                                                                                     |

---

### Install the Legacy Remote Data Connector

Install Remote Data Connector in your on-premises environment.

1. Review the prerequisites in Before You Start. See *Before You Start with Remote Data Connector*.  
2. Install Remote Data Connector on Linux. See *Install the Legacy Remote Data Connector Version on Linux*.  
3. Deploy Remote Data Connector on Linux. See *Deploy the Legacy Remote Data Connector on Linux*.  

### Before You Start with Remote Data Connector

Download and install the required software.

**Before you start**

• Ask the database administrator for the host name and port number of the web-tier machine that's protecting the on-premises network.
• Download your Public Key from the Console in Oracle Analytics Cloud. See Download the Public Key for Your Cloud Service. Then copy the Public Key file oracle_bics_rdc.pem to the machine where you plan to install Remote Data Connector.

• Configure your company firewall so that the port on the machine where you install Remote Data Connector is accessible from your Oracle Analytics Cloud instance. Your network administrator configures the best approach for your organization. For example, you might install a web tier in your DMZ that accepts incoming traffic from your Oracle Analytics Cloud instance and provides port forwarding to your data gateway server deployed behind your firewall. In this case, you configure your web tier to trust the root CA certificate used to sign the SSL certificate of your data gateway server.

Download the Public Key for Your Cloud Service

You download your public key from Oracle Analytics Cloud.

1. In Oracle Analytics Cloud, click Navigator to display the navigator bar, and then click Console.
2. Click Connections.
3. From the menu, click Get Public Key.

This downloads the key file oracle_bics_rdc.pem to your local machine.

Install the Legacy Remote Data Connector Version on Linux

Install Remote Data Connector in your on-premises environment.

Before you start, download Remote Data Connector from Oracle Technology Network to a Linux machine.

1. Run the bi_rdc_client installer file.
2. If a Welcome dialog is displayed, click Next.
3. At the Installation Location dialog, specify where you'd like to install Remote Data Connector on the local machine, then click Next.
4. At the Select Remote Data Version dialog, select Remote Data Connector:
5. At the RDC Configuration dialog, configure these settings:
   • Enable DV Connection: Select this option.
   • Enable RPD Connection: Select this option if you want to model your data in Oracle BI Developer Client before you analyze the data in Oracle Analytics Cloud. When you select this option, you're prompted to specify Java Naming and Directory Interface (JNDI) connection details for an initial on-premises database. If you clear this option, you can skip to Step 6.
   • Database: Select the type of on-premises database that you're connecting to.
   • JNDI Name: Specify a short name to identify the connection in the JNDI connection pool. For example, RDC_Oracle_DB.
   • Server Name and Port Number: If your private network is protected by a web tier, specify the server name and port of the web tier server. If you don't have
a web tier, specify the machine name and port number of the machine where Remote Data Connector is being installed.

- **Database Name**: Specify the name of the on-premises database.
- **Database connect string**: Specify database connection details.
- **Username and Password**: Specify a user with privileges to access the on-premises database. Remote Data Connector will use this database account for queries to the Oracle Analytics Cloud data model.

The installer creates an initial JNDI connection in Remote Data Connector that you use to connect to your data model. If you have more than one on-premises database that you want to connect to, then you manually add connection details to the `web.xml` file and `webapps.xml` file later.

6. At the OAC Public Key dialog, specify the path where the installer can find the public key to your OAC service instance.

   The installer copies this key to `RDCHome/domain/rdc_keys`. If you ever change the Oracle Analytics Cloud service instance that will use this Remote Data Connector installation, you need to either re-install Remote Data Connector or update the key in this location. A Remote Data Connector installation can only serve a single Oracle Analytics Cloud service instance.

7. Click **Next**.

8. At the Installation Summary dialog, click **Install**.

9. Follow the on-screen instructions until you get to the Installation Complete dialog.

10. Under **Next Steps**, click **Start Jetty**, then click **Finish**.

The Remote Data Connector connection details are displayed on-screen. You can review the details at any time using the `\<RDC install folder>\domains\bin\status.sh` command. For example:

```
RDC HTTP Port: 41250
RDC Status: UP

   URL: http://example.com:41250/obiee/javads?status
```

**Tip**: If you plan to analyze your on-premises data in data visualizations, you'll need the URL displayed under **RDC Status** to enable remote connections in the later deployment steps. For example, `http://example.com:41250/obiee/javads?status`.

---

**Deploy the Legacy Remote Data Connector on Linux**

Install Remote Data Connector in your on-premises environment.

Before you start, download Remote Data Connector from Oracle Technology Network to a Linux machine.

1. In Developer Client Tool, load the Java data source metadata:
   a. From the **File** menu, click **Open**, then **In the Cloud**, and use the Open in the Cloud dialog to specify the details of your Cloud data model.
   b. From the **File** menu, click **Load Java Data Sources**.
c. Click SSL.

d. Enter the host name and SSL port to reach your Remote Data Connector installation.

2. In the Physical layer, create a Physical database connection and update your data model.

3. Edit the connection that you created in Step 2, and change the details in the connection pool so that you use a JDBC/JNDI call interface and specify the name of the JNDI data source.

   On the Miscellaneous tab, ensure that **Use SQL over HTTP** is set to True.

4. Publish the data model to the cloud.

5. Test that you can use the data source from Oracle Analytics Cloud.

6. Enable Remote Data Connector for remote connections:
   a. From the Home page navigator, click **Console**, then click **Remote Data Connectivity**.
   
   b. Click **Enable Remote Data Connector**.

   c. In the **URL** field, specify the Remote Data Connector URL displayed on-screen at the end of the Remote Data Connector installation.

      You can also use the `<RDC install folder>/domains/bin/status.sh` command to display the Remote Data Connector URL and port details. For example, `http://example.com:41250/obiee/javads?status`.

7. Create a connection to your on-premises database via Remote Data Connector:
   a. From the Home page, click **Create**, then **Connection**.

   b. Click a database type that supports connection via Remote Data Connector. For example, Oracle Database.

   c. Use the Create Connection dialog to specify connection details.

   d. Select the **Use Remote Data Connector** option.
Part III
Model Data

This part explains how to model data.
You can model data in Oracle Analytics Cloud — Enterprise Edition.

Chapters:
• Understand Data Modeling
• Start to Build Your Data Model
• Define Hierarchies and Levels to Drill and Aggregate
• Secure Your Data Model
Understand Data Modeling

You build a model of your business data to enable analysts to structure queries in the same intuitive fashion as they ask business questions.

**Video**

**Topics:**
- About Modeling Data
- Plan a Data Model

**About Modeling Data**

A data model is a design 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. Well-designed models are simple and mask the complexity of the underlying data structure.

Using Data Modeler you can model data from various source types, such as star and snowflake, in various ways that make sense to business users. You must have the BI Data Model Author role to use Data Modeler.

**Note:**

Although not all source objects have star relationships, Data Modeler presents data as a simple star structure in the data model. In other words, the data model represents measurable facts that are viewed in terms of various dimensional attributes.

When building a data model with Data Modeler, you perform the following tasks:
- Connect to the database containing your business data.
- Add source tables or views to the model and classify them as either a fact table or a dimension table.
- Define joins between fact and dimension tables
- Ensure that every dimension table maps to at least one fact table, and that every fact table maps to at least one dimension table.
- Specify aggregation rules for different fact columns, create derived measures based on expressions, create dimension hierarchies to support drilling, and create level-based measures.
- Publish your data model to permanently save the changes and make the data available for use in analyses.

After publishing your data model, you can start visualizing your data from your enterprise reporting Home page. Your data model displays as a subject area that you
can use in visualizations, dashboards, and analyses. The name of the subject area matches the name of your data model.

When you model source objects with multiple star relationships, they're all part of the same data model and are included in the same subject area.

**Can I Use My Existing Data Model File (RPD) vs Data Modeler**

Yes. This chapter describes how to create data models from scratch using Data Modeler. If you modeled your business data with Oracle BI Enterprise Edition, you can upload the complete data model file (RPD) to Oracle Analytics Cloud and immediately start using your subject areas in visualizations, dashboards, and analyses. See [Upload Data Models from Oracle BI Enterprise Edition](#).

If you upload an existing data model file in this way:

- Data Modeler is disabled. You see the message "Please use Oracle BI Administration Tool to manage your model".
- You use Oracle Analytics Developer Client Tool to make the changes. See [Edit a Data Model in the Cloud](#).

**Plan a Data Model**

Before you start modeling your data, take some time to think about your business requirements and to understand data modeling concepts.

**Topics:**

- Understand Data Model Requirements
- Components of Data Models
- About Modeling Source Objects with Star Relationships
- About Modeling Source Objects with Snowflake Relationships
- About Modeling Denormalized Sources
- About Modeling Normalized Sources

**Understand Data Model Requirements**

Before you can begin to model data, you must first understand your data model requirements:

- What kinds of business questions are you trying to answer?
- What are the measures required to understand business performance?
- What are all the dimensions under which the business operates? Or, in other words, what are the dimensions used to break down the measurements and provide headers for the reports?
- Are there hierarchical elements in each dimension, and what types of relationships define each hierarchy?

After you have answered these questions, you can identify and define the elements of your business model.
Components of Data Models

Fact tables, dimension tables, joins, and hierarchies are key components you will come across when building your data model.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fact Tables</td>
<td>Fact tables contain measures (columns) that have aggregations built into their definitions. Measures aggregated from facts must be defined in a fact table. Measures are typically calculated data such as dollar value or quantity sold, and they can be specified in terms of hierarchies. 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 values of a measure and need a calculation to express the comparison.</td>
</tr>
<tr>
<td>Dimension Tables</td>
<td>A business uses facts to measure performance by well-established dimensions, for example, by time, product, and market. Every dimension has a set of descriptive attributes. Dimension tables contain attributes that describe business entities (like Customer Name, Region, Address, or Country). Dimension table attributes provide context to numeric data, such as being able to categorize Service Requests. Attributes stored in this dimension might include Service Request Owner, Area, Account, or Priority. Dimension tables in the data model are conformed. In other words, even if there are three different source instances of a particular Customer table, the data model only has one table. To achieve this, all three source instances of Customer are combined into one using database views.</td>
</tr>
<tr>
<td>Joins</td>
<td>Joins indicate relationships between fact tables and dimension tables in the data model. When you create joins, you specify the fact table, dimension table, fact column, and dimension column you want to join. Joins allow queries to return rows where there is at least one match in both tables. Tip: Analysts can use the option Include Null Values when building reports to return rows from one table where there’re no matching rows in another table.</td>
</tr>
<tr>
<td>Hierarchies</td>
<td>Hierarchies are sets of top-down relationships between dimension table attributes. In hierarchies, levels roll up from lower levels to higher levels. For example, months can roll up into a year. These rollups occur over the hierarchy elements and span natural business relationships.</td>
</tr>
</tbody>
</table>

About Modeling Source Objects with Star Relationships

Star sources consist of one or more fact tables that reference any number of dimension tables. Because Data Modeler presents data in a star structure, working with star sources is the simplest modeling scenario. In star sources, dimensions are normalized with each dimension represented by a single table.

For example, assume that you have separate sources for Revenue Measures, Products, Customers, and Orders. In this scenario, you load data from each source to
separate database tables. Then, you use Data Modeler to create a fact table (Revenue Measures) and dimension tables (Products, Customers, and Orders). Finally, you create joins between the dimension tables and the fact table.

When you create your fact and dimension tables, you can drag and drop the source objects into the data model, or you can use menu options to create the fact and dimension tables individually.

See Roadmap for Modeling Data for a full list of data modeling tasks.

About Modeling Source Objects with Snowflake Relationships

Snowflake sources are similar to star sources. In a snowflake structure, however, dimensions are normalized into multiple related tables rather than in single dimension tables.

For example, assume that you have separate sources for Revenue Measures, Products, Customers, and Orders. In addition, you have separate sources for Brands (joined to Products) and Customer Group (joined to Customers). The Brands and Customer Group tables are considered to be "snowflaked" off the core dimension tables Customers and Products.

In this scenario, you load data from each source to separate database tables. Next, you create database views that combine the multiple dimension tables into a single table. In this example, you create one view that combines Products and Brand, and another view that combines Customer and Customer Group.

Then, you use Data Modeler to create a fact table (Revenue Measures) and dimension tables (Products + Brand view, Customers + Customer Group view, and Orders). Finally, you create joins between the dimension tables and the fact table.

See Roadmap for Modeling Data for a full list of data modeling tasks.

About Modeling Denormalized Sources

Denormalized sources combine facts and dimensions as columns in one table (or flat file). With a denormalized flat source, one data file is loaded into one table. The data file consists of dimension attributes and measure columns.

In some cases, the data model might consist of a hybrid model that involves a combination of star, snowflake, and denormalized sources. For example, a denormalized source might include information about revenue measures, products, customers, and orders - but all in a single file rather than in separate source files.

In this scenario, you first load the denormalized file as a single database table. Then, you use the Add to Model wizard to partition columns into multiple fact and dimension tables. In this example, you drag and drop revenue measure columns to create a fact table, then drag and drop columns for products, customers, and orders to create three separate dimension tables. Finally, you create joins between the dimension tables and the fact table.

See Roadmap for Modeling Data for a full list of data modeling tasks.

About Modeling Normalized Sources

Normalized or transactional sources distribute data into multiple tables to minimize data storage redundancy and optimize data updates. In a normalized source, you have
multiple data files that correspond to each of the transactional tables. Data from Oracle Cloud applications is likely partitioned into a normalized source.

Similar to snowflake sources, modeling normalized sources involves creating database views to combine columns from multiple source tables into individual fact and dimension tables. Some normalized sources are very complex, requiring a number of database views to organize the data into a star-type model.

For example, assume that you have source files for Products, Customers, Orders, and Order Items. Orders and Order Items both contain facts.

In this scenario, you first load the files as separate database tables. Next, you create a database view that combines the multiple fact columns into a single table. In this example, you create a view that combines columns from Orders and Order Items.

Then, you use Data Modeler to create a fact table (Orders + Order Items view) and dimension tables (Products and Customers). Finally, you create joins between the dimension tables and the fact table.

See Roadmap for Modeling Data for a full list of data modeling tasks.
Start to Build Your Data Model

This section provides information about first steps for building a data model, such as adding dimension tables, fact tables, and joins.

Topics:

- Typical Workflow to Model Data
- Use Data Modeler
- Review Source Tables and Data
- Add Your Own Source Views
- Add Fact Tables and Dimension Tables to a Data Model
- Join Fact and Dimension Tables
- Create a Time Dimension
- Add Measures and Attributes to a Data Model
- Copy Model Objects

Typical Workflow to Model Data

Here are the common tasks for modeling data.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read about Data Modeler</td>
<td>Get familiar with Data Modeler, including how to refresh your data, publish changes, and find the Action menus.</td>
<td>Use Data Modeler</td>
</tr>
<tr>
<td>Create a new model</td>
<td>Start a new model and connect it to your data source.</td>
<td>Create a Data Model</td>
</tr>
<tr>
<td>Browse source objects</td>
<td>Review source tables to determine how to structure your data model.</td>
<td>Review Source Tables and Data</td>
</tr>
<tr>
<td>Create new views in the database if needed</td>
<td>Create views for role-playing dimensions, or create views to combine multiple tables into a single view, as in snowflake or normalized sources.</td>
<td>Add Your Own Source Views</td>
</tr>
<tr>
<td>Add fact tables and dimension tables</td>
<td>Create fact tables and dimension tables from source objects.</td>
<td>Add Fact Tables and Dimension Tables to a Data Model</td>
</tr>
<tr>
<td>Join fact and dimension tables</td>
<td>Create joins between fact and dimension tables.</td>
<td>Join Fact and Dimension Tables</td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>More Information</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Add a time dimension</td>
<td>Create a time dimension table and database source table with time data.</td>
<td>Create a Time Dimension</td>
</tr>
<tr>
<td>Add aggregated and calculated measures</td>
<td>Specify aggregation for columns and create calculated measures using expressions.</td>
<td>Add Measures and Attributes to a Data Model</td>
</tr>
<tr>
<td>Add derived attributes</td>
<td>Specify custom attributes for dimension tables using expressions.</td>
<td>Create Derived Attributes</td>
</tr>
<tr>
<td>Create hierarchies and levels</td>
<td>Define hierarchies and levels based on relationships between groups of attribute columns.</td>
<td>Edit Hierarchies and Levels</td>
</tr>
<tr>
<td>Create variables</td>
<td>Optionally, create variables that dynamically calculate and store values for use in column expressions and data filters</td>
<td>Define Variables</td>
</tr>
<tr>
<td>Set up object permissions</td>
<td>Control who can access fact tables, dimension tables, and columns.</td>
<td>Secure Access to Objects in the Model</td>
</tr>
<tr>
<td>Set up data security filters</td>
<td>Define row-level data security filters for fact tables, dimension tables, and columns.</td>
<td>Secure Access to Data</td>
</tr>
<tr>
<td>Upload a data model RPD file</td>
<td>If you've modeled your business data with Oracle BI Enterprise Edition, instead of building a data model from scratch using Data Modeler, you can use Console to upload your data model to the cloud.</td>
<td>Upload Data Models from a File (.rpd) Using Console</td>
</tr>
</tbody>
</table>

Use Data Modeler

Data Modeler enables you to model the data that is needed to produce reports.

Topics:

- Open Data Modeler
- Create a Data Model
- Use the Left Pane in Data Modeler
- Use the Right Pane in Data Modeler
- Use Action Menus
- Lock a Data Model
- Validate a Data Model
- Refresh and Synchronize Source Objects and Data Model Objects
- Publish Changes to Your Data Model
- Clear Cached Data
- Rename a Data Model
- Connect a Model to a Different Database
- Export a Data Model
• Import a Data Model
• Delete a Data Model

Open Data Modeler

Your administrator gives you access to Data Modeler.

1. Sign in to Oracle Analytics Cloud.
2. Click the Page menu on the Home page, and select Open Data Modeler.

3. At the Models page, open an existing model or create a new model.

Create a Data Model

Create a new data model from scratch in Data Modeler.

Video

1. Open Data Modeler.
2. Click Create model.
3. Enter a name and description for your data model.
   The subject area associated with this model gets the same name.
4. Connect the model to a Database.
   If the database you want isn't listed, ask your administrator to set up the connection for you.

Use the Left Pane in Data Modeler

Various data modeling menus are available from the left pane in Data Modeler.

• Database — Lists source objects such database tables and views
• Data Model — Lists data model objects such as fact tables, dimension tables, hierarchies, fact columns, and dimension columns
• Variables — Lists variables for use in data security filters and in column expressions
• **Roles** — Lists roles that you can use when defining object permissions and data security filters

Filter a list to find exactly what you want.

1. In Data Modeler, in the left pane, open the **Database, Data Model, Variables**, or **Roles** menu.
2. Click the **Filter** icon to the right of the selected menu.

3. In the Filter area, enter a string value for filtering the display.
4. Delete the text or click the **Filter** icon again to remove the filter.
Use the Right Pane in Data Modeler

The right pane in Data Modeler is a contextual pane that changes depending on what task you're performing. After you have started modeling data, the default or home view shows the fact tables, dimension tables, and joins that you've defined so far.

- In the fact tables and dimension tables area you can see the number of joins for each fact and dimension table, as well as the number of measures in each fact table.

- Joins are listed below the fact and dimension tables. Click the up or down arrow in each column header to sort.

- When you click an object to open its editor, the editor appears in the right pane. For example, clicking a dimension table name from the Data Model menu in the left pane opens the dimension table editor in the right pane.
• Open the Permission tab to control who has access to the model and who is allowed to build reports from its associated subject area.

• Open the Properties tab to rename the model or connect the model to a different database.

Use Action Menus

Data Modeler provides action menus for most objects. When you select an object, you'll see a gear icon, which displays the menu.

A global Model Actions menu in the upper right corner enables you to clear, close, refresh, or unlock the model.

You can also use action menus to delete individual data model objects that you have locked.

• You can delete source views but you can't delete source tables. Use SQL Workshop to drop tables in the source database.

• You can't delete model objects that other objects depend on.

Lock a Data Model

You lock a data model before making any changes. Click Lock to Edit to lock the data model.

Tips:

• Publish changes regularly (browsers timeout after 20 minutes of inactivity).

• Publish changes before closing your browser to ensure that the lock is released.

• Lock your model before changing views.

• If you have administrative privileges, you can override locks set by other users.
Validate a Data Model

You can use the global **Validate** checkmark icon ✅ in the upper-left corner to check whether a data model is valid.

The data model is also validated automatically when you publish changes. Validation errors are shown at the bottom of the right pane.

![Model Validation failed](image)

Use the **Message Actions** menu to customize the types of messages displayed (Errors, Warnings, and Information).

Some tasks are validated when they’re performed. For example, you can’t save a source view unless its SQL query is valid. Expressions for calculated measures and derived columns must be valid before they can be saved. Validation messages that are displayed as you’re performing tasks provide more information about any validation errors.

Refresh and Synchronize Source Objects and Data Model Objects

Data Modeler provides three ways to refresh data to ensure you’re looking at the most up-to-date information. You can refresh source objects, refresh the data model, or synchronize the data model with source object definitions in the database.

**Refresh Source Objects**

You can refresh the Database pane to ensure that the source objects list reflects the latest objects in the database. For example, you can refresh the source objects list to include any new database tables that were added. The source objects list is not refreshed automatically after new objects are loaded into the database.

To refresh source objects, select **Refresh** from the **Database Actions** menu in the left pane.

![Database Refresh](image)

**Refresh the Data Model**

In some cases, other Data Modeler users might have locked the model and made changes. You can refresh the data model to ensure that Data Modeler is displaying the latest version of the model.
To refresh the data model, select **Refresh** from the **Data Model Actions** menu in the left pane.

Alternatively, select **Refresh Model** from the **Model Actions** gear menu next to the **Lock to Edit** button.

**Synchronize with the Database**

You can synchronize the data model with source objects in the database. Synchronization identifies objects in the model that have been deleted in the database, as well as tables and columns that are new. It also identifies other discrepancies like column data type mismatches.

To synchronize all model objects and source objects with the database, select **Synchronize with Database** from the global **Model Actions** menu in the upper right corner.

To synchronize individual fact tables or dimension tables, select **Synchronize with Database** from the **Actions** menu for the given fact table or dimension table in the Data Model objects list in the left pane. Then, click **OK**.

You must lock the data model to synchronize with the database.

Synchronization discrepancies are displayed in a message box at the bottom of the right pane. Use the **Message Actions** menu to customize the types of messages displayed (Errors, Warnings, and Information), select or deselect all messages, and perform sync-up actions on selected messages. For example, you can select all data type mismatch warnings and then select **Sync-up selected** from the **Actions** menu to make the relevant synchronization changes.
Publish Changes to Your Data Model

As you update a data model, you make changes that you can save or discard. You publish a model to save the changes permanently and make the data available for use in reports. The published data model displays as a subject area.

Tip:

Although changes to the data model are saved as you work, they are saved in the browser session only. The changes aren’t truly saved until you publish the model.

When you publish a data model, it is validated automatically. Any validation errors appear in the bottom of the right pane. If you see validation errors, fix them and then try to publish the data model again.

After making changes to your data model, you can perform these actions using the menus in the upper-right corner:

• **Publish and Unlock** — Verifies that the model is valid, saves the changes, and publishes the model for use with reports. The model is unlocked for other users.

• **Publish and Keep Lock** — Verifies that the model is valid, saves the changes, and publishes the model for use with reports. The lock is retained for further edits.

• **Unlock** — Removes the lock on the model so that other users can update it. Your unpublished changes to the model are discarded.

• **Revert** — Returns the model to its previously published state. Your unpublished changes to the model are discarded, but the model remains locked.

• **Clear**—Permanently deletes all objects in the model and removes them from any reports that are based on the model’s subject area.

You can also click **Undo** and **Redo** in the upper right corner to revert or reapply individual changes.

Tip:

You don’t need to publish the model to save database changes. Changes made to database views and other source database objects are saved to the database when you complete the action, not to the data model. For database changes, **Undo** and **Redo** aren’t available.

After publishing your model it takes up to two minutes for changes to the data model to reflect in reports and dashboards. To see changes immediately, open the report, click **Refresh**, and then **Reload Server Metadata**.

Oracle Analytics Cloud takes a snapshot when you or someone else publishes changes to the data model. If you’re having some problems with the latest data model, you can ask your administrator to restore an earlier version.
Clear Cached Data

Oracle Analytics Cloud caches data to maximize performance. This means data updates may not immediately reflect in reports and Data Modeler.

After loading new data in your tables, you might want to clear the cache to see the very latest data.

- To see new data in Data Modeler, select the Refresh Model menu.
- To see new data in reports, manually clear the cache from the Data Model menu in the left pane
  - To clear cached data for a particular fact or dimension table, right-click the table and select Clear Cached Data.
  - To clear all cached data, click Data Model Actions, then select Clear All Cached Data to remove all data from the cache.

You can also select Clear All Cached Data from the global Model Actions menu in the upper-right corner.

**Tip:**

Always clear the cache after loading new data to ensure that the most recent data is displayed in reports.

Rename a Data Model

To rename a data model, lock it, select the Properties tab, and change the name. This action also renames the corresponding subject area for reports.

Connect a Model to a Different Database

When you start a new data model you’re asked to select the database where your data is stored. All the tables and views in this database display in Data Modeler so you can
add them to your model. Sometimes, data is moved or the source database changes. If this happens, change your model's database connection.

If you change the database, reports based on the model's subject area won't work unless all the required source objects are available in the new database.

1. In Data Modeler, lock your model for editing.
2. Click the Properties tab.
3. Select the Database.
   If the database you want isn't listed, ask your administrator to set up the connection for you.

4. Synchronize your data model with the new database. Select Synchronize with Database from the Model Actions menu.

Export a Data Model

Individual data models can be exported to a JSON file and the information imported on another service. If you want to make minor changes to the model, you can edit the JSON before importing it. For example, you might want to change the name of the model (modelDisplayName) or the database connection (connectionName).

1. Open Data Modeler.
2. In the Models page, click the Model Actions icon for the model you want to export, and select Export.
3. Save the JSON file. The default name is model.json.

Import a Data Model

Individual data models can be exported to a JSON file and the information imported on another service. If you want to make minor changes to the model, you can edit the
JSON before importing it. For example, you might want to change the name of the model (modelDisplayName) or the database connection (connectionName).

For any data model to work properly it must have access to the associated database tables. Before importing the data model, check whether Data Modeler can connect to the required database. If not, ask your administrator to set up the connection.

1. Open Data Modeler.
2. Click **Import Model**.
3. Browse to the JSON file that contains the data model you want to import.
4. Click **OK**.
5. Optional: Select a database connection for the model.
   You're asked to select a database connection if Data Modeler doesn't recognize the connection name in the JSON file. If the connection you want isn't listed, ask your administrator to set up the connection and try again.
6. Optional: Choose whether to replace a data model with the same name. Click **Yes** to overwrite the model or **No** to cancel.
   This happens when the model named in the JSON file clashes with another model in Data Modeler. If you don't want to replace the existing model, change the modelDisplayName attribute in the JSON file and try again.

### Delete a Data Model

You can delete all objects from your data model if you want to clear your model and start over. Or you can delete an entire model along with its subject area.

- **Clearing model content**—Lock the model and select **Clear Model** from the global **Model Actions** menu in the upper right corner.
  This permanently removes all the objects in the data model and also removes them from any reports that are based on the model's subject area.

- **Deleting a model**—Click **Data Modeler**, click the **Model Actions** menu for the model you don't want anymore, and select **Delete**.
  This permanently removes the data model and its subject area.

Before clearing or deleting a model, we recommend that you or your administrator take a snapshot of the model as a backup.

### Review Source Tables and Data

This topic describes how you can learn more about the source database objects that are available for your data model.

**Topics:**

- View Source Objects
- Preview Data in Source Objects
View Source Objects

You can see a list of source tables and views in the Database menu in the left pane. Click a table or view to see its properties.

![Database menu showing source tables and views]

The Overview tab for source tables and views shows column information, like column name, data type, whether it’s unique, and whether it accepts null values.

Preview Data in Source Objects

You can preview the first 25 rows of data in your database tables and views. By reviewing the initial rows, you can get ideas for modeling the database tables and views as either dimension tables or fact tables.

1. Open Data Modeler.
2. From the Database menu in the left pane, click a database table or view to open it.
3. Click the Data tab.
4. Review the first 25 rows of data for the table or view. You can resize the columns in the display table if needed.

5. Click Get Row Count to retrieve a complete row count for the table or view. This take might take some time to complete if the table is large.
6. Click **Done**.

## Create Source Views

Create source views as a base for model objects when you think you might want to perform subsequent changes.

**Topics:**
- About Source Views
- Add Your Own Source Views
- Define Filters for Source Views

### About Source Views

Source views are saved queries of data in the database. You can think of a source view as a "virtual table."

You create source views when using a single table as a source for more than one dimension table. For example, you can create source views that use the Employee source table as a source for the Employee and Manager dimension tables.

You also create source views when creating a dimension table that is based on multiple source tables, as in a snowflake source. For example, you can create a source view that combines columns from the Customer and Customer Group source tables to create a single Customers dimension table.

You can also perform pre-aggregation calculations in a source view. For example, to create an Average Revenue column that is calculated pre-aggregation, you can include the calculation in the SQL query for the view:

```sql
SELECT
  "BICS_REVENUE_FT1"."UNITS",
  "BICS_REVENUE_FT1"."ORDER_KEY",
  "BICS_REVENUE_FT1"."REVENUE",
  "BICS_REVENUE_FT1"."PROD_KEY",
  "BICS_REVENUE_FT1"."REVENUE" / "BICS_REVENUE_FT1"."UNITS" AS AVERAGE_REVENUE
FROM
  "BICS_REVENUE_FT1"
```

In general, create source views as a base for model objects when you think you might want to perform subsequent changes. Creating a data model based on source views provides greater flexibility than using source tables directly. For example, using source views makes it much easier to extend model objects, create filters, and add pre-aggregation calculations.

### Add Your Own Source Views

You can add views to the source database from Data Modeler. For example, you can create a source view that combines the Brands and Products source tables to create a single source for your dimension table.

Create source views as a base for model objects when you think you might want to perform subsequent changes. You can create a view from scratch and add any
column you want from other tables and views in the database. Alternatively, you can create a view by copying an existing source table or another source view.

1. In Data Modeler, lock the model for editing.

2. From the Database menu in the left pane, click **Actions**, then click **Create View**.

Initially the view is empty. You can add any column you want from other tables and views in the database.

**Tip:**

To create a view from an existing source table or source view, navigate to the database object you want to copy, click **Actions**, and then click **Duplicate**.

3. In the View editor, specify a name and description for the view. Optionally deselect **Remove duplicate rows** if you want to include duplicate rows in the view.

4. Add columns to the database view by dragging and dropping tables or views from the Database menu into the Columns area of the View editor.

   Alternatively, click **Add Columns**, select a source database table or view, select columns, and then click **Add**.
5. Define aliases for columns if needed. You can also optionally move rows up or down using the **Action** menu for a specific row.

6. From the Joins tab, you can define joins for the view. Click **Create Join**, then specify the left side table, right side table, columns, and the join type. You must include more than one source table in your view to create joins.

7. From the Filters tab, you can define filters for the view.

8. From the SQL Query tab, review the code for the SQL query for the source view.

![SQL Query](image.png)

You can edit the SQL code for the query here, but do so only if you're familiar with SQL code. Entering invalid SQL code can produce unexpected results.

If you do edit the SQL query directly, simple updates are reflected back in the Overview, Join, and Filters tabs and you can use these tabs to further edit the view later. For example, you can include:

- Simple SELECT clause with aliases and DISTINCT keyword
- FROM clause with joins
- WHERE clause with filter conditions which combined with AND keyword

If you use the SQL Query tab to make more advanced code changes you cannot use the Overview, Joins or Filters tabs to further edit the view. For example, if you include:

- SQL aggregation functions, GROUP BY clause, HAVING clause
- ORDER BY clause
- OR keyword in WHERE clause

9. Optionally, click the Data tab to preview the first 25 rows of data. You can also get a complete row count. It is best to view data only after defining joins between all tables for better performance.

10. Click **Save and Close**.

**Define Filters for Source Views**

A filter specifies criteria that are applied to columns to limit the results that are returned. In other words, a filter is the **WHERE** clause for the view statement. For example, you can define a filter where Customer Country is equal to USA.
1. Create a view.
2. Click the Filters tab.
3. Click Create Filter.
4. In the WHERE row, first select the column for the filter. Next, select the condition, such as "is not equal to" or "is greater than". Finally, specify the value for the filter. You can specify a variable if needed.

![Create Filter Image]

5. Optionally, click Create Filter again to add an "and" row to the filter. Specify the column, condition, and value. Repeat as needed.
6. To remove a row, click Actions, then select Delete.

![Actions and Delete Image]

7. Click Save.

Add Fact Tables and Dimension Tables to a Data Model

Use fact tables and dimension tables to represent aspects of your business that you want to understand better.

Topics:
- About Fact Tables and Dimension Tables
- Create Fact and Dimension Tables from a Single Table or View
- Create Fact Tables Individually
- Create Dimension Tables Individually
- Edit Fact Tables and Dimension Tables
- Add More Columns to Fact and Dimension Tables

About Fact Tables and Dimension Tables

Fact tables and dimension tables hold the columns that store the data for the model:
- Fact tables contain measures, which are columns that have aggregations built into their definitions. For example, Revenue and Units are measure columns.
- Dimension tables contain attributes that describe business entities. For example, Customer Name, Region, and Address are attribute columns.
Fact tables and dimension tables represent the aspects of your business that you want to understand better. See Components of Data Models.

Before you begin modeling fact tables and dimension tables, make sure that the data that you need to model is available in the source tables list. Also ensure that you have created any source views upon which to base model objects.

If you think the list of source objects in the database has changed since you opened Data Modeler, then you can click Refresh from the Database Actions menu. If the data that you need has not yet been loaded into the database, then you can load it.

Create Fact and Dimension Tables from a Single Table or View

Some source tables contain both facts and dimensions. For these source tables, Data Modeler provides a wizard to help you partition the fact and dimension columns into fact tables and dimension tables.

Video

For example, you might have a source that contains both product and customer attributes, as well as revenue measures. Use the wizard to create the corresponding fact and dimension tables.

1. In Data Modeler, lock the model for editing.
2. In the Database menu in the left pane, right-click the source table that contains the fact and dimensional data that you want to model, select Add to Model, and then select Add as Fact and Dimension Tables.
3. To let Data Modeler suggest some fact tables, dimension tables, and joins for the source table, select Let Data Modeler Recommend and click OK. You can review suggestions in Step 4.

If you’d rather choose fact and dimension tables yourself from scratch:
   a. Deselect Let Data Modeler Recommend and click OK.
   b. Drag measures from the source table onto the fact table.
c. Enter a name for the fact table, such as Costs or Measures.

d. Add a dimension table for each group of related attributes, and enter a meaningful name, such as Products. Drag and drop related columns from the source table to the appropriate dimension table.

e. To add more dimension tables, click Add and repeat the previous step.

f. To delete a dimension table, click X next to the table name.

g. Specify the join columns for each of the dimension tables. Select the box beside the appropriate columns to mark those columns as join columns. If the join column you select is missing from the fact table, a corresponding column gets added automatically to the fact table.

4. Review fact tables, dimension tables, and join columns. For example:
   - Rename fact and dimension tables.
   - Add or remove columns.
   - Add, delete, or merge dimension tables.
   - Move columns from one dimension table to another.

5. Click Next.
6. Review the objects that will be created.

7. Click **Create**.

8. Click **Done**.

New fact tables, dimension tables, and joins display in Data Modeler. New views display in the Database pane.

**Create Fact Tables Individually**

You can add individual source tables containing fact data to your data model.

If you have distinct source tables with fact data, such as in a star source, then you can add them to your data model individually. For example, if you have a source table that contains only revenue measures, then you can use this method to create the corresponding fact table.

Alternatively, you might have sources with fact information spread across multiple tables, such as normalized transactional sources. In this case, create source views first to combine tables in a way that resembles a star model. For information about creating views, see **Add Your Own Source Views**. For information about modeling different source types, see **Plan a Data Model**.

**Tip:**

Create source views as a base for model objects when you think you might want to perform subsequent changes like extending model objects, creating filters, and adding pre-aggregation calculations. Creating a fact table based on source views provides greater flexibility than using source tables directly.

When you use this method to create individual fact tables, all columns in the source table or view are assigned to a single fact table and if the source has relationships with other tables or views, we'll offer to add them to your model.

After locking the model, perform one of the following actions to create fact tables individually:

- Drag the source table or view from the Database menu in the left pane to the Fact Tables area of the Data Model.
• From the Database menu in the left pane, right-click the table or view, then click **Add to Model**, then **Add as Fact Table**.

• From the Database menu in the left pane, click **Table Actions** or **View Actions**, click **Add to Model**, then **Add as Fact Table**.

• From the Database Table or View editor for a particular source table or view, click **Add to Model**, then **Add as Fact Table**.

• In the right pane, click **Add** in the Fact Tables area of the Data Model. Then, select one or more source tables and views from the Database Objects list and click **OK**.

• To copy an existing fact table, click **Fact Table Actions** for the fact table you want to copy, and then click **Duplicate**.

After adding the source table or view to the model, you can edit the fact table.

---

Create Dimension Tables Individually

You can add individual source tables containing dimension data to your data model.

If you have distinct dimensional source tables, such as in a star source, then you can add them to your data model individually. For example, if you have a source table that contains only customer attributes, then you can use this method to create the corresponding dimension table.

Alternatively, for snowflake or normalized (Transactional) sources, create source views to combine source objects in a way that resembles a star model. For information about creating views, see **Add Your Own Source Views**. For information about modeling different source types, see **Plan a Data Model**.

---

**Tip:**

Create source views as a base for model objects when you think you might want to perform subsequent changes like extending model objects, creating filters, and adding pre-aggregation calculations. Creating a dimension table based on source views provides greater flexibility than using source tables directly.

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When you use this method to create individual dimension tables, all columns in the source table or view are assigned to a single dimension table and if the source has relationships with other tables or views, we'll offer to add them to your model.

After locking the model, perform one of the following actions to create dimension tables individually:

• Drag the table or view from the Database menu in the left pane to the Dimension Tables area of the Data Model.

• From the Database menu in the left pane, right-click the table or view, click **Add to Model**, and then select **Add as Dimension Table**.

• From the Database menu in the left pane, click **Table Actions** or **View Actions** for a table or view, click **Add to Model**, and then select **Add as Dimension Table**.

• Click **Add** in the Dimension Tables area, and then select **Add Database Tables**. From the Database Objects list, select one or more sources and then click **OK**.
• From the Database Table or View editor for a particular source table or view, click **Add to Model** and then select **Add as Dimension Table**.

• To copy an existing dimension table, click **Dimension Table Actions** for the dimension table you want to copy, and then click **Duplicate**.

After adding the source table or view to the model, you can edit the dimension table.

### Edit Fact Tables and Dimension Tables

You can edit properties of fact and dimension tables in your data model and preview the source data.

1. In Data Modeler, lock the model for editing.
2. Click the fact table or dimension table that you want to edit.
3. Change settings on the Overview tab as needed:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time dimension</td>
<td>For dimension tables only. Specifies that hierarchies for this dimension table support a time dimension.</td>
</tr>
<tr>
<td>Enable skipped levels and Enable unbalanced hierarchies</td>
<td>For dimension tables only. Set properties for hierarchies associated with this dimension table.</td>
</tr>
<tr>
<td>Column list</td>
<td>Click the link for a column to edit that column in the Column editor. Or, right-click the row for the column and click <strong>Edit</strong>.</td>
</tr>
<tr>
<td>Field or Element</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Aggregation</td>
<td>For fact tables only. Click to select a type of aggregation for the column from the list, or select <strong>Set Aggregation</strong> from the Column Actions menu. Aggregation types include:</td>
</tr>
<tr>
<td></td>
<td><strong>None</strong>: Applies no aggregation.</td>
</tr>
<tr>
<td></td>
<td><strong>Sum</strong>: Calculates the sum by adding up all values.</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong>: Calculates the mean value.</td>
</tr>
<tr>
<td></td>
<td><strong>Median</strong>: Calculates the middle value.</td>
</tr>
<tr>
<td></td>
<td><strong>Count</strong>: Calculates the number of rows that aren’t null.</td>
</tr>
<tr>
<td></td>
<td><strong>Count Distinct</strong>: Calculates the number of rows that aren’t null. Each distinct occurrence of a row is counted only once.</td>
</tr>
<tr>
<td></td>
<td><strong>Maximum</strong>: Calculates the highest numeric value.</td>
</tr>
<tr>
<td></td>
<td><strong>Minimum</strong>: Calculates the lowest numeric value.</td>
</tr>
<tr>
<td></td>
<td><strong>First</strong>: Selects the first occurrence of the item.</td>
</tr>
<tr>
<td></td>
<td><strong>Last</strong>: Selects the last occurrence of the item.</td>
</tr>
<tr>
<td></td>
<td><strong>Standard Deviation</strong>: Calculates the standard deviation to show the level of variation from the average.</td>
</tr>
<tr>
<td></td>
<td><strong>Standard Deviation (all values)</strong>: Calculates the standard deviation using the formula for population variance and standard deviation.</td>
</tr>
</tbody>
</table>

**Tip:**

Some calculated measures show **Pre-Aggregated** for aggregation. These measures have calculations involving measures that already have an aggregation applied. To edit a calculation that contains pre-aggregated measures, click the column name.

<table>
<thead>
<tr>
<th>Available</th>
<th>Click to mark a column as <strong>Available</strong> or <strong>Unavailable</strong> to choose whether that column is displayed in analyses that are created. You can also select <strong>Mark as Unavailable</strong> or <strong>Mark as Available</strong> from the Column Actions menu.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Edit All</th>
<th>You can click to edit properties for individual columns in the table, or select <strong>Edit All</strong> to edit all rows at once.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Column</td>
<td>Click <strong>Add Column</strong> to display the Column editor and create a new column.</td>
</tr>
</tbody>
</table>
4. From the Source Data tab, you can preview the first 25 rows of source data for the table. Resize the columns in the display table if needed. Click Get Row Count to retrieve a complete row count for the table or view.

5. For dimension tables only: from the Hierarchies tab, edit the hierarchies and levels for the table.

6. From the Permissions tab, specify object permissions.

7. From the Data Filters tab, you can define data filters that provide row-level filtering for data model objects. See Secure Access to Data.

8. Click Done to return to the data model.

Add More Columns to Fact and Dimension Tables

There are different ways to add more source columns to fact and dimension tables in your model.

- If new columns are added to a source table and you want to include them in fact tables and dimension tables in your model, synchronize the fact or dimension table with the database. Synchronization identifies any new columns and adds them to the fact or dimension table. See Refresh and Synchronize Source Objects and Data Model Objects.

- Dimension tables can combine columns from multiple sources. See Add Columns from Another Source to a Dimension Table.

Add Columns from Another Source to a Dimension Table

You can add the columns from another source table or view to an existing dimension table. For example, you may want to include attributes from a Product Category table in your Products dimension table.

1. In Data Modeler, lock the model for editing.

2. Select the dimension table you want to edit so its Overview tab displays.

3. Drag and drop the source table or view that contains the columns you want to add from the Database pane to the dimension table (columns area).

   Alternatively, right-click the dimension table you want to edit, click Add Columns, and then select the source table or view that contains the columns you want to add.

4. Select appropriate join columns and click OK.
View the dimension table to see the additional columns. The Source property shows that the dimension table is based on a new database view. Data Modeler creates a new database view whenever you add columns from another source.

### Join Tables in a Data Model

A join in the model indicates a relationship between one fact table and one dimension table.

**Video**

**Topics:**
- About Joins
- Join Fact and Dimension Tables

### About Joins

A join in the model indicates a relationship between one fact table and one dimension table. When you use the Add to Model wizard to model data, the wizard creates joins automatically between a fact table and each of its corresponding dimension tables.

When you model fact and dimension tables individually, joins are automatically created between them if the join references exist in the source tables.

You can also manually create joins in the data model. To do this, you drag and drop a dimension table to a fact table, or click **Create Join** in the Joins area.

When you define a join between a fact table and dimension table, you select a join column from each table. You can create a join on more than one column.

### Join Fact and Dimension Tables

Define joins between fact tables and dimension tables to enable querying of related data. For example, you can define a join between the Profit Metrics fact table and the Products dimension table.

1. In Data Modeler, lock the model for editing.
2. In the Dimensions Tables area, drag and drop a dimension table to the Fact Tables area. Or, in the Joins area, click **Create Join**.

   ![Image showing drag and drop of dimension table](image)

3. In the Joins area, specify the appropriate Fact Table, Fact Column, Dimension Table, and Dimension Column to use for the join.

   For example, you might specify a billing date column and a calendar date column.

4. Click the checkmark icon to save the changes to the join.

   If you want to remove your changes, then click the X icon. If you start to create a new join and click X, then the new row for the join is removed from the Joins table.

   After you create joins, you can see the default hierarchies and levels when you click the Hierarchies tab for the given dimension table.

### Create a Time Dimension

Time series functions provide the ability to compare business performance with previous time periods, enabling you to analyze data that spans multiple time periods. For example, time series functions enable comparisons between current sales and sales a year ago, a month ago, and so on. To use time series functions, the data model must include a time dimension

**Video**

When you create a time dimension, the Create Time Dimension wizard creates a table in the database, populates it with time data, creates a corresponding time dimension table in the data model, and creates a time hierarchy.

The Create Time Dimension wizard populates the source table with time data from 01-JAN-1970 to 31-DEC-2020.

1. In Data Modeler, lock the model for editing.
2. In the Dimension Tables area, click **Add**, then **Create Time Dimension**.

   ![Image showing dimension tables](image)

3. In the Create Time Dimension wizard, specify names for the database table, the dimension table, and the hierarchy.

4. In the Hierarchy Levels, specify which levels to include, such as Year, Quarter, and Month.
5. Click **Next**.

6. On the next page, review the tasks that the wizard will perform to create the time dimension.

7. Click **Create** to enable the wizard to create the dimension.

   The wizard adds a time dimension with data to the database and creates a corresponding dimension in the data model. This action might take up to 30 seconds.

8. Click **Done**.

9. To create joins between columns in the fact table and columns in the Time dimension table, click **Create Join** in the data model.

   The time dimension has two unique columns. The DAY_TS column has the type TIMESTAMP, and the DATE_ID column has the type NUMBER. When you create a join, you specify either the column with the timestamp format or with the numeric format (depending on whether the column in the fact table has a date or number type).

10. In the Joins area for the new definition, select the appropriate fact column, then select the appropriate timestamp or numeric column from the Time dimension.

   After you create the joins, you can display the Hierarchies tab in the Time Dimension editor to view the default hierarchies and levels.

11. Edit the tables in the model.

12. Click **Done** to return to the data model.

---

### Add Measures and Attributes to a Data Model

This topic describes how to add measures and attributes to your data model.

**: Video**

**Topics:**

- [Edit Measures and Attributes](#)
- [Specify Aggregation for Measures in Fact Tables](#)
- [Create Calculated Measures](#)
- [Create Derived Attributes](#)
- [Create Expressions in the Expression Editor](#)
• Copy Measures and Attributes

Edit Measures and Attributes

Use the table editor to add, edit, and delete measures and attributes in your data model.

1. In Data Modeler, lock the model for editing.
2. Click the fact table or dimension table that contains the measure or attribute that you want to edit.
3. To edit all the columns directly in the table editor, select Edit All.
   To edit, copy, or delete a selection of columns at the same time, Shift + click or Ctrl + click the rows you want.

4. In the table editor, right-click a column and optionally click Copy or Delete as appropriate.
5. In the table editor, click the column that you want to edit or click Add Column.
6. Change settings on the Overview tab as needed.
   • Edit the display name and description.
   • Change the sort order.
   By default, columns are sorted based on the data in the column and reports display data in this order. To sort a column based on the data in another column, select Sort by a different column and select the Sort By value you prefer. For example, instead of sorting a Month Name attribute alphabetically, you could sort by month number, such as 1 (January), 2 (February), 3 (March), and so on.
7. Change settings for calculated measures or derived attributes.

8. From the Permissions tab, optionally modify object permissions.

9. From the Data Filters tab, optionally define data filters that provide row-level filtering for data model objects. See Secure Access to Data.

10. From the Levels tab for columns in a fact table, optionally create a level-based measure. See Set Aggregation Levels for Measures.

11. Click Done to return to the table editor.

Specify Aggregation for Measures in Fact Tables

You can specify aggregation for a measure in a fact table. For example, you can set the aggregation rule for a Revenue column to **Sum**.

1. In Data Modeler, lock the model for editing.

2. In the Fact Tables area, click the fact table for which you want to create measures.

3. In the Columns list, change the aggregation rule for the appropriate columns to specify that they're measures.

   To apply the same aggregation rule to multiple columns, Shift + click or Ctrl + click the appropriate columns.

   Aggregation options include:

   **None**: No aggregation.

   **Sum**: Calculates the sum by adding up all values.

   **Average**: Calculates the mean value.

   **Median**: Calculates the middle value.

   **Count**: Calculates the number of rows that aren't null.

   **Count Distinct**: Calculates the number of rows that aren't null. Each distinct occurrence of a row is counted only once.

   **Maximum**: Calculates the highest numeric value.

   **Minimum**: Calculates the lowest numeric value.
First: Selects the first occurrence of the item.

Last: Selects the last occurrence of the item.

Standard Deviation: Calculates the standard deviation to show the level of variation from the average.

Standard Deviation (all values): Calculates the standard deviation using the formula for population variance and standard deviation.

Tip:

Some calculated measures are Pre-Aggregated. These measures have calculations involving measures that already have an aggregation applied. To edit a calculation that contains pre-aggregated measures, click the column name.

For most measures, the same aggregation rule applies for each dimension but for some measures you'll want to specify one aggregation rule for a given dimension and specify other rules to apply to other dimensions.

Time dimensions are most likely to require different aggregation. For example, Headcount (calculated measure) typically aggregates as SUM across Organization and Geography dimensions but SUM does not apply for a Time dimension. Aggregation for the Time dimension should be LAST, so you can show Headcount on the last week or day of the year.

4. To override the aggregation for specific dimensions:
   a. Click the name of the measure column.
   b. Deselect Same for all dimensions.
c. Click **Add Override**.

d. Select the dimension you want to aggregate differently, for example Time.

e. Select an aggregation rule for the dimension.

f. If required, override aggregation for another dimension.

g. Click **Done**.

When dimension-specific aggregation rules are defined for a measure, you see an asterisk * next to the aggregation rule in the Columns table. For example, **Sum**.

5. By default, all the columns in the fact table are displayed in reports. Deselect the **Available** box for any columns that you don’t want to display. You can use Shift + click or Ctrl + click to select multiple rows.

6. Click **Cancel** to cancel any of your changes.

7. Click **Done** to return to the table editor.

### Create Calculated Measures

If a fact table does not include all the measures that you need, then you can create calculated measures. For example, you can create a calculated measure called Average Order Size using the formula Revenue/Number of Orders.

1. In Data Modeler, lock the model for editing.

2. In the Fact Tables area, click the fact table for which you want to create measures.

3. In the Columns area, click **Add Column**.

4. In the New Column editor, enter a name and description for the column.

Then, enter an expression directly in the Expression box, or click **Full Editor** to display the Expression editor.

5. Expressions can contain measures that are already aggregated, as well as measures with no aggregation applied. Do one of the following:

   - Set Aggregation to **Before Calculating**, if your expression includes measures that are already aggregated or aggregation is not required.

   - Set Aggregation to **After Calculating** and select an aggregation rule, such as **Sum, Average, Count**, to apply aggregation after calculating the expression.
6. Click **Done** to return to the table editor.

About Creating Calculated Measures

Calculated measures, as the name suggests, are calculated from other measures. For example, you can create a measure that calculates Average Order Size using the formula Revenue/Number of Orders.

Calculations can contain measures that are already aggregated, as well as measures with no aggregation applied. For example:

- **Calculation includes aggregated measures**: \( \text{Sum(Revenue)} / \text{Sum(Orders)} \)
- **Calculation includes measures with no aggregation applied**: UnitPrice \( \times \) Quantity

If the measures in your calculation aren’t pre-aggregated, such as UnitPrice and Quantity, you may apply aggregation after the calculation. For example, \( \text{Sum(UnitPrice \times Quantity)} \).

Check the measures in your calculations before choosing whether to apply aggregation **Before Calculating** or **After Calculating** your expression.

**Calculations Include Measures Already Aggregated**

Set Aggregation to **Before calculating** if the calculation contains pre-aggregated measures. For example: \( \text{Sum(Revenue)} / \text{Sum(Orders)} \).
Calculations Include Non Aggregated Measures

Optionally, you can apply aggregation after your calculation. Set Aggregation to After calculating and then select an aggregation rule from the list. For example, **Sum**, **Average**, **Count** and so on.

Don't include expression columns in the calculation. If you include aggregated columns in the calculation, aggregation on the columns is ignored.
Create Derived Attributes

You can create custom or derived attributes for dimension tables that are based on an expression. For example, you can use an expression to concatenate multiple address columns into a single Full Address column.

1. In Data Modeler, lock the model for editing.
2. In the Dimension Tables area, click the dimension table for which you want to create derived attributes.
3. In the Columns area, click Add Column.
4. In the New Column editor, enter a name and description for the column. Then, enter an expression directly in the Expression box, or click Full Editor to display the Expression editor.

You can use a variable in a column expression.

5. Click Done to return to the table editor.

Create Expressions in the Expression Editor

You can use the Expression Editor to create constraints, aggregations, and other transformations on columns.

Topics:

- About the Expression Editor
- Create an Expression

About the Expression Editor

When modeling data, you can use the Expression Editor to create constraints, aggregations, and other transformations on columns. For example, you can use the Expression Editor to change the data type of a column from date to character. You can also use the Expression Editor to create expressions for data filters.

The Expression Editor contains the following sections:
• The Expression box on the left-hand side enables you to edit the current expression.

• The toolbar at the bottom contains commonly used expression operators, such as a plus sign, equals sign, or comma to separate items.

• The Expression Elements section on the right-hand side provides building blocks that you can use in your expression. Examples of elements are tables, columns, functions, and types.

The Expression Elements section only includes items that are relevant for your task. For example, if you open the Expression Editor to define a calculated measure, the Expression Elements section only includes the current fact table, any dimension tables joined to that table, plus any fact tables indirectly joined through a dimension table. Similarly, when you define a derived attribute, you see the current dimension table, any fact tables joined to that table, and any dimension table joined to those fact tables.

Another example is that time hierarchies are only included if the Time fact table is joined to the current table.

See Expression Editor Reference.

Create an Expression

You can use the Expression Editor to create constraints, aggregations, and other transformations on columns.

1. Add or edit a column from the Table editor.

2. Enter an expression in the Expression box and click Done. Or, click Full Editor to launch the Expression Editor.
3. Use the Expression Elements menus to locate the building blocks you want to use to create your expression.

Drag and drop an element to add it to your expression. You can also double-click an element to insert it, or you can select the element and click the arrow icon.

When you add a function, brackets indicate text that needs to be replaced. Select the text, then type, or use the Expression Elements menus to add the appropriate element.

See Expression Editor Reference.

4. Click Filter and then enter text in the search box to filter the available elements. Remove the text to revert to the full list of elements.

5. Click Actions to show or hide menus under Expression Elements, or to expand or collapse all menus.

6. Click an item on the toolbar to insert an operator.

7. Click Undo or Redo as needed when building your expression.

8. Click Validate to check your work.

9. Click Save when you’re finished.

Copy Measures and Attributes

You can copy measures and attributes in your data model.

• From the Data Model menu in the left pane, right-click the column that you want to copy and select Copy.

To copy multiple columns, Shift + click or Ctrl + click all the rows that you want and right-click to select Copy.

• From the Data Model menu in the left pane, click Column Actions for the column that you want to copy and select Copy.

The copy is displayed with a number added to the name.

Copy Model Objects

Sometimes it’s quicker to copy objects rather than starting from scratch.

In Data Modeler you can copy fact tables, dimension tables, database tables, and database views:

• Fact tables
To copy an existing fact table, select **Duplicate** from the **Fact Table Actions** menu. When you copy a fact table, Data Modeler includes joins by default. See **Create Fact Tables Individually**.

Aggregation level settings for measures aren't copied as, in most cases, level settings in the original fact table and the copied version differ. After copying a fact table, review and set the aggregation levels for measures as required.

- **Dimension tables**

  To copy an existing dimension table, select **Duplicate** from the **Dimension Table Actions** menu. When you copy a dimension table, Data Modeler excludes joins by default. See **Create Dimension Tables Individually**.

- **Database tables and views**

  To copy an existing database object, select **Duplicate** from the **Actions** menu. When you copy a table or view, Data Modeler creates a view based on the table or view you copy. See **Add Your Own Source Views**.
Define Hierarchies and Levels to Drill and Aggregate

You can define hierarchies and levels in Data Modeler.

Topics:
• Typical Workflow to Define Hierarchies and Levels
• About Hierarchies and Levels
• Edit Hierarchies and Levels
• Set Aggregation Levels for Measures

Typical Workflow to Define Hierarchies and Levels

Here are the common tasks to add hierarchies and levels to your data model.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add hierarchies and levels</td>
<td>Create hierarchies and levels for your dimension tables</td>
<td>Edit Hierarchies and Levels</td>
</tr>
<tr>
<td>Set aggregation levels for</td>
<td>Set custom aggregation levels for measures that are different from the</td>
<td>Set Aggregation Levels for Measures</td>
</tr>
<tr>
<td>measures</td>
<td>default level</td>
<td></td>
</tr>
</tbody>
</table>

About Hierarchies and Levels

A hierarchy shows relationships among groups of columns in a dimension table. For example, quarters contain months and months contain days. Hierarchies enable drilling in reports.

A dimension table can have one or more hierarchies. A hierarchy typically begins with a total level, then has child levels, working down to the lowest detail level.

All hierarchies for a given dimension must have a common lowest level. For example, a time dimension might contain a fiscal hierarchy and a calendar hierarchy, with Day as the common lowest level. Day has two named parent levels called Fiscal Year and Calendar Year, which are both children of the All root level.

All levels, except the total level, must have at least one column specified as the key or display column. However, it’s not necessary to explicitly associate all of the columns from a table with levels. Any column that you don’t associate with a level is automatically associated with the lowest level in the hierarchy that corresponds to that dimension table.

There’s no limit to the number of levels you can have in a hierarchy. The total number of levels isn’t by itself a determining factor in query performance. However, be aware that for extremely complex queries, even a few levels can impact performance.
Edit Hierarchies and Levels

When fact tables and dimension tables are joined, a default hierarchy is created but you can also add hierarchies and levels to those tables. For example, a Geography hierarchy might include levels for Country, State, and City.

1. In Data Modeler, lock the model for editing.
2. In the Dimension Tables area, click the dimension table for which you want to add a hierarchy. The dimension table must have at least one join to a fact table.
3. In the Dimension editor, click the Hierarchies tab.
4. In the Hierarchies area, click Add Level, and select the dimension columns or shared levels that you want to use.

5. Drag and drop levels to a different location in the order, as appropriate. You can also right-click a level and select Move left or Move right.

6. Click a level to display a dialog in which you can specify the level name, the key column, and the display column for the level.
7. Deselect Available if you don't want the hierarchy visible in analyses.
8. Click Done when you're finished.

Set Dimension Table Properties for Hierarchies

From the Overview tab for a particular dimension table, you can set properties that apply to all hierarchies for that table.

1. In Data Modeler, lock the model for editing.
2. Click the dimension table that you want to edit.
3. On the Overview tab, set properties as required.
   - Time dimension — Specifies that hierarchies for this dimension table support a time dimension. Hierarchies for time dimensions can't include skip levels or be unbalanced.
• **Enable skipped levels** — Specifies that this dimension table supports hierarchies with skipped levels. A skip-level hierarchy is a hierarchy where there are members that do not have a value for a particular ancestor level. For example, in a Country-State-City-District hierarchy, the city "Washington, D.C." does not belong to a State. In this case, you can drill down from the Country level (USA) to the City level (Washington, D.C.) and below. In a query, skipped levels aren’t displayed, and don’t affect computations. When sorted hierarchically, members appear under their nearest ancestors.

• **Enable unbalanced hierarchies** — Specifies that this dimension table supports unbalanced hierarchies. An unbalanced (or ragged) hierarchy is a hierarchy where the leaves (members with no children) don’t necessarily have the same depth. For example, a site can choose to have data for the current month at the day level, previous months data at the month level, and the previous 5 years data at the quarter level.

### Set Aggregation Levels for Measures

When fact tables and dimension tables are joined, you can set custom aggregation levels for a measure.

1. In Data Modeler, lock the model for editing.
2. In the Fact Tables area, click the fact table in which the measure is located.
3. Specify the aggregation rule for the new column that you want to become the level-based measure.
4. Click the column name, then click **Levels**.
5. In the Levels tab, for one or more hierarchies, use the slider to select the aggregation level for the measure.

6. Click **Done** to return to the table editor.

### About Setting Aggregation Levels for Measures

By default, measures are aggregated at the level of the dimension attributes that are selected in an analysis. For example, in an analysis that includes Sales Person and Revenue columns, the Revenue is aggregated at the level of a Sales Person.

To calculate ratios, you often need measures that are aggregated at a level that is different than the grain of the analysis. For example, to calculate the Revenue Percent Contribution for a Sales Person with respect to his department, you need Department Revenue at the Sales Person level in an analysis (Sales Person, Revenue, Revenue...).
*100 / Revenue@Dept). In this example, Revenue@Dept has a custom aggregation level that is different from the default level.
Secure Your Data Model

You can define object-level permissions and row-level security data filters for your data model.

Topics:
- Typical Workflow to Secure Model Data
- Create Variables to Use in Expressions
- Secure Access to Objects in the Model
- Secure Access to Data

Typical Workflow to Secure Model Data

Here are the common tasks to secure your data model.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define variables for data filters, if needed</td>
<td>Optionally, create variables that dynamically calculate and store values for use in column expressions and data filters.</td>
<td>Create Variables to Use in Expressions</td>
</tr>
<tr>
<td>Set permissions on model objects</td>
<td>Object permissions control visibility for your entire model, or individual fact tables, dimension tables, and columns.</td>
<td>Secure Access to Objects in the Model</td>
</tr>
<tr>
<td>Define row-level security filters</td>
<td>Data filters limit results returned for fact tables, dimension tables, and columns.</td>
<td>Secure Access to Data</td>
</tr>
</tbody>
</table>

Create Variables to Use in Expressions

In Data Modeler, you can define variables that dynamically calculate and store values so that you can use those values in column expressions or data filters.

Topics:
- About Variables
- Define Variables

About Variables

Variables dynamically calculate and store values so that you can use those values in expressions. You can use variables in column expressions, or in data filters.
For example, suppose User1 belongs to Department1 and User2 belongs to Department2. Each user must access only the data that is specific to his department. You can use the DEPARTMENT_NUMBER variable to store the appropriate values for User1 and User2. You can use this variable in a data filter in which the data is filtered by Department2 for User1 and Department2 for User2. In other words, variables dynamically modify metadata content to adjust to a changing data environment.

Values in variables aren't secure, because object permissions don't apply to variables. Anybody who knows or can guess the name of the variable can use it in an expression. Because of this, don't put sensitive data like passwords in variables.

You can't use a variable in an expression that defines another variable.

Define Variables

You can create a variable for use in column expressions and data filters. For example, a variable called SalesRegion might use a SQL query to retrieve the name of the sales region of the user.

Tip:

Only reference source database objects in the SQL query for a variable. Don't include names of data model objects in the query.

1. In Data Modeler, lock the model for editing.
2. In the Variables menu in the left pane, click the Plus icon.
3. Enter a SQL query to populate the value of the variable:
   a. Specify whether the variable returns **A single value** or **Multiple values**.
   b. Enter a SQL query to populate the value or values of the variable. For example:
      — Return a single value with the query like: SELECT prod-name FROM products
      — Return multiple values with a query like: SELECT 'MyVariable', prod-name FROM products
      For multiple values, always use the format: SELECT 'VariableName', VariableValue FROM Table
   c. Provide a default starting value if needed.
   d. Click **Test** to validate that the query returns an appropriate value
4. To create a variable that refreshes its value at the start of each user session, select **On sign in** for **Update Value**.

5. To create a variable that refreshes its value on a schedule that you set, select **On a schedule** for **Update Value**.
   In the **Run SQL Query** area, select the frequency and start date for refreshing the variable.

6. To create a variable with a static value that never changes, select **Never** for **Update Value** and provide a value for the variable in the **Value** field.

7. Click **Done** to return to the data model.

Tip:

To edit an existing variable, right-click it in the Variables list and select **Inspect**. To delete a variable, right-click it and select **Delete**.

After you have defined a variable, you can use it in a data filter or in a column expression.

### Secure Access to Objects in the Model

It's important to keep sensitive information secure. Everyone has access to the data in your model by default. To avoid exposing sensitive data, set show and hide permissions for your entire model or for individual fact tables, dimension tables, and columns.

For example, you can restrict access to certain Revenue columns to ensure only authorized users can view them. Or you can restrict access to an entire model to stop people opening the model or accesses its subject area.

1. In Data Modeler, lock the model for editing.
2. To restrict access to the whole model, select the **Permissions** tab.
To restrict access to a specific item in the model, edit the fact table, dimension table, or column whose access you want to secure, then select the Permissions tab.

3. To control access, click Add and select the appropriate role. Alternatively, in the left pane, click Roles. Then, drag and drop a role to the Permissions list. To add multiple roles, use Shift + click or Ctrl + click to make your selections before you drag and drop.

4. Specify whether or not this object is visible to users with that role by selecting either Visible or Hidden.
   - Models — If you hide a model, users with that role can't open the model or its subject area.
   - Model objects — If you hide a fact table, dimension table, or column, users with that role can't see the object in reports.
     The same users will see the object in Data Modeler if they have the BI Data Model Author role and have access to the model.

5. To remove roles from the Permissions list (you can't remove the Everyone role), do one of the following:
   - Right-click a role and select Remove.
   - Select Remove from the Actions menu for that role.
   - Select multiple roles using Shift + click or Ctrl + click, then select Remove Selected from the Permissions Action menu.
   - Remove all roles by selecting Remove All from the Permissions Action menu.

About Permission Inheritance

When multiple application roles act on a user or role with conflicting security attributes, the user or role is granted the least restrictive security attribute. Also, any explicit permissions acting on a user take precedence over any permissions on the same objects granted to that user through application roles.
Secure Access to Data

You can define data filters for fact tables, dimension tables, and columns that provide row-level security for data model objects. For example, you can create a filter that restricts access to the Products table so that only certain brands are visible to users assigned to a particular role.

1. In Data Modeler, lock the model for editing.
2. Edit the fact table, dimension table, or column you want to secure.
3. Select the Data Filters tab.
4. Add a role to the Data Filters list by doing one of the following:
   • Click Add and select the appropriate role.
   • In the left pane, click Roles. Then, drag and drop a role to the Data Filters list.
5. Enter an expression to specify which data is accessible for that role. Either enter the expression directly, or click Full Editor to display the Expression Editor. You can use a variable in a data filter expression.
6. Select Enable to specify whether the filter is enabled for that role.
7. To remove filters from the Data Filters list, do one of the following:
   • Right-click a filter and select Remove.
   • Select Remove from the Actions menu for that filter.
   • Select multiple filters using Shift-click or Ctrl-click, then select Remove Selected from the Data Filters Action menu.
   • Remove all filters by selecting Remove All from the Data Filters Action menu.
8. Click **Done**.
Part IV
Manage Your Service

This part explains how to manage an Analytics Cloud instance offering data visualization and business intelligence enterprise modeling services. The information is aimed at administrators whose primary job is to manage users and keep them productive. Administrators perform a long list of critical duties; they control user permissions and amend accounts, set up database connections for data modelers, manage data storage to avoid exceeding storage limits, keep regular backups so users don't risk losing their work, authorize access to external content by whitelisting safe domains, troubleshoot user queries, and so much more.

Chapters:

• Manage What Users Can See and Do
• Take Snapshots and Restore
• Perform Administration Tasks
# Manage What Users Can See and Do

Administrators can manage what other users are allowed to see and do when working with data.

## Video

### Topics:
- **Typical Workflow to Manage What Users See and Do**
- **About Users and Roles**
  - About Application Roles
  - **Configure What Users Can See and Do**

## Typical Workflow to Manage What Users See and Do

Here are the common tasks to start managing what users can see and do when working with Oracle Analytics Cloud.

### Tutorial

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add users and roles</td>
<td>Add users who want access to Oracle Analytics Cloud.</td>
<td>Add a User or a Role</td>
</tr>
<tr>
<td>Understand application roles</td>
<td>Learn about the predefined application roles and what they allow users to do in Oracle Analytics Cloud.</td>
<td>About Application Roles</td>
</tr>
<tr>
<td>Assign application roles to users</td>
<td>Give your users access to different features by granting them application roles.</td>
<td>Assign Application Roles to Users</td>
</tr>
<tr>
<td>Assign application roles to user roles</td>
<td>Grant access to users more quickly through roles. Give a group of users access in one go.</td>
<td>Assign Application Roles to Multiple Users Through Roles</td>
</tr>
<tr>
<td>Add members and actions to application roles</td>
<td>Grant access to Oracle Analytics Cloud features in a different way. Go to the application role and assign users and groups from there.</td>
<td>Add Members to Application Roles</td>
</tr>
<tr>
<td>Add your own application roles</td>
<td>Oracle Analytics Cloud provides application roles that map directly to all the main features but you can create your own application roles that make sense to your business too.</td>
<td>Add Your Own Application Roles</td>
</tr>
</tbody>
</table>
About Users and Roles

Most administrators set up user accounts and give people access to Oracle Analytics Cloud through roles (also known as, user groups). The way you do this depends whether you manage users through Oracle Identity Cloud Service or the WebLogic embedded LDAP server.

Once user accounts are set up, you assign application roles to give your users permissions within a particular Oracle Analytics Cloud service. You manage application roles through the Console in your service (Administer Users and Roles). See About Application Roles.

Predefined Users, Groups, and Application Roles in Oracle Identity Cloud Service

The identity domain controls the authentication and authorization of users who sign in to Oracle Analytics Cloud. Oracle Analytics Cloud services that use Oracle Identity Cloud Service, initially have a single user account and several predefined application roles. You can give people access to Oracle Analytics Cloud through these predefined application roles in Oracle Identity Cloud Service.

<table>
<thead>
<tr>
<th>Oracle Identity Cloud Service Application Roles for Oracle Analytics Cloud</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServiceAdministrator</td>
<td>Member of <strong>BI Service Administrator</strong>, <strong>BI Data Model Author</strong>, and <strong>BI Data Load Author</strong>. Allows users to administer Oracle Analytics Cloud and delegate privileges to others. The user who creates the service is automatically assigned this Oracle Identity Cloud Service application role.</td>
</tr>
<tr>
<td>ServiceUser</td>
<td>Member of <strong>BI Content Author</strong> and <strong>DV Content Author</strong>. Allows users to create and share content.</td>
</tr>
<tr>
<td>ServiceViewer</td>
<td>Member of <strong>BI Consumer</strong> and <strong>DV Consumer</strong>. Allows users to view and explore content.</td>
</tr>
<tr>
<td>ServiceDeployer</td>
<td>Not used in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td>ServiceDeveloper</td>
<td>Not used in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td>PODManager</td>
<td>Member of the global WebLogic server Administrator role. Allows users to can create and manage services.</td>
</tr>
</tbody>
</table>

Predefined Users and Roles in WebLogic Embedded LDAP Server

The identity domain controls the authentication and authorization of users who sign in to Oracle Analytics Cloud. When Oracle Analytics Cloud is set up to use an embedded LDAP server, a single user account and several predefined roles are available. You can give people access to Oracle Analytics Cloud through these predefined roles and you can create roles of your own.

<table>
<thead>
<tr>
<th>Predefined Roles</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators</td>
<td>By default, this role contains the administrative user created when the service was set up.</td>
</tr>
</tbody>
</table>
### Predefined Roles

<table>
<thead>
<tr>
<th>Predefined Roles</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployers</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>Operators</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>Monitors</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>AppTesters</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>CrossDomainConnectors</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>AdminChannelUsers</td>
<td>By default, this role is empty.</td>
</tr>
<tr>
<td>OracleSystemGroup</td>
<td>By default, this role is empty.</td>
</tr>
</tbody>
</table>

## Add a User or a Role

One of the first jobs you do after setting up Oracle Analytics Cloud is to add user accounts for everyone you expect to use data visualization and enterprise modeling services, and assign them to suitable roles.

The way you add users depends whether you use Oracle Identity Cloud Service or an embedded LDAP server for identity management.

- **Oracle Identity Cloud Service** - Use Oracle Identity Cloud Service to add users and roles. See Manage Oracle Identity Cloud Service Users, in *Administering Oracle Identity Cloud Service*.

- **Embedded LDAP server** - You can add users and roles one-by-one through the Console. Alternatively, you can add a batch of users and roles from a CSV file programmatically. See Import Users and Roles from a CSV File, in *Administering Oracle Analytics Cloud - Classic*.

To add a user or a role using the Console:

1. Open the Console.
2. Click **Users and Roles**.
3. To add a user:
   a. Click **Users**.
   b. Click **Add**.
   c. Enter a user name; the name used to sign in.
   d. Enter the user's first name and last name.
   e. Enter a password.
      The user enters this password the first time they sign in. To prevent unauthorized access, advise all users to change the default password as soon as possible.
      The other fields are optional.
   f. Click **Save**.
   g. To give this user permissions in Oracle Analytics Cloud, select **Manage Application Roles** from the menu for this user, click **Search**, and specify what this user is allowed to do by selecting one or more application roles.
4. To add a role (sometimes referred to as a user group):
a. Click **Roles**.
b. Click **Add**.
c. Enter a name for the role.
d. Enter a more detailed display name and description if you want.
   Initially, roles don't have any users.
e. To assign one or more users to this role, select **Manage Members**, select **Users** from the Type list, and then click **Search** to list all the users.
f. Move all the users you want for this role to the **Selected Users** pane, and click **OK**.

**Reset Another User's Password**

If a user can't sign in because they've forgotten their password, you can reset it for them. Users who are signed in can change their own password at any time.

1. Open the Console.
2. Click **Users and Roles**.
3. Click **Users**.
4. Select the user, click **Navigator** to display the navigator bar, then **Change Password**.
5. Enter the new password twice.

**Change Your Own Password**

You can sign in to Oracle Analytics Cloud to change or reset your password. If you forgot the password you use to sign in to Oracle Analytics Cloud, you can ask the administrator to reset it.

1. Click your user name or name badge displaying your first initial.
2. Click **Change Password**.
3. Enter your new password twice.
4. Click **Update**.

**About Application Roles**

An application role comprises a set of privileges that determine what users can see and do after signing in to Oracle Analytics Cloud. It's your job as an administrator to assign people to one or more application roles.
There are two types of application role:

<table>
<thead>
<tr>
<th>Type of Application Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predefined</td>
<td>Include a fixed set of privileges.</td>
</tr>
<tr>
<td>User-defined</td>
<td>Created by administrators. Include one or more predefined application roles. See Add Your Own Application Roles.</td>
</tr>
</tbody>
</table>

**Predefined Application Roles**

Oracle Analytics Cloud provides several predefined application roles to get you started. In many cases, these predefined application roles are all that you need.

<table>
<thead>
<tr>
<th>Predefined Application Roles in Oracle Analytics Cloud</th>
<th>Description</th>
<th>Default Members</th>
<th>Predefined Application Role in Oracle Identity Cloud Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI Service Administrator</td>
<td>Allows users to administer Oracle Analytics Cloud and delegate privileges to others using the Console.</td>
<td>Administrator who created the service</td>
<td>ServiceAdministrator</td>
</tr>
<tr>
<td>BI Data Model Author</td>
<td>Allows users to manage data models in Oracle Analytics Cloud using Data Modeler</td>
<td>BI ServiceAdministrator</td>
<td>ServiceAdministrator</td>
</tr>
<tr>
<td>BI Data Load Author</td>
<td>Allows users to load data.</td>
<td>BI ServiceAdministrator</td>
<td>ServiceAdministrator</td>
</tr>
<tr>
<td>Predefined Application Roles in Oracle Analytics Cloud</td>
<td>Description</td>
<td>Default Members</td>
<td>Predefined Application Role in Oracle Identity Cloud Service</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>BI Content Author</td>
<td>Allows users to create analyses and dashboards in Oracle Analytics Cloud and share them with others.</td>
<td>BI Service Administrator, DV Content Author</td>
<td>ServiceUser</td>
</tr>
<tr>
<td>DV Content Author</td>
<td>Allows users to create visualization projects, load data for data visualizations, and explore data visualizations.</td>
<td>BI Service Administrator</td>
<td>ServiceUser</td>
</tr>
<tr>
<td>DV Consumer</td>
<td>Allows users to explore data visualizations.</td>
<td>DV Content Author</td>
<td>ServiceViewer</td>
</tr>
<tr>
<td>BI Consumer</td>
<td>Allows users to view and run reports in Oracle Analytics Cloud (projects, analyses, dashboards). Use this application role to control who has access to the service.</td>
<td>DV Content Author, BI Content Author</td>
<td>ServiceViewer</td>
</tr>
</tbody>
</table>

1 If you’re using Oracle Identity Cloud Service for identity management, the predefined application roles you see in Oracle Analytics Cloud map to a similar set of application roles in Oracle Identity Cloud Service.

You can't delete predefined application roles or remove default memberships.

Application roles can have users, roles, or other application roles as members. This means that a user who is a member of one application role might indirectly be a member of other application roles.

For example, a member of the BI Service Administrator application role inherits membership of other application roles, such as BI Data Model Author and BI Consumer. Any user that is a member of BI Service Administrator can do and see everything that these other application roles can do and see. Therefore you don't need to add a new user (for example, John) to all these application roles. You can simply add the user to the BI Service Administrator application role.

**Configure What Users Can See and Do**

Administrators assign application roles to determine what other users can see and do in Oracle Analytics Cloud.

**Topics:**

- Get Started with Application Roles
- Assign Application Roles to Users
- Assign Application Roles to Multiple Users Through Roles
• Add Members to Application Roles
• Add Your Own Application Roles
• Delete Application Roles

Get Started with Application Roles

Administrators configure what users see and do in Oracle Analytics Cloud from the **Users and Roles** page in the Console. This page presents user information in 3 different views:

<table>
<thead>
<tr>
<th>Users and Roles Page</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users tab</td>
<td>Shows users from the identity domain associated with your service. You can add users, delete users, and assign users one or more application roles in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td>Roles tab</td>
<td>Shows roles from the identity domain associated with your service. You can add and remove roles (groups of users), and assign them to one or more application roles in Oracle Analytics Cloud. From the Roles tab you can also see who belongs to each role.</td>
</tr>
<tr>
<td>Application Roles tab</td>
<td>Shows predefined application roles for Oracle Analytics Cloud together with any custom application roles you define. From the Application Roles tab you can assign application roles to multiple users, roles, and other application roles. You can also create application roles of your own and assign privileges to them through other application roles.</td>
</tr>
</tbody>
</table>

Add Members to Application Roles

Application roles determine what people are allowed to see and do in Oracle Analytics Cloud. It’s the administrator’s job to assign appropriate application roles to everyone using the service and to manage the privileges of each application role.

You can make individuals (users) and groups of users (roles) from your identity domain members of an application role.

Remember:

• Members inherit the privileges of an application role.
• Application roles inherit privileges from their parent (application roles).

You select members for an application role or change parent privileges using the Console.

1. Click **Console**.
2. Click **Users and Roles**.
3. Click the **Application Roles** tab.
4. To display all available application roles, leave the **Search** field blank and **Show Members: All**.

   To filter the list by name, enter all or part of an application role name in the **Search** filter and press Enter. The search is case-insensitive, and searches both name and display name.
5. Look in the **Members** area to see who belongs to each application role:

![Application Role Management](image)

The number of users, roles, and application roles that are members displays on the page. Click a number, such as **5** in this image, to see those members in more detail (either users, roles or application roles).

6. To add new members or remove members from an application role:
   a. Click **Members**.
   b. Select either users, roles, or application roles from the **Type** box and click **Search** to show the current members.
   c. Use the shuttle controls to move members between the **Available** and **All Selected** list.

   Some application roles aren't eligible to be members and these are grayed. For example, you can't select a parent application role to be a member.

   Users marked 'absent' no longer have an account in your identity domain. To remove absent users, use the shuttle control to move the user from the **All selected users** list to the **Available users** list.
   d. Click **OK**.

7. To see whether an application role, such as Sales Analyst, inherits privileges from other application roles:
   a. Click the action menu.

   ![Manage Application Roles](image)

   **Inherited privileges are displayed in the Selected Application Roles pane.**

b. Select **Manage Application Roles**.

8. To add or remove privileges:
   a. Click **Search** to display all available application roles.

   Alternatively, enter all or part of an application role name and click **Search**.

   b. Use the shuttle controls to move application roles between the **Available Application Roles** list and the **Selected Application Roles** list.

   You can't select application roles that are grayed out. Application roles are grayed out so you can't create a circular membership tree.
Why Is the Administrator Application Role Important?

You need the BI Service Administrator application role to access administrative options in the Console.

There must always be at least one person in your organization with the BI Service Administrator application role. This ensures there is always someone who can delegate permissions to others. If you remove yourself from the BI Service Administrator role you’ll see a warning message. Consider adding yourself back to the this application role before you sign out. After you sign out, you won’t be allowed to manage permissions through the Console to reinstate yourself.

Assign Application Roles to Users

The Users page lists all the users who can sign in to Oracle Analytics Cloud. The list of names comes directly from the identity domain associated with your service. It’s the administrator’s job to assign users to appropriate application roles.

1. Click Console.
2. Click Users and Roles.
3. Click the Users tab.

4. To show everyone, leave the Search field blank and click Show Members: All.
   To filter the list by name, enter all or part of a user name in the Search filter and press enter. The search is case-insensitive, and searches both name and display name.
5. To see what application roles are assigned to a user:
   a. Select the user.
   b. Click the action menu and select Manage Application Roles.
The user's current application role assignments are displayed in the Selected Application Roles pane.

For example, this image shows a user called Ed Ferguson assigned with the Sales Analysts application role.

6. To assign additional application roles or remove current assignments:
   a. Show available application roles. Click Search to display all the application roles.
      Alternatively, filter the list by Name and click Search.
   b. Use the shuttle controls to move application roles between the Available Application Roles list and the Selected Application Roles list.
   c. Click OK.

Assign Application Roles to Multiple Users Through Roles

The Roles page shows you all the roles that people signing in belong to in their identity domain. The list of roles comes directly from the identity domain associated with your service. It's often quicker to assign privileges to multiple users through their predefined identity domain roles, than it is to assign privileges to users one by one.

You can assign application roles from the Roles page. You can also see who belongs to each role.

1. Click Console.
2. Click Users and Roles.
3. Click the Roles tab.
4. Look in the **Members** area to see who belongs to each role:

   The number of users and roles that are members are displayed on the page. Click a number, such as 1 in this image, to see the members in more detail.

5. To display all available roles, leave the **Search** field blank and **Show Members**: **All**.

   To filter the list by name, enter all or part of a role name in the **Search** filter and press enter. The search is case-insensitive, and searches both name and display name.

   Alternatively, use the **Show Members** filter to list roles that are members of a particular application role or belong to another role.

6. To see the current application roles assignments:
   a. Select the role.
   b. Click the action menu and select **Manage Application Roles**.

   Current application role assignments display in the **Selected Application Roles** pane.

7. To assign additional application roles or remove them:
   a. Click **Search** to display all available application roles.

      Alternatively, enter all or part of an application role name and click **Search**.

   b. Use the shuttle controls to move application roles between the **Available Application Roles** list and the **Selected Application Roles** list.

   c. Click **OK**.

**Add Your Own Application Roles**

Oracle Analytics Cloud provides a set of predefined application roles. You can also create application roles of your own to suit your own requirements.

For example, you can create an application role that only allows a select group of people to view specific folders or projects.

1. Click **Console**.
2. Click **Users and Roles**.
3. Click the **Application Roles** tab.
4. Click **Add**.

---

ORACLE
5. Enter a name and describe the application role. Click **Save**.

Initially, new application roles don't have any members or privileges.

6. Add members to the application role:
   a. Click the action menu.
   b. Select **Manage Members**.
   c. Select the members (users, roles or application roles) that you want assigned to this application role and move them to the **Selected** pane on the right.

   For example, you might want an application role that restricts access to everyone in your organization, except sales managers. To do this, move anyone who is a sales manager, to the **Selected** pane.
   d. Click **OK**.

7. Optionally, add privileges to the new application role:
   a. Click the action menu.
   b. Select **Manage Application Roles**.
   c. Click **Search**.
   d. Move all the application roles you want this application role to inherit to the **Selected Application Roles** pane, and click **OK**.

Delete Application Roles

You can delete application roles that you created but no longer need.

1. Click **Console**.
2. Click **Users and Roles**.
3. Click the **Application Roles** tab.
4. Navigate to the application role you want to delete.
5. Click the action menu for the application role you want to delete and select **Remove**.

6. Click **OK**.
Add One Predefined Application Role to Another (Advanced)

Oracle Analytics Cloud provides several predefined roles: BI Service Administrator, BI Data Model Author, BI Data Load Author, BI Content Author, DV Content Author, DV Consumer, BI Consumer. There are very few, advanced use cases where you might want to permanently include one predefined application role in another.

Any changes that you make to predefined application roles are permanent, so don't perform this task unless you need to.

1. Click **Console**.
2. Click **Snapshots**.
3. Click **New Snapshot** to take a snapshot of your system before the change.
   The only way you can revert predefined application role changes is to restore your service from a snapshot taken before the change.
4. Go back to the Console, click **Users and Roles**.
5. Click the **Application Roles** tab.
6. Click the action menu for the predefined application role you want to change and select **Add Predefined Member (Advanced)**.
7. Click **Yes** to confirm that you've taken a snapshot and want to continue.
8. Select the predefined application role that you want to add.
   You can select only one application role.
9. Click **Yes** to confirm that you've taken a snapshot and want to permanently change the predefined application role.
Take Snapshots and Restore

This topic describes how to back up and restore application content using a file called a snapshot.

Topics:
- Typical Workflow to Take Snapshots and Restore
- About Snapshots
- Take Snapshots and Restore Information
- Download and Upload Snapshots
- Migrate Oracle Analytics Cloud Using Snapshots

Typical Workflow to Take Snapshots and Restore

Here are the common tasks to back up and restore your content using snapshots.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take a snapshot</td>
<td>Capture content and settings in your Oracle Analytics Cloud environment at a point in time.</td>
<td>Take a Snapshot</td>
</tr>
<tr>
<td>Restore from a snapshot</td>
<td>Restore the system to a previously working state.</td>
<td>Restore from a Snapshot</td>
</tr>
<tr>
<td>Delete a snapshot</td>
<td>Delete unwanted snapshots.</td>
<td>Delete Snapshots</td>
</tr>
<tr>
<td>Download a snapshot</td>
<td>Save a snapshot to a local file system.</td>
<td>Download Snapshots</td>
</tr>
<tr>
<td>Upload a snapshot</td>
<td>Upload content from a snapshot that is stored on a local file system.</td>
<td>Upload Snapshots</td>
</tr>
<tr>
<td>Migrate content using a snapshot</td>
<td>Migrate content to another environment.</td>
<td>Migrate Oracle Analytics Cloud Using Snapshots</td>
</tr>
</tbody>
</table>

About Snapshots

A snapshot captures the state of your environment at a point in time. Snapshots don’t include data that is hosted on external data sources.

Take a snapshot of your environment before people start using the system and again at suitable intervals so you can restore the environment if something goes wrong. You can download and store snapshots on a local file system and upload them back to your system if they’re required to restore content. The snapshot file that you download is a compressed archive file (BAR file).
Snapshots are also useful if you want to migrate your content to another cloud service. For example, you might want to migrate content you created in a development or test environment to a production environment.

You can keep up to 40 snapshots online and download as many as you want.

Oracle Analytics Cloud automatically takes a snapshot when someone publishes changes to the data model and keeps the 5 most recent snapshots in case you unexpectedly need to revert to an earlier model version. The minimum interval between these automatically generated snapshots is one hour.

Options When You Take a Snapshot

When you take a snapshot you choose the content you want to include in it. You can take a snapshot of your entire environment (everything) or specify only specific content that you want to back up or migrate (custom).

- **Everything** - Saves your entire environment in the snapshot. This option is useful if you want to:
  - Back up everything in case something goes wrong.
  - Migrate everything to a new service.
  - Clone an existing service.

- **Custom** - You select which content to save in the snapshot. Some content types are always included while others are optional.

<table>
<thead>
<tr>
<th>Snapshot Option</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>Data visualization content that users create (Data tab).</td>
<td>Always included</td>
</tr>
<tr>
<td>– Data Sets</td>
<td>Data sets that users create for data visualizations and data flows.</td>
<td>Always included</td>
</tr>
<tr>
<td>– File-based Data</td>
<td>File-based data that users upload to create data sets. For example, data uploaded from a spreadsheet.</td>
<td>Optional</td>
</tr>
<tr>
<td>– Connections</td>
<td>Data connections that users create so they can visualize their data.</td>
<td>Always included</td>
</tr>
<tr>
<td>– Data Flows</td>
<td>Data flows that users create for data visualization.</td>
<td>Always included</td>
</tr>
<tr>
<td>– Sequences</td>
<td>Sequences that users create for data visualization.</td>
<td>Always included</td>
</tr>
<tr>
<td>– Data Replications</td>
<td>Data replications that users create for data visualization.</td>
<td>Optional</td>
</tr>
<tr>
<td>Machine Learning</td>
<td>Machine learning models that users create from data flows.</td>
<td>Optional</td>
</tr>
<tr>
<td>Jobs</td>
<td>Jobs that users schedule for data flows, sequences, data replications, and pixel-perfect reports.</td>
<td>Optional</td>
</tr>
<tr>
<td>Snapshot Option</td>
<td>Description</td>
<td>Optional?</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Plug-ins and Extensions</td>
<td>Extensions that users upload to implement custom visualizations and custom maps.</td>
<td>Optional</td>
</tr>
<tr>
<td>Configuration and Settings</td>
<td>Service configuration and settings configured through Console. For example, mail settings, database connections, safe domains, and more.</td>
<td>Optional</td>
</tr>
<tr>
<td>Application Roles</td>
<td>Custom application roles administrators create through Console.</td>
<td>Always included</td>
</tr>
<tr>
<td>Credentials</td>
<td>- <strong>Data connections:</strong> Credentials and other connection parameters, such as host, port, user name, and password. If you exclude credentials, you must reconfigure the connection details after you restore the snapshot.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>- <strong>Cloud storage:</strong> Credentials required to access cloud storage where file-based data that users upload is stored. If you include file-based data in your snapshot, include the storage credentials if you plan to migrate the content to another environment. If you exclude credentials, you can use the Data Migration utility to download and then upload your data files separately.</td>
<td>Optional</td>
</tr>
<tr>
<td>Classic Content</td>
<td>Content that users create using Classic tools in Oracle Analytics Cloud, such as analyses, dashboards, and pixel-perfect reports.</td>
<td>Always included</td>
</tr>
<tr>
<td></td>
<td>- <strong>Data Model and Subject Areas</strong> Data models and subject areas that users create.</td>
<td>Always included</td>
</tr>
<tr>
<td></td>
<td>- <strong>Catalog Content</strong> Catalog containing content that users create and save for future use, such as analyses, dashboards, reports, deliveries, agents, and so on.</td>
<td>Always included</td>
</tr>
</tbody>
</table>
Snapshot Option | Description | Optional?
---|---|---
Shared Folders and Projects | Content that is being shared, that is, content that everyone with access to Classic tools can see. This includes any data visualization projects saved in the shared folders. | Always included
User Folders and Projects | Content stored in user folders. Content that users create and store for their private use. This includes any data visualization projects users saved in their private folders. | Optional

Options When You Restore a Snapshot

When you restore content from a snapshot you have several options. You can restore only the content that's inside the snapshot, restore everything in your environment, or restore a specific set of items in the snapshot (custom).

- **Replace Snapshot Content Only** - Everything that's in the snapshot is restored. Any content type excluded from the snapshot remains unchanged in your environment.

- **Replace Everything** - Replaces your entire environment using information in the snapshot. Any content type excluded from the snapshot is restored to its default state, that is, "no content". For example, if you chose not to include data flows in the snapshot, any data flows that exist on your system are deleted when you restore the snapshot and the data flow component is restored with default settings. There are some exceptions; if the snapshot doesn't contain any file-based data sets, plug-ins, or extensions these items are left unchanged.

  This option is useful if you want to:
  - Replace everything after something went wrong.
  - Migrate from another service.
  - Clone an existing service.

- **Custom** - You select the content you want to restore. If you don't want to restore certain content types, exclude them before you restore. The options on restore are the same as the options when you take a snapshot. Some content types are always restored while others are optional.

Take Snapshots and Restore Information

You can take a snapshot of your system at any time.

**Topics:**

- Take a Snapshot
- Restore from a Snapshot
Take a Snapshot

Administrators can take a snapshot of the system at any time.

1. Click **Console**.
2. Click **Snapshots**.
3. Click **Create Snapshot**.
4. Enter a short description for the snapshot to help you remember later why you took it.
   For example, why you created the snapshot and what it contains.
5. Select the content you want to include, **Everything** or **Custom**.
   - **Everything** - Include everything about your environment in the snapshot.
   - **Custom** - Select only the content types you want to save in the snapshot. Deselect any items that you don't want.
6. Click **Create**.

The latest content is saved to a snapshot.

Restore from a Snapshot

If something goes wrong, you can easily restore your content to a previous working state from a snapshot. You also restore snapshots when you migrate content between services.

Restoring a snapshot temporarily disrupts your system and you don't see the restored content instantly. Before you start, read the tips about restoring snapshots and start your restore at a time that minimizes any impact on you and other users.

- As you start to restore the snapshot, users currently signed in have their session terminated.
- After you restore from a snapshot, allow time for restored content to refresh (for example, approximately 15 to 30 minutes for a large snapshot).
- When you restore a snapshot taken from a different service, you must upload the data associated with your data sets on the new service.
- You can restore snapshots taken from the same version as or an earlier version than your service is currently running.

1. Click **Console**.
2. Click **Snapshots**.
3. Select the snapshot that you want to use to restore your system.
4. Click **Snapshot Actions**.
5. Click **Restore** to return your system to the state when this snapshot was taken.
6. In the Restore Snapshot dialog, select only those elements you want to restore.
For example, you may not want to include application roles if you’re restoring a snapshot taken from a pre-production service, to a production service. Pre-production roles often have different members to the production service. If so, select **Custom** and deselect **Application Roles** before you restore.

a. Select the **Restore** option you want.

- **Replace Snapshot Content Only** - Restore only the content inside the snapshot. Don't remove content that exists on the target; only replace content that's inside the snapshot.

- **Replace Everything** - Overwrite all your existing content. Replace your existing content with the content included in this snapshot (listed in the description field). Any content types not included in the snapshot, excluding file-based data sets, plug-ins and extensions, are removed and restored with default settings.

- **Custom** - Select only the content types you want to restore. You can restore with content saved inside the snapshot or restore content with default settings if that content is missing from the snapshot.
  - Content saved inside the snapshot is listed in the description field.
  - Content not included in the snapshot is marked with a warning icon. Only restore content marked with a warning icon if you want to restore that content with default settings.

If you don’t want to restore everything, deselect all the items you want to keep.

b. If you select **Custom**, select only those items you want to restore.

7. For auditing purposes, enter the reason why you’re restoring.

It’s good practice to include a restore reason. Later on you might want to analyze the restore history, and this information can help you remember why you restored the snapshot.

8. Click **Restore**.

A warning message is displayed because restoring a snapshot can be very disruptive.

9. Click **Yes** to restore the selected snapshot, or click **No** to abandon the restore.

10. Wait for the restore to complete, and then wait a few more minutes for the restored content to refresh through your system.

    The time it takes to restore your system depends on the size of your snapshot. For a large snapshot, allow approximately 15 to 20 minutes.

11. Sign out and then sign back in to see the restored content and inherit newly restored application roles, if any.

**Track Who Restored What and When**

You can check the restore history to learn exactly when and what content was restored, and to check for any errors during the restore process. This might be useful if you experience issues during or after you restore a snapshot.

1. Click **Console**.
2. Click Snapshots.

3. Click the Page menu and select Show Restore History.

**Edit Snapshot Descriptions**

You can add or update the description for any snapshot.

1. Click Console.
2. Click Snapshots.
3. Select the snapshot you want to edit.
4. Click Snapshot Actions.
5. Click Edit Name.
6. Update the description, and click OK.

**Delete Snapshots**

From time to time, delete snapshots that you don’t need.

1. Click Console.
2. Click Snapshots.
3. Select the snapshot that you want to delete.
4. Click Snapshot Actions.
5. Click Delete to confirm that you want to delete the snapshot.

**Download and Upload Snapshots**

Download and upload features enable you to save snapshots to your local file system and upload them back to the cloud. Use these features to back up and restore your content or to migrate content between development, test, and production environments.

**Topics:**

- Download Snapshots
- Upload Snapshots

**Download Snapshots**

Use the Download option to save a snapshot to your local file system. This allows you to locally store and manage snapshots you take of your system.

The snapshot downloads as an archive file (.bar). The time it takes to download depends on the size of the snapshot .bar file.

If you haven’t taken the snapshot yet, you’ll need to do that first.
1. Click **Console**.

2. Click **Snapshots**.

3. Select the snapshot that you want to download.

4. Click **Snapshot Actions**.

5. Click **Download**.

6. Enter and confirm a password for the snapshot. The password must be between 8 and 50 characters long and contain at least one numeric character, one uppercase letter, and one lowercase letter.

   Don't forget this password. You'll be asked for this password if you try to upload the file in the future. For example, you may want to restore or migrate the content stored in the snapshot.

7. Click **OK**.

   What happens next depends on your browser. In Internet Explorer, for example, you browse the Save As dialog, and click **Save** to save the snapshot .bar file in the selected location.

   The time it takes to download depends on the file size.

### Upload Snapshots

You can upload a snapshot that you previously saved on your local file system. The time it takes to upload a snapshot depends on the size of the snapshot .bar file.

When you upload a snapshot, the file itself is uploaded to your system but the artifacts stored inside the snapshot aren't immediately available in your environment. Any snapshot you upload displays in the snapshot list. When you're ready to do so, you can overwrite your current artifacts, such as your catalog, by restoring the snapshot.

1. Click **Console**.

2. Click **Snapshots**.

3. Click the **Page actions** menu and select **Upload Snapshot**.

4. Use **Browse** to locate the snapshot that you want to upload.

   Select the BAR file (.bar) that contains your snapshot. You can only upload snapshots taken from Oracle Analytics Cloud.

5. Enter the snapshot password.

   This is the password that you specify whenever you download a snapshot to your local file system.

6. Click **OK**.

### Migrate Oracle Analytics Cloud Using Snapshots

Download and upload features enable you to save snapshots to your local file system and upload them back to the cloud. Use these features to migrate between two different services, migrate between development, test, and production environments,
and migrate service deployed on Oracle Cloud Infrastructure Classic to Oracle Cloud Infrastructure.

Topics:
- About Oracle Analytics Cloud Migration
- Typical Workflow to Migrate Oracle Analytics Cloud
- Migrate File-based Data

About Oracle Analytics Cloud Migration

It's easy to migrate content and settings from one Oracle Analytics Cloud environment to another using snapshots. You can migrate an entire environment or you can migrate specific types of content.

Valid Migration Paths

When you use a snapshot, it doesn't matter whether Oracle Analytics Cloud is deployed on Oracle Cloud Infrastructure or Oracle Cloud Infrastructure Classic.

If you want to migrate from Oracle Cloud Infrastructure Classic to Oracle Cloud Infrastructure, you use a snapshot to migrate your content from Oracle Analytics Cloud - Classic services to Oracle Cloud Infrastructure.

<table>
<thead>
<tr>
<th>Source Environment (Version 105.1.x or later)</th>
<th>Target Environment (Version 105.1.x or later)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Analytics Cloud (on Oracle Cloud Infrastructure)</td>
<td>Oracle Analytics Cloud (on Oracle Cloud Infrastructure)</td>
</tr>
<tr>
<td>Oracle Analytics Cloud - Classic (on Oracle Cloud Infrastructure Classic)</td>
<td>Oracle Analytics Cloud (Oracle Cloud Infrastructure)</td>
</tr>
</tbody>
</table>

Prerequisites for Migration

Before you migrate content using snapshots, verify your source and target environment:

- If you haven't done so already, create the target service on Oracle Cloud Infrastructure.
  See Create Services with Oracle Analytics Cloud on Oracle Cloud Infrastructure.

- Check the source and target environments are using Oracle Analytics Cloud 105.1.x or later. Snapshots taken from earlier versions don't capture the entire environment.

  The version of your service is displayed in Oracle Cloud Infrastructure Console. If you're not sure, check with your administrator.

- If you want to migrate file-based data, check the source and target environments are up and running, and configured with valid storage credentials.

  Storage access issues can prevent data file migration using snapshots. If this happens, you can use the Data Migration utility to download and then upload your data files separately.

Content, Configuration, and Other Items Not Migrated

You can't include some items and non-Oracle Analytics Cloud artifacts in a snapshot.
### Content, Configuration, and Other Items Not Migrated

<table>
<thead>
<tr>
<th>Item</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus scanner configuration</td>
<td>Record the virus scanner configuration in your source environment and use it to configure your virus scanner on the target. See Set Up a Virus Scanner.</td>
</tr>
<tr>
<td>Mail server configuration</td>
<td>Record the SMTP mail server configuration in your source environment and use it to configure your mail server on the target. See Set Up an Email Server to Deliver Reports.</td>
</tr>
<tr>
<td>Other snapshots available in the source environment.</td>
<td>Download individual snapshots and then upload them to your target environment, as required. See Upload Snapshots.</td>
</tr>
<tr>
<td>Job history</td>
<td>Available in a future release.</td>
</tr>
<tr>
<td>Users (and groups)</td>
<td><strong>Migrate from Oracle Identity Cloud Service</strong> Use export and import features in Oracle Identity Cloud Service to migrate users and roles from one identity domain to another. See Manage Oracle Identity Cloud Service Users and Manage Oracle Identity Cloud Service Groups. <strong>Migrate from Embedded WebLogic LDAP Server</strong> Use the script wls_ldap_csv_exporter to export users and groups to a CSV file that you can import on the target Oracle Identity Cloud Service. See Export Users and Groups from Embedded WebLogic LDAP Server.</td>
</tr>
<tr>
<td>Other Oracle Identity Cloud Service configuration</td>
<td>Use Oracle Identity Cloud Service in your target environment to reconfigure any user (or group) application role assignments that you configured on the source, reconfigure single sign-on (SSO), and so on.</td>
</tr>
<tr>
<td>Network configuration</td>
<td>Set up your network requirements in the target environment, as required.</td>
</tr>
</tbody>
</table>

### Typical Workflow to Migrate Oracle Analytics Cloud

You use snapshots to migrate Oracle Analytics Cloud to another environment. Here’s what you need to do.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand how to migrate using snapshots</td>
<td>Understand what you can and can’t migrate in snapshots and any prerequisites.</td>
<td>About Oracle Analytics Cloud Migration</td>
</tr>
<tr>
<td>Create the target service</td>
<td>Use Oracle Cloud Infrastructure Console to deploy a new service on Oracle Cloud Infrastructure with Oracle Analytics Cloud or Oracle Analytics Cloud Subscription.</td>
<td>Create Services with Oracle Analytics Cloud on Oracle Cloud Infrastructure</td>
</tr>
</tbody>
</table>
### Migrate Oracle Analytics Cloud Using Snapshots

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
</table>
| Migrate users and groups            | Use export and import features in Oracle Identity Cloud Service to migrate users and roles from one identity domain to another.  
If your source system uses an embedded WebLogic LDAP server for identity management, use the wls_ldap_csv_exporter script to export your users and groups to a CSV file. | Manage Oracle Identity Cloud Service Users  
Export Users and Groups from Embedded WebLogic LDAP Server |
| Take a snapshot on the source       | Capture the content you want to migrate on the source system.                                                                            | Take a Snapshot                                  |
| Download the snapshot locally       | Download the snapshot that you want to migrate to your local file system.                                                               | Download Snapshots                               |
| Upload the snapshot to the target   | Sign in to the target system and upload the snapshot.                                                                                   | Upload Snapshots                                 |
| Restore the snapshot content        | Select the newly uploaded snapshot in the list of saved snapshots and restore the content in the snapshot.                               | Restore from a Snapshot                          |
| Migrate data files                  | (Only if the restore process fails due to connection issues) Use the Data Migration utility to migrate and restore data files from another environment. | Migrate File-based Data                          |
| Reconfigure your virus scanner      | Record the virus scanner configuration in your source environment and use it to configure your virus scanner on the target.       | Set Up a Virus Scanner                           |
| Reconfigure your mail server        | Record the SMTP mail server configuration in your source environment and use it to configure your mail server on the target.       | Set Up an Email Server to Deliver Reports        |
| (Optional) Migrate other snapshots  | Download individual snapshots that you want to migrate and then upload them to your target environment, as required.               | Download Snapshots                               |
| Migrate other Oracle Identity Cloud Service configuration | Use Oracle Identity Cloud Service in your target environment to reconfigure any user (or group) application role assignments that you configured on the source, reconfigure single sign-on (SSO), and so on. | Upload Snapshots                                |

### Migrate File-based Data

Users upload data files, such as spreadsheets, to Oracle Analytics Cloud to create data sets. When you migrate to a new Oracle Analytics Cloud environment, you can take this file-based data with you. Sometimes, network connectivity or storage access issues might prevent you from migrating the data files in the snapshot. For such cases, Oracle Analytics Cloud offers a Data Migration utility that enables you to move your
data files to the new location. The Data Migration utility also moves any map-related
plug-ins and extension files that users might upload for their data visualizations.

Only run the Data Migration utility if you see the message Restore succeeded with
errors - data restore failed or similar when you try to restore a snapshot that
contains data files.

The Data Migration utility allows you to move data files directly from one environment
to another in a single step. Or if you prefer, you can download your file-based data to a
ZIP file and then upload the data files to your chosen environment in two separate
steps.

1. Check your environment details.
   - Verify that the source and target system both use Oracle Analytics Cloud
     version 105.3 or later. The Data Migration utility isn't available in earlier
     versions.
     If you're not sure, ask your Oracle representative.
   - Check that the source and target system are both up and running, and Oracle
     Analytics Cloud is configured with valid storage credentials.
   - Check your local environment. You need Java 1.8 or later to run the migration
     utility.
   - Make sure you can access the source environment and the target Oracle
     Analytics Cloud from the local environment where you plan to run this utility.
   - Verify the name and location of the snapshot you downloaded earlier that
     contains your file-based data. For example, /tmp/20190307095216.bar.

2. Download the Data Migration utility.
   a. In your target Oracle Analytics Cloud, click Console and then click
      Snapshots.
   b. Click the Page menu, select Migrate, then Download Data Migration
      Utility. Follow the instructions to save the migrate-oac-data.zip file locally.


   The ZIP file contains three files:
   - migrate-oac-data.jar
   - config.properties
   - readme

4. If you want to migrate data files stored in your source environment directly to the
target in a single step, configure the section [MigrateData] in
config.properties.

   [MigrateData]
   # Migrate data files from a source Oracle Analytics Cloud environment
   (OAC) to a target Oracle Analytics Cloud environment.
   # Specify the source environment as Oracle Analytics Cloud.
   SOURCE_ENVIRONMENT=OAC
   # Source Oracle Analytics Cloud URL. For example: https://
   sourcehost.com:443 or http://sourcehost.com:9704
If you want to first download data files from your source Oracle Analytics Cloud to your local environment and subsequently upload the data files to the target Oracle Analytics Cloud environment, configure sections `[DownloadDataFragments]` and `[UploadDataFragments]` in `config.properties`.

### [DownloadDataFragments]

# Download Data Files: Download data files from Oracle Analytics Cloud storage to a local repository

# Specify the source environment as Oracle Analytics Cloud.
SOURCE_ENVIRONMENT=OAC

# Source Oracle Analytics Cloud URL. For example: https://sourcehost.com:443 or http://sourcehost.com:9704
SOURCE_URL=http(s)://<Source Oracle Analytics Cloud Host>:<Source Port>

# Name of a user with Administrator permissions in the source environment. For example: SourceAdmin
SOURCE_USERNAME=<Source Administrator User Name>

# Location of the source BAR file. For example: /tmp/20190307095216.bar
BAR_PATH=<Path to Source BAR File>

# Target Oracle Analytics Cloud URL. For example: https://targethost.com:443 or http://targethost.com:9704
TARGET_URL=http(s)://<Target Oracle Analytics Cloud Host>:<Target Port>

# Name of a user with Administrator permissions in the target environment. For example: TargetAdmin
TARGET_USERNAME=<Target Administrator User Name>

# Local data file directory. Make sure you have enough space to download the data files to this directory. For example: /tmp/mydatafiledir
DATA_FRAGMENTS_DIRECTORY=<Data Files Directory>

# Data fragment size. Data files are downloaded in fragments. Default fragment size is 500MB.
MAX_DATA_FRAGMENT_SIZE_IN_MB=500

### [UploadDataFragments]

# Upload data files: Upload data files to the target Oracle Analytics Cloud.

# Target Oracle Analytics Cloud URL. For example: https://targethost.com:443 or http://targethost.com:9704
TARGET_URL=http(s)://<Target Oracle Analytics Cloud Host>:<Target Port>
Port>
# Name of a user with Administrator permissions in the target
environment. For example: TargetAdmin
    TARGET_USERNAME=<Target Administrator User Name>
# Local directory containing the data files you want to upload. For
example: /tmp/mydatafiledir
    DATA_FRAGMENTS_DIRECTORY=<Data Files Directory>
# Location of the source BAR file. For example: /tmp/
    20190307095216.bar
    BAR_PATH=<Path to Source BAR File>

6. Run the migrate-oac-data.jar file in your local environment.
   Syntax:


   Where:
   • -config configfile: Name of the config.properties file
   • -d: Downloads data locally using information in config.properties
   • -help: Displays help
   • -m: Migrates data using source and target information in the
     config.properties file
   • -u: Uploads data using information in the config.properties file

   For example, to migrate data files in a single step:

   java -jar migrate-oac-data.jar -m -config config.properties

   For example, to download data files locally:

   java -jar migrate-oac-data.jar -d -config config.properties

   For example, to upload data files:

   java -jar migrate-oac-data.jar -u -config config.properties

7. Sign in to your target Oracle Analytics Cloud.

8. To expose the data files in Oracle Analytics Cloud, you must restore the snapshot
that you used to migrate your content for a second time. This time, you must select
the Custom restore option.
   a. Open the Console, and click Manage Snapshots.
   b. Select the snapshot containing your data files.
   c. Select the Custom restore option, and then select the option File-based data.
      Deselect all other options.
   d. Click Restore.

9. Verify that your data files are available.
Perform Administration Tasks

This topic describes tasks performed by administrators managing Oracle Analytics Cloud.

Topics:

• Typical Workflow to Perform Administration Tasks
• Understanding Administration Tools
• Manage Database Connections for Data Models
• Set Up a Virus Scanner
• Set Up Social Channels for Sharing Visualizations
• Set Up a Public Container to Share Visualizations
• Set Up an Email Server to Deliver Reports
• Send Email Reports and Track Deliveries
• Enable Content Delivery Through Agents
• Manage the Types of Devices that Deliver Content
• Migrate from Oracle BI Enterprise Edition 11g
• Migrate from Oracle BI Enterprise Edition 12c
• Upload Data Models from Oracle BI Enterprise Edition
• Delete Unused Data Sources
• Manage Map Information for Analyses
• Whitelist Safe Domains
• Manage How Content Is Indexed and Searched
• Monitor Users and Activity Logs
• Execute Test SQL Queries
• Apply Custom Logos and Dashboard Styles
• Localize Catalog Captions
• Integrate with Oracle Planning and Budgeting Cloud
• Replicate Data
• Download and Install Developer Client Tool for Oracle Analytics Cloud
• Track Usage
• Enable Custom Java Script For Actions
• Deploying Write-back
• Configure Advanced Options
## Typical Workflow to Perform Administration Tasks

Here are the common tasks for Oracle Analytics Cloud administrators managing data visualization and enterprise modeling services.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage what users see and do</td>
<td>Configure what users see and do in Oracle Analytics Cloud using the Application Role page in the Console.</td>
<td>Manage What Users Can See and Do</td>
</tr>
<tr>
<td>Back up and restore content</td>
<td>Back up and restore the data model, catalog content, and application roles using a file called a snapshot.</td>
<td>Take Snapshots and Restore</td>
</tr>
<tr>
<td>Create database connections</td>
<td>Connect to one or more databases.</td>
<td>Manage Database Connections for Data Models</td>
</tr>
<tr>
<td>Set up virus scanning</td>
<td>Connect to your virus scanning server.</td>
<td>Set Up a Virus Scanner</td>
</tr>
<tr>
<td>Set up social channels for content sharing</td>
<td>Enable users to share content on Twitter, Slack, Oracle Cloud Storage, and Oracle Content and Experience Cloud Service.</td>
<td>Set Up Social Channels for Sharing Visualizations</td>
</tr>
<tr>
<td>Set up email deliveries</td>
<td>Connect to your email server.</td>
<td>Set Up an Email Server to Deliver Reports</td>
</tr>
<tr>
<td>Enable agents to deliver content</td>
<td>Allow users to use agents to deliver their content.</td>
<td>Enable Content Delivery Through Agents</td>
</tr>
<tr>
<td>Manage the types of devices that deliver content</td>
<td>Configure devices for your organization.</td>
<td>Manage the Types of Devices that Deliver Content</td>
</tr>
<tr>
<td>Free up storage space</td>
<td>Delete data sources on behalf of other users to free up storage space.</td>
<td>Delete Unused Data Sources</td>
</tr>
<tr>
<td>Manage how content is indexed and searched</td>
<td>Set up how content is indexed and crawled so users always find the latest information when they search.</td>
<td>Manage How Content Is Indexed and Searched</td>
</tr>
<tr>
<td>Manage maps</td>
<td>Manage map layers and background maps.</td>
<td>Manage Map Information for Analyses</td>
</tr>
<tr>
<td>Whitelist safe domains</td>
<td>Authorize access to safe domains.</td>
<td>Whitelist Safe Domains</td>
</tr>
<tr>
<td>Manage session information</td>
<td>Monitor who is signed in and troubleshoot issues with analyses by analyzing the SQL queries and logs.</td>
<td>Monitor Users and Activity Logs</td>
</tr>
<tr>
<td>Change the default reporting page and dashboard styles</td>
<td>Change the default logo, page style, and dashboard style.</td>
<td>Apply Custom Logos and Dashboard Styles</td>
</tr>
</tbody>
</table>
Understanding Administration Tools

You administer Oracle Analytics Cloud from the Console and Oracle Cloud Infrastructure Console.

You must have the BI Service Administrator role to perform all the administration tasks outlined here.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrate from Oracle Business Intelligence Enterprise Edition 11g</td>
<td>Migrate reporting dashboards and analyses, data models, and application roles.</td>
<td>Migrate from Oracle BI Enterprise Edition 11g</td>
</tr>
<tr>
<td>Migrate from Oracle Business Intelligence Enterprise Edition 12c</td>
<td>Migrate reporting dashboards and analyses, data models, and application roles.</td>
<td>Migrate from Oracle BI Enterprise Edition 12c</td>
</tr>
<tr>
<td>Upload data models from Oracle Business Intelligence Enterprise Edition</td>
<td>Upload and edit data models from Oracle BI Enterprise Edition</td>
<td>Upload Data Models from Oracle BI Enterprise Edition Edit a Data Model in the Cloud</td>
</tr>
<tr>
<td>Localize reporting dashboards and analyses</td>
<td>Localize the names of catalog objects (known as captions) into different languages.</td>
<td>Localize Catalog Captions</td>
</tr>
<tr>
<td>Replicate data you want to visualize</td>
<td>Import data from Oracle Cloud applications into a high-performant data stores, such as Oracle Database Cloud Service and Oracle Big Data Cloud, for visualization and analysis in Oracle Analytics Cloud.</td>
<td>Replicate Data</td>
</tr>
<tr>
<td>Track usage</td>
<td>Track the user-level queries to the content in Oracle Analytics Cloud.</td>
<td>Track Usage</td>
</tr>
<tr>
<td>Set up write-back</td>
<td>Enable users to update data from analyses and dashboards.</td>
<td>Deploying Write-back</td>
</tr>
<tr>
<td>Set up custom JavaScript for actions</td>
<td>Enable users to invoke browser scripts from analyses and dashboards.</td>
<td>Enable Custom Java Script For Actions</td>
</tr>
</tbody>
</table>

Understanding Administration Tools

You administer Oracle Analytics Cloud from the Console and Oracle Cloud Infrastructure Console.

You must have the BI Service Administrator role to perform all the administration tasks outlined here.

<table>
<thead>
<tr>
<th>Product</th>
<th>Administration Tool</th>
<th>Description and How to Access</th>
</tr>
</thead>
</table>
| Oracle Analytics Cloud | Console | Use the Console to manage user accounts and permissions, back up your information, add database connections for Data Modeler, whitelist safe domains, configure your virus scanner, email server, deliveries, and more. See who is currently signed in and diagnose issues with SQL queries:  
  • Manage What Users Can See and Do  
  • Take Snapshots and Restore  
  • Manage Database Connections for Data Models  
  • Whitelist Safe Domains  
  • Monitor Users and Activity Logs  
  • Execute Test SQL Queries |
## Product Administration Tool Description and How to Access

<table>
<thead>
<tr>
<th>Product</th>
<th>Administration Tool</th>
<th>Description and How to Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Analytics Cloud</td>
<td>Classic Administration</td>
<td>Our legacy product, Oracle Business Intelligence Enterprise Edition, provides an Administration page for administrative tasks. Only use this interface if you're familiar with this product. See About the Classic Administration Page.</td>
</tr>
<tr>
<td>Oracle Cloud</td>
<td>Oracle Cloud Infrastructure Console</td>
<td>Use Oracle Cloud Infrastructure Console to perform lifecycle tasks, such as create, delete, patch, restore, and scale, and to monitor usage metrics.</td>
</tr>
</tbody>
</table>

### About the Classic Administration Page

Oracle's legacy product, Oracle BI Enterprise Edition, provides an Administration page for administrative tasks. Only use this interface if you're familiar with this product.

<table>
<thead>
<tr>
<th>Task</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Privileges</td>
<td>Oracle recommends that you keep the default privileges because they're optimized for Oracle Analytics Cloud. Editing privileges might result in unexpected behavior or access to features.</td>
</tr>
<tr>
<td>Manage Sessions</td>
<td>See which users are signed in and troubleshoot report queries. See Monitor Users and Activity Logs.</td>
</tr>
<tr>
<td>Manage Agent Sessions</td>
<td>Currently not available in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td>Manage Device Types</td>
<td>Add devices that can deliver content for your organization. See Manage the Types of Devices that Deliver Content</td>
</tr>
<tr>
<td>Toggle Maintenance Mode</td>
<td>Indicates whether Maintenance Mode is on or off. In Maintenance Mode, you make the catalog read-only so that other users can't modify its content. Users can still view objects in the catalog, but they can't update them. Some features, such as the &quot;most recently used&quot; list aren't available.</td>
</tr>
<tr>
<td>Reload Files and Metadata</td>
<td>Use this link to reload XML message files, refresh metadata, and clear caches. You might want to do this after uploading new data, for example if you add or update a data model.</td>
</tr>
<tr>
<td>Reload Log Configuration</td>
<td>Oracle recommends that you keep the default log level. Oracle Support might suggest you change the log level to help troubleshoot an issue.</td>
</tr>
<tr>
<td>Issue SQL</td>
<td>Test and debug SQL queries. See Execute Test SQL Queries.</td>
</tr>
<tr>
<td>Scan and Update Catalog Objects That Require Updates</td>
<td>Use this link to scan the catalog and update any objects that were saved with earlier versions of Oracle Analytics Cloud.</td>
</tr>
<tr>
<td>Manage Themes</td>
<td>Change the default logo, colors, and heading styles for reporting pages, dashboards, and analyses. See Manage Themes.</td>
</tr>
<tr>
<td>Manage Captions</td>
<td>Localize the names (captions) of reporting objects that users create. See Localize Your Captions.</td>
</tr>
</tbody>
</table>
### Manage Database Connections for Data Models

Administrators create and manage cloud database connections for Data Modeler. Your business data doesn't have to be in one place. Connect to multiple cloud databases so business modelers and analysts can analyze company data wherever it is stored.

**Topics**

- About Database Connections for Data Models
- Connect to Data in an Oracle Cloud Database
- Secure Database Connections with SSL

### About Database Connections for Data Models

Data Modeler in Oracle Analytics Cloud can handle data stored in Oracle Cloud databases. Simply connect Oracle Analytics Cloud to your cloud data sources to start modeling the data.

It doesn't matter if your business data is stored in several different locations. You can connect Oracle Analytics Cloud to multiple cloud databases, so business analysts can model and then analyze their data wherever it is stored.

Administrators create, manage, and test database connections for Data Modeler through the Console. Business modelers can see connected databases through Data Modeler and build business models from the data.

You can connect Data Modeler to Oracle Cloud databases. The target database must be Oracle Database Cloud Service or Oracle Autonomous Data Warehouse.

You don't have to re-enter database connection information for data models pre-built with Oracle BI Enterprise Edition. Connection information for these models is often already defined in the data model file (.rdp) that you upload to Oracle Analytics Cloud. See About Uploading Oracle BI Enterprise Edition Data Models to the Cloud.

If you’re using Oracle Analytics Developer Client Tool to edit your data models and upload them to Oracle Analytics Cloud, you can refer to any database connections you define in the Console “by name” in the Connection Pool dialog. You don’t need to re-enter the connection details in Developer Client Tool. See Connect to a Data Source using a Connection Defined Through Console.
Connect to Data in an Oracle Cloud Database

Administrators create database connections for Data Modeler so business analysts can analyze data stored in Oracle Cloud databases.

1. Click **Console**.
2. Click **Connections**.
3. Click **Create**.
4. Enter a meaningful **Name** and **Description** that you'll remember and business modelers will recognize.
5. For **Connect Using**, select which properties you want to use to connect to the database.
6. Enter database connection information for your Oracle Database Cloud Service or Oracle Autonomous Data Warehouse. Ask the database administrator to provide the connection details.

<table>
<thead>
<tr>
<th>Connection Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host</td>
<td>Host name of the database or the IP address of the database you want to connect to.</td>
</tr>
<tr>
<td>Port</td>
<td>Port number on which the database is listening for incoming connections.</td>
</tr>
<tr>
<td>Service Name</td>
<td>Network service name of the database.</td>
</tr>
<tr>
<td>SID</td>
<td>Name of the Oracle database instance.</td>
</tr>
<tr>
<td>TNS Descriptor</td>
<td>TNS connect descriptor that provides the location of the database and the name of the database service. Use the format: DESCRIPTION=(ADDRESS=(PROTOCOL=protocol)(HOST=host)(PORT=port)) (CONNECT_DATA=(SERVICE_NAME=service name)) For example: DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=myhost.example.com)(PORT=1521)) (CONNECT_DATA=(SERVICE_NAME=sales.example.com))</td>
</tr>
</tbody>
</table>

7. For **Connect As**, enter the name of a user with read access to database and then enter the **Password**.
8. Select **Enable SSL**, to secure this connection using SSL.
   If you haven’t done so already, you must upload a wallet containing your SSL certificates.
9. Click **Test** to verify the connection.
10. Click **OK**.

Business modelers see the new connection in Data Modeler right away and can start to model the data.
Secure Database Connections with SSL

Use SSL to secure communication between Oracle Analytics Cloud and an Oracle database with SSL configured, Oracle Autonomous Data Warehouse, or Oracle Autonomous Transaction Processing. You must obtain and upload a wallet that contains SSL certificates, to enable SSL on your Oracle Database Cloud Service connections.

1. Click **Console**.
2. Click **Connections**.
3. If you’ve not done so already, upload a wallet file containing SSL certificates to Oracle Analytics Cloud:
   a. Click the Action menu, then **Upload Wallet**.
      To update an existing wallet file, click **Replace Wallet**.
   b. Click **Browse** and locate the wallet file.
      Select a valid `cwallet.sso` file.
   c. Click **OK**.
4. Enable SSL security on a database connection:
   a. Create or edit a database connection.
   b. In the Connection dialog, select **Enable SSL**.
   c. Click **OK**.

Set Up a Virus Scanner

To keep Oracle Analytics Cloud virus-free, Oracle highly recommends that you set up the virus scanning servers used by your organization, to scan any files that are uploaded to Oracle Analytics Cloud. Once set up, all files are checked. This includes data files that users might upload for analysis, and snapshots that you might upload to restore content or migrate content from another environment.

1. Click **Console**.
2. Click **Virus Scanner**.
3. Enter the host and port of the virus scanning server.
   For example, `my.virus.scanning.serverexample.com`.
4. Click **Save**.
5. To remove the current virus scanner configuration, click **Delete**.

Set Up Social Channels for Sharing Visualizations

Set up social channels (such as Twitter, LinkedIn, Slack, and other Oracle Cloud services) so that content authors can easily share their data visualizations with others.

After you set up and activate a channel, the associated Share menu option is available for users to share their data visualizations through that channel.
1. Click Console.

2. Click Social.

3. **Twitter** - To enable users to share data visualizations on Twitter as tweets:
   a. In Twitter Application Manager (that is, the apps.twitter website), click the app to use for tweets and on the Key and Access Tokens tab, obtain the Consumer Key and Consumer Secret values.
   b. In Oracle Analytics Cloud Console, specify the following on the Social page:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Select Twitter.</td>
</tr>
<tr>
<td>Status</td>
<td>Select Active.</td>
</tr>
<tr>
<td>Application</td>
<td>Enter the name of the app that you set up in Twitter Application Manager.</td>
</tr>
<tr>
<td>Client ID</td>
<td>Enter the Consumer Key value that you obtained in apps.twitter.com (in Step 3.a).</td>
</tr>
<tr>
<td>Client Secret</td>
<td>Enter the Consumer Secret value that you obtained in apps.twitter.com (in Step 3.a).</td>
</tr>
<tr>
<td>Redirect URL</td>
<td>Click <strong>Copy to clipboard</strong>.</td>
</tr>
</tbody>
</table>

   c. Click **Update**.
   d. In Twitter Application Manager, click the app to use for tweets and on the Settings tab, add the clipboard contents to the Callback URLs values specified for the app.

4. **LinkedIn** - To enable users to share data visualizations on LinkedIn:
   a. In LinkedIn Developers (that is, the linkedin.com/developers website), click the app you want to use for posts and on the Application Settings\Authentication page, obtain the Client ID and Client Secret values.
   b. In Oracle Analytics Cloud Console, specify the following on the Social page:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Select LinkedIn.</td>
</tr>
<tr>
<td>Status</td>
<td>Select Active.</td>
</tr>
<tr>
<td>Application</td>
<td>Enter the name of the app that you set up in LinkedIn Developers.</td>
</tr>
<tr>
<td>Client ID and Client Secret</td>
<td>Enter the Client ID and Client Secret values that you obtained in LinkedIn Developers (in Step 4.a).</td>
</tr>
<tr>
<td>Redirect URL</td>
<td>Click <strong>Copy to clipboard</strong>.</td>
</tr>
</tbody>
</table>

   c. Click **Update**.
   d. In LinkedIn Developers, click the app to use for LinkedIn posts and on the Application Settings\Authentication page, add the clipboard contents to the Authorized Redirect URLs values specified for the app.

   For sharing visualizations to LinkedIn, ensure that you have public web storage configured with your Cloud service.

5. **Slack** - To enable users to share data visualizations on Slack:
   a. Configure a Slack app for your service.
b. Select Slack, and then Activate.

c. Enter information about the Slack app where users can post their content.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slack Endpoint</td>
<td>Enter the Slack endpoint URL, for example <a href="https://hooks.slack.com/services">https://hooks.slack.com/services</a>.</td>
</tr>
<tr>
<td>Application Name</td>
<td>Enter the name of your Slack app, for example mySlackApp.</td>
</tr>
<tr>
<td>Distributed App</td>
<td>Select this option if Manage Distribution is configured for your Slack app. Don't select this option if your Slack app is installed only for your Slack workspace.</td>
</tr>
<tr>
<td>Client ID and Client Secret</td>
<td>Enter the client ID and the client secret that you received when the Slack app was created.</td>
</tr>
<tr>
<td>Redirect URL</td>
<td>Copy the URL and paste it in the Slack OAuth &amp; Permissions console.</td>
</tr>
<tr>
<td>Team</td>
<td>Optional. Enter the name of your Slack team.</td>
</tr>
</tbody>
</table>

d. Click Update to save.

6. If you have Oracle Analytics Cloud - Classic, you can enable users to share data visualizations on a public storage container on Oracle Cloud:

a. Select Public Web Store.

b. Verify that a public container is available for your service or click Edit to configure one.

c. Select Activate.

When the public container is configured, the menu option that enables users to share their data visualization is displayed.

d. Click Update to save.

7. Oracle Content and Experience Cloud - To enable users to share data visualizations on Oracle Content and Experience Cloud Service:

a. Select Oracle Content and Experience Cloud Service and Activate.

b. Enter connection information for the document service where users can post their content.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document Service Endpoint</td>
<td>Enter the endpoint URL, for example <a href="http://myservice.example.com/documents">http://myservice.example.com/documents</a>.</td>
</tr>
<tr>
<td>User ID and Password</td>
<td>Enter the user credentials for a user with access to Oracle Content and Experience Cloud Service.</td>
</tr>
</tbody>
</table>

c. Click Test to verify that Oracle Analytics Cloud can connect to Oracle Content and Experience Cloud Service.

d. Click Update to save.

The social channels that you configure are available to users as a Share option in visualizations. For example, if you configure Twitter and Slack, when users click Share they see icon options for Twitter and Slack.
Set Up a Public Container to Share Visualizations

This topic applies only to Oracle Cloud Infrastructure Classic.

You can set up and activate a public storage container so that other users can share their data visualizations.

1. Click Console.
2. Click Social.
3. For Service, select Public Web Store.
4. To specify a public container for the first time or change the existing container, click Edit.
5. Specify the container you want to use to share content. The container must exist and be set up as a public container, that is, a container with global read access.
   a. Enter Storage Container URL.
      Use the REST endpoint URL format:
      https://domain.storage.oraclecloud.com/v1/Storage-domain/ContainerName
      For example: https://example.storage.oraclecloud.com/v1/Storage-example/mypubliccontainer
      To find the REST endpoint URL for the storage container, go to the Storage Classic page in Oracle Cloud Infrastructure Classic Console, and click Account. The REST Endpoint value for the service is displayed. Copy the REST endpoint and append this value with your container name: <Rest Endpoint>/<PublicContainerName>
   b. Enter the user name and password of a user with read and write access to the public container.
6. Click Save.
7. If you’re making changes to an existing public container, confirm that you want to continue.
   Links to content that people have already shared through the existing public container continue to work but they can’t be updated if you decide to use a different public container. Newly shared content is stored in the new location.
8. Click Activate.

Set Up an Email Server to Deliver Reports

Connect Oracle Analytics Cloud to your organization's email server, so analysts can email their reports and data visualizations directly from Oracle Analytics Cloud.

1. Click Console.
2. Click Mail Server.
3. Enter the name of the SMTP Server and Port you want to use to deliver emails.
For example, mymail.domainexample.com.

4. For **Display name of sender** and **E-mail address of sender**, enter the name and email address you want to see in the “From” field on emails delivering reports.

5. Optional. If the mail server requires authentication:
   a. Click **Authenticated**.
   b. Enter the **Username** and **Password** for a user with access to the email server.

6. Optional. For secure communication:
   a. If you mail server uses SSL or TLS, select **SSL/TLS** and then select or drag and drop the certificate file (.pem).
      With SSL/TLS, the port is 465.
   b. STARTTLS is a way to take an existing insecure connection and upgrade it to a secure connection using SSL or TLS. To use STARTTLS, select **STARTTLS** and then select or drag and drop the certificate file (.pem).
      With STARTTLS, the port is 587.

7. Click **Test** to verify that Oracle Analytics Cloud can connect to the mail server.

8. Click **Save**.
   Allow some time for your changes to refresh through your system and Email menu options to display.

### Enable Content Delivery Through Agents

In the latest Oracle Analytics Cloud release, users can use agents to deliver their content. This feature is not enabled automatically. To display the **Create Agent** link on the Classic home page, grant the **View Delivers Full UX** privilege to the BI Content Author application role.

You also have to enable this feature if you import a snapshot taken from earlier Oracle Analytics Cloud versions that don't support the **Delivers Full UX** privilege.

1. On the Classic Home page, click **Administration**.
2. Click **Manage Privileges**.
3. Navigate to the **Delivers** section, and grant **View Delivers Full UX** to **BI Content Author**.

Now, users with the BI Content Author application role see the **Create Agent** link on the Classic home page.

### Send Email Reports and Track Deliveries

Send Email reports to anyone inside or outside the organization or use agents to send reports to a range of other devices. Keep everyone up-to-date with regular daily or weekly reports.

**Topics**

- **Send Email Reports Once, Weekly, or Daily**
- **Track the Reports You Distribute By Email or Through Agents**
Send Email Reports Once, Weekly, or Daily

Send Email reports to one or more recipients directly from the catalog. It’s easy to distribute reports this way and quicker than downloading a report and mailing it from your email client. To keep everyone up-to-date, schedule daily or weekly emails.

1. On the Classic home page, click Catalog.
2. Navigate to the item you want to email, click the More action menu, and select Email.
3. Enter the email address for one or more recipients. Separate multiple email addresses with a comma. For example: jane.white@abc.com, steve.brown@abc.com.
4. Customize the Subject line.
5. Send the email Now or click Later to set a date and time in the future.
6. To email report updates on a daily or weekly basis, click Repeat and then select Daily or Weekly.

You can check the status of email deliveries from the Console.

Email Security Alert

Content that you send by email isn't encrypted. It’s your responsibility to safeguard any sensitive data that you send.

See Send Reports by Email and Track Deliveries.

Track the Reports You Distribute By Email or Through Agents

Track the reports you’ve chosen to send to people by email from the Console. Quickly see when reports were sent and which items are pending. Review, change, or delete your deliveries (scheduled or completed) from the same page.

Any agents that you set up to deliver content are displayed in the Console too. This way, all your delivery information is in one place.

You can filter the deliveries by their status to track deliveries most important to you. The various status messages are explained here.

<table>
<thead>
<tr>
<th>Delivery Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canceled</td>
<td>Someone canceled the delivery. Users can cancel any delivery that they own.</td>
</tr>
<tr>
<td>Completed</td>
<td>Delivery ran successfully.</td>
</tr>
<tr>
<td>Disabled</td>
<td>Users can temporarily disable any delivery or agent that they own through the catalog. For example, you might stop a job running on its defined schedule if you want to edit the report or change who sees the report.</td>
</tr>
<tr>
<td>Delivery Status</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Failed</td>
<td>Delivery ran as scheduled but it didn't complete successfully. Click the error icon to find out what went wrong so you can fix it.</td>
</tr>
<tr>
<td>Not Scheduled</td>
<td>No one has set up a schedule for the delivery or the scheduled run date is for a date in the past (rather than a future date).</td>
</tr>
<tr>
<td>Pending</td>
<td>Delivery is scheduled to run. For example, you might have a delivery scheduled to run every day at 9am. If you look at the delivery the night before or at 8am, it shows as pending to indicate it's due to run soon.</td>
</tr>
<tr>
<td>Running</td>
<td>Delivery is in progress.</td>
</tr>
<tr>
<td>Suspended</td>
<td>Administrators can temporarily suspend deliveries that other users set up. For example, before you migrate from a test environment to a production environment, your administrator might suspend deliveries in the test environment, and resume them in the production environment.</td>
</tr>
<tr>
<td>Timed out</td>
<td>Delivery timed out because it took too long to complete.</td>
</tr>
<tr>
<td>Try Again</td>
<td>Something went wrong. Try to run the delivery again.</td>
</tr>
<tr>
<td>Warning</td>
<td>Delivery ran as scheduled but it wasn't 100% successful. For example, the delivery specifies 10 recipients but only 9 of them received it because 1 of the email addresses was incorrect. Click the error icon to find out more.</td>
</tr>
</tbody>
</table>

To track deliveries from the Console:

1. Click **Console**.
2. Click **Monitor Deliveries**.

   Initially, minimal historical information is displayed to prevent clutter. To see more detail, click the Action menu for the page and select **History Level**.
3. To filter deliveries by name, start typing the name of the delivery you're looking for in the search box.

   Or click **Today**, to quickly navigate down the list to the first report scheduled for delivery today.

   You can also filter by delivery status. Click the **Filter** icon and select one or more from: Failed, Warning, Completed, Canceled, Timed Out, Try Again, Running, Pending, Disabled, Suspended, Not Scheduled.
4. To preview the content, click the Actions menu for the delivery, and select **View Report**.
This option isn’t available if the delivery is generated by an agent.

5. To edit a delivery, click the Actions menu for the delivery, and select **Edit Delivery**.
   - Email deliveries — Update the email options.
   - Agent deliveries — Edit the agent associated with the delivery.

6. To disable a delivery, click the Actions menu for the delivery, and select **Disable Delivery**.
   If you want to enable the delivery later on, click the Actions menu for the delivery, and select **Edit Delivery**.

7. To delete a delivery and all future scheduled deliveries, select **Delete Delivery**, then **OK** to confirm.

8. To delete delivery information only, select **Delete Delivery History** from the Actions menu.
   Use this option to remove historical information that you don't want to see any more.

### Suspend and Resume Deliveries

Administrators can temporarily suspend any delivery, at any time.

1. Click **Console**.
2. Click **Monitor Deliveries**.
3. To access everyone’s deliveries in addition to your own, click the Action menu for the page, and select **Admin View**.
4. To suspend a delivery, click the Action menu for the delivery and select **Suspend Delivery**.
   To suspend multiple deliveries at once, select Shift + click or Ctrl + click to select all the deliveries you want to suspend, and then click the Action menu and select **Suspend Delivery**.
5. To resume a delivery, click the Action menu for the delivery and select **Resume Delivery**.

### Restore and Enable Delivery Schedules

When you restore Oracle Analytics Cloud from a snapshot, delivery information is restored but it isn't activate right away. Initially, restored deliveries are disabled. Click the **Edit Delivery** option to re-activate them.

1. Click **Console**.
2. Click **Monitor Deliveries**.
3. To restore deliveries, click the Action menu for the page and select **Restore Deliveries**.
   Click **OK** to confirm. Recently restored deliveries display **Disabled**.
4. To activate a delivery, click the Action menu for the delivery, and select **Edit Delivery**.
Enable, and if necessary, redefine the delivery schedule.

5. To prevent clutter, delete any history or deliveries you don't want anymore. Click the Action menu for the delivery:
   - **Delete History** — Removes historical information that you don't want to see any more.
   - **Delete Delivery** — Deletes the delivery and all its history.

Manage the Types of Devices that Deliver Content

Oracle Analytics Cloud can deliver content to a wide range of devices. You can add more devices for your organization, if users want to receive content on a device that's not on the list. You can't edit or delete default devices, such as AT&T Wireless.

1. On the Classic home page, click **Administration**.
2. Click **Manage Device Types**.
3. To define a new type of device:
   a. Click **Create New Device Type**.
   b. Enter information about the device, and click **OK**.
4. To edit a device that you added:
   a. Click **Edit**.
   b. Make your changes, and click **OK**.
5. To delete a device that you added:
   a. Click **Delete**.
   b. Click **OK** to confirm.

Upload Data Models from Oracle BI Enterprise Edition

Administrators can upload data models built with Oracle BI Enterprise Edition to Oracle Analytics Cloud. After uploading a data model file (.rpd) to the cloud, content authors can then build data visualizations, dashboards and analyses in the usual way.

Topics

- About Uploading Oracle BI Enterprise Edition Data Models to the Cloud
- Get Your Data Model File Ready
- Upload Data Models from a File (.rpd) Using Console
- About Editing Data Models Uploaded from Oracle BI Enterprise Edition
- Download and Install Developer Client Tool for Oracle Analytics Cloud
- Connect to a Data Model in the Cloud
- Edit a Data Model in the Cloud
- Upload a Data Model to the Cloud
- Troubleshoot Oracle Analytics Developer Client Tool
- Connect to a Data Source using a Connection Defined Through Console
About Uploading Oracle BI Enterprise Edition Data Models to the Cloud

If you’ve already modeled your business data with Oracle BI Enterprise Edition, you don’t need to start from scratch in Oracle Analytics Cloud. Ask an administrator to upload your data model file to Oracle Analytics Cloud and start exploring your data through visualizations, analyses, and dashboards.

Oracle Analytics Cloud lets you upload a data model file with:

- One or more data models
- Connections to one or more instances of Oracle Database Cloud Service

You’ll need to validate your data model file and configure database connection details in Oracle BI Enterprise Edition.

When your administrator uploads a data model file from Oracle Analytics Cloud, existing data models (if any) are deleted and replaced with content from the uploaded file and Data Modeler is disabled. Data models uploaded from the file become available to content authors through the Subject Areas pane.

If model changes are required, metadata developers can use Oracle BI Administration Tool to edit the data model in the cloud.

If you want to copy reports and dashboards built in Oracle BI Enterprise Edition to Oracle Analytics Cloud you can do that too. See Upload Content from a Catalog Archive in Visualizing Data and Building Reports in Oracle Analytics Cloud.

Get Your Data Model File Ready

Take some time to ready your data model (the RPD file) for the cloud.

1. Verify that you’re using Oracle BI Enterprise Edition 11.1.1.7 or later.
2. Open your data model file (the RPD file) and use Consistency Check Manager to run consistency checks.
3. Remove any Init Blocks that set the USER, ROLES or GROUP session variables.
4. Verify that the data model file includes connection details to Oracle Database Cloud Service.
   
   Review the connection pool settings from Oracle BI Administration Tool:
   - **Data source name** must contain the full connect string for the Oracle Database Cloud Service where data is stored.
     
     You can’t specify a net service name here.
   - **Call interface** must be Oracle Call Interface (OCI).
If your data model file connects to multiple Oracle Database Cloud Service instances, ensure that the settings for each connection pool are correct.

5. Disable subject areas that you don’t want to expose or that don’t have a working connection.

If connection information is missing, users see the message `Fetch subject areas failed error` when they view subject areas in Oracle Analytics Cloud.

6. Back up your Oracle Analytics Cloud service, including the current data model, in case you need to restore this version.

When the data model is ready, you can upload it to Oracle Analytics Cloud.

**Upload Data Models from a File (.rpd) Using Console**

Administrators can upload data models built with Oracle BI Enterprise Edition to Oracle Analytics Cloud. After migrating data models to the cloud, content authors can visualize data in the usual way.

When you upload data models from Oracle BI Enterprise Edition, you delete existing data model information in Oracle Analytics Cloud and replace it with content in the data model file (.rpd). The data models you upload become available to content authors as subject areas.

You can also upload data model files from a file (.rpd) using Oracle Analytics Developer Client Tool.

1. Verify the data model file (.rpd) and associated database connections.

2. In Oracle Analytics Cloud, click **Console**.

3. Select **Snapshots**.

4. Take a snapshot of the current data model in case you need to restore this version.

5. From the **Page menu**, click **Replace Data Model**.

6. Click **Browse** and select the data model file (.rpd) that you want to upload.

7. Enter the password for the file.

8. Click **OK**.

9. Go to the Home page, click **Data**, and then **Data Sets** to see the data models that you uploaded, available as subject areas.

10. Optional: If the data model file includes permissions and data filters, create matching application roles in Oracle Analytics Cloud for the data security to work in the cloud.

    a. Create application roles with exactly the same names as those defined in Oracle BI Administration Tool.

    b. Assign users (and user roles) to the application roles as required.

**About Editing Data Models Uploaded from Oracle BI Enterprise Edition**

Administrators use Console to upload data models from Oracle BI Enterprise Edition to Oracle Analytics Cloud. Once a data model is uploaded, metadata developers use
Oracle Analytics Developer Client Tool to edit and deploy the data model. Users can then start exploring data through visualizations, analyses, and dashboards.

**Prerequisites**

- Oracle BI Enterprise Edition 11.1.1.7 or later.
- A Windows 64–bit machine on which to run Oracle Analytics Developer Client Tool.
- Oracle Analytics Developer Client Tool. See Download and Install Developer Client Tool for Oracle Analytics Cloud.
- A validated metadata repository file (.rpd).
- Check with your cloud service administrator that the required port number has been opened (that is, port 443 for Oracle Analytics Cloud deployed with Oracle Identity Cloud Service, otherwise port 80).

**Typical Workflow for Using BI Administration Tool to Edit Your Data Model**

- Upload your data model. See Upload Data Models from a File (.rpd) Using Console.
- Edit your data model. See Edit a Data Model in the Cloud.
- Copy analyses and dashboards built in Oracle BI Enterprise Edition to Oracle Analytics Cloud. See Uploading Content from a Catalog Archive in Visualizing Data and Building Reports in Oracle Analytics Cloud.

**Connect to a Data Model in the Cloud**

Whenever you open, publish, or upload a data model to the cloud using Oracle Analytics Developer Client Tool, you’re prompted to specify connection details for your Oracle Analytics Cloud instance.

1. In Oracle Analytics Developer Client Tool, choose an option to connect to your Oracle Analytics Cloud instance.
   For example, click **File**, then **Cloud**, then either **Open**, **Publish**, or **Upload**.

2. Enter connection information for Oracle Analytics Cloud.

<table>
<thead>
<tr>
<th>Option</th>
<th>What to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>The user name of an Oracle Analytics Cloud administrator (a user with the BIServiceAdministrator application role).</td>
</tr>
<tr>
<td>Password</td>
<td>The password for the specified user.</td>
</tr>
<tr>
<td>Cloud</td>
<td>Enter bootstrap.</td>
</tr>
<tr>
<td>Host name</td>
<td>The Oracle Analytics Cloud URL link address without the &quot;https://&quot; at the start or the &quot;/dv/ui&quot; part at the end of the URL. For example, oac123456-oacppacm12345.uscom-central-1.oraclecloud.com. To obtain your Oracle Analytics Cloud URL link address, in Oracle Cloud Infrastructure Console, navigate to your Oracle Analytics Cloud instance, click <strong>Manage this instance</strong>, copy the link address for Oracle Analytics Cloud URL.</td>
</tr>
</tbody>
</table>
### Option | What to specify
--- | ---
**Port number** | Specify 443 for Oracle Analytics Cloud deployed with Oracle Identity Cloud Service. Specify 80 for Oracle Analytics Cloud deployed without Oracle Identity Cloud Service.

**SSL** | Select this option. For the Trust Store value, click Browse and select the default JDK key store that’s bundled with JRE: `<BI client domain home>\oracle_common\jdk\jre\lib \security\cacerts`
For the password, specify the passphrase for the trust store (JKS) that contains the CA cert that you trust and has been used to sign the OAC cert. The OAC cert is signed by a well-known CA, so you can use a regular Java cacerts (the default jks truststore that trusts well-known CA’s).

**Proxy** | If you’re deploying Oracle Analytics Developer Client Tool on a machine in a proxy-enabled network, select this option. Ask your network administrator for the proxy server URL and Port number.

---

Expect the initial connection to take from 3–15 minutes, depending on the repository size.

### Edit a Data Model in the Cloud

Use Oracle Analytics Developer Client Tool to edit a data model in Oracle Analytics Cloud.

Before you start, upload your local data model RPD file to Oracle Analytics Cloud.

1. In Oracle Analytics Developer Client Tool, from the File menu, select **Open**, then **In the Cloud**.
2. Enter connection information for Oracle Analytics Cloud.
3. Update your model.
   a. Make changes to the model, as required.
   b. To validate your changes, click **Tools**, **Show Consistency Checker**, and then click **Check All Objects**.
   c. To save the changes locally, click **File**, and then click **Save**.
4. To upload your changes to Oracle Analytics Cloud, click **File**, **Cloud**, and then click **Publish**.

To refresh or discard your changes, use the File submenu:

- **Refresh** – Use this option to refresh your data model with the latest updates. If another developer has modified the data model, then you’re prompted to initiate a merge.
- **Discard** – Use this option to cancel any changes that you’ve made to the data model in the current session.
Upload a Data Model to the Cloud

Use Oracle Analytics Developer Client Tool to upload a data model RPD file to Oracle Analytics Cloud.

1. In Oracle Analytics Developer Client Tool, open your data model file (*.rpd).
2. From the File menu, click Cloud, then click Upload.
3. Enter connection information for Oracle Analytics Cloud.

To refresh or discard your changes, use the File submenu:

- **Refresh** – Use this option to refresh your data model with the latest updates. If another developer has modified the data model, then you're prompted to initiate a merge.
- **Discard** – Use this option to cancel any changes that you've made to the data model in the current session.

Troubleshoot Oracle Analytics Developer Client Tool

Here's some tips on troubleshooting connection issues in Oracle Analytics Developer Client Tool when you're connecting to Oracle Analytics Cloud.

Use these log files on the client machine:

- `BI_client_domain home/domains/bi/servers/obis1/logs /user_name_NQSAdminTool.log`
- `BI_client_domain_home/domains/bi/clients/datamodel/logs/datamodel.log`

This table describes some common connection issues and how you can resolve them.

<table>
<thead>
<tr>
<th>Common Connection Issues</th>
<th>Cause and Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>401: Unauthorized OR Authentication failure</td>
<td>The login credentials are invalid.</td>
</tr>
<tr>
<td></td>
<td>• Make sure the user account exists.</td>
</tr>
<tr>
<td></td>
<td>• Make sure you spelled the user name and password correctly.</td>
</tr>
<tr>
<td></td>
<td>• Make sure the password doesn't contain an exclamation mark (!)</td>
</tr>
<tr>
<td></td>
<td>• Make sure the user has the BI Service Administrator application role.</td>
</tr>
</tbody>
</table>
Common Connection Issues

<table>
<thead>
<tr>
<th>Cause and Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error initializing TLS secure connection or Proxy exception: java.security.NoSuchAlgorithmException: Error constructing implementation (algorithm: Default, provider: SunJSSE, class: sun.security.ssl.SSLContext Impl$DefaultSSLContext)</td>
</tr>
<tr>
<td>OR</td>
</tr>
<tr>
<td>Error initializing TLS secure connection or Proxy exception: Remote host closed connection during handshake</td>
</tr>
<tr>
<td>Connection failed, the server processes may be down, the host name, port number, service instance, or protocol (http/https) may be incorrect</td>
</tr>
</tbody>
</table>

This issue has multiple causes:

- The connection points to a file which is not trust/key store.
- The connection points to a trust/key store that doesn't contain a certificate that can be used to verify the server certificate.
- The trust store password is incorrect.

Use the default JDK key store located in: 
BI_client_domain_home\oracle_common\jdk\jre \lib\security\cacerts.

Connect to a Data Source using a Connection Defined Through Console

Administrators can define database connections for data models using the Console in Oracle Analytics Cloud. This includes databases such as Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, and Oracle Autonomous Transaction Processing. If you want to re-use these database connections in Oracle Analytics Developer Client Tool, you don't have to re-enter the connection details. Instead, you refer to the database connections “by name” in the Connection Pool dialog.

If you haven't already done so, create the database connection in Console and note down its name. For example, MyCloudSalesDB.
1. In Oracle Analytics Developer Client Tool, navigate to the Physical Layer pane, and open the Connection Pool dialog.
2. In Name, enter a name for the data source.
3. Select the Externalize connection check box.
4. In Connection name, enter the name of the database connection exactly as defined in Console (case-sensitive). For example, MyCloudSalesDB.
   Ignore the other options on this dialog, for example Data source name, Shared Logon User Name and Password.

Working with Data Models

Use these options to manage and publish a data model using Oracle BI Developer Client Tool.

<table>
<thead>
<tr>
<th>Menu option</th>
<th>Use it to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>File, then Cloud, then Open</td>
<td>Open your Cloud data model for editing.</td>
</tr>
<tr>
<td>File, then Cloud, then Publish</td>
<td>Publish your Cloud data model, including any changes that you've made. Oracle Analytics Cloud users will see the changes when they create a new browser session.</td>
</tr>
</tbody>
</table>

Delete Unused Data Sources

Your service comes with a fixed storage quota for data files. From time to time, administrators might need to delete data sources on behalf of other users to free up storage space and enable the service to function properly. For example, a user uploads data files and then their account is disabled when they leave the company.

1. Click the Page menu on the Home page, and select Data Set Management.

2. To free up some space, click the Options menu for a user with files you want to delete.
3. Select one of the following options:
   • **Delete Private** to delete non-shared (private) data files.
   • **Delete All** to delete all data files.

### Manage Map Information for Analyses

Administrators set up map information for dashboards and analyses so that users can visualize and interact with data through maps.

**Topics**

- **Set Up Maps for Dashboards and Analyses**
- **Edit Background Maps for Dashboards and Analyses**

### Set Up Maps for Dashboards and Analyses

As the administrator, you define how data columns modeled in Oracle Analytics Cloud display on maps. Once you've configured the map data, users can analyze data in map views.

Map views allow users to display data on maps in different formats and to interact with data. Oracle Analytics Cloud is configured with Oracle MapViewer, spatial boundary data, hosted maps, Oracle Database, and optionally Oracle Spatial. As the administrator, you must configure the metadata that defines the mapping between Oracle BI data and spatial data.

Spatial features such as shape definitions are managed by database administrators for your service. If a shape geometry definition doesn't exist for a particular column value, then the shape cannot be shown on the map and might inhibit user interactions on the map.

1. On the Classic Home page, click **Administration** and then click **Manage Map Data**.
2. On the **Layers** tab, click **Import Layers** from the toolbar.
3. In the Import Layers dialog, select the layers you want to use and click **OK**.

4. Back on the Layers tab, select a layer and click the **Edit Layers** button. In the Edit Layer dialog, associate layers with columns so that users can display data in the map view.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specifies the name of the layer that is displayed to users who work with map views.</td>
</tr>
<tr>
<td>Location</td>
<td>Specifies which background map the layer originates from. Click <strong>Location</strong> to select a different layer.</td>
</tr>
<tr>
<td>Description</td>
<td>Specifies the description of the map layer. This description is displayed when users are editing map views and they hover over the layer name in the Map Formats area.</td>
</tr>
</tbody>
</table>
| Layer Key   | Specifies the column of spatial data that you can associate with data for Oracle Analytics Cloud. Each column value corresponds to a “shape” that originates from the background map. For example, a MY_CITIES layer might have a layer key called CITY. The default value is a “best guess”. Select the appropriate column from the list. There are various reasons why a country such as Mexico might be drawn as a white area on a map:  
• The column has a null value for the country of Mexico, but a shape exists for Mexico in the spatial column.  
• The column has a value for the country of Mexico, but no shape exists for Mexico in the spatial column.  
• The column has a value for the country of Mexico and the shape exists for Mexico in the spatial column, but the names are mismatched. The data columns in Oracle Analytics Cloud might have the value MEX and the spatial column might have MXC. |
<p>| BI Key Delimiter | Available only when multiple columns are specified for one key. Specifies a single ASCII character (such as a comma or underscore) to function as a delimiter for combining the data columns in Oracle Analytics Cloud that form a key. |
| Geometry Type | Specifies whether the layer is a polygon, point, or line geometry layer. The type that you select affects the formatting that users can apply to the layer. |</p>
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI Key Columns Area</td>
<td>Specifies the columns of data in Oracle Analytics Cloud that you want to associate with the layer. You can have multiple columns associated with a single layer. You can select multiple columns from one subject area or from multiple subject areas. The columns and delimiter that you select must exactly match the name of the <strong>Layer Key</strong> value. Suppose the Layer Key value is STATE_CITY. You must select the STATE and CITY BI data columns and specify the underscore character in the <strong>BI Key Delimiter</strong> field. Use the various options in this area:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Add</strong> — Displays the list of available subject areas. Select a subject area and select all the data columns that you want to associate with the layer.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Delete</strong> — Deletes the selected key column.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Edit</strong> — Lets you edit the data columns associated with a layer.</td>
</tr>
<tr>
<td></td>
<td>When a content designer creates a map view, a default main map is selected as the basis for that map view. If at least one data column from the analysis is associated with a layer that is associated with a main map, then that main map is selected by default.</td>
</tr>
<tr>
<td>Show Qualified Names</td>
<td>Specifies whether to display the fully qualified name of the column in the BI Key Columns Area or simply the column name.</td>
</tr>
</tbody>
</table>

You use this dialog to associate layers with BI data. If you use a specific column in multiple subject areas, then you must associate it with a layer for each subject area.

5. Click **OK** to close the dialog.

6. Click the Background Maps tab, then click the **Import Background Maps** button.

7. In the Import Background Maps dialog, select the connection in the **Look in** field and the main maps to use, then click **OK**.

   The connection that you select for the main map can be different from the connection for the layers or images.

8. See **Editing Background Maps** for the steps required to prepare the background maps.
After you’ve added background maps and map layers, you can use the information to create a static image for a map. The static image is displayed to content designers and users who work with map views.

See Editing Map Views in *Visualizing Data and Building Reports in Oracle Analytics Cloud*.

**Edit Background Maps for Dashboards and Analyses**

You edit background maps to ensure that users have a seamless experience with map views in dashboards and analyses.

A background map is a non-interactive map that serves as a base for the map view. It might display a satellite image or a map with roads. The background map specifies the order of layers on the map view.

The ordering of map layers is very important. You must pay close attention to ensure that users have a seamless experience while navigating on the map (that is, drilling and zooming). In the Edit Background Map dialog, you assign each layer a minimum and maximum zoom range. Given that the map zoom slider can slide only from bottom to top vertically, the layers with lower minimum zoom levels are placed at the bottom of the slider. Ensure that the layer grid on the Interactive BI Layers section of the dialog follows a similar pattern, so that you place layers with lower minimum zoom levels at the bottom of the list.

Layer ordering becomes irrelevant when the zoom ranges of layers don’t intersect on the scale. Ordering becomes very important when layers have a common minimum and maximum zoom range. Use care to ensure that detailed layers aren’t hidden by the aggregated layers during drilling or zooming operations.

1. On the Classic Home page, click **Administration** and then click **Manage Map Data**.
2. Click the **Background Maps** tab, select a map, then click the **Edit Background Map** button to display the Edit Background Map dialog.
3. Specify the name and description of the map, which is displayed as a tooltip for the map when selecting a map from the list, when editing the map view.
4. The Location field displays the location of the background map in the data source. Click the **Location** button to change to a different map. If you select a background map that includes a different number of zoom levels, then the zoom levels are automatically adjusted for the layers that are associated with the map by scaling their ranges.
5. Click the **Add Layers** button to display a list of the layers that have been imported on the Layers tab, then select the layers to add to the map. This button is unavailable when all layers from the Layers tab have been added to the background map.

When you add a layer that’s part of the map definition, the layer displays at its default zoom levels. If the layer is not part of the map definition, then specify the zoom levels yourself.

The layers are listed from bottom to top, in terms of how they’re applied to the map. A sample order is Countries, States, Cities. The lower level layers generally have the lower zoom levels. For example, if you have a States layer and a Cities layer, then include lower zoom levels for State than City.
6. Click the **Sort Layers By Zoom Level** button to list the layers in ascending or descending order based on visibility on the map. This button is unavailable when layers are listed in the proper order.

The sort order that's specified here does not affect the order in which layers are applied on the map. Instead, the sorting order affects the zoom levels. For example, the States layer might have zoom levels 1 through 3 and the Cities layer has zoom levels 4 through 9. The lower layers have the lower zoom level numbers. The zoom levels that you specify correspond to the tick marks on the zoom slider on the map.

You can include both layers that have been associated with a BI column by using the Edit Layer dialog and layers that have not been associated. Ensure that BI layers are ordered higher than non-BI layers. If a non-BI layer is ordered higher than any BI layers, then the non-BI layer is displayed on top of the lower BI layers on the map, which prevents the BI layers from being interactive.

7. Click the **Turn On Layer Visibility** or **Turn Off Layer Visibility** button to control the visibility of layers on the map. Use the buttons to indicate whether the layer is visible in the Preview map in this dialog only. The layer is still visible on a map view. You can modify the zoom levels for a layer with a visibility turned off.

8. Click a cell under a zoom level for a layer to affect the zoom level:
   - If you click a blue cell that's between other blue cells, then you see a popup menu with **Clear Before** and **Clear After** buttons, which allow you to change the zoom level in either direction. For example, if you click the cell for zoom level 4 and click the eraser on the right, then all cells to the right are cleared for that zoom level.
   - If you click a blue cell that at the end of a line of blue cells, then the cell turns white to indicate that it is no longer part of that zoom level.
   - If you click a white cell, then you increase the zoom level on either side of the existing blue cells. For example, suppose cells 4 through 6 are colored blue to reflect the zoom level. If you click in cell 2, then the zoom level becomes 2 through 6.

If you don’t set any zoom levels for a layer, then that layer does not display on the map.

9. Click the action icon beside the layer name to display a menu from which you can make various selections:
• **Delete** — Removes the layer from this background map. The layer continues to be available on the Layers tab and can be added to this area again.

• **Move Up** or **Move Down** — Moves the layer up or down so you can specify the order in which layers are applied to the map.

• **Reset to Default Visibility** — Resets the current visibility range for this layer as defined in the underlying map definition. If this layer is not natively associated with the map, then this option is disabled for that layer.

10. Use the yellow border that surrounds the column of boxes for a zoom level to determine which zoom level is currently displayed in the map area.

11. Use the panning and zooming controls to specify how the map is displayed to users. If you hover over the zoom slider, then you see tooltips that specify the names of the layers that are currently associated with that zoom level.

12. Click **OK**.

### Whitelist Safe Domains

Whitelisting allows or approves access to specific content. For security reasons, you're not allowed to add external content to reports or embed your reports in other applications unless your administrator considers it safe to do so. Only administrators can add safe domains to the whitelist.

Only authorized users may access the content. Users are prompted to sign in when they access content on these safe domains, unless your service is set up with Single Sign On (SSO).

After you’ve added a safe domain to the whitelist, users need to sign out and sign back in to access content from that source.

1. Click **Console**.

2. Click **Safe Domains**.

3. Click **Add Domain** to register a safe domain.

4. Enter the name of the safe domain. Use formats such as:
   - www.example.com
   - *.example.com
   - https:

5. Specify the types of resources users can embed in their projects, reports, and dashboards.
   - Select the types of resources you want to allow, for example, images, scripts, and so on.
   - Deselect to block any resource types you don't consider safe.

6. If you want to allow users to embed their projects, reports, and dashboards in external content located on the domain, select **Embedding**.
To remove a domain, select it and click the Delete icon.

Manage How Content Is Indexed and Searched

Administrators can set up how catalog content is indexed and crawled so that users find the latest content when they search. By default, the catalog is crawled once a day and all the shared folders are included. You can set up a different schedule to better suit your business and exclude any folders you don't want searched. Administrators also determine whether or not to index data sets.

Topics
- Configure Search Indexing
- Schedule Regular Content Crawls
- Monitor Search Crawl Jobs
- Enable Users to Search Data Sets

Configure Search Indexing

Content is crawled and indexed so people can quickly find content when they search.

If users report search issues, check the status of crawls to ensure that they're current. After a crawl is completed, users might have to wait a few minutes before they can locate the latest content.

1. Click Console.
2. Click Search Index.
3. To ensure users find the most recent information when they search for data model objects, in the Data Model pane, select Enable Data Model Crawl and use the other options to specify what and when to index.
4. To ensure users find the most recent information when they search for content saved in the catalog, in the Catalog pane, select Enable Catalog Crawl and use the other options to specify what and when to index.

To temporarily suspend indexing, deselect Enable Data Model Crawl and Enable Catalog Crawl.
Schedule Regular Content Crawls

It's the administrator's job to select which folders to crawl and schedule when and how often to crawl the content.

1. Click **Console**.
2. Click **Search Index**.
3. Select **Data Model** or **Catalog**.
4. Use the **Schedule** options to specify when to run the crawl.
   By default, a crawl runs once a day. The index updates automatically as users add or modify content.
5. For fine-grained control over what you index:
   - On the Data Model tab, use the **Select Data Models to Index** list to set the crawl status for each model.
   - On the Catalog tab, use the **Select Catalog Objects to Index** list to set the crawl status for each object. Use the **Index User Folders** option to include private user content in the index. User folders are indexed by default. Deselect this option if you don't want any content stored under user folders to be indexed or searched.
6. For **Languages**, select all the languages you want to create indexes for. Crawl results are added to the index in the languages that you specify. For example, if your company's headquarters are in the United States, and you have offices in Italy, then you can choose English and italiano to create indexes in both English and Italian.
7. Click the **Save** icon to save your changes.

Monitor Search Crawl Jobs

Administrators can check the last time content was indexed and monitor the status of crawl jobs. You can stop any crawl job that is running or cancel the next scheduled crawl before it starts.

1. Click **Console**.
2. Click **Search Index**.
3. Click **Monitor Crawls**.
   The Crawl Job Status page shows information about the past, current, and the next scheduled crawl.
4. Look at the **Status** column to find out when the content was last crawled and when the next crawl is due.
5. Click **Cancel** to stop a crawl job that is Running or Scheduled.
Enable Users to Search Data Sets

You certify a data set uploaded by a user so that other users can search it from the home page using the search bar.

As an administrator, you use certification to control how much compute time is consumed by indexing data sets, which can affect system performance.

1. From the navigator on the home page, click Data, then click Data Sets.
2. For the data set you’d like to certify, click Options, then click Inspect.
3. On the General tab, click Certify.
4. On the Search tab, click Index Data Set for Searching, and select the level of indexing.
5. Use the other options on the Search tab to specify the language and indexing frequency.

Monitor Users and Activity Logs

You can see information about any users who are currently signed to your service and troubleshoot report queries from the Manage Session page.

Topics:

• Monitor Users Who Are Signed In
• Analyze SQL Queries and Logs

Monitor Users Who Are Signed In

You can see how many users are signed in to your service and view detailed information about each user from the Manage Session page.

• User ID: Name that the user entered when they signed in.
• Session ID: Unique identifier assigned to the user for each user session.
• Browser Info: Information about the browser used to sign in.
• Logged On: Time when the user signed in.
• Last Access: Time stamp for the last activity for this user. This can be any kind of activity, such as switching from one page to another.

1. Click Console.
2. Click Session and Query Cache.
3. Locate the Sessions sections.
   The Sessions section at the top of the page shows how many users are currently signed in (Total Number of Sessions) and detailed information about these users.
4. To monitor a particular user, select Filter Cursors by Session.
   Information for this user displays in the Cursor Cache table.
   Click Clear Filter to show information for all users.
5. To change how messages are logged for a particular user, select a **Log Level** from the list.

By default, logging is disabled.

### Analyze SQL Queries and Logs

Administrators can examine the underlying SQL query requests that are executed as people use the service.

1. Click **Console**.
2. Click **Sessions and Query Cache**.
3. Locate the **Cursor Cache** section.

The Cursor Cache section enables you to monitor and troubleshoot activity logs for users currently signed in to the service.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>A unique internal identifier that is assigned to each entry.</td>
</tr>
<tr>
<td>User</td>
<td>The name of the user who ran the analysis and last placed it into the cache.</td>
</tr>
<tr>
<td>Refs</td>
<td>The number of references to this entry since it was placed into the cache.</td>
</tr>
<tr>
<td>Status</td>
<td>The status of the analysis that is using this cache entry:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Starting</strong> — The analysis is starting to run.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Waiting on Parent</strong> — A view in the analysis is waiting for data to be returned for the query.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Running</strong> — The analysis is currently running.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Finished</strong> — The analysis has finished.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Queued</strong> — The system is waiting for a thread to become available so the analysis can be processed.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Canceling</strong> — The application is in the process of canceling the analysis.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Error</strong> — An error occurred during the processing or running of the analysis. Look in the Statement column for information about the error.</td>
</tr>
<tr>
<td>Time</td>
<td>The time taken to process and run the analysis, displayed in one-second increments. A value of 0s (zero seconds) indicates that the analysis took under 1 second to complete.</td>
</tr>
<tr>
<td>Action</td>
<td>Links that you can click to affect the analysis:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Cancel</strong> — Terminates the analysis. Is displayed for in-progress analyses. The user running the analysis receives an informational message indicating that the analysis was canceled by an administrator.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Close</strong> — Clears the cache entry associated with this analysis. Is displayed for completed analyses.</td>
</tr>
<tr>
<td></td>
<td>• <strong>View Log</strong> — Displays the log of a query executed for this analysis.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Diagnostic</strong> — Displays an HTML page of diagnostic information that you can share with Oracle Customer Support.</td>
</tr>
<tr>
<td>Last Accessed</td>
<td>The time stamp of the last time the cache entry for this analysis was used to satisfy an analysis.</td>
</tr>
</tbody>
</table>
Field | Description
--- | ---
Statement | The logical SQL statement that was issued for the analysis; or if the analysis resulted in an error, information about the nature of the error.
Information | Usage tracking information (for example, what analysis contained the query).
Records | The number of records in the result set that have been seen (for example, 50+ to indicate that 50 records have been seen but there are additional records to be fetched or 75 to indicate that 75 records have been seen and there are no more records to be fetched).

4. Optionally, click **Close All Cursors** to remove information in the Cursor Cache table.

5. Optionally, click **Cancel Running Requests** to cancel all requests that are running for analyses.

### Execute Test SQL Queries

Administrators can enter a SQL statement directly to underlying data sources. This feature is useful for testing and debugging.

1. Click **Console**.
2. Click **Issue SQL**.
3. Enter the SQL statement. For example:

   ```
   SELECT XSA('weblogic.' 'SalesTargets')."Columns"."E1 Sales Rep Name" s_1 FROM XSA('weblogic.' 'SalesTargets')
   ```

4. Change the **Logging Level** if required.
5. Select **Use Oracle Analytics Presentation Services Cache**.
6. Click **Issue SQL**.

### Apply Custom Logos and Dashboard Styles

Administrators use themes to apply custom logos and dashboard styles.

**Topics:**
- About Custom Logo and Dashboard Styles
- Change the Default Style for Analyses and Dashboards
- Manage Themes

**About Custom Logo and Dashboard Styles**

As an administrator you can customize your reporting environment by creating a theme that displays custom logo, branding text, page style and so on.

When working with themes, note the following:
- You can create multiple themes, but only one theme can be active at one time.
• If you deactivate a theme, you revert to the default Oracle theme, unless you select a different one.
• Themes are applied on pages with analyses and dashboards, but not to Data Visualization projects.
• You create themes in the Manage Themes area of the Administration page.
• When you activate a theme, you apply it to the browser session of the currently signed-in administrator and to the browser sessions of end-users as they sign in.
• If Oracle Analytics Cloud is running on multiple instances, then duplicate and activate them for each instance.

Change the Default Style for Analyses and Dashboards

Administrators create themes to change the default logo, colors, and heading styles for analyzes and dashboards.

1. In the Classic Home page, click Administration.
2. Click Manage Themes.
3. To apply an existing dashboard style, select one from the Theme list, click Active, then click Save.
4. To create a new dashboard style, in the Theme list, click New Theme, and specify the details:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme Name</td>
<td>This name is displayed in the Style list on the Dashboard Properties dialog.</td>
</tr>
<tr>
<td>Logo</td>
<td>The page logo that is displayed in the top left hand corner. To replace the default Oracle logo, click Select Logo and navigate to and select a different logo in PNG, JPG, or JPEG format. Logos cannot exceed 136 pixels in width by 28 pixels in height.</td>
</tr>
<tr>
<td>Header Title</td>
<td>The branding information that is displayed in the top left hand corner next to the logo.</td>
</tr>
<tr>
<td>Other options</td>
<td>Change the default color options for backgrounds and links. To see which options affect which part of the theme, see the diagram below.</td>
</tr>
<tr>
<td>Active</td>
<td>This option applies the currently displayed theme when you click Save. If you click Active, then click Back without saving changes, the new theme isn’t applied.</td>
</tr>
</tbody>
</table>

5. If you want to apply the new style straightaway, click Active, the click Save.
   If you want to save for later, clear the Active option and click Save.

This diagram shows you what theme options affect different areas of the reporting environment.
Manage Themes

Administrators manage themes to change the default logo, colors, and heading styles for reporting pages, dashboards, and analyses.

1. In the Classic Home page, click Administration.
2. Click Manage Themes.
3. Do one of the following:

<table>
<thead>
<tr>
<th>Task</th>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>To apply a previously created theme</td>
<td>Select the theme you want from the Theme list. Click Active, click Save, then click Back.</td>
</tr>
<tr>
<td>To revert back to the default Oracle theme</td>
<td>Clear the Active option, click Save, then click Back.</td>
</tr>
<tr>
<td>To remove a theme completely</td>
<td>Select the theme you want to remove. Click Delete, then click Back.</td>
</tr>
</tbody>
</table>

Localize Catalog Captions

As an administrator, you can localize the names of reporting objects that users create (known as captions) in the catalog. For example, you might localize the names of dashboards and analyses into Spanish and French.
To localize object names in the catalog, you export the captions from the catalog, localize them, and upload back to the catalog.

1. Export the default captions to an XML file. See Export Captions from the Catalog.
2. Localize the downloaded XML file. See Localize Your Captions.
3. Upload the localized XML file. See Upload Localized Captions to the Catalog.

Overview to Localize Captions

Review this information before you start localizing your captions.

When you use the Export Captions option in Oracle Analytics Cloud, the export process creates one XML file for every first-level subfolder in the shared folder, in the format foldername captions.xml, where foldername is the name of the subfolder in the shared folder. Each XML file contains the text strings for all content in the corresponding first-level folder and its subfolders.

For example, if the shared folder in the Presentation Catalog contains the first-level folders Marketing, Service, and Sales, then the export process creates three XML files:

• marketingcaptions.xml
• salescaptions.xml
• servicecaptions.xml

The export process not only generates new XML files, but the process also modifies the catalog, inserting the appropriate message ID for each object. Presentation Services uses those message IDs to locate the newly translated text.

Export Captions from the Catalog

The following procedure describes how to export text strings in the catalog.

1. In the Classic Home page, click Administration.
2. In the Manage Catalog Captions area, click Export Captions.
3. Click Browse to display the Catalog browser, select the folder that you want to localize, then click OK.
   For example, you might select \Shared Folders\SampleLite.
4. Save the downloaded XML file.
   For example, if you selected the Quick Start folder to download, you'll save a file named _shared_Sample Lite_portal_QuickStart_captions.xml.

Localize Your Captions

After you have exported your captions in an XML file, deliver the XML file to the localization team. For example, if you selected the Quick Start folder to download, you’ll deliver a file named _shared_Sample Lite_portal_QuickStart_captions.xml.

You and the localization team are responsible for resolving any errors in the translated text strings. Consider that the contents of the catalog are updated whenever objects are added, deleted, or modified.
The first illustration shows an extract from an exported caption XML file before translation. The file is named myfoldercaptions.xml. The second illustration shows an extract from the file after translation. The file is named myfoldercaptions_fr.xml.

Upload Localized Captions to the Catalog

After you have localized your captions in the required languages, you deploy the languages by uploading the translated XML files. Use this procedure for each language.

1. In the Classic Home page, click Administration.
2. In the Manage Catalog Captions area, click Import Captions.
3. Click Browse and navigate to and select the localized XML file, then click OK.
4. Use the Select language option to select the language to which you’ve localized, then click OK.

Imported XML files are copied to the MsgDb folder under the selected language.

To download, review, or delete imported captions files, use the Manage Captions option.
Integrate with Oracle Planning and Budgeting Cloud

Oracle Analytics Cloud Enterprise Edition integrates with Oracle Planning and Budgeting Cloud. You can build dashboards and analyses to analyze data from Hyperion Planning and Essbase Cubes.

Topics

• About Integration with Oracle Planning and Budgeting Cloud Service
• Prerequisites for Integration with Oracle Planning and Budgeting Cloud
• Build and Upload an Oracle Planning and Budgeting Cloud Data Model

About Integration with Oracle Planning and Budgeting Cloud Service

Oracle Planning and Budgeting Cloud Service is a planning, budgeting, and forecasting solution used by many large, medium, and small companies worldwide to provide enterprise-wide business planning.

You can analyze and build dashboards of data from Hyperion Planning and Oracle Essbase Cubes by importing and querying data from on-premises and cloud data sources. The application metadata enables your report builders to create dashboards and analyses that analyze this data.

• You can review the Service Description documents to understand licensing requirements for using this feature. See Service Description Documents.
• When you import data from Hyperion Planning data sources, both measures and dimensions are imported into your data model.

Prerequisites for Integration with Oracle Planning and Budgeting Cloud

Before you start, make sure you have the required components configured correctly.

• Oracle Analytics Cloud Enterprise Edition.
• A Windows 64-bit machine on which to run Oracle Analytics Developer Client Tool.
• Oracle Analytics Developer Client Tool for Oracle Analytics Cloud Version 5.4. Download it from Oracle Technology Network and install it on a local Windows 64-bit machine.
• Start the Javahost process from the client using: C:\oracle\oac-client-5.4\bi\bifoundation\javahost\bin\startOnClient.bat
• If you're deploying Oracle Analytics Cloud, (that is, on Oracle Cloud Infrastructure with Oracle-Managed), configure these options:
  – Set the JAVA_HOME system environment variable to point to your JDK installation. For example, C:\Program Files\Java\jdk1.8.0_162.
  – set INSTANCE_NAME=%DOMAIN_HOME%
– Edit the file `<BIClient_Home>\bi\bitools\bin\admintool.cmd`, and below the ESSBASEPATH setting add: `set INSTANCE_NAME=%DOMAIN_HOME%`

– Run `<BIClient_Home>\bi\bifoundation\javahost\bin\startOnClient.bat` to start Javahost.
  If you need to restart the client, run `stopOnClient.bat`, then rerun `startOnClient.bat`.

• If you’re deploying Oracle Analytics Cloud-Classic, (that is, Oracle Cloud Infrastructure Classic), configure these options:
  – Configure `<BIClient_Home>\bi\bitools\bin\admintool.cmd` with the instance name:
    `INSTANCE_NAME=%DOMAIN_HOME%`
  – Configure Oracle Analytics Cloud host and port information in `<BIClient_Home>\bi\config\fmwconfig\biconfig\OBIS\NQSConfig.INI`:
    ```ini
    [JAVAHOST]
    JAVAHOST_HOSTNAME_OR_IP_ADDRESSES = "host:9506";
    ```

### Build and Upload an Oracle Planning and Budgeting Cloud Data Model

Build a data model for Oracle Planning and Budgeting Cloud, then upload it to Oracle Analytics Cloud Enterprise Edition.

1. In your local environment, start Oracle Analytics Developer Client Tool, and create a repository.

2. Import the Planning and Budgeting metadata:
   a. From the **File** menu, select **Import Metadata** to start the import wizard.
   b. In the Select Data Source page, select **Hyperion ADM** from the **Connection Type** list.
   c. In the Select Metadata Objects page, enter connection details.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connection Type</strong></td>
<td>Select <strong>Hyperion ADM</strong>.</td>
</tr>
<tr>
<td><strong>Provider Type</strong></td>
<td>Select <strong>Hyperion Planning</strong>.</td>
</tr>
<tr>
<td><strong>URL</strong></td>
<td>Specify the connection URL as:</td>
</tr>
<tr>
<td></td>
<td><code>%3A:&lt;Port&gt;:&lt;Application&gt;</code></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>Specify the URL-encoded value <code>%3A</code> instead of a colon (<code>:</code>) to separate the host and port number.</td>
</tr>
<tr>
<td></td>
<td>For example:</td>
</tr>
<tr>
<td></td>
<td><code>45.oraclecloud.com</code></td>
</tr>
<tr>
<td></td>
<td><code>%3A10001:Vision;locale=en_US;tenantName=mytenant1234</code></td>
</tr>
<tr>
<td></td>
<td><code>5;hubProtocol=https;</code></td>
</tr>
<tr>
<td><strong>User Name and Password</strong></td>
<td>Specify the name and password of a user with administration privileges.</td>
</tr>
</tbody>
</table>

When the import is complete, review the metadata in the Physical Layer.
d. Make sure that you've selected the `ANCESTOR_DIMPROPERTY_SUPPORTED` database feature.

3. Complete your data model:
   a. Cut and paste tables in the Physical layer to the Business Model and Mapping layer and to the Presentation layer.

   ![Data Model Diagram]

b. Verify the data model and save it as an .rpd file.

4. In the Physical layer, edit the **Connection Pool** for this data source, specify a **URL** using the URL that you used on the Select Metadata Objects page in step 1, and select **Shared logon**.
5. Save the repository, and ignore the warning that the database features don't match the defaults.

6. Upload the data model to Oracle Analytics Cloud. From the **File** menu, click **Cloud**, then click **Upload**, and enter connection information for your Oracle Analytics Cloud instance.

Users can analyze data and build dashboards using the new data model.

**Replicate Data**

Use data replication to import data from Oracle Cloud applications into high-performant data stores, such as Oracle Database Cloud Service and Oracle Big Data Cloud, for visualization and analysis in Oracle Analytics Cloud. With data replication, you can import and transform your data without using additional extract-transform-load (ETL) tools.

**Topics**

- Overview of Data Replication
- Replicate Your Data
- Replicate Your Data Regularly
- Modify a Replication Flow
- Monitor and Troubleshoot a Replication Flow
- Move Replicated Data to a Different Target Database

**Replicate Your Data**

Use a replication flow to copy data from a data source to a data target for analysis in Oracle Analytics Cloud. For example, you might copy data from Oracle Fusion Applications to Oracle Big Data Cloud.

1. Set up a connection for your data source:
   
a. From the **Home** page, click **Create**, then **Replication Connection**, and then select the type of data source you want to copy.

   For example, to replicate data from Oracle Fusion Applications, click **Oracle Fusion Application Storage**.
b. At the Create Connection dialog, specify the connection details.

For example, to replicate data from Oracle Fusion Applications, specify connection details for your Oracle Cloud Infrastructure Object Storage or Object Storage Classic instance. See Create a Replication Connection for Oracle Fusion Applications.

2. Set up a connection for your data target:
   a. From the Home page, click Create, Replication Connection, and then select the type of data source you want to copy the data into.
   b. In the Create Connection dialog, specify the connection details of your data target.

For example, to replicate to Oracle Autonomous Data Warehouse, click Oracle Autonomous Data Warehouse Cloud.

3. From the Home page, click Create, then click Data Replication.

4. In the Create Data Replication-Select Source Connection dialog, select the source connection that you created in Step 1.

5. In the Create Data Replication-Select Target Connection dialog, select the target connection that you created in Step 2.

6. If the replication target has multiple schemas, use the Schema list to select the schema to use.

7. In the Replicate Objects area, select the object that you want to replicate:
   • Click the check box next to each object that you want to replicate.
     For Fusion Applications data sources, if the view that you want to replicate isn’t displayed in the list, click the Add a custom view object option below the list. Enter the full path and name of the view, for example, FscmTopModelAM.TaskDffBIAAM.FLEX_BI_TaskDFF, then click Add.
   • When you select a table, you include all attributes by default. Use the check boxes on the right-hand pane to select or deselect attributes.
   • To change a primary key, click the key icon and select Assign Primary Key or Reorder Primary Key. The primary key is used for upsert operations to determine whether a record is inserted or updated.
To improve indexing, it’s best practice to order the columns so that the most selective columns are first and the least selective columns are last. Do this by clicking the **Reorder Primary Key** option from the context menu of any of the primary key columns.

- To use multiple columns as a primary key, select the key icon next to each column to include in the key.
- To replicate a subset of data based on a filter, click **Edit Filter** to display the filter editor and specify a filter expression (without the closing semicolon). The expression format you use depends on the filter language that your data source supports. Common filter languages include SQL, XML, and so on. Refer to the documentation for your data source for details.

<table>
<thead>
<tr>
<th>Data Source Type</th>
<th>Example filter expressions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle Fusion Applications</td>
<td><code>&quot;__DATASTORE__LookupType not in ('GROUPING_SEPARATOR','HZ_FORMAT_DELIMITERS','ICX_NUMERIC_CHARACTERS')&quot;</code></td>
</tr>
<tr>
<td>Oracle RightNow</td>
<td><code>lookupname like 'Admin%'</code></td>
</tr>
<tr>
<td></td>
<td><code>id &gt; 2</code></td>
</tr>
<tr>
<td>Eloqua</td>
<td><code>’{{Account.Field(M_Annual_Revenue1)}}’ &gt; ’2000’</code></td>
</tr>
</tbody>
</table>

Use the **Validate** option to verify the expression before you click **OK** to save the filter.

- To replicate a subset of data based on a timestamp, click the **Replicate From** calendar icon and specify a start date.
  
The **Replicate From** option only applies to tables that have at least one incremental identifier column defined.

- Use the **Load Type** to specify whether to perform an incremental load or a full load.
  
  If you select **Incremental**, you replicate all data on the first run and on subsequent runs you replicate only new data. Incremental updates require tables with a primary key and at least one incremental identifier column.

  If you select **Full**, the target table is initialized and you replicate all data.

8. Save your replication project.

9. To start the data load, click **Run Replication Flow**.

### Create a Replication Connection for Oracle Fusion Applications

To replicate data from Oracle Fusion Applications, you set up a data replication connection in Oracle Analytics Cloud.

1. In Oracle Analytics Cloud, click **Create**, then **Replication Connection**.
2. Click **Oracle Fusion Application Storage**.
3. Specify these connection details:

   - **Storage Type** - Select **OCI** for Oracle Cloud Infrastructure Object Storage or **Classic** for Oracle Cloud Infrastructure Object Storage Classic.
• **Storage Region** - Specify the OCI region where the storage bucket resides (for example, us-ashburn-1). In the Object Storage API endpoint, the region is specified immediately before `oraclecloud.com`. For example, `https://objectstorage.us-ashburn-1.oraclecloud.com`.

• **Storage Tenancy OCID** - Specify the Oracle Cloud Identifier (OCID) for the tenancy where the bucket resides.

• **Storage User OCID** - Specify the Oracle Cloud Identifier (OCID) for the user that will access the storage bucket.

• **Storage Bucket** - Specify the name of the storage bucket.

• **URL** - Specify the API endpoint for the Fusion Enterprise Scheduler Web Service. For example, `https://<fa-host>/bi/ess/esswebservice` or just the hostname `<fa-host>`.

• **Username** - Specify the username of the Fusion Applications user with permissions to access BI Cloud Connector.

• **Password** - Specify the password of the Fusion Applications user with permissions to access BI Cloud Connector.

• **Storage API Key** - Click **Generate**, then click **Copy** to create an API signing key. Oracle Analytics Cloud Data Replication uses this key to authenticate when it accesses the object storage bucket.

• **Storage Connection** - Specify the storage connection in BI Cloud Connector Console to use when writing the extracted data. The BI Cloud Connector storage connection must point to the same bucket as the Oracle Analytics Cloud connection.

4. In separate browser window or tab, navigate to OCI Console, then Identity, then Users, then User Details for your replication user account.

5. Under the **API Keys** section, add these keys:
   - Add the public key for the Data Replication connection that you copied to the clipboard in Step 4.
   - Add the public key that was saved when you created the storage connection in BI Cloud Connector Console on the Configure External Storage page.

6. Return to the Oracle Analytics Cloud browser window or tab, and on the Oracle Fusion Application Storage dialog click **Save**. If you've entered the information correctly, the connection is saved.

**Replicate Your Data Regularly**

You can schedule replication flows to run regularly. For example, if your source data changes weekly, you might replicate your data once per week to keep it up-to-date.

1. In the Home page, click **Navigator**, then click **Data**, then click **Data Replications**.
   - A list of replication flows that you can schedule is displayed. If you haven’t already created a replication flow, do that first.

2. Right-click the replication flow that you want to execute regularly and click **New Schedule**.

3. In the Schedule dialog, specify when to start the replication flow and how often you want it to run.
4. To monitor the progress of your scheduled jobs, in the Home page, click Navigator, then click Jobs.

5. To change the schedule, right-click the replication flow that you scheduled, click Inspect, then click Schedule and make your changes.

Modify a Replication Flow

You can change how your data is replicated by modifying the replication flow that loads your data.

1. In the Home page, click Navigator, then Data, then Data Replications.
2. Right-click the replication flow that you want to modify, and click Open, and make your changes.

Monitor and Troubleshoot a Replication Flow

You can monitor a replication flow to check progress and troubleshoot issues.

If an error occurs during a replication flow and the replication is run again, then the replication starts from where the previous error was encountered and any duplicate rows are removed.

1. To monitor jobs associated with a replication flow:
   a. In the Home page, click Navigator, then Jobs.
   b. Review the current status of your job in the Status column.
   c. To view job history, right-click the job, and click History.
   d. To stop a job, right-click the job and click Cancel. To remove it completely, click Delete.

2. To investigate or troubleshoot the last data load for a replication flow:
   a. In the Home page, click Navigator, then Data, then Data Replications.
   b. Right-click the replication flow that you want to investigate, and click Run Details.

   The Run Details dialog shows detailed information about the last replication operation. For example, you can see how many rows were loaded for each table and detailed error messages for each table.

Move Replicated Data to a Different Target Database

If you change the target database for data replication, you can migrate the current data to the new database, and reconfigure your connections to replicate to your new database.

For example, you might need to do this if your organization migrates from Oracle Cloud Infrastructure - Classic to Oracle Cloud Infrastructure.

1. Make sure that your new target schema has the required privileges and permissions. See What Privileges and Permissions Are Required?.
2. Copy the replicated tables and the following replication system tables to the new target schema.
3. Configure a replication connection for the new target database.
   - If your new target database is of the same type as your old target database, then simply edit your existing replication connection and update the connection details. In the Connections page, locate the replication connection, click Inspect, and use the General tab to update the details for the new target database.
   - If your new target database is of a different type, then create a new replication connection for that type and specify the connection details. Click Create, then Replication Connection, select the appropriate type, and specify the details.

4. Update each data replication entry that is configured to use the old target database connection details.
   a. Open the Data Replications page, and select the data replication you want to edit.
   b. In the Replication Target area:
      - If your new target database is of the same type as your old target database, make sure that Schema is set correctly for the new database.
      - If your new target database is of a different type, click Select and select the new target connection, then click Schema and set correctly for the new database.

5. From the Home page, navigate to Data and then Connections. Locate the replication connection for your target database, click Inspect, and use the Tables tab to verify the table information for the new target schema.

You can now resume data replication in incremental mode into the new database.

Overview of Data Replication

Data replication makes data more readily available for visualization and analysis without repeatedly executing expensive queries or data extracts on the original data source. You can also use data replication to build content packs for Oracle Cloud applications. Data replication is available in Oracle Analytics Cloud Enterprize edition.

Prerequisites for Data Replication

Before you start, make sure you have the correct components required for data replication.
You need the following:

- Oracle Analytics Cloud Enterprise edition. You'll need data replication permissions (administrator role) for Oracle Analytics Cloud.
- A supported data source, such as Oracle Fusion Applications or Oracle Service Cloud (RightNow).
• A supported data target, such as Oracle Database or Oracle Big Data Cloud in which to replicate your data.

• If you're replicating Oracle Fusion Applications data, you need:
  – **BI Cloud Connector**:
    * BI Cloud Connector deployed in the Oracle Fusion Applications environment.
    * Access to BI Cloud Connector Console in Fusion Applications.
    * Connection details for the storage instance of Oracle Cloud Infrastructure specified on the Configure External Storage page of BI Cloud Connector Console.
  – **Oracle Cloud Infrastructure**:
    * Compute permissions in Oracle Cloud Infrastructure to be able to administer object storage.
    * Oracle Cloud Infrastructure storage. You can use either Oracle Cloud Infrastructure Object Storage or Oracle Cloud Infrastructure Object Storage Classic.
      If you already replicate your data from Object Storage Classic, it’s easy to switch to Object Storage.
    * Compute permissions in Oracle Cloud Infrastructure for administering object storage.
    * Details of an existing storage bucket in Oracle Cloud Infrastructure, including the storage bucket name, the namespace in which the bucket resides, and the Oracle Cloud Identifier (OCID) for the tenancy where the bucket resides.
    * A user account Oracle Cloud Identifier (OCID) to access the storage bucket from both Oracle Fusion Applications and Oracle Analytics Cloud.

### Information You Need for Data Replication

Before you start, make sure you have the required details for data replication.

**Oracle BI Cloud Connector**

- The https://{fa_url}/biacm link for your Oracle BI Cloud Connector.

**Oracle Fusion Applications**

- The host name and connection details for your Oracle Fusion Applications instance.

**Oracle Cloud Infrastructure Storage**

- The host name, storage service name, and container name of your Oracle Cloud Infrastructure storage instance (Oracle Cloud Infrastructure Object Storage or Oracle Cloud Infrastructure Classic Storage). Use this information to configure Oracle BI Cloud Connector to point to your Oracle Storage Cloud storage instance.
- The REST Endpoint URL for your Oracle Cloud Infrastructure storage instance.
The first part of the URL is the Storage host and the last part is the Storage Name/Service Name. For example:
https://uscom-{location}.storage.oraclecloud.com/v1/Storage-mystoragecloudclassic

To obtain the REST Endpoint URL, go to Oracle Cloud Infrastructure Classic Console, navigate to Storage Classic, click Account and copy the REST Endpoint URL.

• Details of your object storage bucket in Oracle Cloud Infrastructure, including the name of the storage bucket, the namespace in which the bucket resides, and the Oracle Cloud Identifier (OCID) for the tenancy where the bucket resides.
• The Oracle Cloud Identifier (OCID) for the user with access to the storage bucket.

What Data Can I Replicate?
You can replicate data from these sources.
• Oracle Eloqua
• Oracle Fusion Applications (with either Oracle Cloud Infrastructure Object Storage or Object Storage Classic)
• Oracle Service Cloud (RightNow)
• Oracle Talent Acquisition Cloud (Taleo)

What Target Databases Can I Replicate Data Into?
You can replicate data into numerous types of database.
• Oracle Autonomous Data Warehouse
• Oracle Big Data Cloud
• Oracle Database Cloud Service

What Replication Tasks Can I Do?
You can perform numerous data replication tasks.
• Create data flows to replicate your data (known as replication data flows).
• Schedule replication data flows to perform regular incremental updates.
• Limit the data that you replicate using a filter.

What Privileges and Permissions Are Required?
Make sure you have the required privileges and permissions for data replication.

To replicate data, you must have the BI Service Administrator application role or some other role that includes BI Service Administrator.

For Oracle Big Data Cloud, the user requires no special privileges.

For Oracle Database, to replicate into the user's own schema, the user needs the following privileges:
• CREATE SESSION
CREATE TABLE

For Oracle Database, to replicate data into other schemas within the target database, the user needs all of the following privileges:

- CREATE ANY TABLE
- SELECT ANY TABLE
- ALTER ANY TABLE
- COMMENT ANY TABLE
- INSERT ANY TABLE
- UPDATE ANY TABLE
- DELETE ANY TABLE
- DROP ANY TABLE
- CREATE ANY INDEX
- ALTER ANY INDEX
- DROP ANY INDEX
- ANALYZE ANY

What Options Are Available when Replicating Data from Oracle Fusion Applications Data Sources

When you replicate data from an Oracle Fusion Applications data source, use these options.

Some View Objects record change history (similar to slowly changing dimensions). To replicate the change history, click Include History on the replication setup dialog.

Keep replicated data synchronized with the source data using the Include Deletions option on the replication setup dialog. If you select Include Deletions and a record is deleted from the source data, it's also deleted from the target database.

To synchronize data, you use the Include Deletions option in incremental data loads (where the Load Type option is Incremental). In full data loads, the target table rows are deleted before the replication starts.

With Custom View Objects, you can replicate data in any custom view using the Add a custom view object option on the replication setup dialog. Enter the full path and name of the view, for example, FscmTopModelAM.TaskDffBIAM.FLEX_BI_TaskDFF, then click Add to add the view to the Replicate Objects list so you can select fields.

Migrate from Oracle BI Enterprise Edition 11g

You can migrate data models, dashboards, analyses, and application roles from Oracle BI Enterprise Edition 11g to Oracle Analytics Cloud. Before you start, download a migration utility to a Windows or UNIX system.

1. Download the Oracle Analytics Cloud migration utility.
   a. In Oracle Analytics Cloud, click Console and then click Snapshots.
b. Click the Page menu, select Migrate, then Download BI EE 11g Migration Utility. Follow the instructions to save the migration-tool.jar file locally.

2. Copy the JAR file for the migration utility that you downloaded to your Oracle BI Enterprise Edition 11g environment.

3. Run the migration-tool.jar file in your Oracle BI Enterprise Edition 11g environment.

Usage:

```bash
class java -jar migration-tool.jar out oracle_home domain_home instance_home Optional export_jar_location
```

For example:

```bash
class java -jar migration-tool.jar out /u01/app/oracle/bi /u01/app/instance/ domains/example.com/myDomain /u01/app/instance/BIIInstance /tmp/myBIEE11gContentBundle.jar
```

The tool exports your content to a file. In this example, the file is named myBIEE11gContentBundle.jar.

4. Upload your Oracle BI Enterprise Edition 11g bundle and restore the content on Oracle Analytics Cloud.

a. In Oracle Analytics Cloud, click Console and then click Snapshots.

b. Click the Page menu, select Migrate, then Upload and Restore BI EE11g Migration Bundle.

c. Click Select to navigate to the migration bundle (JAR file) containing the content you want to migrate.

d. Enter the password for the data model file (RPD file) included in the JAR file.

   It's important to enter the correct password here. Content migration fails if the password you enter doesn't match the password required to access the data model file.

e. Click Upload and Restore.

Allow a few minutes for the content to upload and refresh through your system. The time it takes depends on the size of your content bundle. Sign out, then sign back in after, say, 15 or 20 minutes to see new content and inherit newly restored application roles, if any.

5. Verify that your subject areas, analyses, and dashboards are available as expected.

Migrate from Oracle BI Enterprise Edition 12c

You can migrate a snapshot (BAR file) from Oracle BI Enterprise Edition 12c to Oracle Analytics Cloud.
When you migrate the snapshot, you can include the data model, dashboards and analyses, and application roles required in Oracle Analytics Cloud. See Upload Snapshots and Restore from a Snapshot.

Update the Cloud Storage Password

Oracle Analytics Cloud stores analytics data sets and backups in cloud storage. If the credentials required to access the cloud storage container change or expire, users might see the message "Failed to connect to the storage service. Please check the user and password are correct". If this happens, administrators can update the storage password. The way you do this depends whether your Oracle Analytics Cloud service is managed by Oracle or by you (customer managed).

Topics:
- Update the Cloud Storage Password for an Oracle-Managed Service
- Update the Cloud Storage Password for a Customer-Managed Service

Update the Cloud Storage Password for an Oracle-Managed Service

If your Oracle Analytics Cloud is managed by Oracle, you can update the cloud storage password from the Console.

1. Click Console.
2. Click Connections.
3. Click Update Cloud Storage Password.
4. Enter the Storage Password.
5. Click Save.

Update the Cloud Storage Password for a Customer-Managed Service

If your Oracle Analytics Cloud is a customer-managed service, you must sign in to Oracle Cloud Infrastructure Console to update cloud storage credentials and restart the service. Contact your service administrator if you don't have the required permissions.

See Manage Credentials in Administering Oracle Analytics Cloud - Classic.

Track Usage

Usage tracking enables administrators to track the user-level queries to the content in Oracle Analytics Cloud.

Tracking usage is helpful in determining which user queries are creating performance bottlenecks, based on query frequency and response time. Administrators set up the criteria to track user queries and generate usage reports that can be used in a variety of ways such as database optimization, aggregation strategies, or billing users or departments based on the resources that they consume.

Topics:
- About Tracking Usage
• Understand the Usage Tracking Tables
• Typical Workflow for Tracking Usage
• Specify the Usage Tracking Database
• Set Usage Tracking Parameters
• Analyze Usage Tracking Data

About Tracking Usage

(Oracle Analytics Cloud Enterprise Edition only) Usage tracking can be configured in services that offer enterprise modeling features. Usage information is tracked at the detailed user query level so you can answer questions such as:

• How are users engaging with Oracle Analytics Cloud?
• Where are they spending or not spending their time?
• How long do users spend in each session, between sessions, and between queries?
• How are queries within sessions, across sessions, and across users related to each other?
• Are users drilling up and down in analyses?
• What queries are running when issues are reported?

About the Usage Tracking Database

Oracle Analytics Cloud stores usage tracking details in a database that you specify. The database can be Oracle Database Cloud Service or Oracle Autonomous Data Warehouse. You specify the database and connection pool details in your data model file using the Oracle Analytics Developer Client Tool.

See Specify the Usage Tracking Database.

About Usage Tracking Parameters

After specifying the database where you want to store usage tracking information, you must set various parameters, required for usage tracking, through the Console.

Parameters that configure usage tracking are:

• Connection pool name
• Physical and logical query logging table names
• Maximum number of query rows in the usage tracking tables

Administrators must restart the system after configuring usage tracking parameters. Oracle Analytics Cloud:

• Creates the physical and logical query logging tables in the database specified in the data model file. It names the tables based on the table name that you provide in the physical and logical query logging table names parameters.
• Inserts usage tracking data in these tables.

See Set Usage Tracking Parameters.
About Analyzing Usage Data

You can use Oracle Analytics Cloud to create useful usage reports from the tracking data added to the physical and logical query logging tables.

You can connect to the database, create a data set from the tables, and create reports and visualizations to help you understand your users' queries and take appropriate action to improve the performance of Oracle Analytics Cloud.

Understand the Usage Tracking Tables

Oracle Analytics Cloud stores usage tracking data in three database tables.

The usage tracking process creates these tables with table names that you specify through settings in the Systems Settings page.

- Usage Tracking Logical Query Logging Table
- Usage Tracking Physical Query Logging Table
- Usage Tracking Initialization Block Table

See Set Usage Tracking Parameters.

Usage Tracking Logical Query Logging Table

The following table describes each column in the database table that tracks logical queries. Where appropriate, the data type such as variable character field (varchar and varchar2) and length is specified. As you review the descriptions in this table, you might assume that certain time-related columns can be added or subtracted to equal exact values. For example, you might assume that \texttt{TOTAL\_TIME\_SEC} is equal to \texttt{END\_TS} minus \texttt{START\_TS}. The columns don't provide such exact values because:

- Various processes run in parallel and their speed depends on the load on Oracle Analytics Cloud and on database performance. Server-based operations might be either light or intensive.
- If all connections are full, then the query enters a queue and waits to be processed. The timing depends on the load and configuration of Oracle Analytics Cloud.

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{CACHE_IND_FLG}</td>
<td>Holds Y to indicate a cache hit for the query; N to indicate a cache miss. Default is N.</td>
</tr>
<tr>
<td>\texttt{COMPILE_TIME_SEC}</td>
<td>Contains the time in seconds required to compile the query. The number for \texttt{COMPILE_TIME_SEC} is included in \texttt{TOTAL_TIME_SEC}.</td>
</tr>
<tr>
<td>\texttt{CUM_DB_TIME_SEC}</td>
<td>Contains the cumulative time of all queries sent to the database. Queries run in parallel, so the cumulative query time is equal to or greater than the total time connected to the database. For example, suppose a logical request spawns 4 physical SQL statements sent to the database, and the query time for 3 of the queries is 10 seconds, and for one query is 15 seconds, \texttt{CUM_DB_TIME_SEC} displays 45 seconds because the queries run in parallel.</td>
</tr>
<tr>
<td>\texttt{CUM_NUM_DB_ROW}</td>
<td>Contains the total number of rows returned by the back-end databases.</td>
</tr>
<tr>
<td>Column</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>END_DT</td>
<td>Indicates the date the logical query completed.</td>
</tr>
<tr>
<td>END_HOUR_MIN</td>
<td>Indicates the hour and minute the logical query completed.</td>
</tr>
<tr>
<td>END_TS</td>
<td>Indicates the date and time the logical query completed. The start and end timestamps also reflect any time that the query spent waiting for resources to become available. If the user submitting the query navigates away from the page before the query finishes, then the final fetch never happens and a timeout value of 3600 is recorded. However, if the user navigates back to the page before the timeout, then the fetch completes at that time, which is recorded as the end_ts time.</td>
</tr>
<tr>
<td>ERROR_TEXT</td>
<td>Contains the error message from the back-end database. This column is applicable only if the SUCCESS_FLAG is set to a value other than 0 (zero). Multiple messages are concatenated and aren't parsed by Oracle Analytics Cloud. Default is Null and data type is Varchar(250).</td>
</tr>
<tr>
<td>ID</td>
<td>Indicates the unique row identifier.</td>
</tr>
<tr>
<td>NODE_ID</td>
<td>Contains &lt;hostname&gt;:&lt;component_name&gt; where &lt;component_name&gt; can be overridden by the environment variable COMPONENT_NAME. For example, examplehost:obis1 (for a single instance). Default value of COMPONENT_NAME is obis1.</td>
</tr>
<tr>
<td>NUM_CACHE_HITS</td>
<td>Indicates the number of times that the cache result returned for the query. NUM_CACHE_HITS is a 32-bit integer (or a 10-digit integer). Default is Null.</td>
</tr>
<tr>
<td>NUM_CACHE_INSERTED</td>
<td>Indicates the number of times that the query generated a cache entry. Default is Null. NUM_CACHE_INSERTED is a 32-bit integer (or a 10-digit integer).</td>
</tr>
<tr>
<td>NUM_DB_QUERY</td>
<td>Indicates the number of queries that were submitted to the back-end databases to satisfy the logical query request. For successful queries (SuccessFlag = 0), this number is 1 or greater.</td>
</tr>
<tr>
<td>PRESENTATION_NAME</td>
<td>Indicates the name of the Catalog. Default is Null and data type is Varchar(128).</td>
</tr>
<tr>
<td>QUERY_BLOB</td>
<td>Contains the entire logical SQL statement without any truncation. The QUERY_BLOB column is a character string of type Long.</td>
</tr>
<tr>
<td>QUERY_KEY</td>
<td>Contains an MD5 hash key generated by Oracle Analytics Cloud from the logical SQL statement. Default is Null and the data type is Varchar(128).</td>
</tr>
<tr>
<td>QUERY_SRC_CD</td>
<td>Indicates the source of the request. Possible values include:</td>
</tr>
<tr>
<td></td>
<td>• Report - If the source is an analysis or any export operation.</td>
</tr>
<tr>
<td></td>
<td>• ValuePrompt - If the source is the Value drop-down list in a filter dialog or a dashboard prompt.</td>
</tr>
<tr>
<td></td>
<td>• Seed - If the source is an agent that seeds the cache of the analytics server.</td>
</tr>
<tr>
<td></td>
<td>• Null - If the source is the Online Administration Tool physical table or column row count, or view data.</td>
</tr>
<tr>
<td><strong>Column</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>QUERY_TEXT</td>
<td>Indicates the SQL statement that was submitted for the query. The data type is Varchar(1024). You can change the length of this column (using the ALTER TABLE command), but note that the text written into this column is always truncated to the size that is defined in the physical layer. The repository administrator mustn’t set the length of this column to a value greater than the maximum query length that’s supported by the back-end physical database. For example, Oracle Databases enable a maximum Varchar of 4000, but Oracle Databases truncate to 4000 bytes, not 4000 characters. If you use a multibyte character set, the actual maximum string size has a varying number of characters, depending on the character set and characters used.</td>
</tr>
<tr>
<td>REPOSITORY_NAME</td>
<td>Specifies the name of the repository that the query accesses.</td>
</tr>
<tr>
<td>ROW_COUNT</td>
<td>Indicates the number of rows returned to the query client. When a large amount of data is returned from a query, this column isn’t populated until the user displays all the data.</td>
</tr>
<tr>
<td>IMPERSONATOR_USER_NAME</td>
<td>Specifies the user name of the impersonated user. If the request isn’t run as an impersonated user, then the value is None. Default is None and the data type is Varchar(128).</td>
</tr>
<tr>
<td>SAW_DASHBOARD</td>
<td>Indicates the path name of the dashboard. If the query wasn’t submitted through a dashboard, then the value is NULL.</td>
</tr>
<tr>
<td>SAW_DASHBOARD_PG</td>
<td>Indicates the page name in the dashboard. If the request isn’t a dashboard request, then the value is NULL. Default is Null and the data type is Varchar(150).</td>
</tr>
<tr>
<td>SAW_SRC_PATH</td>
<td>Specifies the path name in the Catalog for the analysis.</td>
</tr>
<tr>
<td>START_DT</td>
<td>Indicates the date that the logical query was submitted.</td>
</tr>
<tr>
<td>START_HOUR_MIN</td>
<td>Indicates the hour and minute that the logical query was submitted.</td>
</tr>
<tr>
<td>START_TS</td>
<td>Indicates the date and time that the logical query was submitted.</td>
</tr>
<tr>
<td>SUBJECT_AREA_NAME</td>
<td>Contains the name of the business model being accessed.</td>
</tr>
<tr>
<td>SUCCESS_FLG</td>
<td>Indicates the completion status of the query, as defined in the following list:</td>
</tr>
<tr>
<td></td>
<td>• 0 - The query completed successfully with no errors.</td>
</tr>
<tr>
<td></td>
<td>• 1 - The query timed out.</td>
</tr>
<tr>
<td></td>
<td>• 2 - The query failed because row limits were exceeded.</td>
</tr>
<tr>
<td></td>
<td>• 3 - The query failed due to some other reason.</td>
</tr>
<tr>
<td>TOTAL_TIME_SEC</td>
<td>Indicates the time in seconds that Oracle Analytics Cloud spent working on the query while the client waited for responses to its analyses. TOTAL_TIME_SEC includes the time for COMPILE_TIME_SEC.</td>
</tr>
<tr>
<td>USER_NAME</td>
<td>Specifies the name of the user who submitted the query.</td>
</tr>
<tr>
<td>ECID</td>
<td>Indicates the system-generated execution context ID. Data type is Varchar2(1024).</td>
</tr>
<tr>
<td>TENANT_ID</td>
<td>Specifies the name of the tenant of the user who ran the initialization block. Data type is Varchar2(128).</td>
</tr>
<tr>
<td>SERVICE_NAME</td>
<td>Specifies the name of the service. Data type is Varchar2(128).</td>
</tr>
<tr>
<td>SESSION_ID</td>
<td>Indicates the ID of the session. Data type is Number(10).</td>
</tr>
</tbody>
</table>
Usage Tracking Physical Query Logging Table

The following table describes the database table that tracks physical queries. This database table records the physical SQL information for the logical queries stored in the logical query logging table. The physical query table has a foreign key relationship to the logical query table.

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASH_ID</td>
<td>Indicates the HASH value for the logical query. Data type is Varchar2(128).</td>
</tr>
<tr>
<td>TOTAL_TEMP_KB</td>
<td>Specifies the total KB received for a query. Data type is Number(10).</td>
</tr>
<tr>
<td>RESP_TIME_SEC</td>
<td>Indicates the time taken for query response. Data type is Number(10).</td>
</tr>
</tbody>
</table>

Usage Tracking Initialization Block Table

The following table describes the database table that tracks information about the initialization blocks.

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER_NAME</td>
<td>The name of the user who ran the initialization block. The data type is Varchar2(128).</td>
</tr>
</tbody>
</table>
### Column Description

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPOSITORY_NAME</td>
<td>The name of the repository that the query accesses. The data type is Varchar2(128).</td>
</tr>
<tr>
<td>TENANT_ID</td>
<td>The name of the tenant of the user who ran the initialization block. The data type is Varchar2(128).</td>
</tr>
<tr>
<td>SERVICE_NAME</td>
<td>The name of the service. The data type is Varchar2(128).</td>
</tr>
<tr>
<td>ECID</td>
<td>The system-generated execution context ID. The data type is Varchar2(1024).</td>
</tr>
<tr>
<td>SESSION_ID</td>
<td>The ID of the session. The data type is Number(10).</td>
</tr>
<tr>
<td>BLOCK_NAME</td>
<td>The name of the initialization block that was executed. The data type is Varchar2(128).</td>
</tr>
<tr>
<td>START_TS</td>
<td>The date and time that the initialization block started.</td>
</tr>
<tr>
<td>END_TS</td>
<td>The date and time that the initialization block finished. The start and end timestamps also reflect the time that the query spent waiting for resources to become available.</td>
</tr>
<tr>
<td>DURATION</td>
<td>The length of time it took to execute the initialization block. The data type is Number(13,3).</td>
</tr>
<tr>
<td>NOTES</td>
<td>Notes about the initialization block and its execution. The data type is Varchar2(1024).</td>
</tr>
</tbody>
</table>

## Typical Workflow for Tracking Usage

Here are the tasks to track the user-level queries to Oracle Analytics Cloud.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the usage tracking statistics database</td>
<td>Specify a database to store the usage tracking statistics.</td>
<td>Specify the Usage Tracking Database</td>
</tr>
<tr>
<td>Specify the usage tracking parameters</td>
<td>Specify the connection details and table names of the usage tracking statistics database.</td>
<td>Set Usage Tracking Parameters</td>
</tr>
<tr>
<td>Analyze the usage tracking data</td>
<td>Create usage reports using the usage tracking data.</td>
<td>Analyze Usage Tracking Data</td>
</tr>
</tbody>
</table>

### Specify the Usage Tracking Database

Before you can track usage of reports, dashboards, and data visualization projects on your system, you must specify the database where you want to store the usage tracking statistics.

The database you specify must have at least one schema defined. Oracle Analytics Cloud creates usage tracking tables in the schema whose name matches the user name you specify in the connection pool details. For example, if the name of a schema in the usage tracking database is "ANALYTICS_USAGE", you must specify "ANALYTICS_USAGE" in the User Name field for the connection pool. The usage tracking-tables are created in the schema named "ANALYTICS_USAGE".

You must configure the database and connection pool details in the physical layer of your data model file (RPD). Use the Oracle Analytics Developer Client Tool to edit the data model file.
1. In Oracle Analytics Developer Client Tool, open the data model file in the cloud. From the **File** menu, select **Open**, and then **In the Cloud**. Enter connection information for your Oracle Analytics Cloud instance.

2. Specify the usage tracking database:
   a. In the Physical layer of the data model file, right-click and select **New Database**.
   b. In the Database dialog, provide a name for your database, specify the database type, for example **Oracle 12c**, and click **OK**.
   c. Right-click the newly created database, select **New Object**, and then select **Connection Pool**.
   d. In the Connection Pool dialog, enter a name for the connection pool and specify values for:
      - **Call interface**: Select **Default (Oracle Call Interface (OCI))**.
      - **Require fully qualified table names**: Ensure that this check box isn't selected.
      - **Data Source Name**: Specify the data source to which you want this connection pool to connect and send physical queries. For example:
        
        ```
        (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = <DB Host>)(PORT = <DB port>)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = <Servicename>)))
        ```
        
        As an alternative to providing the data source name, select the **Externalize connection** check box and enter the name of the database connection that you defined for the data model. You can define database connections for data models using the Console in Oracle Analytics Cloud. If you want to use the same database connections in the Oracle Analytics Developer Client Tool, then you don't have to re-enter the connection details. Instead, refer to the database connections “by name” in the Connection Pool dialog. See Connect to Data in an Oracle Cloud Database and Connect to a Data Source with an External Connection.
      - **User name and Password**: Enter a user name that matches the name of a schema available in the usage tracking database.

3. Validate your changes by clicking **Tools**, **Show Consistency Checker**, and then **Check All Objects**.

4. Optionally, save changes locally by clicking **File**, and then **Save**.

5. Upload the data model file that you edited to your Oracle Analytics Cloud instance by clicking **File**, **Cloud**, and then **Publish**.

### Set Usage Tracking Parameters

To start recording usage information, you specify connection details for the database you want to use and names for the database tables used to track usage. You set these parameters through the Console.

1. Sign in to your service.
2. Click **Console**.
3. Click **System Settings**.
4. Set the following properties:
• **Usage Tracking Connection Pool**  
Name of the connection pool that you created for your usage tracking database in the format, `<database name>.<connection pool name>`. For example, `UsageTracking.UTConnectionPool`.

• **Usage Tracking Initialization Block Table**  
Name of the database table you want to use to store information about initialization blocks in the format, `<database name>.<catalog name>.<schema name>.<table name>` or `<database name>.<schema name>.<table name>`. For example, `UsageTracking.Analytics_Usage.InitBlockInfo`.

• **Usage Tracking Physical Query Logging Table**  
Name of the database table you want to use to store physical query details in the format, `<database name>.<catalog name>.<schema name>.<table name>` or `<database name>.<schema name>.<table name>`. For example, `UsageTracking.Analytics_Usage.PhysicalQueries`.

• **Usage Tracking Logical Query Logging Table**  
Name of the database table you want to use to store logical query details in the format, `<database name>.<catalog name>.<schema name>.<table name>` or `<database name>.<schema name>.<table name>`. For example, `UsageTracking.Analytics_Usage.LogicalQueries`.

• **Usage Tracking Max Rows**  
Maximum number of rows that you want in the usage tracking tables.

5. Click **Restart**.  
Oracle Analytics Cloud creates the usage tracking tables and starts to log user queries.

---

**Analyze Usage Tracking Data**

Create usage reports to understand the user queries in Oracle Analytics Cloud and take appropriate action.

1. On the Home page, click the **Page Menu** and select **Open Classic Home**. Create and run an analysis.  
Oracle Analytics Cloud populates the query in the usage tracking tables in the usage tracking database.

2. Create a connection to the usage tracking database.  
See Create Database Connections.

3. On the Home page, click **Create**, and click **Data Set**.

4. In Create Data Set, click the connection to the usage tracking statistics database, and select the schema specified in the Physical Query and Logical Query Logging table names in System Settings. For example, schema name provided in `<database name>.<schema name >.<table name>` for the Physical Query and Logical Query Logging table names.

5. In Add Data Set, search for the usage tracking physical query logging table, add all the columns, name the data set (for example, Physical Queries), and then click **Add**. Similarly, search for the usage tracking logical query logging table, add all the columns, name the data set (for example, Logical Queries), and then click **Add**.
6. On the data set Results page, click **Create Project**. Add both the data sets to the project: for example, the Physical Queries and Logical Queries data sets. Name the project (for example, Usage Tracking).

7. In the Prepare tab of the project, click **Data Diagram**, and create joins between the data sets using a column such as the ID column.

8. In Visualize, drag data to create visualizations based on your requirement.

   Refer to the usage tracking table descriptions in "Understand Usage Tracking Tables" to select applicable columns. For example, you can create a visualization to show how many queries took how much time.

---

**Enable Custom Java Script For Actions**

Users working with analyses and dashboards can add action links that invoke custom JavaScript accessible through a web server. To enable this feature, administrators specify the URL of the web server in System Settings and whitelist the web server as a safe domain.

1. Develop your scripts in JavaScript, store them in a web server, and make a note of the URL pointing to the JavaScript (*.JS) file containing the custom scripts.

   For example, you might develop a currency conversion script named `mycurrencyconversion` that you store in `myscripts.js`, and the URL might be: `http://example.com:8080/mycustomscripts/myscripts.js`.

2. Specify the URL of your web server in System Settings:
   a. Click **Console**, then click **System Settings**.
   b. In **URL for Browser Script Actions**, enter the URL that you noted in Step 1.
   c. If you're prompted to restart, then follow the on-screen instructions.

3. Whitelist the web server as a safe domain:
   a. Click **Console**, then click **Safe Domains**.
   b. Add an entry for the domain in the URL you specified in Step 2.
      For example, you might add: `example.com:8080`.
   c. For options, select **Script** and **Connect**.

4. Test your configuration:
   a. In Classic Home, open or create an analysis.
   b. Display the Column Properties for a column, click **Interaction**, then Add **Action Link**.
   c. Click **Create New Action**, then **Invoke a Browser Script**.
   d. Under **Function Name** enter the name of a script in your JavaScript (*.JS) file.
      For example, `USERSCRIPT.mycurrencyconversion`.
   e. Save the details, and open the analysis.
   f. Click the column to which you added the action, then click the action.
Deploying Write-back

Write-back enables users to update data from analyses.

Topics:

• About Write-back for Administrators
• Enable Write-back in Analyses and Dashboards

About Write-back for Administrators

Write-back enables users to update your data directly from dashboards and analyses.

Users with the 'Write Back to Database' privilege see write-back fields as editable fields in analyses. The values they enter are saved to the database. If a user doesn't have the 'Write Back to Database' privilege, then the write-back fields display as normal fields.

If a user types a value in an editable field and clicks the write-back button, then the application executes the insert or update SQL command defined in the write-back template. If the command succeeds, the analysis is updated with the new value. If there is an error in either reading the template or in executing the SQL command, then an error message is displayed.

The insert command runs when a record does not yet exist and the user enters new data into the table. In this case, a user has typed in a table record whose value was originally null. The update command runs when a user modifies existing data. To display a record that does not yet exist in the physical table, you can create another similar table. Use this similar table to display placeholder records that a user can modify.

Enable Write-back in Analyses and Dashboards

Administrators can enable users to edit the data in analyses and dashboards.

1. Set up your data model:
   a. In Oracle Analytics Cloud Developer Client Tool, open your data model (RPD file).
   b. In the Physical layer, double-click the physical table that contains the column for which you want to enable write-back.
   c. On the General tab of the Physical Table dialog, ensure that Cacheable is not selected. Deselecting this option ensures that Oracle BI Presentation Services users can see updates immediately.
   d. In the Business Model and Mapping layer, double-click the corresponding logical column.
   e. In the Logical Column dialog, select Writeable, then click OK.
   f. In the Presentation layer, double-click the column that corresponds to the logical column for which you enabled write-back.
   g. In the Presentation Column dialog, click Permissions.
h. Select the **Read/Write** permission for the appropriate users and application roles.

i. Save your changes.

2. Create a write-back template and copy it to your clipboard. For example:

```xml
<?xml version="1.0" encoding="utf-8" ?>
<WebMessageTables xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:oracle.bi.presentation/writebackschemas/v1>
<WebMessageTable lang="en-us" system="WriteBack" table="Messages">
  <WebMessage name="SetQuotaUseID">
    <XML>
      <writeBack connectionPool="Supplier">
        <insert>INSERT INTO regiontypequota
VALUES(@{c0},@{c1},@{c2},@{c3},@{c4})</insert>
        <update>UPDATE regiontypequota SET Dollars=@{c4} WHERE YR=@{c0} AND Quarter=@{c1} AND Region=@{c2} AND ItemType=@{c3}</update>
      </writeBack>
    </XML>
  </WebMessage>
</WebMessageTable>
</WebMessageTables>
```

3. Apply your write-back template in Oracle Analytics Cloud:
   a. Click **Console**, then click **System Settings**.
   b. In **Writeback Template XML**, paste in the write-back template that you copied in Step 2.

4. Grant permissions to use the write-back code:
   a. Navigate to Classic home, then click **Administration**.
   b. Under **Security**, click **Manage Privileges**, and navigate to **Write Back**.
   c. Grant 'Write Back to Database' to Authenticated User.
   d. Grant 'Manage Write Back' to BI Service Administrator.

5. To enable write-back in columns:
   a. In the analysis editor, display the Column Properties of the column on which you want to enable write-back.
   b. In the Column Properties dialog, click the **Write Back** tab.
      If the column has been enabled for write-back in the repository, then the **Enable Write Back** box is available.
   c. Select the **Enable Write Back** option.
   d. Specify the value of other options if you want to change the default.
   e. Save your changes.

The column is enabled for write-back in any analysis that includes this column.

6. To enable write-back in table views:
   a. In the analysis editor, open the table view for editing.
   b. Click **View Properties**.
c. In the Table Properties dialog, click the **Write Back** tab.

d. Select the **Enable Write Back** option.

e. Select the **Template Name** box, specify the value of "WebMessage name=" in the write-back template that you specified in Step 2.

   For example, the **Template Name** for the example template in Step 2 is 'SetQuotaUseID'.

f. Save your changes.

### Configure Advanced Options

You can set several advanced options for Oracle Analytics Cloud through the Console.

**Topics:**
- About Advanced Configuration
- Set Advanced Options for the Service

### About Advanced Configuration

Administrators can set more advanced, service-level options through the Systems Settings page.

- Performance and Compatibility Options
- Analysis, Dashboard, and Pixel-Perfect Report Options
- Usage Tracking Options
- Prompt Options
- Format Options
- View Options
- Connection Options
- Security Options

### Performance and Compatibility Options

You use these options to configure performance and compatibility settings between Oracle BI Enterprise Edition and Oracle Analytics Cloud. For example, you can set the maximum temporary file size.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cache Enable</td>
<td>Specifies whether data query caching is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td>• enabled — Data caching is enabled.</td>
</tr>
<tr>
<td></td>
<td>• disabled — Caching is disabled.</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> Enabled</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obis.CACHE_ENABLE</td>
</tr>
</tbody>
</table>
### System Setting

<table>
<thead>
<tr>
<th>Evaluate Support Level</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specifies who can issue database functions: EVALUATE, EVALUATE_ANALYTIC, EVALUATE_AGGR, and EVALUATE_PREDICATE. By default (0), the EVALUATE database functions are disabled.</td>
</tr>
<tr>
<td></td>
<td>• 1 — Service administrators only. Users with the BI Service Administrator application role can invoke EVALUATE database functions.</td>
</tr>
<tr>
<td></td>
<td>• 2 — Anyone. Any user who signs in to Oracle Analytics Cloud can invoke EVALUATE database functions.</td>
</tr>
<tr>
<td></td>
<td>• 0 (or any other value) — No one. All EVALUATE database functions are disabled in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> 0, 1, 2</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> 0</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obis.EVALUATE_SUPPORT_LEVEL</td>
</tr>
</tbody>
</table>

### OBIEE Compatibility Release

<table>
<thead>
<tr>
<th>OBIEE Compatibility Release</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specifies the on-premises Oracle BI Enterprise Edition version number for feature compatibility. This only applies if you upgrade from Oracle BI Enterprise Edition to Oracle Analytics Cloud, and you want to use a feature from a specific on-premises release in Oracle Analytics Cloud.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> 11.1.1.9, 11.1.1.10, 11.1.1.11, 12.2.1.0, 12.2.1.1, 12.2.1.3, 12.2.1.4, 12.2.2.0, 12.2.3.0, 12.2.4.0, 12.2.5.0, DV_EXTN_11.1.1.9</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> No value.</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obis.COMPATIBLE_RELEASE</td>
</tr>
</tbody>
</table>
### System Setting

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Working File Percent Size</td>
<td>Specifies that the temporary file doesn't exceed a specified percentage of the global work directory size limit. The size limit defaults for temporary files is 5% (of 100 GB), equivalent to 5 GB. The file limit applies individually to each temporary file, while the size specified for the total global work directory applies collectively to all temporary files created. You can increase or decrease this value within the range of 5% to 50%. This enables temporary file sizes between 5GB and 50GB. Raising this setting above 50% limits concurrency for large operations. <strong>Valid Values:</strong> 5–50 <strong>Default:</strong> 5 <strong>Restart Required:</strong> Yes <strong>Name in Oracle BI Enterprise Edition:</strong> obis.MAX_WORK_FILE_SIZE_PERCENT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strong Datetime Checking</th>
<th>Specifies whether to enforce strict checking for date and time data types and whether to reject queries that contain incompatibilities in date and time data types.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Yes — Enforces strict checking for date and time data types.</td>
</tr>
<tr>
<td></td>
<td>• No — Relaxes strict checking for date and time data types. However, invalid queries or queries with severe date and time incompatibilities may still be rejected. For example, date and time incompatibilities might be rejected if your relational database uses strict checking for those data types. <strong>Default:</strong> Yes <strong>Restart Required:</strong> Yes <strong>Name in Oracle BI Enterprise Edition:</strong> obis.STRONG_DATETIME_TYPE_CHECKING</td>
</tr>
</tbody>
</table>
Analysis, Dashboard, and Pixel-Perfect Report Options

You use these options to set defaults and customizations for dashboards, analyses, and reports. For example, you can configure the analysis editor to open by default to the Criteria tab or the Results tab.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom Links XML</td>
<td>Specifies the XML code containing Classic Home page header customizations. You can use this XML code to customize the global header and the Get Started section of the Home page to better meet the needs of your users. For example, you can disable certain links or add custom ones. Restart Required: Yes Name in Oracle BI Enterprise Edition: obips.CustomLinksXml</td>
</tr>
<tr>
<td>Writeback Template XML</td>
<td>Defines the XML configuration for performing writeback on data elements. For example, you can use an XML template to enable users of a dashboard page or an analysis with the ability to modify, or write back, the data that they see in a table view. Restart Required: Yes Name in Oracle BI Enterprise Edition: obips.WriteBack.TemplateXML</td>
</tr>
</tbody>
</table>
| Answers Subject Area Sort Order | Sets the default sort order for subject area content trees. Users can override this default setting in the My Account: Subject Area Sort Order dialog.  
• asc — Sorts A to Z.  
• desc — Sorts Z to A.  
• rpd — Uses the subject area sort order specified in the original analyses. Valid Values: asc, desc, rpd Default: rpd Restart Required: Yes Name in Oracle BI Enterprise Edition: obips.SubjectAreaTreeOrder |
<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answers Editor Start Tab</td>
<td>Specifies whether the analysis editor opens by default to the Criteria tab or the Results tab. This setting applies when users click an Edit link for an analysis from a dashboard, the Home page, or the Catalog page. Users can override this default setting by specifying the Full Editor option in the My Account dialog.</td>
</tr>
<tr>
<td></td>
<td>• answerResults — Opens the analysis editor by default to the Results tab.</td>
</tr>
<tr>
<td></td>
<td>• answerCriteria — Opens the analysis editor by default to the Criteria tab.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> answerResults, answerCriteria</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> answerResults</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.AnalysisEditorStartTab</td>
</tr>
<tr>
<td>BIP Reporting Toolbar Mode</td>
<td>Configures an alternate toolbar for pixel-perfect reports that are included in a dashboard.</td>
</tr>
<tr>
<td></td>
<td>• 1 — Don't display a toolbar for pixel-perfect reports.</td>
</tr>
<tr>
<td></td>
<td>• 2 — Displays the URL to the report without the logo, toolbar, tabs, or navigation path.</td>
</tr>
<tr>
<td></td>
<td>• 3 — Displays the URL to the report without the header or any parameter selections. Controls such as Template Selection, View, Export, and Send are still available.</td>
</tr>
<tr>
<td></td>
<td>• 4 — Displays the URL to the report only. No other page information or options are displayed.</td>
</tr>
<tr>
<td></td>
<td>• 6 — Displays parameter prompts for the report in a toolbar.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> 1, 2, 3, 4, 6</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> 1</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.AdvancedReporting.ReportingToolbarMode</td>
</tr>
</tbody>
</table>
Usage Tracking Options

You use these options to specify how you want to monitor system usage. For example, you can set the number of rows that you want stored in the usage tracking tables.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage Tracking Logical Query Logging Table</td>
<td>Specifies the name of the database table you want to use to store logical query details. For example, <code>&lt;database name&gt;.&lt;catalog name&gt;.&lt;schema name&gt;.&lt;table name&gt;</code> or <code>&lt;database name&gt;.&lt;schema name&gt;.&lt;table name&gt;</code>.</td>
</tr>
<tr>
<td>Default: No value.</td>
<td>Restart Required: Yes</td>
</tr>
<tr>
<td>Name in Oracle BI Enterprise Edition:</td>
<td>obis.UT_PHYSICAL_TABLE_NAME</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage Tracking Physical Query Logging Table</td>
<td>Specifies the name of the database table you want to use to store physical query details. For example, <code>&lt;database name&gt;.&lt;catalog name&gt;.&lt;schema name&gt;.&lt;table name&gt;</code> or <code>&lt;database name&gt;.&lt;schema name&gt;.&lt;table name&gt;</code>.</td>
</tr>
<tr>
<td>Default: No value.</td>
<td>Restart Required: Yes</td>
</tr>
<tr>
<td>Name in Oracle BI Enterprise Edition:</td>
<td>obis.UT_PHYSICAL_QUERY_TABLE_NAME</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage Tracking Connection Pool</td>
<td>Specifies the name of the connection pool you created for your usage tracking statistics database. For example, <code>&lt;database name&gt;.&lt;connection pool name&gt;</code>.</td>
</tr>
<tr>
<td>Default: No value.</td>
<td>Restart Required: Yes</td>
</tr>
<tr>
<td>Name in Oracle BI Enterprise Edition:</td>
<td>obis.UT_CONNECTION_POOL</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage Tracking Max Rows</td>
<td>Indicates the number of rows allowed in usage tracking tables, with a value of 0 indicating an unlimited number of rows.</td>
</tr>
<tr>
<td>Valid Values: Any positive number (up to 64-bit integer)</td>
<td>Default: 0</td>
</tr>
<tr>
<td>Restart Required: Yes</td>
<td>Name in Oracle BI Enterprise Edition: obis.UT_UT_MAX_NUM_ROWS</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### System Setting

<table>
<thead>
<tr>
<th>Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| Usage Tracking File Encoding    | Specifies the file encoding type used for usage tracking. The type depends upon which database loader you’re using. For example, to support multilingual repositories for database loaders used by Oracle Database, use UTF8.  
  **Valid Values:** ANSI, ASCII, UTF8, UNICODE  
  **Default:** UTF8  
  **Restart Required:** Yes  
  **Name in Oracle BI Enterprise Edition:** obis.UT.CODE_PAGE |
| Usage Tracking Initialization Block Table | Specifies the name of the fully-qualified database table you use for inserting records that correspond to the initialization block statistics, as it appears in the physical layer of your data model file (RPD). For example,  
  `<database name>.<catalog name >..<schema name >..<table name>` or  
  `<database name>..<schema name >..<table name>`.  
  **Default:** No value.  
  **Restart Required:** Yes  
  **Name in Oracle BI Enterprise Edition:** obis.UT.INIT_BLOCK_TABLE_NAME |

### Prompt Options

You use these options to configure prompt behavior. For example, you can enable search results to automatically display as highlighted when users enter search parameters, without the need to click **Search**.

**Note:**

These options apply only to analyses and dashboards. They don’t apply to data visualizations.
<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Auto Complete</td>
<td>Enables or disables the auto-complete functionality available in prompts.</td>
</tr>
<tr>
<td></td>
<td>• Enabled — Enables auto-complete, which means that the Prompts Auto-Complete field is displayed and set to On in the My Account dialog and in the Dashboard Properties dialog.</td>
</tr>
<tr>
<td></td>
<td>• Disabled — Disables auto-complete, which means that the auto-complete fields in the My Account and Dashboard Properties dialogs aren’t available.</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> Disabled</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.Prompts.AutoCompletePromptDropDowns.SupportAutoComplete</td>
</tr>
</tbody>
</table>

| Case Insensitive Auto Complete              | Specifies whether, when a user enters a prompt value in analyses and dashboards, the auto-complete functionality is case-insensitive. |
|                                            | • Enabled — Case isn’t considered when a user enters a prompt value such as “Oracle” or “oracle.” |
|                                            | • Disabled — Case is considered when a user enters a prompt value, so the user must enter “Oracle” and not “oracle” to find the Oracle record. |
|                                            | **Default:** Enabled                                                             |
|                                            | **Restart Required:** Yes                                                        |
|                                            | **Name in Oracle BI Enterprise Edition:** obips.Prompts.AutoCompletePromptDropDowns.CaseInsensitive |

| Show Null Value When Column Is Nullable     | Specifies whether to show the term "NULL" at runtime in the column prompt above the column separator in the drop-down list when the database allows null values. |
|                                            | • always — Always shows the term "NULL" above the column separator in the drop-down list. |
|                                            | • never — Never shows the term "NULL" in the drop-down list. |
|                                            | • asDataValue — Displays the data value in the drop-down list, not the term "NULL" above the separator in the drop-down list. |
|                                            | **Valid Values:** always, never, asDataValue                                      |
|                                            | **Default:** always                                                              |
|                                            | **Restart Required:** Yes                                                         |
|                                            | **Name in Oracle BI Enterprise Edition:** obips.Prompts.ShowNullValueWhenColumnIsNullable |
### System Setting

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| **Auto Apply Dashboard Prompt Values** | Enables the option to hide the **Apply** button so that prompt values can be applied without clicking any button.  
If this is property is **Enabled**:
• Displays the **Show Apply Button** and **Show Reset Button** fields in the Edit Page Settings dialog.
• Displays the **Prompts Apply Buttons** and **Prompts Reset Buttons** fields in the Dashboard Properties dialog.
• Displays the **Prompt Buttons on Current Page** option on the dashboard builder's Tools menu.  
**Default**: Enabled  
**Restart Required**: Yes  
**Name in Oracle BI Enterprise Edition**: obips.Prompts.AutoApplyDashboardPromptValues |

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| **Auto Search on Prompt Value Search Dialog** | Enables search results to automatically display and highlight when users enter search parameters, without the need to click **Search**.  
**Default**: Enabled  
**Restart Required**: Yes  
**Name in Oracle BI Enterprise Edition**: obips.Prompts.AutoSearchPromptDialogBox |

### Format Options

You use these options to configure default currency and time zone settings.

**Note:**

These options apply only to analyses and dashboards. They don't apply to data visualizations.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| **Currencies XML** | Defines the default currency that’s displayed for currency data in analyses and dashboards. For example, you can change from American dollars ($) to Euros (€).  
**Restart Required**: Yes  
**Name in Oracle BI Enterprise Edition**: obips.CurrenciesXml |
<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| User Currency Preferences XML | Determines whether users see a **Currency** option in their My Account preferences dialog and the list of currencies available to them. If you provide the **Currency** option, users can select in which currency they prefer to view columns of currency data in analyses and dashboards.  
**Restart Required:** Yes  
**Name in Oracle BI Enterprise Edition:** obips.UserCurrencyPreferencesXml                                                                                                                                                                                                                 |

<table>
<thead>
<tr>
<th>Default Data Offset Time Zone</th>
<th><strong>Note:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This property only applies to Oracle Analytics Cloud - Classic.</td>
</tr>
</tbody>
</table>

Specifies a time zone offset of the original data that users see in analyses and dashboards. Enter an offset value that indicates the number of hours away from Greenwich Mean Time (GMT) time.

For example, to display values in United States Eastern Standard Time (EST), which is Greenwich Mean Time (GMT) - 5 hours, enter the value **GMT-05:00** or the equivalent value in minutes **-300**.

If you don't set this option, no time zone conversion occurs because the value is "unknown".

If you want to specify a different offset value for each user, enter the session variable **DATA_TZ**.

**Example:** **GMT-05:00** or **-300**, which means minus 5 hours.

**Example:** **DATA_TZ**

**Default:** No value. Equivalent to Greenwich Mean Time (GMT), 0 offset.

**Restart Required:** Yes

**Name in Oracle BI Enterprise Edition:** obips.TimeZone.DefaultDataOffset
<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default User Preferred Time Zone</td>
<td>Specifies a default preferred time zone that users see in analyses and dashboards before they select their own in the My Account Preferences dialog.</td>
</tr>
<tr>
<td></td>
<td>If you don’t set this option, then the value is the local time zone from Oracle BI Presentation Services.</td>
</tr>
<tr>
<td></td>
<td>Enter one of the time zones specified in the TimeZones.xml file.</td>
</tr>
<tr>
<td></td>
<td>If you want to specify a different preferred time zone for each user, enter the session variable TIMEZONE.</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> (GMT-08:00) Pacific Time (US &amp; Canada); Tijuana</td>
</tr>
<tr>
<td></td>
<td><strong>Example:</strong> TIMEZONE</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> No value.</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.TimeZone.DefaultUserPreferred</td>
</tr>
</tbody>
</table>

**View Options**

You use these options to configure default search and viewing settings for users.

**Note:**

These options apply only to analyses and dashboards. They don't apply to data visualizations.
<table>
<thead>
<tr>
<th><strong>System Setting</strong></th>
<th><strong>More Information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prompt Auto Complete Matching Level</td>
<td>Specifies whether the auto-complete functionality uses matching to find the prompt value that the user enters into the prompt field. This setting doesn't apply if the user accesses the Search dialog to locate and specify a prompt value.</td>
</tr>
<tr>
<td></td>
<td>• <strong>StartsWith</strong> — Searches for a match that begins with the text that the user types. For example, the user types &quot;M&quot; and the following stored values are displayed: &quot;MicroPod&quot; and &quot;MP3 Speakers System&quot;.</td>
</tr>
<tr>
<td></td>
<td>• <strong>WordStartsWith</strong> — Searches for a match at the beginning of a word or group of words. For example, the user types &quot;C&quot; and the following values are displayed: &quot;ComCell&quot;, &quot;MPEG Camcorder&quot;, and &quot;7 Megapixel Digital Camera&quot;.</td>
</tr>
<tr>
<td></td>
<td>• <strong>MatchAll</strong> — Searches for any match within the word or words.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> MatchAll, StartsWith, WordStartsWith</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> MatchAll</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.Prompts.AutoCompletePromptDropdowns.MatchingLevel</td>
</tr>
</tbody>
</table>

<p>| <strong>Default Scrolling Enabled</strong>           | Specifies how data scrolls in these views: table, pivot table, heat matrix, and simple and advanced trellis views. |
|                                         | • <strong>Enabled</strong> — Data displays with a fixed header and content scrolling controls for users to browse the data. |
|                                         | • <strong>Disabled</strong> — Data displays with content paging controls for users to browse the data. |
|                                         | <strong>Default:</strong> Enabled                                                                   |
|                                         | <strong>Restart Required:</strong> Yes                                                               |
|                                         | <strong>Name in Oracle BI Enterprise Edition:</strong> obips.Views.GridViews.DefaultScrollingEnabled |</p>
<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Interactions: Include/Exclude Columns</td>
<td>Specifies whether the <strong>Include/Exclude Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled</strong> — The <strong>Include/Exclude Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Disabled</strong> — The <strong>Include/Exclude Columns</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> <strong>Enabled</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> <strong>Yes</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.Analysis.InteractionProperties.InclExclColumns</td>
</tr>
<tr>
<td>View Interactions: Display/Hide Running Sum</td>
<td>Specifies whether the <strong>Display/Hide Running Sum</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled</strong> — The <strong>Display/Hide Running Sum</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Disabled</strong> — The <strong>Display/Hide Running Sum</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> <strong>Disabled</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> <strong>Yes</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Name in Oracle BI Enterprise Edition:</strong> obips.Analysis.InteractionProperties.RunningSum</td>
</tr>
<tr>
<td>View Interactions: Create/Edit/Remove Groups</td>
<td>Specifies whether the <strong>Create/Edit/Remove Groups</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled</strong> — The <strong>Create/Edit/Remove Groups</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Disabled</strong> — The <strong>Create/Edit/Remove Groups</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> <strong>Disabled</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> <strong>Yes</strong></td>
</tr>
</tbody>
</table>
### System Setting

<table>
<thead>
<tr>
<th>View Interactions: Move Columns</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Setting</strong></td>
<td>Specifies whether the <strong>Move Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Enabled</strong></td>
<td>The <strong>Move Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Disabled</strong></td>
<td>The <strong>Move Columns</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Default:</strong></td>
<td>Enabled</td>
</tr>
<tr>
<td><strong>Restart Required:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Name in Oracle BI Enterprise Edition:</strong></td>
<td>obips.Analysis.InteractionProperties.MoveColumns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>View Interactions: Sort Columns</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Setting</strong></td>
<td>Specifies whether the <strong>Sort Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Enabled</strong></td>
<td>The <strong>Sort Columns</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Disabled</strong></td>
<td>The <strong>Sort Columns</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Default:</strong></td>
<td>Enabled</td>
</tr>
<tr>
<td><strong>Restart Required:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Name in Oracle BI Enterprise Edition:</strong></td>
<td>obips.Analysis.InteractionProperties.SortColumns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>View Interactions: Display/Hide Sub-totals</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Setting</strong></td>
<td>Specifies whether the <strong>Display/Hide Sub-totals</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Enabled</strong></td>
<td>The <strong>Display/Hide Sub-totals</strong> option is selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Disabled</strong></td>
<td>The <strong>Display/Hide Sub-totals</strong> option is not selected by default in the Analysis Properties dialog: Interactions tab.</td>
</tr>
<tr>
<td><strong>Default:</strong></td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>Restart Required:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Name in Oracle BI Enterprise Edition:</strong></td>
<td>obips.Analysis.InteractionProperties.ShowHideSubTotal</td>
</tr>
</tbody>
</table>
### System Setting | More Information
--- | ---
**View Interactions: Drill** | Specifies whether the **Drill** (when not a primary interaction) option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Enabled** — The **Drill** (when not a primary interaction) option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Disabled** — The **Drill** (when not a primary interaction) option is not selected by default in the Analysis Properties dialog: Interactions tab.  
**Default:** Enabled  
**Restart Required:** Yes  
**Name in Oracle BI Enterprise Edition:** obips.Analysis.InteractionProperties.Drill

**View Interactions: Add/Remove Values** | Specifies whether the **Add/Remove Values** option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Enabled** — The **Add/Remove Values** option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Disabled** — The **Add/Remove Values** option is not selected by default in the Analysis Properties dialog: Interactions tab.  
**Default:** Disabled  
**Restart Required:** Yes  
**Name in Oracle BI Enterprise Edition:** obips.Analysis.InteractionProperties.AddRemoveValues

**View Interactions: Create/Edit/Remove Calculated Items** | Specifies whether the **Create/Edit/Remove Calculated Items** option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Enabled** — The **Create/Edit/Remove Calculated Items** option is selected by default in the Analysis Properties dialog: Interactions tab.  
- **Disabled** — The **Create/Edit/Remove Calculated Items** option is not selected by default in the Analysis Properties dialog: Interactions tab.  
**Default:** Disabled  
**Restart Required:** Yes  
Connection Options

You use these options to configure connection defaults. For example, you can specify how often to synchronize the database connections defined in Console.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
</table>
| Connection Externalization Enabled | Specifies whether to externalize any database connections that administrators configured for data models in Oracle Analytics Cloud, using Console. When you externalize the connection information, anyone who uses Oracle Analytics Developer Client Tool to edit data models can refer to the database connections “by name” rather than re-entering the connection details in full (connection pool settings). See Connect to a Data Source using a Connection Defined Through Console.  
  • Enabled — Externalize the database connections that administrators define for data models through Console.  
  • Disabled — Don’t externalize database connections details. Anyone using Oracle Analytics Developer Client Tool to edit data models must enter the database connection information in the Connection Pool dialog.  
  Default: Enabled  
  Restart Required: Yes  
  Name in Oracle BI Enterprise Edition: obis.CONNECTION_EXTERNALIZATION.ENABLED |
| Connection Externalization Polling Interval | Specifies how often Oracle Analytics Cloud synchronizes database connections defined in Console. Enter a suitable polling interval, in seconds. By default, database connections are synchronized every 180 seconds. This property is used only when Connection Externalization Enabled is set to yes.  
  Valid Values: 60–3600  
  Default: 180  
  Restart Required: Yes  
  Name in Oracle BI Enterprise Edition: obis.CONNECTION_EXTERNALIZATION.POLLING_INTERVAL |
Security Options

Use Security options to control how users can perform specific actions.

**Note:**

These options apply only to analyses and dashboards. They don't apply to data visualizations.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow HTML Content</td>
<td>Determines whether the Contains HTML Markup option is displayed in various dialogs and editors where you can apply formatting. This option allows users to format content with valid HTML markup.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled</strong> — Display the Contains HTML Markup option in various dialogs where additional formatting might be useful. For example:</td>
</tr>
<tr>
<td></td>
<td>– For analyses: In the analysis editor, Analysis Properties dialog, Column Properties dialog, New Calculated Measure dialog.</td>
</tr>
<tr>
<td></td>
<td>– For dashboards: In the Dashboard Properties dialog.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Disabled</strong> — Hide the Contains HTML Markup option. Users can enter only plain text.</td>
</tr>
<tr>
<td>Default:</td>
<td>Disabled</td>
</tr>
<tr>
<td>Restart Required:</td>
<td>Yes</td>
</tr>
<tr>
<td>Name in Oracle BI Enterprise Edition:</td>
<td>obips.Security.EnableSavingContentWithHTML</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>URL for Browser Script Actions</th>
<th>Specifies the URL for the JavaScript file containing custom Browser Script Actions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default:</td>
<td>No value</td>
</tr>
<tr>
<td>Restart Required:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Set Advanced Options for the Service

Use Console to set advanced options for Oracle Analytics Cloud.

1. In Oracle Analytics Cloud, click **Console**.
2. Click **System Settings**.
3. Update the **Property Value**.
4. If required, click **Restart** and then click **OK** to confirm.
   
   Wait a few moments for the changes to refresh through the system.
10

Manage Publishing Options

This topic describes tasks performed by administrators managing pixel-perfect publishing.

Topics:
- About Administering Pixel-Perfect Publishing
- Configure System Maintenance Properties
- Configure the Scheduler
- Set Up Data Sources
- Set Up Delivery Destinations
- Define Runtime Configurations
- Secure Reports
- Audit Reports and Catalog Objects
- Add Translations for the Catalog and Reports

About Administering Pixel-Perfect Publishing

Administrator configures the components required for pixel-perfect publishing.

Administrators must use the Manage Publisher option in the Classic Administration page to set up and configure several components before users start building pixel-perfect reports. You need the BI Service Administrator role to do this.

Roles Required to Perform Pixel-Perfect Publishing Tasks

This topic lists the roles required for pixel-perfect publishing.

<table>
<thead>
<tr>
<th>Application Role</th>
<th>Tasks</th>
<th>Where To Get Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI Service Administrator</td>
<td>Set up data source connections to retrieve XML data for reporting from:</td>
<td>Set Up Data Sources</td>
</tr>
<tr>
<td></td>
<td>• JDBC Connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• JNDI Connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• OLAP Connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Web Service Connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HTTP Connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Content Server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>You can also use the following data sources:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oracle BI Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oracle BI Server subject area</td>
<td></td>
</tr>
<tr>
<td>Application Role</td>
<td>Tasks</td>
<td>Where To Get Information</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>BI Service Administrator</td>
<td>Configure the connections to delivery servers:</td>
<td>Set Up Delivery Destinations</td>
</tr>
<tr>
<td></td>
<td>• Printer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fax</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Email</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HTTP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• FTP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Content Server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CUPS (Common UNIX Printing System ) Server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oracle Content and Experience Cloud</td>
<td></td>
</tr>
<tr>
<td>BI Service Administrator</td>
<td>Configure the scheduler processors</td>
<td>Configure the Scheduler</td>
</tr>
<tr>
<td>BI Service Administrator</td>
<td>Configure system runtime properties that do the following:</td>
<td>Define Runtime Configurations</td>
</tr>
<tr>
<td></td>
<td>• Control the processing for different output types</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enable digital signature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tune for scalability and performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Define font mappings</td>
<td></td>
</tr>
<tr>
<td>BI Service Administrator</td>
<td>Configure server properties such as caching specifications, database failover properties, and database fetch size.</td>
<td>Configure System Maintenance Properties</td>
</tr>
<tr>
<td>BI Content Author</td>
<td>Fetch and structure the data to use in reports.</td>
<td>Model Data for Pixel-Perfect Reports</td>
</tr>
<tr>
<td>BI Consumer</td>
<td>• View reports</td>
<td>Publish Data</td>
</tr>
<tr>
<td></td>
<td>• Schedule report jobs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Manage report jobs</td>
<td></td>
</tr>
<tr>
<td>BI Content Author</td>
<td>• Create report definitions</td>
<td>Create Pixel-Perfect Reports and Layouts</td>
</tr>
<tr>
<td></td>
<td>• Design layouts</td>
<td></td>
</tr>
</tbody>
</table>

### Navigate to the Administration Pages for Pixel-Perfect Reporting

Administrators set the options for publishing reports through the administration pages for pixel-perfect reporting.

1. Sign in to Oracle Analytics Cloud.
2. Click the **Page** menu on the Home page, and select **Open Classic Home**.
3. Click **Administration**.
4. Click **Manage Publisher**.
5. On the Publisher Administration page, select the required option.
Configure System Maintenance Properties

This topic describes how to configure Publisher server properties.

Topics:
• Set Server Caching Specifications
• Set Retry Properties for Database Failover
• Set Report Viewer Properties
• Clear Report Objects from the Server Cache
• Clear the Subject Area Metadata Cache
• Purge Job Diagnostic Logs
• Purge Job History
• Upload and Manage Configuration-Specific Files

Set Server Caching Specifications

When Publisher processes a report, the data and the report document are stored in cache.

Report-specific caching of data sets can be set as a report property.

To configure caching at the server level:

1. In the Server Configuration page, set the following properties:
   • **Cache Expiration** — Enter the expiration period for the cache in minutes. The default is 30.
   • **Cache Size Limit** — Enter the maximum number of cached items to maintain regardless of the size of these items. The default is 1000.
   • **Maximum Cached Report Definitions** — Enter the maximum number of report definitions to maintain in cache. The default is 50.

2. To manually purge this cache, on the Manage Cache tab, click **Clear Object Cache**.

Set Retry Properties for Database Failover

If Publisher fails to connect to a data source through the defined JDBC or JNDI connection, Publisher switches to the backup database.

The following properties control the number of retries that are attempted before switching to the backup connection for the database.

- **Number of Retries**
  Default value is 6. Enter the number of times to attempt to make a connection before switching to the backup database.
- **Retry Interval (seconds)**
Default value is 10 seconds. Enter the number of seconds to wait before retrying the connection.

Set Report Viewer Properties

The Report Viewer Configuration tab enables you to set the Show Apply Button report viewer property.

If Show Apply Button is set to True, reports with parameter options display the Apply button in the report viewer. If you change the parameter values, click Apply to render the report with the new values.

If Show Apply Button is set to False, the report viewer does not display the Apply button. If you enter a new parameter value, Publisher automatically renders the report after the new value is selected or entered.

You set this property at the report level to override the system setting.

Clear Report Objects from the Server Cache

Use the Manage Cache page to clear the server cache.

The server cache stores report definitions, report data, and report output documents. If you need to manually purge this cache (for example, after patching) use the Manage Cache page.

To clear the report objects from the server cache:

1. From the Administration page, select Manage Cache.
2. On the Manage Cache page, click Clear Object Cache.

Clear the Subject Area Metadata Cache

You can clear the subject area metadata cache.

BI subject area metadata such as the dimension and measure names are cached at the server to quickly open the report in report designer. You can manually clear this cache if the BI subject area is updated through a binary repository (.RPD) file.

To clear the subject area metadata cache:

1. From the Administration page, select Manage Cache.
2. On the Manage Cache page, in the Clearing Subject Area Metadata Cache section, click Clear Metadata Cache.

Purge Job Diagnostic Logs

You can purge old diagnostic logs to increase the available space on your system.

The retention period of job diagnostic logs is set to 30 days, by default. If you frequently enable diagnostic logs, these diagnostic logs might consume space in the database, and you might need to periodically free the space consumed by the old diagnostic logs. You can manually purge the job diagnostic logs older than the retention period.

To purge the job diagnostic logs:
1. On the Administration page, under System Maintenance, select Manage Job Diagnostics Log.
2. Click Purge log beyond retention period.

Purge Job History

Use the Manage Job Diagnostics Log page to purge old job history.

The retention period of a job history is set to 180 days, by default. You can manually purge the history of jobs that are older than the retention period. When you purge old job history, the saved output, saved XML, job delivery info, and the job status details of the old jobs are deleted.

To purge old job history:
1. On the Administration page, under System Maintenance, select Manage Job Diagnostics Log.
2. Click Purge scheduler metadata.

Upload and Manage Configuration-Specific Files

Use Upload Center to upload and manage the configuration-specific files for font, digital signature, ICC profile, SSH private key, SSL certificate, and JDBC client certificate.

To upload and manage the configuration-specific files:
1. On the Administration page, under System Maintenance, select Upload Center.
2. Click Browse and select the file you want to upload.
3. Select the configuration file type.
4. If you want to overwrite an existing file with the new file, select Overwrite.
5. Click Upload.
6. To manage the uploaded files, use the Filter By Type field to filter the files in the table.

Enable Diagnostics

This topic describes tasks performed by administrators and BI Authors to enable the diagnostics logs.

Topics:
• Enable Diagnostics for Scheduler Jobs
• Enable Diagnostics for Online Reports
Enable Diagnostics for Scheduler Jobs

You can enable diagnostics for a scheduler job in the Schedule Report Job page, and download the diagnostic logs from Report Job History.

You must have BI Administrator or BI Data Model Developer privileges to access the Diagnostics tab in the Schedule Report Job page. Perform the following steps to enable diagnostics.

To enable and download diagnostics for a scheduler job:

1. From the New menu, select Report Job.
2. Select the report to schedule, and click the Diagnostics tab.
3. Select and enable the required diagnostics.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable SQL Explain Plan</td>
<td>Generates a diagnostic log with Explain plan/SQL monitor report information.</td>
</tr>
<tr>
<td>Enable Data Engine Diagnostic</td>
<td>Generates a data processor log.</td>
</tr>
<tr>
<td>Enable Report Processor Diagnostic</td>
<td>Generates FO (Formatting Options) and server related log information.</td>
</tr>
<tr>
<td>Enable Consolidated Job Diagnostic</td>
<td>Generates the entire log, which includes scheduler log, data processor log, FO and server log details.</td>
</tr>
</tbody>
</table>

4. Submit the report.
5. After the report job runs, in the Report Job History page, select your report to view the details.
6. Under Output & Delivery, click Diagnostic Log to download the job diagnostic log and view the details.

Use the Manage Job Diagnostics Log page to purge the old job diagnostic logs.

Enable Diagnostics for Online Reports

In the Report Viewer, you can enable diagnostics for online reports.

Administrators and BI Authors can enable diagnostics before running the online report, and then download the diagnostic logs after the report finishes. Diagnostics are disabled by default.

If you enable diagnostics for an online report with interactive output, you can:

• Download the following diagnostic logs in a .zip file:
  – SQL logs
  – Data engine logs
  – Report Processor logs

• View the following details in the diagnostic logs:
  – Exceptions
  – Memory guard limits
  – SQL query
To enable diagnostics and download the diagnostic logs for an online report:

1. If the report is running, click **Cancel** to stop the report execution.
2. Click **Actions** in the Report Viewer.
3. Select **Enable Diagnostics** from the **Online Diagnostics** option.
4. Submit the report.
5. To download the diagnostic logs after the report runs:
   a. Click **Actions** in the Report Viewer.
   b. Select **Download Diagnostics** from the **Online Diagnostics** option.

### Configure the Scheduler

This topic describes the features, architecture, diagnostics, and configuration of the scheduler.

**Topics:**
- Understand the Scheduler
- About the Scheduler Configuration
- Configure Processors and Processor Threads
- Scheduler Diagnostics

### Understand the Scheduler

The updated architecture of the Scheduler uses the Java Messaging Service (JMS) queue technology.

This architecture enables you to add multiple publishing servers to a cluster and then dedicate each server to a particular function: report generation, document generation, or specific delivery channels.

### Architecture

The architecture of the Scheduler uses JMS queues and topics to provide a highly scalable, highly performing and robust report scheduling and delivery system.

The figure below displays the scheduler architecture.
The following list describes the tasks performed by the scheduler when a job is submitted:

1. **Submit Job**
   - Stores job information and triggers in Quartz tables

2. **Job Processor**
   - When quartz trigger is fired, puts job information in Scheduler job queue

3. **Bursting Engine / Batch Job Process**
   - **Bursting Engine Listener**
     - Takes the scheduled job information from the queue
     - Extracts data from data source
     - Splits data according to bursting split by definition
     - Stores data temporarily in temp folder
     - Puts report metadata into Report Queue
   - **Batch Job Process**
     - Takes the scheduled job information from the queue
     - Extracts data from data source
     - Stores data temporarily in temp folder
     - Puts report metadata into Report Queue

4. **FO Report Processor**
   - Listens to Report Q
• Generates report based on metadata
• Stores report in shared TEMP directory
• Puts report delivery information in Delivery Queue

5. Delivery Processors
• Listen to Delivery queue
• Call delivery API to deliver to different channels

6. Publisher System Topic
The Publisher System Topic publishes the runtime status and health of the scheduling engine. The topic publishes the status of all instances, the thread status of messages in the JMS queues, the status of all scheduler configurations such as database configuration, JNDI configuration of JMS queues and so on.

About Clustering

Clustering enables you to add server instances on demand to handle processing and delivery load.

The figure below illustrates clustering in an Oracle Service Cloud. Note that the report repository and the scheduler database are shared across the multiple instances; also, the JMS queues for scheduling and JMS topic for publishing diagnostic information are shared across the server by registering JMS queues and topics through JNDI services.

Each managed server instance points to the same report repository. In each managed server instance all the processes such as Job Processor, Report Processor, E-mail Processor, FTP Processor, Fax Processor, and Print Processor are configured. Therefore the moment a server instance pointing to the same repository is deployed, it is added to the cluster and all the processors in this instance are ready to run.
You can select the process to enable on any server instance, thereby using the resources optimally. Moreover, if there is a demand to process heavier jobs you can add more instances for report processing. Similarly, if e-mail delivery is the most preferred delivery channel, then more instances can be added to scale up e-mail delivery.

How Failover Works

The failover mechanism ensures that no report fails to deliver due to server unavailability.

Achieve this by balancing each process of the Scheduler using two or more nodes in a cluster thereby ensuring that a failure of any node must be backed up by the second node without any loss of data. For example, by enabling the Job Processor in two nodes, if one node fails, then the second node can process the pending jobs.

If a node goes down, the other nodes continue to service the queue. However, if a report job is in one of the following stages of execution: data retrieval, data formatting, or report delivery, the job is marked as failed, and must be manually resubmitted.

About Prioritizing Jobs

You can configure the processing order of jobs.

You can prioritize jobs and ensure that the high-priority report jobs run before the non-critical jobs when multiple jobs run simultaneously. In the General tab of the Report Properties page, you can set the job priority as Critical, Normal, or Low priority. When jobs are queued, the execution of a job depends on the priority specified for the job's report. If you don't prioritize jobs, the critical jobs, non-critical jobs, and on-demand queries can compete for resources and the critical jobs might get delayed. In the Report Job History page, you can identify the critical jobs and view the status of each job.

About the Scheduler Configuration

When the scheduler starts automatically, certain configurations occur.

- The scheduler schema is installed to the database by the Repository Creation Utility.
- JMS is configured in your server for publishing.
- The WebLogic JNDI URL is configured.
- Default threads per processor is set to 5.

You can see the configuration in the Scheduler Configuration page under System Maintenance.

Configure Processors and Processor Threads

For each cluster instance that you have configured, a processor configuration table is displayed. Use the tables to enable and disable processors and specify threads for each processor.

The default number of threads for each processor is set by the **Threads per JMS Processor** property under JMS Configuration, as shown in the figure below. Edit the
threads for a specific processor in the Cluster Instances region by updating the **Number Threads** setting. Note that processors that use the default setting show no entry in the table. Enter a **Number Threads** value only to set a thread count for a particular processor to differ from the default. The optimum number of threads per processor depends on the requirements of the system.

You can use the Scheduler Diagnostics page to help in assessing load in the system.

**Scheduler Diagnostics**

The Scheduler diagnostics page provides the runtime status of the scheduler. It provides status of its JMS configuration, JMS queues, Cluster instance status, Scheduler Database status, Toplink status, and Scheduler (Quartz) status.

The Diagnostics page displays how many scheduled report requests have been received by the JMS queues, how many of them have failed and how many are still running. The JMS status can be viewed at the cluster-instance level enabling you to decide whether to add more instances to scale up by one or more of these JMS processors.

For example, if there are too many requests queued up for the e-mail processor in one instance, you can consider adding another instance and enabling it to handle e-mail processing. Similarly, if there are very large reports being processed and showing in the Report Process queue in running status, then you can add another instance to scale up the Report Process capability.

Also, the Scheduler Diagnostics page reflects the status of each component to show if any component is down. You can see the connection string or JNDI name to the database, which cluster instance associates to which managed server instance, Toplink connection pool configuration, and so on.

If an instance shows a failed status, then you can recover the instance and with the failover mechanism of the JMS set up in the cluster, no jobs submitted are lost. When the server instance is brought back, it is immediately available in the cluster for service. The instance removal and addition reflects dynamically on the diagnostic page.

When an instance is added to the cluster, the Scheduler Diagnostics page immediately recognizes the new instance and displays the status of the new instances and all the threads running on that instance. This provides a powerful monitoring capability to the administrator to trace and resolve issues in any instance or any component of the scheduler.

The Scheduler Diagnostics page provides information on the following components:

- **JMS**
- **Cluster**
- **Database**
- **Scheduler Engine**

The JMS section provides information on the following:

- **JMS Cluster Config:** This section provides configuration information for JMS setup:
  - Provider type (Weblogic / ActiveMQ)
  - WebLogic version
WebLogic JNDI Factory

JNDI URL for JMS

Queue names

Temporary directory

- JMS Runtime: This provides runtime status of all JMS queues and topics, as shown in the table below.

<table>
<thead>
<tr>
<th>JMS Runtime</th>
<th>Passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic - SIP.System.T</td>
<td>Passed</td>
</tr>
<tr>
<td>Queue: SIP.Burst.Job.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Burst.Report.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.Email.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.Fax.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.FTP.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.Print.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.WebDAV.Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: SIP.Delivery.Fax.Q</td>
<td>0 pending</td>
</tr>
</tbody>
</table>

The Cluster section provides details on the cluster instance, as shown in the figure below. Use this information to understand the load on each processor.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance - Cluster 369.127928</td>
<td>Passed</td>
</tr>
<tr>
<td>JMS Instance Config</td>
<td>Passed</td>
</tr>
<tr>
<td>JMSWrapper</td>
<td>Started (Thu Jul 01 07:30:11 UTC 2010)</td>
</tr>
<tr>
<td>JMSClient - system</td>
<td>Started; SIP.System.T: 3459 sent, 3 failed</td>
</tr>
<tr>
<td>JMSClient - producer</td>
<td>Started; SIP.Burst.Job.Q: 1 threads; 1661 received, 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - schedule</td>
<td>Started</td>
</tr>
<tr>
<td>JMSClient - schedule</td>
<td>Started</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Job.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Report.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Print.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Fax.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.E-mail.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.FTP.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Print.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.WebDAV.Q: 5 threads; 0 failed, 0 running</td>
</tr>
<tr>
<td>JMSClient - delivery</td>
<td>Started; SIP.Burst.Fax.Q: 5 threads; 0 failed, 0 running</td>
</tr>
</tbody>
</table>

- JMS instance config
- JMS Wrapper
- JMS Client - System — Provides status of the BIP System topic. The scheduler diagnostic page is a subscriber to this topic.
- JMS Client_producer — Not used in this release.
- JMS Client_schedule — Provides status of the job processor and report processor, each processor showing number of active threads, number of messages received, number of messages failed, and number of messages running.
- JMS Client_delivery — Provides status of different delivery processors as listeners, each delivery processor showing number of active threads, number of messages received, number of messages failed, and number of messages running.
The Database section provides information on these components, as shown in the figure below.

- Database Config — Connection type, JNDI Name, or connection string
- Toplink Config — Connection pooling, logging level
- Database Schema

<table>
<thead>
<tr>
<th>Database</th>
<th>/scratch/apphome/xmlserver/repository/Admin/Scheduler/quartz/config.properties</th>
<th>Passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Type</td>
<td>jdbc</td>
<td>Info</td>
</tr>
<tr>
<td>Database Type</td>
<td>oracle-toplink-platform.database.oracle.sqlDriver</td>
<td>Info</td>
</tr>
<tr>
<td>User Name</td>
<td>BIUSER2</td>
<td>Info</td>
</tr>
<tr>
<td>Database Driver</td>
<td>oracle.jdbc.OracleDriver</td>
<td>Info</td>
</tr>
<tr>
<td>Toplink Config</td>
<td>/scratch/apphome/xmlserver/repository/Admin/Scheduler/quartz/config.properties</td>
<td>Passed</td>
</tr>
<tr>
<td>Toplink Mapping File</td>
<td>META-INF/toplink_mappings.xml</td>
<td>Info</td>
</tr>
<tr>
<td>Toplink Logging</td>
<td>severe</td>
<td>Info</td>
</tr>
<tr>
<td>Toplink Connection Policy Lazy</td>
<td>false</td>
<td>Info</td>
</tr>
<tr>
<td>Toplink Read Connection Pool</td>
<td>read-connection-pool, name: read-pool, max-channels: 20, min-channels: 10</td>
<td>Info</td>
</tr>
<tr>
<td>Toplink Write Connection Pool</td>
<td>write-connection-pool, name: default, max-channels: 20, min-channels: 10</td>
<td>Info</td>
</tr>
</tbody>
</table>

The Quartz section provides information on these components, as shown in the figure below.

- Quartz Configuration
- Quartz Initialization

<table>
<thead>
<tr>
<th>Quartz</th>
<th>/scratch/apphome/xmlserver/repository/Admin/Scheduler/quartz/config.properties</th>
<th>Passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>org.quartz.dataSource.myDS.maxConnections</td>
<td>6</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.scheduler.instanceId</td>
<td>AUTO</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.dataSource.myDS.driver</td>
<td>BIPublisher2</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.tablePrefix</td>
<td>QRTZ_R</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.class</td>
<td>org.quartz.iml.jdbcjobstore.JobStoreTX</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.dataSource.myDS.url</td>
<td>jdbc:realtime:10.1.131.32:32765</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.threadPool.class</td>
<td>org.quartz.SimpleThreadPool</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.useProperties</td>
<td>false</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.threadPool.threadPriority</td>
<td>5</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.isClustered</td>
<td>false</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.maxThreadsThreshold</td>
<td>600000</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.threadPool.minThreads</td>
<td>2</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.threadPool.initialThreads</td>
<td>1</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.delegateClass</td>
<td>org.quartz.iml.jdbcjobstore.JobStoreTX</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.dataSource.myDS.driver</td>
<td>oracle.jdbc.OracleDriver</td>
<td>Info</td>
</tr>
<tr>
<td>org.quartz.jobStore.dataSource</td>
<td>myDS</td>
<td>Info</td>
</tr>
</tbody>
</table>

Chapter 10 Configure the Scheduler
Set Up Data Sources

This topic describes how to set up data sources for Publisher.

Topics:
• Set Up a JDBC Connection to the Data Source
• Set Up a Database Connection Using a JNDI Connection Pool
• Set Up a Connection to an OLAP Data Source
• Set Up a Connection to a Web Service
• Set Up a Connection to an HTTP Data Source
• Set Up a Connection to a Content Server
• View or Update a Data Source

About Private Data Source Connections

Private connections for OLAP, JDBC, Web Service, and HTTP data sources are supported in Publisher and can be created by users with data model creation privileges.

When you create a private data source connection, the private data source connection is available only to you in the data model editor data source menus. For example, if you create a private data source connection called “my datasource.” and when you create a data set, the Data Source selection menu is as shown in the figure below.

![New Data Set - SQL Query](image)

Administrators have access to the private data source connections created by users. All private data source connections are displayed to Administrators when they view the list of OLAP, JDBC, Web Service, and HTTP data sources from the Administration page.
Private data source connections are distinguished by an **Allowed User** value on the Data Source Administration page as shown in the figure below. Administrators can extend access to other users to a private data source connection by assigning additional user roles to it.

For more information on assigning roles to data sources, see **Grant Access to Data Sources Using the Security Region**.

---

**Grant Access to Data Sources Using the Security Region**

When you set up data sources, you can also define security for the data source by selecting which user roles can access the data source.

You must grant access to users for the following:

- A report consumer must have access to the data source to view reports that retrieve data from the data source.
- A report designer must have access to the data source to create or edit a data model against the data source.

By default, a role with administrator privileges can access all data sources.

The configuration page for the data source includes a Security region that lists all the available roles. You can grant roles access from this page, or you can also assign the data sources to roles from the roles and permissions page.

---

**About Proxy Authentication**

Publisher supports proxy authentication for connections to various data sources.

Supported data sources include:

- Oracle 10g database
- Oracle 11g database
- Oracle BI Server
For direct data source connections through JDBC and connections through a JNDI connection pool, Publisher enables you to select "Use Proxy Authentication". When you select Use Proxy Authentication, Publisher passes the user name of the individual user (as logged into Publisher) to the data source and thus preserves the client identity and privileges when the Publisher server connects to the data source.

Enabling this feature requires additional setup on the database. The database must have Virtual Private Database (VPD) enabled for row-level security.

For connections to the Oracle BI Server, Proxy Authentication is required. In this case, proxy authentication is handled by the Oracle BI Server, therefore the underlying database can be any database that is supported by the Oracle BI Server.

Choose JDBC or JNDI Connection Type

In general, a JNDI connection pool is recommended because it provides the most efficient use of your resources.

For example, if a report contains chained parameters, then each time the report is executed, the parameters initiate to open a database session every time.

About Backup Databases

When you configure a JDBC connection to a database, you can also configure a backup database.

A backup database can be used in two ways:

• As a true backup when the connection to the primary database is unavailable.
• As the reporting database for the primary. To improve performance you can configure your report data models to execute against the backup database only.

To use the backup database in either of these ways, you must also configure the report data model to use it.

About Pre Process Functions and Post Process Functions

You can define PL/SQL functions for Publisher to execute when a connection to a JDBC data source is created (preprocess function) or closed (postprocess function).

The function must return a Boolean value. This feature is supported for Oracle databases only.

These two fields enable the administrator to set a user's context attributes before a connection is made to a database and then to dismiss the attributes after the connection is broken by the extraction engine.

The system variable :xdo_user_name can be used as a bind variable to pass the login username to the PL/SQL function calls. Setting the login user context in this way enables you to secure data at the data source level (rather than at the SQL query level).

For example, assume you have defined the following sample function:

```sql
FUNCTION set_per_process_username (username_in IN VARCHAR2) RETURN BOOLEAN IS
BEGIN
```

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Set Up Data Sources

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SETUSERCONTEXT(username_in);
    return TRUE;
END set_per_process_username

To call this function every time a connection is made to the database, enter the following in the **Pre Process Function** field:

```sql
set_per_process_username(:xdo_user_name)
```

Another sample usage might be to insert a row to the LOGTAB table every time a user connects or disconnects:

```sql
CREATE OR REPLACE FUNCTION BIP_LOG (user_name_in IN VARCHAR2, smode IN VARCHAR2)
RETURN BOOLEAN AS
BEGIN
    INSERT INTO LOGTAB VALUES(user_name_in, sysdate,smode);
    RETURN true;
END BIP_LOG;
```

In the **Pre Process Function** field enter: `BIP_LOG(:xdo_user_name)`

As a new connection is made to the database, it is logged in the LOGTAB table. The SMODE value specifies the activity as an entry or an exit. Calling this function as a **Post Process Function** as well returns results such as those shown in the table below.

<table>
<thead>
<tr>
<th>NAME</th>
<th>UPDATE_DATE</th>
<th>S_FLAG</th>
</tr>
</thead>
<tbody>
<tr>
<td>oracle</td>
<td>14-MAY-10 09.51.34.00000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 10.23.57.00000000000</td>
<td>AMFinish</td>
</tr>
<tr>
<td>administrator</td>
<td>14-MAY-10 09.51.38.00000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>administrator</td>
<td>14-MAY-10 09.51.38.00000000000</td>
<td>AMFinish</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 09.51.42.00000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 09.51.42.00000000000</td>
<td>AMFinish</td>
</tr>
</tbody>
</table>

### Set Up a JDBC Connection to the Data Source

You can set up a JDBC connection to a data source.

To set up a JDBC connection to a data source:

1. From the Administration page, click **JDBC Connection**.
2. Click **Add Data Source**.
3. Enter a display name for the data source in the **Data Source Name** field. This name is displayed in the Data Source selection list in the Data Model Editor.
4. Select the driver type.
5. You can update the **Database Driver Class** field if required.
6. Enter the database connection string.
   
   Example connection strings:
• Oracle database
To connect to an Oracle database (non-RAC), use the following format for the connect string:
jdbc:oracle:thin:@[host]:[port]:[sid]
For example: jdbc:oracle:thin:@myhost.us.example.com:1521:prod

• Oracle RAC database
To connect to an Oracle RAC database, use the following format for the connect string:
jdbc:oracle:thin:@//<host>[:<port>]/<service_name>
For example: jdbc:oracle:thin:@//myhost.example.com:1521/my_service

• Microsoft SQL Server
To connect to a Microsoft SQL Server, use the following format for the connect string:
jdbc:hyperion:sqlserver://[hostname]:[port];DatabaseName=[Databasename]
For example: jdbc:hyperion:sqlserver://myhost.us.example.com:7777;DatabaseName=mydatabase

7. Enter the user name and password required to access the data source.
8. (Optional) Enter a PL/SQL function to execute when a connection is created (Pre Process) or closed (Post Process).
9. (Optional) Select a client certificate for secured connection.
   The client certificates uploaded in Upload Center are listed for selection.
10. To enable Proxy Authentication, select Use Proxy Authentication.
11. Click Test Connection.
12. (Optional) Enable a backup database for this connection:
   a. Select Use Backup Data Source.
   b. Enter the connection string for the backup database.
   c. Enter the user name and password for this database.
   d. Click Test Connection.
13. Define security for this data source connection. Move the required roles from the Available Roles list to the Allowed Roles list. Only users assigned the roles in the Allowed Roles list can create or view reports from this data source.
   If you have defined a backup data source, the security settings are passed to the backup data source.

Create a Secure JDBC Connection to Oracle Autonomous Data Warehouse

You can upload a JDBC client certificate and set up an SSL based JDBC connection to a database on the cloud.

To create a secure JDBC connection to Oracle Autonomous Data Warehouse:
1. Upload the JDBC client certificate.
   a. From the Administration page, click Upload Center.
b. Browse and select the Oracle wallet file, cWallet.sso.

c. Select JDBC Client Certificate from the File Type list.

d. Click Upload.

2. From the Administration page, click JDBC Connection.

3. Click Add Data Source.

4. Specify the following details for the connection:
   - Data Source Name: DBaaSConnection
   - Driver Type: Oracle 12c
   - Database Driver Class: oracle.jdbc.OracleDriver

5. Enter the JDBC connection string.
   Use TCPS strings. For example, 
   jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=tcps) 
   (HOST=server_name)(PORT=port)) 
   (CONNECT_DATA=(SERVICE_NAME=serviceName)))

6. From the Client Certificate list, select the wallet file, cwallet.sso uploaded earlier.

7. Click Test Connection.

8. Click Apply.

Set Up a Database Connection Using a JNDI Connection Pool

You can connect to the JDBC data source using a connection pool.

Using a connection pool increases efficiency by maintaining a cache of physical connections that can be reused. When a client closes a connection, the connection gets placed back into the pool so that another client can use it. A connection pool improves performance and scalability by allowing multiple clients to share a small number of physical connections. You set up the connection pool in your application server and access it through Java Naming and Directory Interface (JNDI).

To set up a database connection using a JNDI connection pool:

1. From the Administration page, click JNDI Connection.

2. Click Add Data Source.

3. Enter a display name for the data source. This name is displayed in the Data Source selection list in the Data Model Editor.

4. Enter the JNDI name for the pool. For example, jdbc/BIPSSource.

5. Enter the following fields for the new connection:

6. Select Use Proxy Authentication to enable Proxy Authentication.

7. Click Test Connection. You see a confirmation message if the connection is established.

8. Define security for this data source connection. Move the required roles from the Available Roles list to the Allowed Roles list. Only users assigned the roles in the Allowed Roles list can create or view reports from this data source.
Set Up a Connection to an OLAP Data Source

You can set up connections to several types of OLAP databases.

To set up a connection to an OLAP data source:

1. From the Administration page, click **OLAP Connection**.
2. Click **Add Data Source**.
3. Enter a display name for the data source. This name is displayed in the Data Source selection list in the Data Model Editor.
4. Select the OLAP type.
5. Enter the connection string for the OLAP database.
6. Enter the user name and password for the OLAP database.
7. Click **Test Connection**.
8. Define security for this data source connection. Move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles in the **Allowed Roles** list can create or view reports from this data source.

Set Up a Connection to a Web Service

You can use a web service as a data source.

If you want to use an SSL certificate for the connection, upload the SSL certificate in Upload Center before you define the connection to the data source.

To add a web service as a data source:

1. From the Administration page, click **Web Service Connection**.
2. Click **Add Data Source**.
3. Enter a display name for the data source. This name is displayed in the Data Source selection list in the Data Model Editor.
4. Select the server protocol.
5. Enter the server name and the server port.
6. Enter the URL for the web service connection.
7. (Optional) Enter the session timeout in minutes.
8. Select the security header from **WS-Security**.
   - 2004 — Enables the "WS-Security" Username Token with the 2004 namespace: http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#PasswordText
9. (Optional) Enter the user name and password for the web service data source.
10. (Optional) From the **SSL Certificate** list, select the SSL certificate you want to use for the connection.
11. If you're using a proxy-enabled server, select **Use System Proxy**.
12. Click **Test Connection**.

13. Define security for this data source connection. Move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles in the **Allowed Roles** list can create or view reports from this data source.

14. Click **Apply**.

### Set Up a Connection to an HTTP Data Source

HTTP data sources enable your data model designers to build data models from XML, JSON, and CSV data over the web by retrieving data through the HTTP GET method.

If you want to use an SSL certificate for the connection, upload the SSL certificate in Upload Center before you define the connection to the data source.

To add an HTTP data source:

1. From the Administration page, click **HTTP Connection**.
2. Click **Add Data Source**.
3. Enter a display name for the data source. This name is displayed in the Data Source selection list in the Data Model Editor.
4. Select the server protocol.
5. Enter the server name and the server port.
6. Enter the URL context for the HTTP data source connection in the **Realm** field. For example, xmlpserver/services/rest/v1/reports
7. Enter the user name and password required to access the data source on the database.
8. (Optional) From the **SSL Certificate** list, select the SSL certificate you want to use for the data source.
9. If you’re using a proxy-enabled server, select **Use System Proxy**.
10. Define security for this data source connection. Move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles in the **Allowed Roles** list can create or view reports from this data source.

### Set Up a Connection to a Content Server

Content server data source enables you to retrieve a text attachment content stored in Oracle WebCenter Content (earlier known as UCM) server and display it in the report of the corresponding document.

To set up a connection to a content server data source:

1. From the Administration page, select the **Content Server** link.
2. Click **Add Data Source**.
3. Enter the name in the **Data Source Name** field.
4. Enter the URL in the **URI** field.
5. Enter the user name and password in the **Username** and **Password** fields, respectively.
6. Click **Test Connection**.
7. Define security for this data source connection. Move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles in the **Allowed Roles** list can create or view reports from this data source.

8. Click **Apply**.

**View or Update a Data Source**

You can view or update a data source from the Administration page.

To view or update a data source:

1. From the Administration page, select the **Data Source** type to update.
2. Select the name of the connection to view or update. All fields are editable. See the appropriate section for setting up the data source type for information on the required fields.
3. Select **Apply** to apply any changes or **Cancel** to exit the update page.

**Set Up Delivery Destinations**

This topic describes the setup required to deliver Publisher reports. It also describes how to set up the HTTP notification server.

Topics:
- Configure Delivery Options
- Understand Printer and Fax Server Configuration
- Add a Printer
- Add a Fax Server
- Add an Email Server
- Add an HTTP Server
- Add an FTP or SFTP Server
- Add a Content Server
- Add a Common UNIX Printing System (CUPS) Server
- Add an Oracle Content and Experience Cloud Cloud Server

**Configure Delivery Options**

You can define the SSL certificate file and set the general properties for e-mail deliveries and notifications.

To configure delivery options:

1. From the Administration page, select **Delivery Configuration**.
2. If you want to use a self-signed certificate, select a file from **SSL Certificate File**.
3. Enter the From address to appear on e-mail report deliveries. The default value is bipublisher-report@oracle.com.
4. Enter the From address to appear on notifications deliveries. The default value is bipublisher-notification@oracle.com.
5. Enter the subject line to display for e-mail notification recipients when the report status is Success, Warning, Failed, or Skipped.

6. Select **Use System Proxy Settings** if the Delivery Manager must look up the proxy server settings from the Java runtime environment.
   - Printer, Fax, WebDAV, HTTP and CUPS servers use proxy settings for HTTP protocol when SSL is not used. When SSL is used, the HTTPS proxy setting is used.
   - FTP and SFTP use proxy settings for FTP.
   - Contents servers and email servers don't support connection over a proxy, regardless of this setting.

You can override the proxy settings per delivery server, using proxy configuration fields on the individual server setup page. If a proxy server and ports are configured for a delivery server, the Delivery Manager uses the proxy server and port configured for the server instead of the one defined in the Java Runtime environment. In Cloud installations, **Use System Proxy Settings** is always selected, and cannot be turned off or overridden by individual server settings.

### Understand Printer and Fax Server Configuration

Understand your printer type before you set up the printer or fax server.

Regardless of the operating system, the printer destination can be any IPP server. The IPP server can be the printer itself, but if the printer does not natively support IPP, you can set up a print server that does support IPP (such as CUPS), and then connect to the print server to the printer.

To send a fax, you must set up Common Unix Printing Service (CUPS) and the fax4CUPS extension. For information on setting up CUPS or Windows IPP print servers and how to connect network printers to them, refer to the CUPS or Windows IPP software vendor documentation.

PDF is a popular output format for business reports. However, some reports require printing directly from the report server. For example, paychecks and invoices are usually printed as scheduled batch jobs. Some printers with PostScript Level 3 compliant Raster Image Processing can natively support PDF documents, but there are still many printers in business use that only support PostScript Level 2 that can't print PDF documents directly.

To print PDF documents directly, if your printer or print server does not support printing PDF, you have the following options:
   - Select a filter - PDF to PostScript or PDF to PCL.
   - Configure a custom, or third-party filter.

A filter enables you to call a conversion utility to convert the PDF to a file format supported by your specific printer type. You can use the PDF to PCL conversion only for font selection requirements for check printing. For generic printing requirements, use the PDF to PostScript level 2 filter.

Selection of **PDF to PCL** filter automatically populates the **Filter Command** field. You can embed PCL commands into RTF templates to invoke the PCL commands at a specific position on the PCL page; for example, to use a font installed on the printer for routing and account numbers on a check.
You can also call a custom filter using operating system commands.

To specify a custom filter, pass the native OS command string with the two placeholders for the input and output filename, {infile} and {outfile}.

This is useful especially if you're trying to call IPP printers directly or IPP printers on Microsoft Internet Information Service (IIS). Unlike CUPS, those print servers don't translate the print file to a format the printer can understand. With the filter functionality, you can call any of the native OS commands to transform the document to the format that the target printer can understand.

For example, to transform a PDF document to a PostScript format, enter the following PDF to PS command in the Filter Command field:

```bash
pdftops {infile} {outfile}
```

To call an HP LaserJet printer setup on a Microsoft IIS from Linux, you can set Ghostscript as a filter to transform the PDF document into the format that the HP LaserJet can understand. To do this, enter the following Ghostscript command in the Filter Command field:

```bash
gs -q -dNOPAUSE -dBATCH -sDEVICE=laserjet -sOutputFile={outfile} {infile}
```

For fax servers, you can use the filter to transform the file to Tag Image File Format (TIFF).

Add a Printer

You can set up a printer to print reports.

To set up a printer:

1. From the Administration page, under Delivery, select Printer, and then click Add Server.
2. Enter the server name and URI of the printer.
3. (Optional) If your printer or print server doesn't support printing PDF, enter a filter to call a conversion utility to convert the PDF to a file format supported by your specific printer type.
4. (Optional) Enter the user name, password, authentication type (None, Basic, Digest), and encryption Type (None, SSL).
5. (Optional) Enter the host, port, user name, password, and authentication type (None, Basic, Digest) of the proxy server.
6. Click Apply.

Add a Fax Server

You must set up Common Unix Printing Service (CUPS) and the fax4CUPS extension, if you want to send fax.

To set up a fax server:

1. From the Administration page, under Delivery, select Fax, and then click Add Server.
2. Enter the server name and the URI (Uniform Resource Identifier) of the fax server.
3. (Optional) If your fax server doesn’t support printing PDF, enter a filter to call a conversion utility to convert the PDF to a file format supported by your specific fax server.

4. (Optional) Enter the user name, password, authentication type (None, Basic, Digest), and encryption Type (None, SSL) of the fax server.

5. (Optional) Enter the host, port, user name, password, and authentication type (None, Basic, Digest) of the proxy server.

6. Click Apply.

Add an Email Server

You can add an email server to deliver reports by email.

To add an email server:

1. From the Administration page, under Delivery, select Email, and then click Add Server.

2. Enter the Server Name and Host of the email server.

3. (Optional) Select a Secure Connection method to use for connections with the email server.

   Use TLS when the server supports the protocol; SSL is accepted in the response.

4. (Optional) Enter the port number, user name, and password.

5. Click Test Connection.

6. Click Apply.

Deliver Reports Using Email Delivery Service on Oracle Cloud Infrastructure

You can use the Email Delivery service on Oracle Cloud Infrastructure to deliver reports.

If you don’t have access to Oracle Cloud Infrastructure Console, ask your Oracle Cloud Infrastructure administrator.

To deliver reports using the Email Delivery service on Oracle Cloud Infrastructure:

1. In Oracle Cloud Infrastructure Console, verify email server configuration.

   a. Generate SMTP credentials.
      
      See Generate SMTP Credentials for a User.

   b. Obtain SMTP connection information for your Email Delivery service.
      
      See Configure SMTP Connection. Get the following details of the email server:

         • Server name and host
         • Port number
         • SMTP credentials (user name and password)
         • Secure connection method

   c. Verify that the “From” addresses for report delivery are registered as approved senders.
Only approved senders can send mail through Oracle Cloud Infrastructure. See Managing Approved Senders.

2. In Oracle Analytics Cloud, add a connection to the email server.
   a. From the Administration page, under Delivery, select Email, and then click Add Server.
   b. Enter the name of the email server (Email Delivery service hostname).
   c. Enter the port number and SMTP credentials (user name and password).
   d. Select the secure connection method.
      You can select SSL, TLS, or TLS Required.
   e. Click Test Connection.
   f. Click Apply.

3. Set up delivery notification.
   a. From the Administration page, under Delivery, select Delivery Configuration.
   b. Enter values for Email From Address and Delivery Notification Email From Address.
   c. (Optional) Enter values for Success Notification Subject, Warning Notification Subject, Failure Notification Subject, and Skipped Notification Subject.
      The completed jobs use the appropriate notification subject depending on the status of the job.
   d. Deselect Use System Proxy Settings.

4. Configure the bursting jobs to deliver reports using the email server.
   Update bursting queries to specify Email as the delivery channel in DEL_CHANNEL and provide the “From” address in PARAMETER3.

5. Test report delivery.
   a. Schedule a job to email a report using the email server.
   b. In the Job History Details page, check the status of the job.

Add an HTTP Server

You can register an application URL or postprocess HTTP URL as an HTTP server to send a notification request to after the report has completed.

The HTTP notification sent by Publisher posts a form data for Job ID, report URL and Job Status to the HTTP Server URL page.

To add an HTTP server

1. From the Administration page, under Delivery, select HTTP, and then click Add Server.
2. Enter the server name and the URL of the server.
3. (Optional) Enter the host, port, user name, password, authentication type (None, Basic, Digest), and and encryption type (None, SSL) of the server.
4. **(Optional)** If the notification is to be sent through a proxy server, enter the user name, password, and the authentication type (None, Basic, Digest).

5. Click **Apply**.

### Add an FTP or SFTP Server

You can add an FTP server or SFTP server as a delivery channel from the Administration page.

To configure a secure FTP connection using a SSH private key file, you must first upload the SSH private key file in Upload Center.

If the destination file name supplied to the scheduler contains non-ascii characters, UTF-8 encoding is used to specify the file name to the destination FTP server. Your FTP server must support UTF-8 encoding or the job delivery will fail with "Delivery Failed" error message.

To add an FTP or SFTP server:

1. From the Administration page, under **Delivery**, select **FTP**, and then click **Add Server**.

2. Enter the server name, host name, and port number for the FTP or SFTP server. The default port for FTP is 21. The default port for Secure FTP (SFTP) is 22.

3. To enable Secure FTP (SFTP), select **Use Secure FTP**.

4. If the FTP server is behind a firewall, select **Use Passive Mode**.

5. In the **Host Key Fingerprint** field, enter the host key. The value must match the fingerprint calculated from server's host key at runtime. If it doesn't match, an exception error is thrown. When you connect the first time, the Delivery Manager API allows you to retrieve the server key fingerprint.

6. **(Optional)** In the **Filter Command** field, specify a custom filter to apply a file conversion such as encryption.

   To specify a custom filter, pass the native Operating System command string with the two placeholders for the input and output file name, `{infile}` and `{outfile}`. For example, to set up PGP encryption of the file using a Filter Command, enter the following:

   ```
gpg -e -r myKey -o {outfile} {infile}
```

   where

   `myKey` is the ID to gpg key (such as real name, email address, or fingerprint).

   The Filter command field doesn't support quotes. Therefore you cannot use certain valid gpg formats that include spaces, for example: "myname <myemail@example.com>". You must specify the ID in a single string with no spaces.

7. Select **Create files with Part extension when copy is in process** to create a file on the FTP server with a .part extension while the file is transferring.

   When the file transfer is complete, the file is renamed without the .part extension. If the file transfer does not complete, the file with the .part extension remains on the server.

8. **(Optional)** Enter the security information.
a. If your server is password protected, enter the User name and Password.

b. Select the **Authentication Type**: Private Key or Password

c. Depending on the authentication type selection, select the private key file or specify the private password.

   If you have selected Private Key as the authentication type, make sure you have uploaded the SSH Private Key file in the Upload Center.

9. (Optional) Enter the host, port, user name, password, and authentication type (None, Basic, Digest) of the proxy server.

10. Click **Apply**.

### SSH Options for SFTP

Secure File Transfer Protocol (SFTP) is based on the Secure Shell technology (SSH). Publisher supports the following SSH options for SFTP delivery.

<table>
<thead>
<tr>
<th>SSH Option</th>
<th>Supported Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cipher Suites</strong></td>
<td>• 3des-cbc&lt;br&gt;• blowfish-cbc&lt;br&gt;• aes128-cbc&lt;br&gt;• aes128-ctr&lt;br&gt;• aes192-ctr&lt;br&gt;• aes256-ctr</td>
</tr>
<tr>
<td></td>
<td>You can use aes192-ctr and aes256-ctr cipher suites only when Publisher is running on a JVM on which the Java Cryptography Extension (JCE) unlimited strength jurisdiction policy files are installed.</td>
</tr>
<tr>
<td><strong>Key Exchange Method</strong></td>
<td>• diffie-hellman-group1-sha1&lt;br&gt;• diffie-hellman-group14-sha1&lt;br&gt;• diffie-hellman-group-exchange-sha1&lt;br&gt;• diffie-hellman-group-exchange-sha256</td>
</tr>
<tr>
<td></td>
<td>You can use diffie-hellman-group-exchange-sha256 key exchange methods only when Publisher is running on a JVM on which the Java Cryptography Extension (JCE) unlimited strength jurisdiction policy files are installed.</td>
</tr>
<tr>
<td><strong>Public Key Algorithm</strong></td>
<td>• ssh-dss&lt;br&gt;• ssh-rsa</td>
</tr>
</tbody>
</table>

### Add a Content Server

You can deliver documents to Oracle WebCenter Content.

When you use a content server as a delivery destination:

- At runtime, the report consumer can tag the report with Security Group and Account metadata (if applicable) to ensure that the appropriate access rights are applied to the document when delivered.

- For documents that require specific custom metadata fields (such as invoice number, customer name, order date), the report author can map the custom
metadata fields defined in Content Profile Rule Sets to data fields in the data model.

Publisher communicates with Oracle WebCenter Content Server using the Remote Intradoc Client (RIDC). The connection protocols therefore follow the standards required by the RIDC. The protocols supported are:

- **Intradoc**: The Intradoc protocol communicates to the Content Server over the over the Intradoc socket port (typically 4444). This protocol requires a trusted connection between the client and Content Server and will not perform any password validation. Clients that use this protocol are expected to perform any required authentication themselves before making RIDC calls. The Intradoc communication can also be configured to run over SSL.

- **HTTP and HTTPS**: The HTTP protocol connection requires valid user name and password authentication credentials for each request. You supply the credentials to use for requests in the Publisher Administration page.

- **JAX-WS**: The JAX-WS protocol is supported only in Oracle WebCenter Content 11g with a properly configured Content Server instance and the RIDC client installed. JAX-WS is not supported outside this environment.

To set up a content server as a delivery destination:

1. From the Administration page, under Delivery, select Content Server, and then click Add Server.
2. Enter the Server Name, for example: contentserver01.
3. Enter the connection URI for your content server. The URI can take any of the following supported protocols:
   - **HTTP/HTTPS** — Specifies the URL to the Content Server CGI path. For example:
     - `http://localhost:16200/cs/idcplg`
     - `https://localhost:16200/cs/idcplg`
   - **Intradoc** — The Intradoc protocol communicates to the content server over the Intradoc socket port (typically 4444). The IDC protocol also supports communication over SSL. For example:
     - `idc://host:4444`
     - `idcs://host:4443`
   - **JAX-WS** — Uses the JAX-WS protocol to connect to the content server. For example:
     - `http://wlsserver:16200/idcnativews`
4. (Optional) Enter the user name and password of the content server.
5. (Optional) To enable the inclusion of custom metadata with your report documents delivered to the content server, select Enable Custom Metadata.
6. Click Test Connection.
7. Click Apply.
Add a Common UNIX Printing System (CUPS) Server

You add CUPS servers from the Administration page.

You can configure Common Unix Printing Service (CUPS) for sending fax and to enable printing using a printer that doesn’t natively support IPP.

To add a CUPS server:

1. From the Administration page, select CUPS to display the list of servers that have been added.
2. Select Add Server.
3. Enter the Server Name and Host and Port for the CUPS server.

Add an Oracle Content and Experience Cloud Cloud Server

You can deliver reports to an Oracle Content and Experience Cloud Cloud server to enable easy access and share reports on the cloud.

To add an Oracle Content and Experience Cloud Cloud (CEC) server:

1. From the Administration page, under Delivery, select Content and Experience, and then click Add Server.
2. In the Server Name field, type the name of the CEC server through which you want to deliver the reports to the cloud-based content hub.
3. In the URI field, type the URI of the CEC server. For example, https://host.oraclecloud.com.
4. In the Username and Password fields, provide the credentials for accessing the CEC server.
5. Click Test Connection.
6. Click Apply.

Define Runtime Configurations

This topic describes processing properties for PDF document security, FO processing, PDF accessibility, and specific properties for each output type.

Topics:

- Set Runtime Properties
- PDF Output Properties
- PDF Digital Signature Properties
- PDF Accessibility Properties
- PDF/A Output Properties
- PDF/X Output Properties
- DOCX Output Properties
- RTF Output Properties
Set Runtime Properties

The Runtime Configuration page enables you to set runtime properties at the server level.

These same properties can also be set at the report level, from the report editor's Properties dialog. If different values are set for a property at each level, then report level takes precedence.

PDF Output Properties

Generate the type of PDF files you want by setting available output properties.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compress PDF output</td>
<td>Specify &quot;true&quot; or &quot;false&quot; to control compression of the output PDF file.</td>
<td>true</td>
<td>pdf-compression</td>
</tr>
<tr>
<td>Hide PDF viewer's menu bars</td>
<td>Specify &quot;true&quot; to hide the viewer application's menu bar when the document is active. The menu bar option is only effective when using the Export button, which displays the output in a standalone Acrobat Reader application outside of the browser.</td>
<td>false</td>
<td>pdf-hide-menubar</td>
</tr>
<tr>
<td>Hide PDF viewer's toolbars</td>
<td>Specify &quot;true&quot; to hide the viewer application's toolbar when the document is active.</td>
<td>false</td>
<td>pdf-hide-toolbar</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>---------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Replace smart quotes</td>
<td>Specify &quot;false&quot; if you don't want curly quotes replaced with straight quotes in the PDF output.</td>
<td>true</td>
<td>pdf-replace-smartquotes</td>
</tr>
<tr>
<td>Disable opacity and gradient shading for DVT chart</td>
<td>Specify &quot;true&quot; if you don't want opacity and gradient shading for the PDF output. This reduces the size of the PostScript file.</td>
<td>false</td>
<td>pdf-dvt-no-opacity-no-gradient-shading</td>
</tr>
<tr>
<td>Enable PDF Security</td>
<td>Specify &quot;true&quot; if you want to encrypt the PDF output. You can then also specify the following properties:</td>
<td>false</td>
<td>pdf-security</td>
</tr>
<tr>
<td>Open document password</td>
<td>This password is required for opening the document. It enables users to open the document only. This property is enabled only when &quot;Enable PDF Security&quot; is set to &quot;true&quot;. Note that Adobe's password restrictions apply. The password must contain only Latin 1 characters and must be no more than 32 bytes long.</td>
<td>N/A</td>
<td>pdf-open-password</td>
</tr>
<tr>
<td>Modify permissions password</td>
<td>This password enables users to override the security setting. This property is effective only when &quot;Enable PDF Security&quot; is set to &quot;true&quot;. Note that Adobe's password restrictions apply. The password must contain only Latin 1 characters and must be no more than 32 bytes long.</td>
<td>N/A</td>
<td>pdf-permissions-password</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Encryption level</td>
<td>Specify the encryption level for the output PDF file. The possible values are:</td>
<td>2 - high</td>
<td>pdf-encryption-level</td>
</tr>
<tr>
<td></td>
<td>• 0: Low (40-bit RC4, Acrobat 3.0 or later)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1: Medium (128-bit RC4, Acrobat 5.0 or later)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2: High (128-bit AES, Acrobat 7.0 or later)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This property is effective only when &quot;Enable PDF Security&quot; is set to &quot;true&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When Encryption level is set to 0, you can also set the following properties:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disable printing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disable document modification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disable context copying, extraction, and accessibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disable adding or changing comments and form fields</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When Encryption level is set to 1 or higher, the following properties are available:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enable text access for screen readers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enable copying of text, images, and other content</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Allowed change level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Allowed printing level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disable document modification</td>
<td>Permission available when &quot;Encryption level&quot; is set to 0. When set to &quot;true&quot;, the PDF file cannot be edited.</td>
<td>false</td>
<td>pdf-no-changing-the-document</td>
</tr>
<tr>
<td>Disable printing</td>
<td>Permission available when &quot;Encryption level&quot; is set to 0. When set to &quot;true&quot;, printing is disabled for the PDF file.</td>
<td>false</td>
<td>pdf-no-printing</td>
</tr>
<tr>
<td>Disable adding or changing comments and form fields</td>
<td>Permission available when &quot;Encryption level&quot; is set to 0. When set to &quot;true&quot;, the ability to add or change comments and form fields is disabled.</td>
<td>false</td>
<td>pdf-no-accff</td>
</tr>
<tr>
<td>Disable context copying, extraction, and accessibility</td>
<td>Permission available when &quot;Encryption level&quot; is set to 0. When set to &quot;true&quot;, the context copying, extraction, and accessibility features are disabled.</td>
<td>false</td>
<td>pdf-no-cceda</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Enable text access for screen readers</td>
<td>Permission available when &quot;Encryption level&quot; is set to 1 or higher. When set to &quot;true&quot;, text access for screen reader devices is enabled.</td>
<td>true</td>
<td>pdf-enable-accessibility</td>
</tr>
<tr>
<td>Enable copying of text, images, and other content</td>
<td>Permission available when &quot;Encryption level&quot; is set to 1 or higher. When set to &quot;true&quot;, copying of text, images, and other content is enabled.</td>
<td>false</td>
<td>pdf-enable-copying</td>
</tr>
<tr>
<td>Allowed change level</td>
<td>Permission available when &quot;Encryption level&quot; is set to 1 or higher. Valid Values are:</td>
<td>0</td>
<td>pdf-changes-allowed</td>
</tr>
<tr>
<td></td>
<td>• 0: none</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1: Allows inserting, deleting, and rotating pages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2: Allows filling in form fields and signing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 3: Allows commenting, filling in form fields, and signing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4: Allows all changes except extracting pages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed printing level</td>
<td>Permission available when &quot;Encryption level&quot; is set to 1 or higher. Valid values are:</td>
<td>0</td>
<td>pdf-printing-allowed</td>
</tr>
<tr>
<td></td>
<td>• 0: None</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1: Low resolution (150 dpi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2: High resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Use only one shared resources object for all pages</td>
<td>The default mode of Publisher creates one shared resources object for all pages in a PDF file. This mode has the advantage of creating an overall smaller file size. However, the disadvantages are the following:</td>
<td>true</td>
<td>pdf-use-one-resources</td>
</tr>
<tr>
<td></td>
<td>• Viewing may take longer for a large file with many SVG objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If you choose to break up the file by using Adobe Acrobat to extract or delete portions, then the edited PDF files are larger because the single shared resource object (that contains all of the SVG objects for the entire file) is included with each extracted portion.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Setting this property to “false” creates a resource object for each page. The file size is larger, but the PDF viewing is faster and the PDF can be broken up into smaller files more easily.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF Navigation Panel</td>
<td>Controls the navigation panel view that is presented when a user first opens a PDF report. The following options are supported:</td>
<td>true</td>
<td>pdf-pagemode</td>
</tr>
<tr>
<td>Initial View</td>
<td>• Panels Collapsed - displays the PDF document with the navigation panel collapsed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Bookmarks Open (default) - displays the bookmark links for easy navigation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pages Open - displays a clickable thumbnail view of each page of the PDF.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PDF Digital Signature Properties**

There are specific properties that should only be set at the report level to enable digital signature for a report and to define the placement of the signature in the output PDF document.

Note that to implement digital signature for a report based on a PDF layout template or an RTF layout template, you must set the property **Enable Digital Signature** to "True" for the report.

You also must set the appropriate properties to place the digital signature in the desired location on your output report. Your choices for placement of the digital signature depend on the template type. The choices are as follows:
• (PDF only) Place the digital signature in a specific field by setting the **Existing signature field name** property.

• (RTF and PDF) Place the digital signature in a general location of the page (top left, top center, or top right) by setting the **Signature field location** property.

• (RTF and PDF) Place the digital signature in a specific location designated by x and y coordinates by setting the **Signature field x coordinate** and **Signature field y coordinate** properties.

If you choose this option, you can also set **Signature field width** and **Signature field height** to define the size of the field in your document.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Digital Signature</td>
<td>Set this to “true” to enable digital signature for the report.</td>
<td>false</td>
<td>signature-enable</td>
</tr>
<tr>
<td>Existing signature field name</td>
<td>This property applies to PDF layout templates only. If the report is based on a PDF template, then you can enter a field from the PDF template in which to place the digital signature.</td>
<td>N/A</td>
<td>signature-field-name</td>
</tr>
<tr>
<td>Signature field location</td>
<td>This property can apply to RTF or PDF layout templates. This property provides a list that contains the following values: Top Left, Top Center, Top Right. Choose one of these general locations and Publisher inserts the digital signature to the output document, sized and positioned appropriately. If you choose to set this property, do not enter X and Y coordinates or width and height properties.</td>
<td>N/A</td>
<td>signature-field-location</td>
</tr>
<tr>
<td>Signature field X coordinate</td>
<td>This property can apply to RTF or PDF layout templates. Using the left edge of the document as the zero point of the X axis, enter the position in points that you want the digital signature to be placed from the left. For example, if you want the digital signature to be placed horizontally in the middle of an 8.5 inch by 11 inch document (that is, 612 points in width and 792 points in height), enter 306.</td>
<td>0</td>
<td>signature-field-pos-x</td>
</tr>
<tr>
<td>Signature field Y coordinate</td>
<td>This property can apply to RTF or PDF layout templates. Using the bottom edge of the document as the zero point of the Y axis, enter the position in points that you want the digital signature to be placed from the bottom. For example, if you want the digital signature to be placed vertically in the middle of an 8.5 inch by 11 inch document (that is, 612 points in width and 792 points in height), enter 396.</td>
<td>0</td>
<td>signature-field-pos-y</td>
</tr>
</tbody>
</table>
PDF Accessibility Properties

Set the properties described in the table below to configure PDF accessibility.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make PDF output accessible</td>
<td>Set to “true” to make the PDF outputs accessible. Accessible PDF output contains the document title and PDF tags.</td>
<td>False</td>
<td></td>
</tr>
<tr>
<td>Use PDF/UA format for accessible PDF output</td>
<td>Set to “true” to use the PDF/UA format for the accessible PDF outputs.</td>
<td>False</td>
<td></td>
</tr>
</tbody>
</table>

PDF/A Output Properties

Set the properties described in the table below to configure PDF/A output.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF/A version</td>
<td>Set the PDF/A version.</td>
<td>PDF/A-1B</td>
<td>pdfa-version</td>
</tr>
</tbody>
</table>
### Property Name | Description | Default | Configuration Name
--- | --- | --- | ---
**PDF/A ICC Profile Data** | The name of the ICC profile data file, for example: CoatedFOGRA27.icc
The ICC (International Color Consortium) profile is a binary file describing the color characteristics of the environment where this PDF/A file is intended to be displayed.
The ICC profile that you select must have a major version below 4.
To use a specific profile data file other than the default settings in the JVM, obtain the file and place it under `<bi publisher repository>/Admin/Configuration`. When you set this property, you must also set a value for PDF/A ICC Profile Info (`pdfa-icc-profile-info`).
| Default profile data provided by JVM | `pdfa-icc-profile-data` |

**PDF/A ICC Profile Info** | ICC profile information (required when `pdfa-icc-profile-data` is specified) | sRGB IEC61966-2.1 | `pdfa-icc-profile-info` |

**PDF/A file identifier** | One or more valid file identifiers set in the xmpMM:Identifier field of the metadata dictionary. To specify more than one identifier, separate values with a comma (,).
Automatically generated file identifier
| | `pdfa-file-identifier` |

**PDF/A document ID** | Valid document ID. The value is set in the xmpMM:DocumentID field of the metadata dictionary. | None | `pdfa-document-id` |

**PDF/A version ID** | Valid version ID. The value is set in the xmpMM:VersionID field of the metadata dictionary. | None | `pdfa-version-id` |

**PDF/A rendition class** | Valid rendition class. The value is set in the xmpMM:RenditionClass field of the metadata dictionary. | None | `pdfa-rendition-class` |

### PDF/X Output Properties

Configure PDF/X output by setting the properties described below. The values that you set for these properties will depend on the printing device.

Note the following restrictions on other PDF properties:

- **pdf-version** — Value above 1.4 is not allowed for PDF/X-1a output.
- **pdf-security** — Must be set to False.
- **pdf-encryption-level** — Must be set to 0.
- **pdf-font-embedding** — Must be set to true.
<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF/X ICC Profile Data</td>
<td>(Required) The name of the ICC profile data file, for example: CoatedFOGRA27.icc. The ICC (International Color Consortium) profile is a binary file describing the color characteristics of the intended output device. For production environments, the color profile may be provided by your print vendor or by the printing company that prints the generated PDF/X file. The file must be placed under &lt;bi publisher repository&gt;/Admin/Configuration. Profile data is also available from Adobe support or colormanagement.org.</td>
<td>None</td>
<td>pdfx-dest-output-profile-data</td>
</tr>
<tr>
<td>PDF/X output condition identifier</td>
<td>(Required) The name of one of the standard printing conditions registered with ICC (International Color Consortium). The value that you enter for this property is a valid “Reference name,” for example: FOGRA43. Choose the appropriate value for the intended printing environment. This name is often used to guide automatic processing of the file by the consumer of the PDF/X document, or to inform the default settings in interactive applications.</td>
<td>None</td>
<td>pdfx-output-condition-identifier</td>
</tr>
<tr>
<td>PDF/X output condition</td>
<td>A string describing the intended printing condition in a form that will be meaningful to a human operator at the site receiving the exchanged file. The value is set in OutputCondition field of OutputIntents dictionary.</td>
<td>None</td>
<td>pdfx-output-condition</td>
</tr>
<tr>
<td>PDF/X registry name</td>
<td>A registry name. Set this property when the pdfx-output-condition-identifier is set to a characterization name that is registered in a registry other than the ICC registry.</td>
<td><a href="http://www.color.org">http://www.color.org</a></td>
<td>pdfx-registry-name</td>
</tr>
<tr>
<td>PDF/X version</td>
<td>The PDF/X version set in GTS_PDFXVersion and GTS_PDFXConformance fields of Info dictionary. PDF/X-1a:2003 is the only value currently supported.</td>
<td>PDF/X-1a:2003</td>
<td>pdfx-version</td>
</tr>
</tbody>
</table>
DOCX Output Properties

The table below describes the properties that control DOCX output files.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable change tracking</td>
<td>Set to “true” to enable change tracking in the output document.</td>
<td>false</td>
<td>docx-track-changes</td>
</tr>
<tr>
<td>Protect document for tracked changes</td>
<td>Set to “true” to protect the document for tracked changes.</td>
<td>false</td>
<td>docx-protect-document-for-tracked-changes</td>
</tr>
<tr>
<td>Default font</td>
<td>Use this property to define the font style and size in the output when no other font has been defined. This is particularly useful to control the sizing of empty table cells in generated reports. Enter the font name and size in the following format &lt;FontName&gt;:&lt;size&gt; for example: Arial:12. Note that the font you choose must be available to the processing engine at runtime.</td>
<td>Arial:12</td>
<td>docx-output-default-font</td>
</tr>
<tr>
<td>Open password</td>
<td>Use this property to specify the password that report users must provide to open any DOCX report.</td>
<td>NA</td>
<td>docx-open-password</td>
</tr>
</tbody>
</table>

RTF Output Properties

Configure RTF output files by setting the properties described in the table below.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable change tracking</td>
<td>Set to “true” to enable change tracking in the output RTF document.</td>
<td>false</td>
<td>rtf-track-changes</td>
</tr>
<tr>
<td>Protect document for tracked changes</td>
<td>Set to “true” to protect the document for tracked changes.</td>
<td>false</td>
<td>rtf-protect-document-for-tracked-changes</td>
</tr>
</tbody>
</table>
### Property Name | Description | Default | Configuration Name
---|---|---|---
**Default font** | Use this property to define the font style and size in RTF output when no other font has been defined. This is particularly useful to control the sizing of empty table cells in generated reports. Enter the font name and size in the following format `<FontName>:<size>` for example: Arial:12. Note that the font you choose must be available to the processing engine at runtime. See Define Font Mappings for information about installing fonts and for the list of predefined fonts. | Arial:12 | rtf-output-default-font

**Enable widow orphan** | Set to "true" to ensure that the document includes no “hanging paragraphs”. Suppose the last para in a page contains an orphaned line and the remaining lines of the paragraph continue on the next page. With this setting enabled, the starting line of the paragraph moves to the next page to keep all the lines of the paragraph together for improved readability. | false | rtf-enable-widow-orphan

### PPTX Output Properties

The table below describes the properties that control PPTX output files.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open password</td>
<td>Use this property to specify the password that report users must provide to open any PPTX report.</td>
<td>NA</td>
<td>pptx-open-password</td>
</tr>
</tbody>
</table>

### HTML Output Properties

The table below describes the properties that control HTML output files.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show header</td>
<td>Set to &quot;false&quot; to suppress the template header in HTML output.</td>
<td>true</td>
<td>html-show-header</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Show footer</td>
<td>Set to &quot;false&quot; to suppress the template footer in HTML output.</td>
<td>true</td>
<td>html-show-footer</td>
</tr>
<tr>
<td>Replace smart quotes</td>
<td>Set to &quot;false&quot; if you don't want curly quotes replaced with straight quotes in the HTML output.</td>
<td>true</td>
<td>html-replace-smartquotes</td>
</tr>
<tr>
<td>Character set</td>
<td>Specify the output HTML character set.</td>
<td>UTF-8</td>
<td>html-output-charset</td>
</tr>
<tr>
<td>Make HTML output accessible</td>
<td>Set to &quot;true&quot; to make the HTML output accessible.</td>
<td>false</td>
<td>make-accessible</td>
</tr>
<tr>
<td>Use percentage width for table columns</td>
<td>Set to &quot;true&quot; to display table columns according to a percentage value of the total width of the table rather than as a value in points. This property is especially useful if the browser display tables with extremely wide columns. Setting this property to true improves the readability of the tables.</td>
<td>true</td>
<td>html-output-width-in-percentage</td>
</tr>
<tr>
<td>View Paginated</td>
<td>When you set this property to true, HTML output will render in the report viewer with pagination features. These features include:</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Generated table of contents</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Navigation links at the top and bottom of the page</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ability to skip to a specific page within the HTML document</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Search for strings within the HTML document using the browser's search capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Zoom in and out on the HTML document using the browser's zoom capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note that these features are supported for online viewing through the report viewer only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce Padding in Table-cell</td>
<td>When you set this property to true, cells in HTML tables are displayed without padding, which maximizes the page space available for text.</td>
<td>false</td>
<td>html-reduce-padding</td>
</tr>
</tbody>
</table>
### FO Processing Properties

The table below describes the properties that control FO processing.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use BI Publisher's XSLT processor</td>
<td>Controls the use of parser. If set to false, then XSLT is not parsed.</td>
<td>true</td>
<td>xslt-xdoparser</td>
</tr>
<tr>
<td>Enable scalable feature of XSLT processor</td>
<td>Controls the scalable feature of the XDO parser. The property &quot;Use BI Publisher's XSLT processor&quot; must be set to &quot;true&quot; for this property to be effective.</td>
<td>false</td>
<td>xslt-scalable</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>---------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Enable XSLT runtime optimization</td>
<td>When set to &quot;true&quot;, the overall performance of the FO processor is increased and the size of the temporary FO files generated in the temp directory is significantly decreased. Note that for small reports (for example 1-2 pages) the increase in performance is not as marked. To further enhance performance when you set this property to true, it is recommended that you set the Extract attribute sets property to &quot;false&quot;.</td>
<td>true</td>
<td>xslt-runtime-optimization</td>
</tr>
<tr>
<td>Enable XPath Optimization</td>
<td>When set to &quot;true&quot;, the XML data file is analyzed for element frequency. The information is then used to optimize XPath in XSL.</td>
<td>false</td>
<td>xslt-xpath-optimization</td>
</tr>
<tr>
<td>Pages cached during processing</td>
<td>This property is enabled only when you have specified a Temporary Directory (under General properties). During table of contents generation, the FO Processor caches the pages until the number of pages exceeds the value specified for this property. It then writes the pages to a file in the Temporary Directory.</td>
<td>50</td>
<td>system-cache-page-size</td>
</tr>
<tr>
<td>Bidi language digit substitution type</td>
<td>Valid values are &quot;None&quot; and &quot;National&quot;. When set to &quot;None&quot;, Eastern European numbers are used. When set to &quot;National&quot;, Hindi format (Arabic-Indic digits) is used. This setting is effective only when the locale is Arabic, otherwise it is ignored.</td>
<td>National</td>
<td>digit-substitution</td>
</tr>
<tr>
<td>Disable variable header support</td>
<td>When set to true, prevents variable header support. Variable header support automatically extends the size of the header to accommodate the contents.</td>
<td>false</td>
<td>fo-prevent-variable-header</td>
</tr>
<tr>
<td>Property Name</td>
<td>Description</td>
<td>Default</td>
<td>Configuration Name</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Enable multithreading</td>
<td>If you have a multiprocessor machine or a machine with a dual-core single processor, you may be able to achieve faster document generation by setting this option to True.</td>
<td>false</td>
<td>fo-multi-threads</td>
</tr>
<tr>
<td>Disable external references</td>
<td>When set to true, disallows importing of secondary files such as subtemplates or other XML documents during XSL processing and XML parsing. This increases the security of the system. Set this to &quot;false&quot; if the report or template calls external files.</td>
<td>true</td>
<td>xdk-secure-io-mode</td>
</tr>
<tr>
<td>FO Parsing Buffer Size</td>
<td>Specifies the size of the buffer for the FO Processor. When the buffer is full, the elements from the buffer are rendered in the report. Reports with large tables or pivot tables that require complex formatting and calculations may require a larger buffer to properly render those objects in the report. Increase the size of the buffer at the report level for these reports. Note that increasing this value affects the memory consumption of the system.</td>
<td>1000000</td>
<td>fo-chunk-size</td>
</tr>
<tr>
<td>FO extended linebreaking</td>
<td>When set to true, punctuation, hyphenation, and international text are handled properly when line breaking is necessary.</td>
<td>true</td>
<td>fo-extended-linebreaking</td>
</tr>
<tr>
<td>Enable XSLT runtime optimization for sub-template</td>
<td>Provides an option to perform XSL import in FOProcessor before passing only one XSL to XDK for further processing. This allows xslt-optimization to be applied to the entire main XSL template which already includes all its subtemplates. The default is true. If you call the FOProcessor directly, the default is false.</td>
<td>true</td>
<td>xslt-do-import</td>
</tr>
</tbody>
</table>
### Report Timezone

Valid values: User or JVM. When set to User, Publisher uses the User-level Report Time Zone setting for reports. The User Report Time Zone is set in the user’s Account Settings. When set to JVM, Publisher uses the server JVM timezone setting for all users’ reports. All reports therefore display the same time regardless of individual user settings. This setting can be overridden at the report level.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Timezone</td>
<td>Valid values: User or JVM. When set to User, Publisher uses the User-level Report Time Zone setting for reports. The User Report Time Zone is set in the user’s Account Settings. When set to JVM, Publisher uses the server JVM timezone setting for all users’ reports. All reports therefore display the same time regardless of individual user settings. This setting can be overridden at the report level.</td>
<td>User</td>
<td>fo-report-timezone</td>
</tr>
</tbody>
</table>

### PDF Bidi Unicode Version

Specifies the Unicode version (3.0 or 4.1) used to display the BIDI strings in the PDF output.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF Bidi Unicode Version</td>
<td>Specifies the Unicode version (3.0 or 4.1) used to display the BIDI strings in the PDF output.</td>
<td>4.1</td>
<td>pdf-bidi-unicode-version</td>
</tr>
</tbody>
</table>

### RTF Template Properties

Configure RTF templates by setting the properties described in the table below.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extract attribute sets</td>
<td>The RTF processor automatically extracts attribute sets within the generated XSL-FO. The extracted sets are placed in an extra FO block, which can be referenced. This improves processing performance and reduces file size. Valid values are: • Enable - extract attribute sets for all templates and subtemplates • Auto - extract attribute sets for templates, but not subtemplates • Disable - do not extract attribute sets</td>
<td>Auto</td>
<td>rtf-extract-attribute-sets</td>
</tr>
<tr>
<td>Enable XPath rewriting</td>
<td>When converting an RTF template to XSL-FO, the RTF processor automatically rewrites the XML tag names to represent the full XPath notations. Set this property to &quot;false&quot; to disable this feature.</td>
<td>true</td>
<td>rtf-rewrite-path</td>
</tr>
</tbody>
</table>
XPT Template Properties

Configure XPT templates by setting the properties described in the table below.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>XPT Scalable Mode</td>
<td>When you set this property to true, the scheduled reports that use the XPT template and include a large amount of data run without memory issues. The first 100,000 rows of data in the report are stored in memory and the remaining rows are stored in the file system. When you set this property to false, the scheduled reports that use XPT template are processed in-memory. Set this property to false for reports that contain less data.</td>
<td>False</td>
</tr>
<tr>
<td>Enable Asynchronous Mode for Interactive Output</td>
<td>When you set this property to true, interactive reports that use the XPT template make asynchronous calls to Oracle WebLogic Server. When you set this property to false, interactive reports that use the XPT template make synchronous calls to Oracle WebLogic Server. Oracle WebLogic Server limits the number of synchronous calls. Any calls that are stuck expire in 600 seconds.</td>
<td>True</td>
</tr>
</tbody>
</table>
PDF Template Properties

Generate the types of PDF files you want by setting available PDF template properties.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
<th>Configuration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove PDF fields from output</td>
<td>Specify “true” to remove PDF fields from the output. When PDF fields are removed, data entered in the fields cannot be extracted.</td>
<td>false</td>
<td>remove-pdf-fields</td>
</tr>
<tr>
<td>Set all fields as read only in output</td>
<td>By default, all fields in the output PDF of a PDF template is read only. If you want to set all fields to be updatable, set this property to “false”.</td>
<td>true</td>
<td>all-field-readonly</td>
</tr>
<tr>
<td>Maintain each field’s read only setting</td>
<td>Set this property to “true” if you want to maintain the “Read Only” setting of each field as defined in the PDF template. This property overrides the settings of “Set all fields as read only in output.”</td>
<td>false</td>
<td>all-fields-readonly-asis</td>
</tr>
</tbody>
</table>

Excel Template Properties

Configure Excel templates by setting the properties described in the table below.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Scalable Mode</td>
<td>When set to true, large reports that use Excel template run without out of memory issues. Data overflows automatically into multiple sheets if a group of data in a sheet exceeds 65000 rows. This overcomes the Microsoft Excel limitation of 65000 rows per sheet. When set to false, large reports that use Excel template can cause out of memory issues.</td>
<td>false</td>
</tr>
</tbody>
</table>

CSV Output Properties

The table below describes the properties that control comma-delimited value output.
<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSV delimiter</td>
<td>Specifies the character used to delimit the data in comma-separated value output. Other options are: Semicolon (;), Tab (\t) and Pipe (|).</td>
<td>Comma (,)</td>
</tr>
<tr>
<td>Remove leading and trailing white space</td>
<td>Specify “True” to remove leading and trailing white space between data elements and the delimiter.</td>
<td>false</td>
</tr>
<tr>
<td>Add UTF-8 BOM Signature</td>
<td>Specify “False” to remove the UTF-8 BOM signature from the output.</td>
<td>true</td>
</tr>
</tbody>
</table>

**Excel 2007 Output Properties**

You can set specific properties to control Excel 2007 output.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show grid lines</td>
<td>Set to true to show the Excel table grid lines in the report output.</td>
<td>false</td>
</tr>
<tr>
<td>Page break as a new sheet</td>
<td>When set to “True” a page break that is specified in the report template generates a new sheet in the Excel workbook.</td>
<td>true</td>
</tr>
<tr>
<td>Minimum column width</td>
<td>When the column width is less than the specified minimum and it contains no data, the column is merged with the preceding column. The value must be set in points. The valid range for this property is 0.5 to 20 points.</td>
<td>3 (in points, 0.04 inch)</td>
</tr>
<tr>
<td>Minimum row height</td>
<td>When the row height is less than the specified minimum and it contains no data, the row is removed. The value must be set in points. The valid range for this property is 0.001 to 5 points.</td>
<td>1 (in points, 0.01 inch)</td>
</tr>
<tr>
<td>Keep values in same column</td>
<td>Set this property to True to minimize column merging. Column width is set based on column contents using the values supplied in the Table Auto Layout property. Output may not appear as neatly laid out as when using the original layout algorithm.</td>
<td>False</td>
</tr>
</tbody>
</table>
### EText Output Properties

The table below describes the properties that control EText output files.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add UTF-8 BOM Signature</td>
<td>When set to true, the Etext output is in UTF-8 Unicode with BOM format.</td>
<td>false</td>
</tr>
<tr>
<td>Enable bigdecimal</td>
<td>When set to true, you enable high-precision numeric calculation of the Etext output.</td>
<td>false</td>
</tr>
</tbody>
</table>
All Outputs Properties

The properties in the table below apply to all outputs.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use 11.1.1.5 compatibility mode</td>
<td>Reserved. Do not update unless instructed by Oracle.</td>
<td>false</td>
</tr>
</tbody>
</table>

Memory Guard Properties

The Runtime Configuration page lists the default values of the memory guard properties. The values of the memory guard properties depend on the compute shape used for your instance.

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum report data size for online reports</td>
<td>Limits the data size for online reports.</td>
<td>300MB</td>
</tr>
<tr>
<td>Maximum report data size for offline (scheduled) reports</td>
<td>Limits the data size for scheduled reports.</td>
<td>500MB</td>
</tr>
<tr>
<td>Maximum report data size for bursting reports</td>
<td>Limits the data size for bursting reports.</td>
<td>500MB</td>
</tr>
<tr>
<td>Free memory threshold</td>
<td>Ensures a minimum available free memory space.</td>
<td>500MB</td>
</tr>
<tr>
<td>Maximum report data size under the free memory threshold</td>
<td>Limits the data size of a report when the Free memory threshold property is set to a positive value.</td>
<td>50MB</td>
</tr>
<tr>
<td>Minimum time span between garbage collection runs</td>
<td>Ensures a minimum time gap in seconds between any two subsequent garbage collection runs.</td>
<td>300 (seconds)</td>
</tr>
<tr>
<td>Maximum wait time for free memory to come back above the threshold value</td>
<td>Limits the time in seconds for a run-report request to wait for the free JVM memory to exceed the threshold value. This property value takes effect only if you specify a positive value for the Free memory threshold property. If free memory is still below the threshold value after the specified wait time, the run-report request is rejected.</td>
<td>30 (seconds)</td>
</tr>
<tr>
<td>Timeout for online report</td>
<td>Specifies the timeout value in seconds for online reports.</td>
<td>535 (seconds)</td>
</tr>
<tr>
<td>Maximum rows for CSV output</td>
<td>Limits the rows for reports in CSV format.</td>
<td>1000000</td>
</tr>
</tbody>
</table>

Data Model Properties

The Runtime Configuration page lists the values of the data model properties. The values of the data model properties depend on the compute shape used for your instance.
<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum data size limit for data generation</td>
<td>Limits the size of XML data that can be generated by executing a data model.</td>
<td>500MB</td>
</tr>
<tr>
<td>Maximum sample data size limit</td>
<td>Limits the size of a sample data file that can be uploaded from the data model editor.</td>
<td>1MB</td>
</tr>
<tr>
<td>Enable Data Model scalable mode</td>
<td>Prevents out of memory conditions. When set to true, the data engine takes advantage of the disk space while processing data.</td>
<td>True</td>
</tr>
<tr>
<td>Enable Auto DB fetch size mode</td>
<td>Avoids out of memory conditions, but can significantly increase the processing time. This setting is recommended only for frequently processing complex queries of hundreds of columns. When set to true, the database fetch size is set at runtime according to the total number of columns and the total number of query columns in the data set. Ignores the DB fetch size setting. This property overrides the data model-level database fetch size properties.</td>
<td>True</td>
</tr>
<tr>
<td>DB fetch size</td>
<td>Limits the database fetch size for a data model. This property value takes effect only when Enable Auto DB fetch size mode is set to False.</td>
<td>20 (rows)</td>
</tr>
<tr>
<td>SQL Query Timeout</td>
<td>Specifies the timeout for SQL query-based data models. Irrespective of the settings at the instance level or data model level, the maximum SQL query timeout is 10 minutes for all the reports running online. This avoids stuck threads and server outages.</td>
<td>600 seconds</td>
</tr>
<tr>
<td>Enable Data Model diagnostic</td>
<td>Writes the data set details, memory, and SQL execution time information to the log file when set to true. Oracle recommends setting this property to true only for debugging purposes. If you enable this property, the processing time is increased.</td>
<td>False</td>
</tr>
<tr>
<td>Enable SQL Session Trace</td>
<td>When set to true, for every SQL query that is executed, Publisher writes a SQL session trace log to the database. A database administrator can examine the log.</td>
<td>False</td>
</tr>
<tr>
<td>Enable SQL Pruning</td>
<td>Applies only to the Oracle Database queries that use Standard SQL. If your query returns many columns but only a subset are used by your report template, SQL pruning returns only those columns required by the template. If you enable this property, the processing time and the memory usage reduces. SQL pruning is not applicable for PDF, Excel, and E-text template types.</td>
<td>False</td>
</tr>
</tbody>
</table>
### Define Font Mappings

Map base fonts in RTF or PDF templates to target fonts to be used in the published document.

You can specify font mapping at the site or report level. Font mapping is performed only for PDF output and PowerPoint output.

There are two types of font mappings:

- **RTF Templates** — for mapping fonts from RTF templates and XSL-FO templates to PDF and PowerPoint output fonts
- **PDF Templates** — for mapping fonts from PDF templates to different PDF output fonts.

### Make Fonts Available for Publishing

A set of Type1 fonts and a set of TrueType fonts are available for publishing. You can select any of the fonts in these sets as a target font with no additional setup required.

The predefined fonts are located in `<oracle_home>/oracle_common/internal/fonts`. To map to another font, place the font in this directory to make it available for publishing at runtime. If the environment is clustered, then you must place the font on every server. See [Predefined Fonts](#).

### Set Font Mapping at the Site Level or Report Level

A font mapping can be defined at the site level or the report level.

- To set a mapping at the site level, select the Font Mappings link from the Administration page.
- To set a mapping at the report level, view the Properties for the report, then select the Font Mappings tab. These settings apply to the selected report only.

The report-level settings take precedence over the site-level settings.

### Create a Font Map

From the Administration page, under Runtime Configuration, select Font Mappings.

To create a Font Mapping:

1. Under RTF Templates or PDF Templates, select Add Font Mapping.
2. Enter the following on the Add Font Mapping page:
   - **Base Font** — enter the font family to map to a new font. Example: Arial
   - Select the **Style**: Normal or Italic (Not applicable to PDF Template font mappings)
• Select the **Weight**: Normal or Bold (Not applicable to PDF Template font mappings)

• Select the **Target Font Type**: Type 1 or TrueType

• Enter the **Target Font**

If you selected TrueType, you can enter a specific numbered font in the collection. Enter the **TrueType Collection (TTC) Number** of the desired font.

## Predefined Fonts

The following Type1 fonts are built-in to Adobe Acrobat and by default the mappings for these fonts are available for publishing.

You can select any of these fonts as a target font with no additional setup required.

The Type1 fonts are listed in the table below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Font Family</th>
<th>Style</th>
<th>Weight</th>
<th>Font Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>serif</td>
<td>normal</td>
<td>normal</td>
<td>Time-Roman</td>
</tr>
<tr>
<td>1</td>
<td>serif</td>
<td>normal</td>
<td>bold</td>
<td>Times-Bold</td>
</tr>
<tr>
<td>1</td>
<td>serif</td>
<td>italic</td>
<td>normal</td>
<td>Times-Italic</td>
</tr>
<tr>
<td>1</td>
<td>serif</td>
<td>italic</td>
<td>bold</td>
<td>Times-BoldItalic</td>
</tr>
<tr>
<td>2</td>
<td>sans-serif</td>
<td>normal</td>
<td>normal</td>
<td>Helvetica</td>
</tr>
<tr>
<td>2</td>
<td>sans-serif</td>
<td>normal</td>
<td>bold</td>
<td>Helvetica-Bold</td>
</tr>
<tr>
<td>2</td>
<td>sans-serif</td>
<td>italic</td>
<td>normal</td>
<td>Helvetica-Oblique</td>
</tr>
<tr>
<td>2</td>
<td>sans-serif</td>
<td>italic</td>
<td>bold</td>
<td>Helvetica-BoldOblique</td>
</tr>
<tr>
<td>3</td>
<td>monospace</td>
<td>normal</td>
<td>normal</td>
<td>Courier</td>
</tr>
<tr>
<td>3</td>
<td>monospace</td>
<td>normal</td>
<td>bold</td>
<td>Courier-Bold</td>
</tr>
<tr>
<td>3</td>
<td>monospace</td>
<td>italic</td>
<td>normal</td>
<td>Courier-Oblique</td>
</tr>
<tr>
<td>3</td>
<td>monospace</td>
<td>italic</td>
<td>bold</td>
<td>Courier-BoldOblique</td>
</tr>
<tr>
<td>4</td>
<td>Courier</td>
<td>normal</td>
<td>normal</td>
<td>Courier</td>
</tr>
<tr>
<td>4</td>
<td>Courier</td>
<td>normal</td>
<td>bold</td>
<td>Courier-Bold</td>
</tr>
<tr>
<td>4</td>
<td>Courier</td>
<td>italic</td>
<td>normal</td>
<td>Courier-Oblique</td>
</tr>
<tr>
<td>4</td>
<td>Courier</td>
<td>italic</td>
<td>bold</td>
<td>Courier-BoldOblique</td>
</tr>
<tr>
<td>5</td>
<td>Helvetica</td>
<td>normal</td>
<td>normal</td>
<td>Helvetica</td>
</tr>
<tr>
<td>5</td>
<td>Helvetica</td>
<td>normal</td>
<td>bold</td>
<td>Helvetica-Bold</td>
</tr>
<tr>
<td>5</td>
<td>Helvetica</td>
<td>italic</td>
<td>normal</td>
<td>Helvetica-Oblique</td>
</tr>
<tr>
<td>5</td>
<td>Helvetica</td>
<td>italic</td>
<td>bold</td>
<td>Helvetica-BoldOblique</td>
</tr>
<tr>
<td>6</td>
<td>Times</td>
<td>normal</td>
<td>normal</td>
<td>Times</td>
</tr>
<tr>
<td>6</td>
<td>Times</td>
<td>normal</td>
<td>bold</td>
<td>Times-Bold</td>
</tr>
<tr>
<td>6</td>
<td>Times</td>
<td>italic</td>
<td>normal</td>
<td>Times-Italic</td>
</tr>
<tr>
<td>6</td>
<td>Times</td>
<td>italic</td>
<td>bold</td>
<td>Times-BoldItalic</td>
</tr>
<tr>
<td>7</td>
<td>Symbol</td>
<td>normal</td>
<td>normal</td>
<td>Symbol</td>
</tr>
<tr>
<td>8</td>
<td>ZapfDingbats</td>
<td>normal</td>
<td>normal</td>
<td>ZapfDingbats</td>
</tr>
</tbody>
</table>
The TrueType fonts are listed in the table below. All TrueType fonts are subset and embedded into PDF.

<table>
<thead>
<tr>
<th>Number</th>
<th>Font Family Name</th>
<th>Style</th>
<th>Weight</th>
<th>Actual Font</th>
<th>Actual Font Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Albany WT</td>
<td>normal</td>
<td>normal</td>
<td>ALBANYWT.ttf</td>
<td>TrueType (Latin1 only)</td>
</tr>
<tr>
<td>2</td>
<td>Albany WT J</td>
<td>normal</td>
<td>normal</td>
<td>ALBANWTJ.ttf</td>
<td>TrueType (Japanese flavor)</td>
</tr>
<tr>
<td>3</td>
<td>Albany WT K</td>
<td>normal</td>
<td>normal</td>
<td>ALBANWTK.ttf</td>
<td>TrueType (Korean flavor)</td>
</tr>
<tr>
<td>4</td>
<td>Albany WT SC</td>
<td>normal</td>
<td>normal</td>
<td>ALBANWTS.ttf</td>
<td>TrueType (Simplified Chinese flavor)</td>
</tr>
<tr>
<td>5</td>
<td>Albany WT TC</td>
<td>normal</td>
<td>normal</td>
<td>ALBANWTT.ttf</td>
<td>TrueType (Traditional Chinese flavor)</td>
</tr>
<tr>
<td>6</td>
<td>Andale Duospace WT</td>
<td>normal</td>
<td>normal</td>
<td>ADUO.ttf</td>
<td>TrueType (Latin1 only, Fixed width)</td>
</tr>
<tr>
<td>6</td>
<td>Andale Duospace WT</td>
<td>bold</td>
<td>bold</td>
<td>ADUOB.ttf</td>
<td>TrueType (Latin1 only, Fixed width)</td>
</tr>
<tr>
<td>7</td>
<td>Andale Duospace WT J</td>
<td>normal</td>
<td>normal</td>
<td>ADUOJ.ttf</td>
<td>TrueType (Japanese flavor, Fixed width)</td>
</tr>
<tr>
<td>7</td>
<td>Andale Duospace WT J</td>
<td>bold</td>
<td>bold</td>
<td>ADUOJB.ttf</td>
<td>TrueType (Japanese flavor, Fixed width)</td>
</tr>
<tr>
<td>8</td>
<td>Andale Duospace WT K</td>
<td>normal</td>
<td>normal</td>
<td>ADUOK.ttf</td>
<td>TrueType (Korean flavor, Fixed width)</td>
</tr>
<tr>
<td>8</td>
<td>Andale Duospace WT K</td>
<td>bold</td>
<td>bold</td>
<td>ADUOKB.ttf</td>
<td>TrueType (Korean flavor, Fixed width)</td>
</tr>
<tr>
<td>9</td>
<td>Andale Duospace WT SC</td>
<td>normal</td>
<td>normal</td>
<td>ADUOSC.ttf</td>
<td>TrueType (Simplified Chinese flavor, Fixed width)</td>
</tr>
<tr>
<td>9</td>
<td>Andale Duospace WT SC</td>
<td>bold</td>
<td>bold</td>
<td>ADUOSCB.ttf</td>
<td>TrueType (Simplified Chinese flavor, Fixed width)</td>
</tr>
<tr>
<td>10</td>
<td>Andale Duospace WT TC</td>
<td>normal</td>
<td>normal</td>
<td>ADUOTC.ttf</td>
<td>TrueType (Traditional Chinese flavor, Fixed width)</td>
</tr>
<tr>
<td>10</td>
<td>Andale Duospace WT TC</td>
<td>bold</td>
<td>bold</td>
<td>ADUOTCB.ttf</td>
<td>TrueType (Traditional Chinese flavor, Fixed width)</td>
</tr>
</tbody>
</table>
Define Currency Formats

Currency formats defined in the Administration Runtime Configuration page are applied at the system level. Currency formats can also be applied at the report level. The report-level settings take precedence over the system-level settings here.

Understand Currency Formats

The Currency Formats tab enables you to map a number format mask to a specific currency so that your reports can display multiple currencies with their own corresponding formatting. Currency formatting is only supported for RTF and XSL-FO templates.

To apply currency formats in the RTF template, use the format-currency function.

To add a currency format:

1. Click the **Add** icon.
2. Enter the ISO currency code, for example: USD, JPY, EUR, GBP, INR.
3. Enter the format mask to apply for this currency.

   The Format Mask must be in the Oracle number format. The Oracle number format uses the components "9", "0", "D", and "G" to compose the format, for example: 9G999D00

   where

   9 represents a displayed number only if present in data

   G represents the group separator

   D represents the decimal separator

   0 represents an explicitly displayed number regardless of incoming data

The figure below shows sample currency formats.
Secure Reports

This topic describes how to secure pixel-perfect reporting.

Topics:

• Use Digital Signature in a PDF Document

Use Digital Signature in a PDF Document

You can apply digital signatures to PDF output documents.

Digital signatures enable you to verify the authenticity of the documents you send and receive. You can upload your digital signature file to a secure location, and at runtime sign the PDF output with the digital signature. The digital signature verifies the signer’s identity and ensures that the document hasn’t been altered after it was signed.

For additional information, refer to the Verisign and Adobe websites.

Prerequisites and Limitations

When you use digital signatures with documents in Publisher, you must be aware of a few limitations.

Keep the following limitations in mind:

• You can register only a single digital signature with Publisher.
• Only the reports scheduled in Publisher can include the digital signature.
• The digital signature is enabled at the report level; therefore, multiple templates assigned to the same report share the digital signature properties.

Obtain Digital Certificates

You can obtain a digital certificate either by purchasing one or by using the self-sign method.

To obtain a digital certificate:

• Perform one of the following:
  – Purchase a certificate from an authority, verify and trust the authenticity of the certificate, and then use Microsoft Internet Explorer 7 or later to create a PFX file based on the certificate you purchased.
  – Create a self-signed certificate using a software program such as Adobe Acrobat, Adobe Reader, OpenSSL, or OSDT as part of a PFX file, and then use the PFX file to sign PDF documents by registering it with Publisher. Bear in mind that anyone can create a self-signed certificate, so use care when verifying and trusting such a certificate.
Create PFX Files

If you obtained a digital certificate from a certificate authority, you can create a PFX file using that certificate and Microsoft Internet Explorer 7 or later.

You don't need to create a PFX file if a self-signed certificate PFX file already exists.

To create a PFX file with Microsoft Windows Explorer 7 or later:

1. Ensure that your digital certificate is saved on your computer.
2. Open Microsoft Internet Explorer.
3. From the Tools menu, click Internet Options and then click the Content tab.
4. Click Certificates.
5. In the Certificates dialog, click the tab that contains your digital certificate and then click the certificate.
6. Click Export.
7. Follow the steps in the Certificate Export Wizard. For assistance, refer to the documentation provided with Microsoft Internet Explorer.
8. When prompted, select Use DER encoded binary X.509 as your export file format.
9. When prompted, save your certificate as part of a PFX file to an accessible location on your computer.

After you create your PFX file, you can use it to sign PDF documents.

Apply a Digital Signature

You can set up and sign your output PDF documents with a digital signature.

To apply a digital signature:

1. Register the digital signature in the Publisher Administration page and specify the roles that are authorized to sign documents.
2. Specify the display field location.
3. Select the Enable Digital Signature property for the report.
4. Log in as a user with an authorized role and submit the report through the Publisher scheduler, choosing the PDF output. When the report completes, it is signed with your digital signature in the specified location of the document.

Register Your Digital Signature and Assign Authorized Roles

Publisher supports the identification of a single digital signature.

You must upload the digital signature file in Upload Center.

To register a digital signature:

1. On the Administration tab, under Security Center, click Digital Signature.
2. Select the digital signature file you uploaded in Upload Center and enter the password for the digital signature.
3. Enable the Roles that must have the authority to sign documents with this digital signature. Use the shuttle buttons to move Available Roles to the Allowed Roles list.

4. Click **Apply**.

**Specify the Signature Display Field or Location**

You must specify the location for the digital signature to appear in the completed document. The methods available depend on whether the template type is PDF or RTF.

If the template is PDF, use one of the following options:

- Specify a template field in a PDF template for the digital signature.
- Specify the location for the digital signature in the report properties.

If the template is RTF, specify the location for the digital signature in the report properties.

**Specify a Template Field in a PDF Template for the Digital Signature**

Include a field in the PDF template for digital signatures.

Report authors can add a new field or configure an existing field in the PDF template for the digital signature. See Add or Designate a Field for a Digital Signature.

**Specify the Location for the Digital Signature in the Report Properties**

When you specify a location in the document to place the digital signature, you can either specify a general location (Top Left, Top Center, or Top Right) or you can specify x and y coordinates in the document.

You can also specify the height and width of the field for the digital signature by using runtime properties. You don't need to alter the template to include a digital signature.

To specify the location for the digital signature:

1. In the catalog, navigate to the report.
2. Click the **Edit** link for the report to open the report for editing.
3. Click **Properties** and then click the **Formatting** tab.
4. Scroll to the **PDF Digital Signature** group of properties.
5. Set **Enable Digital Signature** to **True**.
6. Specify the location in the document where you want the digital signature to appear by setting the appropriate properties as follows (note that the signature is inserted on the first page of the document only):

   - **Existing signature field name** — Doesn't apply to this method.
   - **Signature field location** — Provides a list containing the following values: Top Left, Top Center, Top Right

Select one of these general locations and Publisher places the digital signature in the output document sized and positioned appropriately.
If you set this property, then don’t enter X and Y coordinates or width and height properties.

• **Signature field X coordinate** — Using the left edge of the document as the zero point of the X axis, enter the position in points to place the digital signature from the left.
  
  For example, to place the digital signature horizontally in the middle of an 8.5 inch by 11 inch document (that is, 612 points in width and 792 points in height), enter 306.

• **Signature field Y coordinate** — Using the bottom edge of the document as the zero point of the Y axis, enter the position in points to place digital signature from the bottom.
  
  For example, to place the digital signature vertically in the middle of an 8.5 inch by 11 inch document (that is, 612 points in width and 792 points in height), enter 396.

• **Signature field width** — Enter in points the desired width of the inserted digital signature field. This applies only if you’re setting the X and Y coordinates.

• **Signature field height** — Enter in points the desired height of the inserted digital signature field. This applies only if you’re setting the X and Y coordinates.

Run and Sign Reports with a Digital Signature

If you’ve been assigned a role that’s been granted the digital signature privilege, you can sign a generated report with a signature, if the report has been configured to include signatures. You can sign only scheduled reports with signatures.

To sign reports with a digital signature:

1. Log in as a user with a role granted digital signature privileges.
2. In the catalog, navigate to the report that has been enabled for digital signature, and click **Schedule**.
3. Complete the fields on the Schedule Report Job page, select **PDF output**, and then submit the job.

   The completed PDF displays the digital signature.

Audit Reports and Catalog Objects

An administrator can enable auditing, configure the connection to the data source for auditing, and create auditing reports.

**Topics:**

• About Audit of Reports and Catalog Objects
• Enable Audit of Reports and Catalog Objects
• Specify the Data Source for Audit
• View Audit Data
About Audit of Reports and Catalog Objects

You can audit the reports and catalog objects.

When you enable auditing, you can find out the time of access and who accessed the catalog objects such as reports, data models, sub-templates, style templates, and folders.

Auditing helps you track:

- Report start, execution, end, and download
- Report job pause, resume, and cancellation
- Resource creation, modification, copy, and deletion
- Resource access

Enable Audit of Reports and Catalog Objects

Administrators can enable or disable auditing of publishing activities.

To enable auditing:

1. Navigate to the Server Configuration page.
2. Select Enable Monitor and Audit.
3. Set Audit Level to Medium.

Specify the Data Source for Audit

Configure the data source for auditing if you want to create the audit reports.

To configure the data source for auditing:

1. In the Administration page, click JNDI Connection.
2. Click Add Data Source.
3. In the Data Source Name field, enter AuditViewDB.
4. In the JNDI Name field, enter jdbc/AuditViewDataSource.
5. Click Test Connection to confirm the connection to the AuditViewDB data source.
6. Define security for this data source. Move the required roles from the Available Roles list to the Allowed Roles list. Only users assigned the roles on the Allowed Roles list can create or view reports from this the data source.
7. Click Apply.

View Audit Data

You can download and use the sample reports for viewing the audited information.

Make sure you select Enable Monitor and Audit in the Server Configuration page to log audit data, and then configure the JNDI connection to the AuditViewDB data source to view the audit data.
The sample reports use the JNDI connection to fetch data from the data source for auditing. The report layout and data model are pre-designed in the sample reports. You can customize the report layout, but don't change the data model in the sample reports. The sample reports are configured to run as a scheduled job because the size of auditing data can be large. If you want to view an audit report online, select the Run Report Online property and make sure you don't select the Auto Run property of the report.

To view audit data:

1. Download the sample audit reports from the Publisher home page in Oracle Technology Network.
2. Upload the sample audit reports to a shared folder in the catalog.
3. Schedule the sample audit reports you want to view.
   a. Navigate to the sample audit report in the catalog.
   b. Click Schedule.
   c. In the General tab, specify the dates for the Date From and Date To parameters.
   d. In the Output tab, make sure the output format is PDF.
      You can add delivery destinations if required.
4. After the scheduled job completes, view the report in the Report Job History page.

Add Translations for the Catalog and Reports

This topic describes how to export and import translation files both for the catalog and for individual report layouts.

Topics:
- Introduction
- Export and Import a Catalog Translation File
- Template Translation
- Use a Localized Template

Introduction

Publisher supports two types of translation: Catalog Translation and Template (or layout) Translation.

Catalog translation enables the extraction of translatable strings from all objects contained in a selected catalog folder into a single translation file; this file can then be translated and uploaded back to Publisher and assigned the appropriate language code.

Catalog translation extracts not only translatable strings from the report layouts, but also the user interface strings that are displayed to users, such as catalog object descriptions, report parameter names, and data display names.

Users viewing the catalog see the item translations appropriate for the UI Language they selected in their My Account preferences. Users see report translations appropriate for the Report Locale that they selected in their My Account preferences.
Template translation enables the extraction of the translatable strings from a single RTF-based template (including sub templates and style templates) or a single Publisher layout template (.xpt file). Use this option when you only need the final report documents translated. For example, your enterprise requires translated invoices to send to German and Japanese customers.

Limitations of Catalog Translation

If you have existing XLIFF file translations for specific reports and then you import a catalog translation file for the folder in which the existing translations reside, the existing XLIFF files are overwritten.

Export and Import a Catalog Translation File

This procedure describes the process of exporting an XLIFF file from the catalog, importing the translated file back to the catalog, and testing the translation.

Importing and exporting XLIFF files can only be performed by an Administrator.

To import and export an XLIFF file:

1. Select the folder in the catalog, click the **Translation** toolbar button, and then click **Export XLIFF**.

2. Save the XLIFF file to a local directory.

3. Open the Translation file (catalog.xlf) and apply translations to the Boilerplate text, as shown in the following figure.

4. After the file is translated, upload the XLIFF file to the Publisher server: Click the **Translation** toolbar button, then click **Import XLIFF**. Upload the translated XLIFF to the server.

5. To test the translation, select **My Account** from Signed In As in the global header.
6. On the General tab of the My Account dialog, change the Report Locale and the UI Language preferences to the appropriate language and click OK.

7. View the objects in the translated folder.

Template Translation

RTF and Publisher (.xpt) templates can be translated from the Properties page. Template translation includes:

- RTF templates
- RTF sub templates
- Style templates
- Publisher templates (.xpt)

To access the Properties page, click the Properties link for the layout in the Report Editor, as shown below.

From the Properties page you can generate an XLIFF file for a single template. Click Extract Translation to generate the XLIFF file.

Generate the XLIFF File from the Layout Properties Page

Generate the XLIFF file for report layout templates, style templates, and sub templates.

To generate the XLIFF file for report layout templates:

1. Navigate to the report in the catalog and click Edit to open it for editing.
2. From the thumbnail view of the report layouts, click the Properties link of the layout (RTF or XPT) to open the Layout Properties page.
3. In the **Translations** region, click **Extract Translation**.
   Publisher extracts the translatable strings from the template and exports them to an XLIFF (.xlf file).

4. Save the XLIFF to a local directory.

To generate the XLIFF file for style templates and sub templates:

1. Navigate to the style template or sub template in the catalog and click **Edit** to open the Template Manager.

2. In the **Translations** region, click **Extract Translation**.
   Publisher extracts the translatable strings from the template and exports them to an XLIFF (.xlf file).

3. Save the XLIFF to a local directory.

**Translate the XLIFF File**

When you have downloaded the XLIFF file, it can be sent to a translation provider, or using a text editor, you can enter the translation for each string.

A "translatable string" is any text in the template that is intended for display in the published report, such as table headers and field labels. Text supplied at runtime from the data is not translatable, nor is any text that you supply in the Microsoft Word form fields.

You can translate the template XLIFF file into as many languages as desired and then associate these translations to the original template.

**Upload the Translated XLIFF File to Publisher**

You can run the Template Manager to upload the translated XLIFF file to Publisher.

To upload a translated XLIFF file:

1. Navigate to the report, sub template, or style template in the catalog and click **Edit** to open it for editing.
   For reports only:
   From the thumbnail view of the report layouts, click the **Properties** link of the layout to open the Template Manager.

2. In the Translations region, click the **Upload** toolbar button.

3. In the Upload Translation File dialog, locate the file in the local directory and select the **Locale** for this translation.

4. Click **OK** to upload the file and view it in the Translations table.

**Use a Localized Template**

You can create localized templates for reports.

If you need to design a different layout for the reports that you present for different localizations, then you can create new RTF file that is designed and translated for the locale and upload this file to the Template Manager.

The localized template option is not supported for XPT templates.
Design the Localized Template File

Use the same tools that you used to create the base template file, translating the strings and customizing the layout as desired for the locale.

Upload the Localized Template to Publisher

Upload localized template files in rtf format.

To upload a localized template:

1. Navigate to the report, subtemplate, or style template in the catalog and click **Edit** to open it for editing.
   
   For reports only:
   
   From the thumbnail view of the report layouts, click the **Properties** link of the layout to open the Template Manager.

2. In the Templates region, click the **Upload** toolbar button.

3. In the Upload Template File dialog, locate the file in the local directory, select rtf as the Template Type and select the **Locale** for this template file.

4. Click **OK** to upload the file and view it in the Templates table.
Part V
Reference

This part provides reference information.

Appendices:
• Frequently Asked Questions
• Troubleshoot
• Expression Editor Reference
Frequently Asked Questions

This reference provides answers to common questions asked by administrators and business intelligence analysts responsible for connecting to and modeling data in Oracle Analytics Cloud.

Topics:

• Top FAQs to Model Data
  – Can I use the same data for different analyses?
  – After I add new columns to my source table, can I include the new columns in my data model?
  – In what situations should I create model objects based on source views?
  – Can I include columns from a different source table or view in my existing dimension table when it is based directly on a source table?
  – Can I include columns from a different source table in my existing dimension table when it is based on a source view?
  – Can I create a source view that is based on another source view?
  – Can I migrate my data model from one environment to another?

• Top FAQs to Manage Oracle Analytics Cloud
  – Can I see how many users are currently signed in?
  – Where can I find the public key for my service?
  – Can I see the SQL generated by an analysis and analyze the log?
  – What happens to my content if I terminate my subscription to Oracle Analytics Cloud?

Top FAQs to Model Data

The top FAQs for data modeling are identified in this topic.

Can I use the same data for different analyses?

Yes. You can create source views that expose the same source columns in different contexts. You use views to include the same source objects in multiple dimensions. For example, to use time data for both the Order Date and Ship Date dimensions, create two views based on the time source table, time_order_date_v and time_ship_date_v. The views can then be used as sources for the Order Date and Ship Date dimensions.

After I add new columns to my source table, can I include the new columns in my data model?

Yes. You can include newly added source columns. To include the new columns, select Synchronize with Database from the Actions menu for the appropriate fact
table or dimension table in the Data Model. Then, in the messages list, select the message item describing the new columns and select **Sync-up selected** from the **Message Actions** menu.

**In what situations should I create model objects based on source views?**

Always create a source view when you think that you might want to perform subsequent changes, such as extending model objects, creating filters, and adding calculations. Creating a model based on source views provides greater flexibility than using source tables directly.

**Can I include columns from a different source table or view in my existing dimension table when it is based directly on a source table?**

Yes. It's easy to add columns from another source table or view to an existing dimension table. To do this, drag and drop the table or view on to your existing dimension table. See **Adding Columns from Another Source to a Dimension Table**.

**Can I include columns from a different source table in my existing dimension table when it is based on a source view?**

Yes. There are two ways you can do this. You can drag and drop the table on to the dimension table to include the columns. Alternatively, edit the view to include the new source columns, and synchronize your dimension table with your changes to the database. Synchronization identifies new columns in the view and adds them to your dimension table.

**Can I create a source view that is based on another source view?**

Yes. To do this, drag and drop the source view to the Columns area of the Overview tab when creating the view, or select a source view from the Add Columns dialog as your source.

For example, assume that you have both time and time_fiscal source tables. You created a view called time_v that combines time and time_fiscal. You want to create multiple dimensions that are based on time data, such as Order Day and Ship Day. You first create the Order Day dimension based on time_v, and then you create a separate view on top of time_v to create Ship Day. (Note that another option is to create a parallel view called ship_day_v that also combines time and time_fiscal.)

**Can I migrate my data model from one environment to another?**

Yes. Take a snapshot of your environment and migrate it to the new environment. See **Take Snapshots and Restore**.

**Can I localize analyses and dashboards that are stored in the catalog?**

Yes. Follow the procedure **Localize Catalog Captions**.

**Can I edit my data model in the Cloud?**

Yes. See **Edit a Data Model in the Cloud**.

**Can I load a data model RPD file from Oracle BI Enterprise Edition?**

Yes. If you’ve modeled your business data with Oracle BI Enterprise Edition, then you don't need to start from scratch in Oracle Analytics Cloud. Instead of using Data Modeler, you can use BI Developer Client Tool to upload and edit your data model.
RPD in the cloud. See About Editing Data Models Uploaded from Oracle BI Enterprise Edition.

Top FAQs to Manage Oracle Analytics Cloud

The top FAQs for managing Oracle Analytics Cloud are identified in this topic.

Can I see how many users are currently signed in?
Yes. Display the Home page, click Console, and then click Sessions and Query Cache. See Monitoring Users Who Are Signed In.

Where can I find the public key for my service?
Display the Home page, click Console, Connections, and then click Get Public Key.

Can I see the SQL generated by an analysis and analyze the log?
Yes. Display the Home page, click Console, and then click Sessions and Query Cache. See Analyzing SQL Queries and Logs.

What happens to my content if I terminate my subscription to Oracle Analytics Cloud?
Before you terminate your subscription, take a snapshot of your system, that is, the latest data model, catalog content, application roles, and so on. If you subscribe to Oracle Analytics Cloud in the future, you can import content from this archive file. See Uploading Snapshots and Restoring from a Snapshot.

Can I change the default logo and dashboard style for the whole deployment?
Yes. When logged in as Administrator, navigate to the Classic Home page, click Administration, and then click Manage Themes. Create a new theme including dashboard properties such as logo, branding, page colors, and link colors, and click Active. This new style is applied for all new browser sessions.

Can I upload a data model RPD file from Oracle BI Enterprise Edition?
Yes. If you’ve modeled your business data with Oracle BI Enterprise Edition, then you don’t need to start from scratch in Oracle Analytics Cloud. Instead of using Data Modeler, you can use BI Developer Client Tool to upload and edit your data model in the cloud. See About Editing Data Models Uploaded from Oracle BI Enterprise Edition.
Troubleshoot

This topic describes common problems that you might encounter preparing data in Oracle Analytics Cloud and explains how to solve them.

Topics:

• Troubleshoot General Issues
  – I can't sign in
  – I'm having trouble resetting my password
  – I can't access certain options from the Home page
  – I see a performance decrease when using Mozilla Firefox
  – I'm having trouble uploading data from a spreadsheet (XLSX) exported from Microsoft Access

• Troubleshoot Data Modeling Issues
  – I can't see any tables or views in Data Modeler
  – I can't see the left pane in Data Modeler
  – I can't edit any objects in Data Modeler
  – I can't lock the data model
  – I can't publish the data model
  – Why must I use the SQL Query tab to edit a join or filter for a view?
  – I see the message: Cluster error-No active server node found

• Troubleshoot Administration Issues
  – I can't access options in the Console
  – I can't upload my snapshot

Troubleshoot General Issues

This topic describes common problems that you might encounter and explains how to solve them.

I can't sign in to Oracle Analytics Cloud

You're likely trying to sign in using the incorrect credentials. You must sign in to Oracle Analytics Cloud using the Oracle Cloud Identity Domain credentials that were mailed to you from Oracle or provided by your administrator. You can't sign in to Oracle Analytics Cloud using your account credentials for Oracle.com.

I'm having trouble resetting my password

When you sign up to use Oracle Analytics Cloud, you get an e-mail with a temporary password. Be careful if you copy and paste this password. If you accidentally include a
blank space at the start or end of it when copying, then the password won't be recognized when you paste it in. Make sure that you paste only the password without any blank spaces.

**I can’t access certain options from the Home page**

Check with your administrator to ensure that you have the correct permissions to access the options that you need.

**I see a performance decrease when using Mozilla Firefox**

If you use Mozilla Firefox and notice a decrease in the performance of the cloud service, then ensure that the **Remember History** option is enabled. When Firefox is set to not remember the history of visited pages, then web content caching is also disabled, which greatly affects the performance of the service. See Firefox documentation for details on setting this option.

**I'm having trouble uploading data from a spreadsheet (XLSX) exported from Microsoft Access**

Open your spreadsheet in Microsoft Excel and resave it as an Excel Workbook (*.xlsx).

When you export spreadsheets from other tools the file format can vary slightly. Saving your data again from Microsoft Excel can fix this.

---

**Troubleshoot Data Modeling Issues**

This topic describes common problems that you might encounter when modeling data and explains how to solve them.

**I can’t see any tables or views in Data Modeler**

If you start Data Modeler and see no tables or views, then one of the following has occurred:

- There aren’t any tables in the database connected to your service. Use one of the supported data-loading tools to load some data.
- Data Modeler does not show the latest database objects. To see the latest objects, refresh the Database pane in Data Modeler.

**I can’t see the left pane in Data Modeler**

The left pane in Data Modeler is collapsed. To display the left pane, click the **Restore Pane** icon displayed on the left of the page.

**I can’t edit any objects in Data Modeler**

You must always lock the data model before making any changes. Click **Lock to Edit** to lock the data model.

**I can’t lock the data model**

Check whether someone else locked the data model. If you’re an administrator, then you can override the lock. Otherwise, wait until the lock is released. For more information, see **Overriding Locks** in **Locking the Data Model**.
I can't publish the data model

Check whether you have Data Modeler open in multiple browser tabs or multiple browser windows. If you do, close any additional browser tabs and windows running Data Modeler, and try publishing the model again. If you still get a publishing error, then restart the browser.

Why must I use the SQL Query tab to edit a join or filter for a view?

The message "Please use SQL Query tab to edit Joins/Filters" is displayed when you click the Joins tab or the Filters tab in the view editor for one of the following reasons:

- **Oracle Analytics Cloud can't parse the SQL query for the database view**
  
  If you use only the Overview, Joins, and Filters tabs to edit a database view, then Oracle Analytics Cloud constructs a simple SQL query for you. If you decide to edit the SQL manually through the SQL Query tab, then simple updates are reflected back in the Overview, Join, and Filters tabs so you can use these tabs to further edit the view later on. If, however, you have used the SQL Query tab to make more advanced code changes, then you can't use the Overview, Joins or Filters tabs to further edit the view because Oracle Analytics Cloud can't verify your updates. For example, if you include:
  
  - SQL aggregation functions, GROUP BY clause, HAVING clause
  - ORDER BY clause
  - OR keyword in WHERE clause
  - UNION clause

- **Oracle Analytics Cloud can't access the database view**
  
  If the problem persists, report the issue to your administrator. Your administrator can investigate connection issues relating to your database service.

I see the message: Cluster error-No active server node found

The instance might be down or the database might be locked. If the problem persists, then report the issue to an administrator.

Troubleshoot Administration Issues

This topic describes common problems that you might encounter when performing administration tasks and explains how to solve them.

I can't access options in the Console

If you see an "unauthorized" message or don't see an option in the Console, you probably don't have the BI Service Administrator application role. You must have the BI Service Administrator application role to access most Console options, for example Users and Roles, Snapshots, Connections, Safe Domains, Session and Query Cache, Issue SQL, Virus Scanner, Mail Server, and Search Index.

Ask an administrator to verify your permissions. See Assigning Application Roles to Users.
I can’t upload my snapshot

You can only upload snapshots taken from Oracle Analytics Cloud. Check where the .bar file you’re trying to upload was originally downloaded from.
Expression Editor Reference

This topic describes the expression elements that you can use in the Expression Editor.

Topics:
- Data Model Objects
- SQL Operators
- Conditional Expressions
- Functions
- Constants
- Types
- Variables

Data Model Objects

You can use data model objects in expressions, like time levels, dimension columns, and fact columns.

To reference a data model object, use the syntax:

"Fact/Dimension Table Name"."Column Name"

For example: "Order Metrics"."Booked Amount"-"Order Metrics"."Fulfilled Amount"

The Expression Elements section includes only items that are relevant for your task, so not all fact tables and dimension tables might be listed. Similarly, time hierarchies are included only if the Time fact table is joined to the current table.

SQL Operators

SQL operators are used to specify comparisons between expressions.

You can use various types of SQL operators.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETWEEN</td>
<td>&quot;COSTS&quot;.&quot;UNIT _COST&quot;</td>
<td>Determines if a value is between two non-inclusive bounds.</td>
<td>BETWEEN [LowerBound] AND [UpperBound]</td>
</tr>
<tr>
<td></td>
<td>BETWEEN 100.0 AND 5000.0</td>
<td>BETWEEN can be preceded with NOT to negate the condition.</td>
<td></td>
</tr>
<tr>
<td>Operator</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>IN</td>
<td>&quot;COSTS&quot;.&quot;UNIT_COST&quot; IN(200, 600, 'A')</td>
<td>Determines if a value is present in a set of values.</td>
<td>IN ([Comma Separated List])</td>
</tr>
<tr>
<td>IS NULL</td>
<td>&quot;PRODUCTS&quot;.&quot;PRODUCT_NAME&quot; IS NULL</td>
<td>Determines if a value is null.</td>
<td>IS NULL</td>
</tr>
<tr>
<td>LIKE</td>
<td>&quot;PRODUCTS&quot;.&quot;PRODUCT_NAME&quot; LIKE 'prod%'</td>
<td>Determines if a value matches all or part of a string. Often used with wildcard characters to indicate any character string match of zero or more characters (%) or any single character match (_).</td>
<td>LIKE</td>
</tr>
<tr>
<td>+</td>
<td>(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE</td>
<td>Plus sign for addition.</td>
<td>+</td>
</tr>
<tr>
<td>-</td>
<td>(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE</td>
<td>Minus sign for subtraction.</td>
<td>-</td>
</tr>
<tr>
<td>* or X</td>
<td>SUPPORT_SERVICES_EXPENDITURE * 1.5</td>
<td>Multiply sign for multiplication.</td>
<td>* or X</td>
</tr>
<tr>
<td>/</td>
<td>CAPITAL_OUTLAY_EXPENDITURE / 1.05</td>
<td>Divide by sign for division.</td>
<td>/</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td>Percentage</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STATE</td>
</tr>
<tr>
<td>(</td>
<td>(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE</td>
<td>Open parenthesis.</td>
<td>(</td>
</tr>
<tr>
<td>)</td>
<td>(FEDERAL_REVENUE + LOCAL_REVENUE) - TOTAL_EXPENDITURE</td>
<td>Close parenthesis.</td>
<td>)</td>
</tr>
<tr>
<td>Operator</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>&gt;</td>
<td>YEAR &gt; 2000 and YEAR &lt; 2016 and YEAR &lt;&gt; 2013</td>
<td>Greater than sign, indicating values higher than the comparison.</td>
<td>&gt;</td>
</tr>
<tr>
<td>&lt;</td>
<td>YEAR &gt; 2000 and YEAR &lt; 2016 and YEAR &lt;&gt; 2013</td>
<td>Less than sign, indicating values lower than the comparison.</td>
<td>&lt;</td>
</tr>
<tr>
<td>=</td>
<td>Equal sign, indicating the same value.</td>
<td>=</td>
<td></td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater than or equal to sign, indicating values the same or higher than the comparison.</td>
<td>&gt;=</td>
<td></td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less than or equal to sign, indicating values the same or lower than the comparison.</td>
<td>&lt;=</td>
<td></td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>YEAR &gt; 2000 and YEAR &lt; 2016 and YEAR &lt;&gt; 2013</td>
<td>Not equal to, indicating values higher or lower, but different.</td>
<td>&lt;&gt;</td>
</tr>
<tr>
<td>,</td>
<td>STATE in ('ALABAMA','CALIFORNIA')</td>
<td>Comma, used to separate elements in a list.</td>
<td>,</td>
</tr>
</tbody>
</table>

## Conditional Expressions

You use conditional expressions to create expressions that convert values.

The conditional expressions described in this section are building blocks for creating expressions that convert a value from one form to another.

Follow these rules:

- **In CASE statements, AND has precedence over OR**
- **Strings must be in single quotes**
<table>
<thead>
<tr>
<th>Expression</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE (If)</td>
<td>CASE</td>
<td>Evaluates each WHEN condition and if satisfied, assigns the value in the corresponding THEN expression. If none of the WHEN conditions are satisfied, it assigns the default value specified in the ELSE expression. If no ELSE expression is specified, the system automatically adds an ELSE NULL.</td>
<td>CASE WHEN request_condition1 THEN expr1 ELSE expr2 END</td>
</tr>
<tr>
<td></td>
<td>WHEN score-par &lt; 0 THEN 'Under Par' WHEN score-par = 0 THEN 'Par' WHEN score-par = 1 THEN 'Bogey' WHEN score-par = 2 THEN 'Double Bogey' ELSE 'Triple Bogey or Worse' END</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CASE Score-par</td>
<td>Also referred to as CASE (Lookup). The value of the first expression is examined, then the WHEN expressions. If the first expression matches any WHEN expression, it assigns the value in the corresponding THEN expression. If none of the WHEN expressions match, it assigns the default value specified in the ELSE expression. If no ELSE expression is specified, the system automatically adds an ELSE NULL. If the first expression matches an expression in multiple WHEN clauses, only the expression following the first match is assigned.</td>
<td>CASE expr1 WHEN expr2 THEN expr3 ELSE expr4 END</td>
</tr>
<tr>
<td></td>
<td>WHEN -5 THEN 'Birdie on Par 6' WHEN -4 THEN 'Must be Tiger' WHEN -3 THEN 'Three under par' WHEN -2 THEN 'Two under par' WHEN -1 THEN 'Birdie' WHEN 0 THEN 'Par' WHEN 1 THEN 'Bogey' WHEN 2 THEN 'Double Bogey' ELSE 'Triple Bogey or Worse' END</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IfCase &gt; ELSE</td>
<td>ELSE [expr]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IfCase &gt; IFNULL</td>
<td>IFNULL([expr], [value])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IfCase &gt; NULLIF</td>
<td>NULLIF([expr], [expr])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IfCase &gt; WHEN</td>
<td>WHEN [Condition] THEN [expr]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IfCase &gt; CASE</td>
<td>CASE WHEN [Condition] THEN [expr] END</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SwitchCase &gt; ELSE</td>
<td>ELSE [expr]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SwitchCase &gt; IFNULL</td>
<td>IFNULL([expr], [value])</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Functions

There are various types of functions that you can use in expressions.

Topics:

- Aggregate Functions
- Analytics Functions
- Calendar Functions
- Conversion Functions
- Display Functions
- Evaluate Functions
- Mathematical Functions
- Running Aggregate Functions
- String Functions
- System Functions
- Time Series Functions

Aggregate Functions

Aggregate functions perform operations on multiple values to create summary results.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGREGATE AT</td>
<td>AGGREGATE(sales AT month, region)</td>
<td>This function aggregates columns based on the level or levels you specify. measure is the name of a measure column. level is the level at which you want to aggregate. You can optionally specify more than one level. You cannot specify a level from a dimension that contains levels that are being used as the measure level for the measure you specified in the first argument. For example, you cannot write the function as AGGREGATE(yearly_sales AT month) because month is from the same time dimension that is being used as the measure level for yearly_sales.</td>
<td>AGGREGATE(measure AT level [, level1, levelN])</td>
</tr>
<tr>
<td>AVG</td>
<td>Avg(Sales)</td>
<td>Calculates the average (mean) of a numeric set of values.</td>
<td>AVG(expr)</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AVGDISTINCT</td>
<td></td>
<td>Calculates the average (mean) of all distinct values of an expression.</td>
<td>AVGDISTINCT expr</td>
</tr>
<tr>
<td>BIN</td>
<td>BIN(revenue BY productid, year WHERE productid &gt; 2 INTO 4 BINS RETURNING RANGE_LOW)</td>
<td>The BIN function classifies a given numeric expression into a specified number of equal width buckets. The function can return either the bin number or one of the two end points of the bin interval. numeric_expr is the measure or numeric attribute to bin BY grain_expr1,..., grain_exprN is a list of expressions that define the grain at which the numeric_expr will be calculated. BY is required for measure expressions and is optional for attribute expressions. WHERE a filter to apply to the numeric_expr before the numeric values are assigned to bins INTO number_of_bins BINS is the number of bins to return BETWEEN min_value AND max_value is the min and max values used for the end points of the outermost bins RETURNING NUMBER indicates that the return value should be the bin number (1, 2, 3, 4, etc.). This is the default. RETURNING RANGE_LOW indicates the lower value of the bin interval RETURNING RANGE_HIGH indicates the higher value of the bin interval</td>
<td>BIN(numeric_expr [BY grain_expr1, ..., grain_exprN] [WHERE condition] INTO number_of_bins BINS [BETWEEN min_value AND max_value] [RETURNING {NUMBER</td>
</tr>
<tr>
<td>BottomN</td>
<td></td>
<td>Ranks the lowest n values of the expression argument from 1 to n, 1 corresponding to the lowest numerical value.</td>
<td>BottomN(expr, integer)</td>
</tr>
<tr>
<td>COUNT</td>
<td>COUNT(Products)</td>
<td>Determines the number of items with a non-null value.</td>
<td>COUNT(expr)</td>
</tr>
<tr>
<td>COUNTDISTINCT</td>
<td></td>
<td>Adds distinct processing to the COUNT function.</td>
<td>COUNT(DISTINCT expr)</td>
</tr>
<tr>
<td>COUNT*</td>
<td>SELECT COUNT(*) FROM Facts</td>
<td>Counts the number of rows.</td>
<td>COUNT(*)</td>
</tr>
<tr>
<td>First</td>
<td>First(Sales)</td>
<td>Selects the first non-null returned value of the expression argument. The First function operates at the most detailed level specified in your explicitly defined dimension.</td>
<td>First([NumericExpression])</td>
</tr>
<tr>
<td>Last</td>
<td>Last(Sales)</td>
<td>Selects the last non-null returned value of the expression.</td>
<td>Last([NumericExpression])</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
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<td>--------</td>
</tr>
<tr>
<td>MAVG</td>
<td></td>
<td>Calculates a moving average (mean) for the last n rows of data in the result set, inclusive of the current row. &lt;br&gt; <em>expr</em> is any expression that evaluates to a numerical value. <em>integer</em> is any positive integer. Represents the average of the last n rows of data.</td>
<td>MAVG(<em>expr</em>, integer)</td>
</tr>
<tr>
<td>MAX</td>
<td>MAX(Revenue)</td>
<td>Calculates the maximum value (highest numeric value) of the rows satisfying the numeric expression argument.</td>
<td>MAX(<em>expr</em>)</td>
</tr>
<tr>
<td>MEDIAN</td>
<td>MEDIAN(Sales)</td>
<td>Calculates the median (middle) value of the rows satisfying the numeric expression argument. When there are an even number of rows, the median is the mean of the two middle rows. This function always returns a double.</td>
<td>MEDIAN(<em>expr</em>)</td>
</tr>
<tr>
<td>MIN</td>
<td>MIN(Revenue)</td>
<td>Calculates the minimum value (lowest numeric value) of the rows satisfying the numeric expression argument.</td>
<td>MIN(<em>expr</em>)</td>
</tr>
<tr>
<td>NTILE</td>
<td></td>
<td>Determines the rank of a value in terms of a user-specified range. It returns integers to represent any range of ranks. NTILE with numTiles=100 returns what is commonly called the “percentile” (with numbers ranging from 1 to 100, with 100 representing the high end of the sort).&lt;br&gt; <em>expr</em> is any expression that evaluates to a numerical value. <em>numTiles</em> is a positive, nonnull integer that represents the number of tiles.</td>
<td>NTILE(<em>expr</em>, numTiles)</td>
</tr>
<tr>
<td>PERCENTILE</td>
<td></td>
<td>Calculates a percentile rank for each value satisfying the numeric expression argument. The percentile rank ranges are between 0 (0th percentile) to 1 (100th percentile).&lt;br&gt; <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>PERCENTILE(<em>expr</em>)</td>
</tr>
<tr>
<td>RANK</td>
<td>RANK(chronological_key, null, year_key_columns)</td>
<td>Calculates the rank for each value satisfying the numeric expression argument. The highest number is assigned a rank of 1, and each successive rank is assigned the next consecutive integer (2, 3, 4, ...). If certain values are equal, they are assigned the same rank (for example, 1, 1, 1, 4, 5, 5, 7, ...).&lt;br&gt; <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>RANK(<em>expr</em>)</td>
</tr>
<tr>
<td>STDDEV</td>
<td>STDDEV(Sales) STDDEV(DISTINCT Sales)</td>
<td>Returns the standard deviation for a set of values. The return type is always a double.</td>
<td>STDDEV(<em>expr</em>)</td>
</tr>
</tbody>
</table>
### Function List

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>STDDEV_POP</td>
<td>STDDEV_POP(Sales)</td>
<td>Returns the standard deviation for a set of values using the computational formula for population variance and standard deviation.</td>
<td>STDDEV_POP([NumericExpression])</td>
</tr>
<tr>
<td></td>
<td>STDDEV_POP(DISTINCT Sales)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUM</td>
<td>SUM(Revenue)</td>
<td>Calculates the sum obtained by adding up all values satisfying the numeric expression argument.</td>
<td>SUM(expr)</td>
</tr>
<tr>
<td>SUMDISTINCT</td>
<td></td>
<td>Calculates the sum obtained by adding all of the distinct values satisfying the numeric expression argument.</td>
<td>SUM(DISTINCT expr)</td>
</tr>
<tr>
<td>TOPN</td>
<td></td>
<td>Ranks the highest n values of the expression argument from 1 to n, 1 corresponding to the highest numerical value.</td>
<td>TOPN(expr, integer)</td>
</tr>
</tbody>
</table>

### Analytics Functions

Analytics functions allow you to explore data using models such as trendline and cluster.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRENDLINE</td>
<td>TRENDLINE(revenue, (calendar_year, calendar_quarter, calendar_month) BY (product), 'LINEAR', 'VALUE')</td>
<td>Fits a linear or exponential model and returns the fitted values or model. The numeric_expr represents the Y value for the trend and the series (time columns) represent the X value.</td>
<td>TRENDLINE(numeric_expr, ([series]) BY ([partitionBy]), model_type, result_type)</td>
</tr>
<tr>
<td>CLUSTER</td>
<td>CLUSTER((product, company), (billed_quantity, revenue), 'clusterName', 'algorithm=k-means;numClusters=%1;maxIter=%2;useRandomSeed=False;enablePartitioning=TRUE', 5, 10)</td>
<td>Collects a set of records into groups based on one or more input expressions using K-Means or Hierarchical Clustering.</td>
<td>CLUSTER((dimension_expr1, ... dimension_exprN), (expr1, ... exprN), output_column_name, options, [runtime_binded_options])</td>
</tr>
</tbody>
</table>
### Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTLIER</td>
<td>OUTLIER((product, company), (billed_quantity, revenue), 'isOutlier', 'algorithm=kmeans')</td>
<td>This function classifies a record as Outlier based on one or more input expressions using K-Means or Hierarchical Clustering or Multi-Variate Outlier detection Algorithms.</td>
<td>OUTLIER((dimension_expr1, ... dimension_exprN), (expr1, ... exprN), output_column_name, options, [runtime_binded_options])</td>
</tr>
<tr>
<td>REGR</td>
<td>REGR(revenue, (discount_amount), (product_type, brand), 'fitted', '')</td>
<td>Fits a linear model and returns the fitted values or model. This function can be used to fit a linear curve on two measures.</td>
<td>REGR(y_axis_measure_expr, (x_axis_expr), (category_expr1, ..., category_exprN), output_column_name, options, [runtime_binded_options])</td>
</tr>
<tr>
<td>EVALUATE_SCRIPT</td>
<td>EVALUATE_SCRIPT('filerepo://obiee.Outliers.xml', 'isOutlier', 'algorithm=kmeans;id=%1;arg1=%2;arg2=%3;useRandomSeed=False;', customer_number, expected_revenue, customer_age)</td>
<td>Executes a Python script as specified in the script_file_path, passing in one or more columns or literal expressions as input. The output of the function is determined by the output_column_name.</td>
<td>EVALUATE_SCRIPT(script_file_path, output_column_name, options, [runtime_binded_options])</td>
</tr>
</tbody>
</table>

### Calendar Functions

Calendar functions manipulate data of the data types `DATE` and `DATETIME` based on a calendar year.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT_DATE</td>
<td>CURRENT_DATE</td>
<td>Returns the current date. The date is determined by the system in which the Oracle BI is running.</td>
<td>CURRENT_DATE</td>
</tr>
<tr>
<td>CURRENT_TIME</td>
<td>CURRENT_TIME(3)</td>
<td>Returns the current time to the specified number of digits of precision, for example: HH:MM:SS.SSS. If no argument is specified, the function returns the default precision.</td>
<td>CURRENT_TIME(expr)</td>
</tr>
<tr>
<td>CURRENT_TIMESTAMP</td>
<td>CURRENT_TIMESTAMP(3)</td>
<td>Returns the current date/timestamp to the specified number of digits of precision.</td>
<td>CURRENT_TIMESTAMP(expr)</td>
</tr>
<tr>
<td>DAYNAME</td>
<td>DAYNAME(Order_Date)</td>
<td>Returns the name of the day of the week for a specified date expression.</td>
<td>DAYNAME(expr)</td>
</tr>
<tr>
<td>DAYOFMONTH</td>
<td>DAYOFMONTH(Order_Date)</td>
<td>Returns the number corresponding to the day of the month for a specified date expression.</td>
<td>DAYOFMONTH(expr)</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td><strong>DAYOFWEEK</strong></td>
<td><code>DAYOFWEEK(Order_Date)</code></td>
<td>Returns a number between 1 and 7 corresponding to the day of the week for a specified date expression. For example, 1 always corresponds to Sunday, 2 corresponds to Monday, and so on through to Saturday which returns 7.</td>
<td><code>DAYOFWEEK(expr)</code></td>
</tr>
<tr>
<td><strong>DAYOFYEAR</strong></td>
<td><code>DAYOFYEAR(Order_Date)</code></td>
<td>Returns the number (between 1 and 366) corresponding to the day of the year for a specified date expression.</td>
<td><code>DAYOFYEAR(expr)</code></td>
</tr>
<tr>
<td><strong>DAY_OF_QUARTER</strong></td>
<td><code>DAY_OF_QUARTER(Order_Date)</code></td>
<td>Returns a number (between 1 and 92) corresponding to the day of the quarter for the specified date expression.</td>
<td><code>DAY_OF_QUARTER(expr)</code></td>
</tr>
<tr>
<td><strong>HOUR</strong></td>
<td><code>HOUR(Order_Time)</code></td>
<td>Returns a number (between 0 and 23) corresponding to the hour for a specified time expression. For example, 0 corresponds to 12 a.m. and 23 corresponds to 11 p.m.</td>
<td><code>HOUR(expr)</code></td>
</tr>
<tr>
<td><strong>MINUTE</strong></td>
<td><code>MINUTE(Order_Time)</code></td>
<td>Returns a number (between 0 and 59) corresponding to the minute for a specified time expression.</td>
<td><code>MINUTE(expr)</code></td>
</tr>
<tr>
<td><strong>MONTH</strong></td>
<td><code>MONTH(Order_Time)</code></td>
<td>Returns the number (between 1 and 12) corresponding to the month for a specified date expression.</td>
<td><code>MONTH(expr)</code></td>
</tr>
<tr>
<td><strong>MONTHNAME</strong></td>
<td><code>MONTHNAME(Order_Time)</code></td>
<td>Returns the name of the month for a specified date expression.</td>
<td><code>MONTHNAME(expr)</code></td>
</tr>
<tr>
<td><strong>MONTH_OF_QUARTER</strong></td>
<td><code>MONTH_OF_QUARTER(Order_Date)</code></td>
<td>Returns the number (between 1 and 3) corresponding to the month in the quarter for a specified date expression.</td>
<td><code>MONTH_OF_QUARTER(expr)</code></td>
</tr>
<tr>
<td><strong>NOW</strong></td>
<td><code>NOW()</code></td>
<td>Returns the current timestamp. The NOW function is equivalent to the CURRENT_TIMESTAMP function.</td>
<td><code>NOW()</code></td>
</tr>
<tr>
<td><strong>QUARTER_OF_YEAR</strong></td>
<td><code>QUARTER_OF_YEAR(Order_Date)</code></td>
<td>Returns the number (between 1 and 4) corresponding to the quarter of the year for a specified date expression.</td>
<td><code>QUARTER_OF_YEAR(expr)</code></td>
</tr>
<tr>
<td><strong>SECOND</strong></td>
<td><code>SECOND(Order_Time)</code></td>
<td>Returns the number (between 0 and 59) corresponding to the seconds for a specified time expression.</td>
<td><code>SECOND(expr)</code></td>
</tr>
<tr>
<td><strong>TIMESTAMPADD</strong></td>
<td><code>TIMESTAMPADD(SQL_TSI_MONTH, 12, Time.&quot;Order Date&quot;)</code></td>
<td>Adds a specified number of intervals to a timestamp, and returns a single timestamp. Interval options are: <code>SQL_TSI_SECOND</code>, <code>SQL_TSI_MINUTE</code>, <code>SQL_TSI_HOUR</code>, <code>SQL_TSI_DAY</code>, <code>SQL_TSI_WEEK</code>, <code>SQL_TSI_MONTH</code>, <code>SQL_TSI_QUARTER</code>, <code>SQL_TSI_YEAR</code></td>
<td><code>TIMESTAMPADD(interval, expr, timestamp)</code></td>
</tr>
<tr>
<td><strong>TIMESTAMPDIFF</strong></td>
<td><code>TIMESTAMPDIFF(SQL_TSI_MONTH, Time.&quot;Order Date&quot;, CURRENT_DATE)</code></td>
<td>Returns the total number of specified intervals between two timestamps. Use the same intervals as <code>TIMESTAMPADD</code>.</td>
<td><code>TIMESTAMPDIFF(interval, expr, timestamp2)</code></td>
</tr>
</tbody>
</table>
## Conversion Functions

Conversion functions convert a value from one form to another.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAST</strong></td>
<td>CAST(hiredate AS CHAR(40)) FROM employee</td>
<td>Changes the data type of an expression or a null literal to another data type. For example, you can cast a customer_name (a data type of CHAR or VARCHAR) or birthdate (a datetime literal). Use CAST to change to a Date data type. Don’t use TODATE.</td>
<td>CAST(expr AS type)</td>
</tr>
<tr>
<td><strong>IFNULL</strong></td>
<td>IFNULL(Sales, 0)</td>
<td>Tests if an expression evaluates to a null value, and if it does, assigns the specified value to the expression.</td>
<td>IFNULL(expr, value)</td>
</tr>
<tr>
<td><strong>INDEXCOL</strong></td>
<td>SELECT INDEXCOL(VALUEOF (NQ_SESSION.GEOGRAPHY_LEVEL), Country, State, City), Revenue FROM Sales</td>
<td>Uses external information to return the appropriate column for the signed-in user to see.</td>
<td>INDEXCOL([integer literal], [expr1] [, [expr2], ?-])</td>
</tr>
<tr>
<td><strong>NULLIF</strong></td>
<td>SELECT e.last_name, NULLIF(e.job_id, j.job_id) &quot;Old Job ID&quot; FROM employees e, job_history j WHERE e.employee_id = j.employee_id ORDER BY last_name, &quot;Old Job ID&quot;;</td>
<td>Compares two expressions. If they’re equal, then the function returns NULL. If they’re not equal, then the function returns the first expression. You can’t specify the literal NULL for the first expression.</td>
<td>NULLIF([expression], [expression])</td>
</tr>
<tr>
<td><strong>To_DateTime</strong></td>
<td>SELECT To_DateTime ('2009-03-03 01:00', 'yyyy-mm-dd hh:mi:ss') FROM sales</td>
<td>Converts string literals of DateTime format to a DateTime data type.</td>
<td>To_DateTime([expression], [literal])</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
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<td>--------</td>
</tr>
<tr>
<td>VALUEOF</td>
<td>SalesSubjectArea.Customer.Region = VALUEOF(&quot;Region Security&quot;).&quot;REGION&quot;)</td>
<td>References the value of an Oracle BI repository variable in a filter. Use expr variables as arguments of the VALUEOF function. Refer to static repository variables by name.</td>
<td>VALUEOF(expr)</td>
</tr>
</tbody>
</table>

Display Functions

Display functions operate on the result set of a query.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>BottomN</td>
<td>BottomN(Sales, 10)</td>
<td>Returns the n lowest values of expression, ranked from lowest to highest.</td>
<td>BottomN([NumericExpression], [integer])</td>
</tr>
<tr>
<td>FILTER</td>
<td>FILTER(Sales USING Product = 'widget')</td>
<td>Computes the expression using the given preaggregate filter.</td>
<td>FILTER(measure USING filter_expr)</td>
</tr>
<tr>
<td>MAVG</td>
<td>MAVG(Sales, 10)</td>
<td>Calculates a moving average (mean) for the last n rows of data in the result set, inclusive of the current row.</td>
<td>MAVG([NumericExpression], [integer])</td>
</tr>
<tr>
<td>MSUM</td>
<td>SELECT Month, Revenue, MSUM(Revenue, 3) as 3_MO_SUM FROM Sales</td>
<td>Calculates a moving sum for the last n rows of data, inclusive of the current row. The sum for the first row is equal to the numeric expression for the first row. The sum for the second row is calculated by taking the sum of the first two rows of data, and so on. When the n th row is reached, the sum is calculated based on the last n rows of data.</td>
<td>MSUM([NumericExpression], [integer])</td>
</tr>
<tr>
<td>NTILE</td>
<td>NTILE(Sales, 100)</td>
<td>Determines the rank of a value in terms of a user-specified range. It returns integers to represent any range of ranks. The example shows a range from 1 to 100, with the lowest sale = 1 and the highest sale = 100.</td>
<td>NTILE([NumericExpression], [integer])</td>
</tr>
<tr>
<td>PERCENTILE</td>
<td>PERCENTILE(Sales)</td>
<td>Calculates a percent rank for each value satisfying the numeric expression argument. The percentile rank ranges are from 0 (1st percentile) to 1 (100th percentile), inclusive.</td>
<td>PERCENTILE([NumericExpression])</td>
</tr>
<tr>
<td>RANK</td>
<td>RANK(Sales)</td>
<td>Calculates the rank for each value satisfying the numeric expression argument. The highest number is assigned a rank of 1, and each successive rank is assigned the next consecutive integer (2, 3, 4,...). If certain values are equal, they are assigned the same rank (for example, 1, 1, 1, 4, 5, 5, 7...).</td>
<td>RANK([NumericExpression])</td>
</tr>
<tr>
<td>RCOUNT</td>
<td>SELECT month, profit, RCOUNT(profit) FROM sales WHERE profit &gt; 200</td>
<td>Takes a set of records as input and counts the number of records encountered so far.</td>
<td>RCOUNT([NumericExpression])</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
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<td>--------</td>
</tr>
<tr>
<td>RMAX</td>
<td><code>SELECT month, profit, RMAX(profit) FROM sales</code></td>
<td>Takes a set of records as input and shows the maximum value based on records encountered so far. The specified data type must be one that can be ordered.</td>
<td>RMAX([NumericExpression])</td>
</tr>
<tr>
<td>RMIN</td>
<td><code>SELECT month, profit, RMIN(profit) FROM sales</code></td>
<td>Takes a set of records as input and shows the minimum value based on records encountered so far. The specified data type must be one that can be ordered.</td>
<td>RMIN([NumericExpression])</td>
</tr>
<tr>
<td>RSUM</td>
<td><code>SELECT month, revenue, RSUM(revenue) as RUNNING_SUM FROM sales</code></td>
<td>Calculates a running sum based on records encountered so far. The sum for the first row is equal to the numeric expression for the first row. The sum for the second row is calculated by taking the sum of the first two rows of data, and so on.</td>
<td>RSUM([NumericExpression])</td>
</tr>
<tr>
<td>TOPN</td>
<td><code>TOPN(Sales, 10)</code></td>
<td>Returns the n highest values of expression, ranked from highest to lowest.</td>
<td>TOPN([NumericExpression], [integer])</td>
</tr>
</tbody>
</table>

### Evaluate Functions

Evaluate functions are database functions that can be used to pass through expressions to get advanced calculations.

Embedded database functions can require one or more columns. These columns are referenced by %1 ... %N within the function. The actual columns must be listed after the function.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVALUATE</td>
<td><code>SELECT EVALUATE('instr(%1, %2)', address, 'Foster City') FROM employees</code></td>
<td>Passes the specified database function with optional referenced columns as parameters to the database for evaluation.</td>
<td>EVALUATE([string expression], [comma separated expressions])</td>
</tr>
<tr>
<td>EVALUATE_AGGR</td>
<td><code>EVALUATE_AGGR('REG_SLOPE(%1, %2)', sales.quantity, market.marketkey)</code></td>
<td>Passes the specified database function with optional referenced columns as parameters to the database for evaluation. This function is intended for aggregate functions with a GROUP BY clause.</td>
<td>EVALUATE_AGGR('db_agg_function(%$1...%$N)' [AS datatype] [, column1, columnN])</td>
</tr>
</tbody>
</table>

### Mathematical Functions

The mathematical functions described in this section perform mathematical operations.
<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>ABS(Profit)</td>
<td>Calculates the absolute value of a numeric expression.</td>
<td>ABS(expr)</td>
</tr>
<tr>
<td>ACOS</td>
<td>ACOS(1)</td>
<td>Calculates the arc cosine of a numeric expression.</td>
<td>ACOS(expr)</td>
</tr>
<tr>
<td>ASIN</td>
<td>ASIN(1)</td>
<td>Calculates the arc sine of a numeric expression.</td>
<td>ASIN(expr)</td>
</tr>
<tr>
<td>ATAN</td>
<td>ATAN(1)</td>
<td>Calculates the arc tangent of a numeric expression.</td>
<td>ATAN(expr)</td>
</tr>
<tr>
<td>ATAN2</td>
<td>ATAN2(1, 2)</td>
<td>Calculates the arc tangent of ( y/x ), where ( y ) is the first numeric expression and ( x ) is the second numeric expression.</td>
<td>ATAN2(expr1, expr2)</td>
</tr>
<tr>
<td>CEILING</td>
<td>CEILING(Profit)</td>
<td>Rounds a non-integer numeric expression to the next highest integer. If the numeric expression evaluates to an integer, the CEILING function returns that integer.</td>
<td>CEILING(expr)</td>
</tr>
<tr>
<td>COS</td>
<td>COS(1)</td>
<td>Calculates the cosine of a numeric expression.</td>
<td>COS(expr)</td>
</tr>
<tr>
<td>COT</td>
<td>COT(1)</td>
<td>Calculates the cotangent of a numeric expression.</td>
<td>COT(expr)</td>
</tr>
<tr>
<td>DEGREES</td>
<td>DEGREES(1)</td>
<td>Converts an expression from radians to degrees.</td>
<td>DEGREES(expr)</td>
</tr>
<tr>
<td>EXP</td>
<td>EXP(4)</td>
<td>Sends the value to the power specified.</td>
<td>EXP(expr)</td>
</tr>
<tr>
<td>ExtractBit</td>
<td>Int ExtractBit(1, 5)</td>
<td>Retrieves a bit at a particular position in an integer. It returns an integer of either 0 or 1 corresponding to the position of the bit.</td>
<td>ExtractBit([Source Number], [Digits])</td>
</tr>
<tr>
<td>FLOOR</td>
<td>FLOOR(Profit)</td>
<td>Rounds a non-integer numeric expression to the next lowest integer. If the numeric expression evaluates to an integer, the FLOOR function returns that integer.</td>
<td>FLOOR(expr)</td>
</tr>
<tr>
<td>LOG</td>
<td>LOG(1)</td>
<td>Calculates the natural logarithm of an expression.</td>
<td>LOG(expr)</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td><strong>Example</strong></td>
<td><strong>Description</strong></td>
<td><strong>Syntax</strong></td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>LOG10</td>
<td>LOG10(1)</td>
<td>Calculates the base 10 logarithm of an expression. <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>LOG10(expr)</td>
</tr>
<tr>
<td>MOD</td>
<td>MOD(10, 3)</td>
<td>Divides the first numeric expression by the second numeric expression and returns the remainder portion of the quotient.</td>
<td>MOD(expr1, expr2)</td>
</tr>
<tr>
<td>PI</td>
<td>PI()</td>
<td>Returns the constant value of pi.</td>
<td>PI()</td>
</tr>
<tr>
<td>POWER</td>
<td>POWER(Profit, 2)</td>
<td>Takes the first numeric expression and raises it to the power specified in the second numeric expression.</td>
<td>POWER(expr1, expr2)</td>
</tr>
<tr>
<td>RADIANS</td>
<td>RADIANS(30)</td>
<td>Converts an expression from degrees to radians. <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>RADIANS(expr)</td>
</tr>
<tr>
<td>RAND</td>
<td>RAND()</td>
<td>Returns a pseudo-random number between 0 and 1.</td>
<td>RAND()</td>
</tr>
<tr>
<td>RANDFromSee d</td>
<td>RAND(2)</td>
<td>Returns a pseudo-random number based on a seed value. For a given seed value, the same set of random numbers are generated.</td>
<td>RAND(expr)</td>
</tr>
<tr>
<td>ROUND</td>
<td>ROUND(2.166000, 2)</td>
<td>Rounds a numeric expression to <em>n</em> digits of precision. <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>ROUND(expr, integer)</td>
</tr>
<tr>
<td>SIGN</td>
<td>SIGN(Profit)</td>
<td>This function returns the following: • 1 if the numeric expression evaluates to a positive number • -1 if the numeric expression evaluates to a negative number • 0 if the numeric expression evaluates to zero</td>
<td>SIGN(expr)</td>
</tr>
<tr>
<td>SIN</td>
<td>SIN(1)</td>
<td>Calculates the sine of a numeric expression.</td>
<td>SIN(expr)</td>
</tr>
<tr>
<td>SQRT</td>
<td>SQRT(7)</td>
<td>Calculates the square root of the numeric expression argument. The numeric expression must evaluate to a nonnegative number.</td>
<td>SQRT(expr)</td>
</tr>
<tr>
<td>TAN</td>
<td>TAN(1)</td>
<td>Calculates the tangent of a numeric expression. <em>expr</em> is any expression that evaluates to a numerical value.</td>
<td>TAN(expr)</td>
</tr>
</tbody>
</table>
### Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUNCATE</td>
<td>TRUNCATE(45.12345, 2)</td>
<td>Truncates a decimal number to return a specified number of places from the decimal point. &lt;br&gt;<code>expr</code> is any expression that evaluates to a numerical value. &lt;br&gt;<code>integer</code> is any positive integer that represents the number of characters to the right of the decimal place to return.</td>
<td>TRUNCATE(expr, integer)</td>
</tr>
</tbody>
</table>

### Running Aggregate Functions

Running aggregate functions perform operations on multiple values to create summary results.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAVG</td>
<td>MAVG(expr, integer)</td>
<td>Calculates a moving average (mean) for the last <code>n</code> rows of data in the result set, inclusive of the current row. &lt;br&gt;<code>expr</code> is any expression that evaluates to a numerical value. <code>integer</code> is any positive integer. Represents the average of the last <code>n</code> rows of data.</td>
<td>MAVG(expr, integer)</td>
</tr>
<tr>
<td>MSUM</td>
<td>MSUM(expr, integer)</td>
<td>This function calculates a moving sum for the last <code>n</code> rows of data, inclusive of the current row. &lt;br&gt;<code>expr</code> is any expression that evaluates to a numerical value. <code>integer</code> is any positive integer. Represents the sum of the last <code>n</code> rows of data.</td>
<td>MSUM(expr, integer)</td>
</tr>
<tr>
<td>RSUM</td>
<td>RSUM(expr)</td>
<td>This function calculates a running sum based on records encountered so far. &lt;br&gt;<code>expr</code> is any expression that evaluates to a numerical value.</td>
<td>RSUM(expr)</td>
</tr>
<tr>
<td>RCOUNT</td>
<td>RCOUNT(expr)</td>
<td>This function takes a set of records as input and counts the number of records encountered so far. &lt;br&gt;<code>expr</code> is an expression of any datatype.</td>
<td>RCOUNT(expr)</td>
</tr>
<tr>
<td>RMAX</td>
<td>RMAX(expr)</td>
<td>This function takes a set of records as input and shows the maximum value based on records encountered so far. &lt;br&gt;<code>expr</code> is an expression of any datatype.</td>
<td>RMAX(expr)</td>
</tr>
</tbody>
</table>
### Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMIN</td>
<td><code>select month, profit, RMIN(profit) from sales_subject_area</code></td>
<td>This function takes a set of records as input and shows the minimum value based on records encountered so far. <code>expr</code> is an expression of any datatype.</td>
<td><code>RMIN(expr)</code></td>
</tr>
</tbody>
</table>

### String Functions

String functions perform various character manipulations. They operate on character strings.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCII</td>
<td><code>ASCII('a')</code></td>
<td>Converts a single character string to its corresponding ASCII code, between 0 and 255. If the character expression evaluates to multiple characters, the ASCII code corresponding to the first character in the expression is returned. <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>ASCII(expr)</code></td>
</tr>
<tr>
<td>BIT_LENGTH</td>
<td><code>BIT_LENGTH('abcdef')</code></td>
<td>Returns the length, in bits, of a specified string. Each Unicode character is 2 bytes in length (equal to 16 bits). <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>BIT_LENGTH(expr)</code></td>
</tr>
<tr>
<td>CHAR</td>
<td><code>CHAR(35)</code></td>
<td>Converts a numeric value between 0 and 255 to the character value corresponding to the ASCII code. <code>expr</code> is any expression that evaluates to a numerical value between 0 and 255.</td>
<td><code>CHAR(expr)</code></td>
</tr>
<tr>
<td>CHAR_LENGTH</td>
<td><code>CHAR_LENGTH(Customer_Name)</code></td>
<td>Returns the length, in number of characters, of a specified string. Leading and trailing blanks aren’t counted in the length of the string. <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>CHAR_LENGTH(expr)</code></td>
</tr>
<tr>
<td>CONCAT</td>
<td><code>SELECT DISTINCT CONCAT ('abc', 'def') FROM employee</code></td>
<td>Concatenates two character strings. <code>exprs</code> are expressions that evaluate to character strings, separated by commas. You must use raw data, not formatted data, with CONCAT.</td>
<td><code>CONCAT(expr1, expr2)</code></td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>INSERT</td>
<td>SELECT INSERT('123456', 2, 3, 'abcd') FROM table</td>
<td>Inserts a specified character string into a specified location in another character string. <code>expr1</code> is any expression that evaluates to a character string. Identifies the target character string. <code>integer1</code> is any positive integer that represents the number of characters from the beginning of the target string where the second string is to be inserted. <code>integer2</code> is any positive integer that represents the number of characters in the target string to be replaced by the second string. <code>expr2</code> is any expression that evaluates to a character string. Identifies the character string to be inserted into the target string.</td>
<td>INSERT(expr1, integer1, integer2, expr2)</td>
</tr>
<tr>
<td>LEFT</td>
<td>SELECT LEFT('123456', 3) FROM table</td>
<td>Returns a specified number of characters from the left of a string. <code>expr</code> is any expression that evaluates to a character string. <code>integer</code> is any positive integer that represents the number of characters from the left of the string to return.</td>
<td>LEFT(expr, integer)</td>
</tr>
<tr>
<td>LENGTH</td>
<td>LENGTH(Customer_Name)</td>
<td>Returns the length, in number of characters, of a specified string. The length is returned excluding any trailing blank characters. <code>expr</code> is any expression that evaluates to a character string.</td>
<td>LENGTH(expr)</td>
</tr>
<tr>
<td>LOCATE</td>
<td>LOCATE('d', 'abcdef')</td>
<td>Returns the numeric position of a character string in another character string. If the character string isn't found in the string being searched, the function returns a value of 0. <code>expr1</code> is any expression that evaluates to a character string. Identifies the string for which to search. <code>expr2</code> is any expression that evaluates to a character string. Identifies the string to be searched.</td>
<td>LOCATE(expr1, expr2)</td>
</tr>
<tr>
<td>LOCATEN</td>
<td>LOCATE('d', 'abcdef', 3)</td>
<td>Like LOCATE, returns the numeric position of a character string in another character string. LOCATEN includes an integer argument that enables you to specify a starting position to begin the search. <code>expr1</code> is any expression that evaluates to a character string. Identifies the string for which to search. <code>expr2</code> is any expression that evaluates to a character string. Identifies the string to be searched. <code>integer</code> is any positive (nonzero) integer that represents the starting position to begin to look for the character string.</td>
<td>LOCATEN(expr1, expr2, integer)</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>LOWER</td>
<td>LOWER(Customer_Name)</td>
<td>Converts a character string to lowercase. <code>expr</code> is any expression that evaluates to a character string.</td>
<td>LOWER(expr)</td>
</tr>
<tr>
<td>OCTET_LENGTH</td>
<td>OCTET_LENGTH('abcdef')</td>
<td>Returns the number of bytes of a specified string. <code>expr</code> is any expression that evaluates to a character string.</td>
<td>OCTET_LENGTH(expr)</td>
</tr>
<tr>
<td>POSITION</td>
<td>POSITION('d', 'abcdef')</td>
<td>Returns the numeric position of <code>strExpr1</code> in a character expression. If <code>strExpr1</code> isn’t found, the function returns 0. <code>expr1</code> is any expression that evaluates to a character string. <code>expr2</code> is any expression that evaluates to a character string. Identifies the target string to be searched.</td>
<td>POSITION(expr1 IN expr2)</td>
</tr>
<tr>
<td>REPEAT</td>
<td>REPEAT('abc', 4)</td>
<td>Repeats a specified expression <code>n</code> times. <code>expr</code> is any expression that evaluates to a character string. <code>integer</code> is any positive integer that represents the number of times to repeat the character string.</td>
<td>REPEAT(expr, integer)</td>
</tr>
<tr>
<td>REPLACE</td>
<td>REPLACE('abcd1234', '123', 'zz')</td>
<td>Replaces one or more characters from a specified character expression with one or more other characters. <code>expr1</code> is any expression that evaluates to a character string. <code>expr2</code> is any expression that evaluates to a character string. This second string identifies the characters from the first string that are to be replaced. <code>expr3</code> is any expression that evaluates to a character string. This third string specifies the characters to substitute into the first string.</td>
<td>REPLACE(expr1, expr2, expr3)</td>
</tr>
<tr>
<td>RIGHT</td>
<td>SELECT RIGHT('123456', 3) FROM table</td>
<td>Returns a specified number of characters from the right of a string. <code>expr</code> is any expression that evaluates to a character string. <code>integer</code> is any positive integer that represents the number of characters from the right of the string to return.</td>
<td>RIGHT(expr, integer)</td>
</tr>
<tr>
<td>SPACE</td>
<td>SPACE(2)</td>
<td>Inserts blank spaces. <code>integer</code> is any positive integer that indicates the number of spaces to insert.</td>
<td>SPACE(expr)</td>
</tr>
<tr>
<td>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>SUBSTRING</td>
<td><code>SUBSTRING('abcdef' FROM 2)</code></td>
<td>Creates a new string starting from a fixed number of characters into the original string. The <code>expr</code> is any expression that evaluates to a character string. The <code>startPos</code> is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.</td>
<td><code>SUBSTRING([SourceString] FROM [StartPostition])</code></td>
</tr>
<tr>
<td>SUBSTRINGN</td>
<td><code>SUBSTRING('abcdef' FROM 2 FOR 3)</code></td>
<td>Like SUBSTRING, creates a new string starting from a fixed number of characters into the original string. <code>SUBSTRINGN</code> includes an integer argument that enables you to specify the length of the new string, in number of characters. The <code>expr</code> is any expression that evaluates to a character string. The <code>startPos</code> is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.</td>
<td><code>SUBSTRING(expr FROM startPos FOR length)</code></td>
</tr>
<tr>
<td>TrimBoth</td>
<td><code>TRIM(BOTH ' ' FROM '_abcdef_')</code></td>
<td>Strips specified leading and trailing characters from a character string. The <code>char</code> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. The <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>TRIM(BOTH char FROM expr)</code></td>
</tr>
<tr>
<td>TRIMLEADING</td>
<td><code>TRIM(LEADING ' ' FROM '_abcdef')</code></td>
<td>Strips specified leading characters from a character string. The <code>char</code> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. The <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>TRIM(LEADING char FROM expr)</code></td>
</tr>
<tr>
<td>TRIMTRAILING</td>
<td><code>TRIM(TRAILING ' ' FROM 'abcdef_')</code></td>
<td>Strips specified trailing characters from a character string. The <code>char</code> is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. The <code>expr</code> is any expression that evaluates to a character string.</td>
<td><code>TRIM(TRAILING char FROM expr)</code></td>
</tr>
<tr>
<td>UPPER</td>
<td><code>UPPER(Customer_Name)</code></td>
<td>Converts a character string to uppercase. The <code>Expr</code> is any expression that evaluates to a character string.</td>
<td><code>UPPER(expr)</code></td>
</tr>
</tbody>
</table>
System Functions

The `USER` system function returns values relating to the session. It returns the user name you signed in with.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATABASE</td>
<td>Returns the name of the Oracle BI subject area to which you're logged on.</td>
<td>DATABASE()</td>
<td></td>
</tr>
<tr>
<td>USER</td>
<td>Returns the user name for the Oracle BI Repository to which you're logged on.</td>
<td>USER()</td>
<td></td>
</tr>
</tbody>
</table>

Time Series Functions

Time series functions are aggregate functions that operate on time dimensions. The time dimension members must be at or below the level of the function. Because of this, one or more columns that uniquely identify members at or below the given level must be projected in the query.

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGO</td>
<td>SELECT Year_ID, AGO(sales, year, 1)</td>
<td>Calculates the aggregated value of a measure from the current time to a specified time period in the past. For example, AGO can produce sales for every month of the current quarter and the corresponding quarter-ago sales.</td>
<td>AGO(expr, time_level, offset)</td>
</tr>
<tr>
<td>PERIODROLLING</td>
<td>SELECT Month_ID, PERIODROLLING (monthly_sales, -1, 1)</td>
<td>Computes the aggregate of a measure over the period starting $x$ units of time and ending $y$ units of time from the current time. For example, PERIODROLLING can compute sales for a period that starts at a quarter before and ends at a quarter after the current quarter.</td>
<td>PERIODROLLING(measure, $x$, $y$)</td>
</tr>
<tr>
<td>TODATE</td>
<td>SELECT Year_ID, Month_ID, TODATE (sales, year)</td>
<td>Aggregates a measure from the beginning of a specified time period to the currently displayed time. For example, this function can calculate Year to Date sales.</td>
<td>TODATE(expr, time_level)</td>
</tr>
</tbody>
</table>
FORECAST Function

Creates a time-series model of the specified measure over the series using Exponential Smoothing (ETS) or Seasonal ARIMA or ARIMA, and outputs a forecast for a set of periods as specified by numPeriods.

Syntax

FORECAST(numeric_expr, ([series]), output_column_name, options, [runtime_binded_options])

Where:

- **numeric_expr** indicates the measure to forecast, for example, revenue data to forecast.
- **series** indicates the time grain at which the forecast model is built. This is a list of one or more time dimension columns. If you omit series, then the time grain is determined from the query.
- **output_column_name** indicates the output column. The valid values are forecast, low, high, and predictionInterval.
- **options** indicates a string list of name/value pairs separated by a semi-colon (;). The value can include %1 ... %N specified in runtime_binded_options.
- **runtime_binded_options** indicates a comma separated list of runtime-binded columns and options.

**FORECAST Function Options**
The following table list available options to use with the FORECAST function.

<table>
<thead>
<tr>
<th>Option Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>numPeriods</td>
<td>Integer</td>
<td>The number of periods to forecast</td>
</tr>
<tr>
<td>predictionInterval</td>
<td>0 to 100, where higher values specify higher confidence</td>
<td>The confidence level for the prediction.</td>
</tr>
<tr>
<td>modelType</td>
<td>ETS</td>
<td>The model to use for forecasting.</td>
</tr>
<tr>
<td></td>
<td>SeasonalArima</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARIMA</td>
<td></td>
</tr>
<tr>
<td>useBoxCox</td>
<td>TRUE</td>
<td>If TRUE, then use Box-Cox transformation.</td>
</tr>
<tr>
<td></td>
<td>FALSE</td>
<td></td>
</tr>
<tr>
<td>lambdaValue</td>
<td>Not applicable</td>
<td>The Box-Cox transformation parameter. Ignore if NULL or when useBoxCox is FALSE. Otherwise the data is transformed before the model is estimated.</td>
</tr>
<tr>
<td>trendDamp</td>
<td>TRUE</td>
<td>This is a parameter for ETS model. If TRUE, then use damped trend. If FALSE or NULL, then use non-damped trend.</td>
</tr>
<tr>
<td></td>
<td>FALSE</td>
<td></td>
</tr>
<tr>
<td>errorType</td>
<td>Not applicable</td>
<td>This is a parameter for ETS model.</td>
</tr>
</tbody>
</table>

Appendix C

Functions

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<table>
<thead>
<tr>
<th>Option Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>trendType</td>
<td>none(&quot;N&quot;)</td>
<td>This is a parameter for ETS model.</td>
</tr>
<tr>
<td></td>
<td>additive(&quot;A&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>multiplicative(&quot;M&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>automatically selected(&quot;Z&quot;)</td>
<td></td>
</tr>
<tr>
<td>seasonType</td>
<td>none(&quot;N&quot;)</td>
<td>This is a parameter for ETS model.</td>
</tr>
<tr>
<td></td>
<td>additive(&quot;A&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>multiplicative(&quot;M&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>automatically selected(&quot;Z&quot;)</td>
<td></td>
</tr>
<tr>
<td>modelParamIC</td>
<td>ic_auto</td>
<td>The information criterion (IC) used in the model selection.</td>
</tr>
<tr>
<td></td>
<td>ic_aicc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ic_bic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ic_auto (this is the default)</td>
<td></td>
</tr>
</tbody>
</table>

Revenue Forecast by Day Example

This example selects revenue forecast by day.

FORECAST("A - Sample Sales"."Base Facts"."1- Revenue" Target, 
("A - Sample Sales"."Time"."T00 Calendar Date"), 'forecast', 
'numPeriods=30;predictionInterval=70;') ForecastedRevenue

Revenue Forecast by Year and Quarter Example

This example selects revenue forecast by year and quarter.

FORECAST("A - Sample Sales"."Base Facts"."1- Revenue", 
("A - Sample Sales"."Time"."T01 Year" timeYear, "A - Sample Sales"."Time"."T02 
Quarter" TimeQuarter), 'forecast', 'numPeriods=30;predictionInterval=70;')
ForecastedRevenue

Constants

You can use constants in expressions.

Available constants include Date, Time, and Timestamp. See Current_Date, Current_Time, and Current_TimeStamp.

<table>
<thead>
<tr>
<th>Constant</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE</td>
<td>DATE [2014-04-09]</td>
<td>Inserts a specific date.</td>
<td>DATE [yyyy-mm-dd]</td>
</tr>
<tr>
<td>TIME</td>
<td>TIME [12:00:00]</td>
<td>Inserts a specific time.</td>
<td>TIME [hh:mi:ss]</td>
</tr>
</tbody>
</table>
| TIMESTAMP | TIMESTAMP [2014-04-09 
12:00:00] | Inserts a specific timestamp. | TIMESTAMP [yyyy-mm-dd hh:mi:ss] |
Types

You can use data types, such as CHAR, INT, and NUMERIC in expressions.

For example, you use types when creating CAST expressions that change the data type of an expression or a null literal to another data type.

Variables

Variables are used in expressions.

You can use a variable in an expression. See Defining Variables.