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- Top FAQs to Model Data
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- Functions
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  - Analytics Functions
  - Calendar Functions
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  - Display Functions
  - Evaluate Functions
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
- Getting Started with Oracle Cloud
- Managing and Monitoring Oracle Cloud

Conventions

This document uses the standard Oracle text and image conventions.

Text Conventions

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<th>Meaning</th>
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<td>boldface</td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
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<tr>
<td>italic</td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td>monospace</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 are 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
- Store Your Data With Oracle Analytics Cloud
- Before You Start to Prepare Your Data
- 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.
- You can also 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.

Store Your Data With Oracle Analytics Cloud

Oracle Analytics Cloud leverages Oracle Database Cloud Service. You must have at least one Oracle Database Cloud Service subscription to store the required system schemas. This Oracle Database Cloud Service subscription is mandatory, even if you are storing your enterprise data somewhere else. The instructions in this guide
assume that you’re intending to store your enterprise data in Oracle Database Cloud Service.

Your administrator will provide you with the connection details. See Manage Database Connections for Data Models.

Before You Start to Prepare Your Data

Before you start, make sure that you have the necessary tools and account privileges.

- If you plan to use Data Sync to load your data, make sure that you have a user login with the required data loading privileges. See Give Users Permissions to Upload Data with Data Sync.

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.

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<td>Data modelers</td>
<td>Understand Data Modeling</td>
</tr>
<tr>
<td>Take regular snapshots, and more</td>
<td>Administrators</td>
<td>Take Snapshots and Restore Information</td>
</tr>
</tbody>
</table>

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 Load Data
• Top Tasks to Model Data
• Top Tasks to Manage Data

Top Tasks to Load Data

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

Video
• Starting a Data Load
• Refreshing Data Regularly
• Setting Up Data Loads from CSV or XLSX Files Using Data Sync
• Setting Up Data Loads from Tables Using Data Sync
• Set Up Data Loads from JDBC Data Sources
• Set Up Data Loads from SaaS Applications
• Set Up Data Loads to Oracle Essbase
• Transform Your Data

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
Load Data

This part explains how to load data that you want to model.

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Chapters:

• Get Your Data to the Cloud
• Load Data from Files
• Load Data from Relational Tables
• Set Up Data Loads from SaaS Applications
• Set Up Data Loads from JDBC Data Sources
• Set Up Data Loads to Oracle Essbase
• Load Data With Data Sync
• Transform Your Data
Overview to Get Your Data to the Cloud

This topic outlines ways to upload data for Analytics Cloud and introduces the data loading tool Data Sync.

Tutorial

Topics:
• Upload Data to the Cloud
• Help: About Data Sync
• Set Up Data Sync for the First Time
• Quick Guide to Loading Data With Data Sync

Upload Data to the Cloud

Use Data Sync to upload data to the cloud so that analysts and users can start analyzing the data. You can upload data to tables, data sets (for Data Visualization), and flat files.

Set Up Data Sync for the First Time

Set up Data Sync so that you can load your data.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request permissions to load data</td>
<td>Work with your service administrator to ensure that you have permissions to load data.</td>
<td>Give Users Permissions to Upload Data with Data Sync</td>
</tr>
<tr>
<td>Change default environment properties</td>
<td>Configure Data Sync for your local environment.</td>
<td>Set Default Options for Data Sync</td>
</tr>
<tr>
<td>Create a new data loading project</td>
<td>Create a project, specify connections, set up the loading options, and load your data.</td>
<td>Quick Guide to Loading Data With Data Sync</td>
</tr>
</tbody>
</table>
Give Users Permissions to Upload Data with Data Sync

To load data using Data Sync, you need a user account with appropriate privileges.

Your Data Sync user account must also have read permissions on any source databases from which you plan to load data. This user account must be separate to any federated user accounts that you create for dashboard and report users.

Ask your administrator for the appropriate permissions. These steps describe what your Cloud service administrator needs to do.

1. If required, create an account for the Data Sync user.
   a. Click Console.
   b. Navigate to Users and Roles, then Users, and create a user.
2. Sign into your Cloud service as administrator.
3. Click Console, then Users and Roles.
4. Navigate to the user, click Manage Application Roles, and assign the following application roles:
   • BI Dataload Author - Enables Data Sync users to load data into a table.
   • DV Content Author - Enables Data Sync users to load data into a data set.

Set Default Options for Data Sync

Set up defaults for Data Sync to suit your business needs and optimize the way Data Sync works for you. For example, you can set up a default directory for your data files, determine how much detail gets logged, how long to keep log files, and more.

1. In Data Sync, from the Views menu, select System Properties.
2. Set the properties to suit your data loading requirements.
3. If you plan to upload data from files (CSV or XLSX), use the Data File Root Directory property to specify the default location for source files so that you don’t have to navigate to the folder each time.
   For example, D:\mydatafiles.
4. If your organization uses a proxy server to route calls to external websites, configure Proxy Host and Proxy Port.

Quick Guide to Loading Data With Data Sync

With Data Sync you can quickly load data from a data source to Oracle Analytics Cloud, Oracle Essbase, or flat-file format.

1. From the Projects menu, click New.
2. Click Create a New Project, specify a short name to identify the data loading project in Data Sync, then click OK.
3. In the Connections view, specify connection details:
   a. Create a connection to tell Data Sync where you’re loading data to. See Specify Connection Details for Your Data Target.
b. If you’re loading data from a database, create a connection to tell Data Sync where you’re loading data from. See Specify Connection Details for a Data Source.

If you’re loading data from data files, for example CSV, ZIP, or XLSX, then you can skip this step because you don’t need a connection for data files.

4. In the Project view, specify loading options for your project. See Set Up Your Data Load.

5. In the Jobs view, start the data load:
   a. On the Jobs tab, click New, use the New Job dialog to specify a job name and loading details, then click Next.
   b. At the New Job – Choose the connections dialog, use the Override With option to specify a data source and data target.
      For the data source named TARGET, select the target connection that you created for your project (in Step 3.a). For example, if you created a target connection named MyDBaaS, select it here.
   c. Click Finish to display the Configure Initial Extract dialog, and specify whether you want to perform a full load or incremental load, then click OK.
   d. Click Run Job.
      In the Jobs view, use the Runs tab to monitor the progress of the data load.

Specify Connection Details for Your Data Target

To set up a Data Sync environment, you specify connection details for your data target. For example, your data target might be Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, or Oracle Essbase.

1. In the Connections view, click New.
2. At the New Connection dialog box, specify the following details:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short name to identify the connection details in Data Sync and in logs.</td>
</tr>
<tr>
<td>Type</td>
<td>Specify how you’re connecting to your target database:</td>
</tr>
<tr>
<td></td>
<td>• If you’re connecting directly to a database (for example, Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, Exadata Express) select Oracle (Thin). Optionally, if you are using cwallet.sso authentication, click the Advanced Properties tab, and set the value of Additional JDBC driver Properties to oracle.net.wallet_location=file:&lt;FULL_PATH_TO_CWALLET.SSO_FILE&gt;). For example, oracle.net.wallet_location=file:C:\12.1_client\network\admin.</td>
</tr>
<tr>
<td></td>
<td>• If you’re connecting via HTTPS to an Oracle Database Cloud Service target, select Oracle (BICS).</td>
</tr>
<tr>
<td></td>
<td>• If you’re connecting to an Oracle Essbase target, select EssBase.</td>
</tr>
<tr>
<td></td>
<td>• If you’re connecting to a flat file target, select File source.</td>
</tr>
</tbody>
</table>
3. Click **OK**, and use the Edit tab to specify the connection details for the data target.

For example, for an Oracle Analytics Cloud target, you typically specify values for User, Password, Connection Name, and URL.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Enter the name of a user with an appropriate data loading application role (<strong>BI Dataload Author</strong> for loading to tables, and/or <strong>DV Content Author</strong> for loading to data sets).</td>
</tr>
<tr>
<td>Password</td>
<td>Specify the password for the user that you entered in the <strong>User</strong> field.</td>
</tr>
<tr>
<td>Connection Name</td>
<td>If you’re connecting via HTTPS to a Oracle Database Cloud Service target, specify the name of your target database exactly as it’s specified in the Connections page in Oracle Analytics Cloud Console. For other types of database connection (for example, using Oracle (Thin) or Oracle Essbase), leave this field blank.</td>
</tr>
</tbody>
</table>
| URL                    | Specify a URL connection string for your target database:  
  - If you're connecting directly to a database (for example, Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, Exadata Express), specify your database URL in the format:  
    
    ```
    jdbc:oracle:thin:@<Service Name URL string>
    ```

    You can obtain your Service Name URL from the tnsnames.ora file, which contains Service Name URLs for three levels of security. For example, open c:\12c_client\product\12.2.0\client_1\network\admin\tnsnames.ora. For the Service Name URL entry for the lowest level (that is, ending in 'low'), copy the string from "(DESCRIPTION" to the end of connect string, and append it to jdbc:oracle:thin:@. For example:

    ```
    jdbc:oracle:thin:@(description=(address=(protocol=tcp)(port=1522)
    (host=adwc.oraclecloud.com))(connect_data=(service_name=partners_low.adwc.oraclecloud.com))(security=(ssl_server_cert_dn="CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")))
    ```

  - If you're connecting via HTTPS to an Oracle Database Cloud Service target, specify your Oracle Analytics Cloud URL without the /analytics or /va URL extension. For example, https://<My OAC>.oraclecloud.com.

    You obtain your Oracle Analytics Cloud URL in Oracle Cloud My Services by navigating to your cloud service and clicking **Manage this instance**.

  - If you're connecting to an Oracle Essbase target, specify your Essbase URL.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Properties tab</td>
<td>If your connection requires cwallet.sso, click <strong>Advanced Properties</strong>, and set the value of <strong>Additional JDBC driver Properties</strong> to oracle.net.wallet_location=file:&lt;FULL_PATH_TO_CWALLET.SSO_FILE&gt;). For example, oracle.net.wallet_location=file:C:\12.1_client\network\admin.</td>
</tr>
<tr>
<td>JDBC Driver</td>
<td>If you’re connecting directly to a database (for example, Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, Exadata Express), specify 'oracle.jdbc.driver.OracleDriver'.</td>
</tr>
<tr>
<td>Schema/Table Owner</td>
<td>If you’re connecting directly to a database (for example, Oracle Database Cloud Service, Oracle Autonomous Data Warehouse, Exadata Express), specify the SCHEMA owner (typically the same as the database user, but in upper case). Alternatively, click the edit icon on the <strong>Schema/Table Owner</strong> field to select from available schemas.</td>
</tr>
</tbody>
</table>

4. Click **Test Connection** to validate the connections details.
5. Click **Save**.

### Specify Connection Details for a Data Source

To set up a Data Sync environment, you specify connection details for your source database. If you’re only loading data from files, then you can skip this task.

1. In the **Connections** view, click **New**.
2. At the New Connection dialog box, specify the following details:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short name to identify the connection details in Data Sync and in system logs.</td>
</tr>
</tbody>
</table>
3. Click OK, and use the Edit tab to specify the connection details for the data source.

For example, for a generic JDBC source, you typically specify values for User, Password, Connection Name, URL, and JDBC Driver.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Enter the name of a user with an appropriate data loading application role (BI Dataload Author for loading to tables, and/or DV Content Author for loading to data sets).</td>
</tr>
<tr>
<td>Password</td>
<td>Specify the password for the user that you entered in the User field.</td>
</tr>
</tbody>
</table>
| Service Name, TNS Name, Connection String, or Database Name, or ODBC Data Source | Enter the values appropriate for your database. For an Oracle TNS Name, enter the TNS name that is specified in the tnsnames.ora file in \network\admin\.
| Host             | Specify the machine name or IP address of the machine where the database resides. |
| Port             | Specify the port number where the database listens (for example, 1521 is the default for an Oracle database). |
### Field or Element | Description
--- | ---
URL (Optional) | Specify a JDBC URL for the data source connection. The value in this field must conform to the database specifications. Use this option to specify a unique URL for a particular data source. For example, this option can be useful if this physical data source uses Oracle RAC and other data sources use a different database type.

Driver (Optional) | Specify the driver as described in the JDBC documentation. The JDBC driver version must match the database version. A version mismatch can lead to spurious errors during the data load process. Even using an Oracle database, if the version of the JDBC driver does not match that of the database, then you must download the compatible version of the JDBC driver from Oracle’s website and place it in the lib directory.

---

4. Click **Test Connection** to validate the connections details.

5. Click **Advanced Properties** to review and update additional properties that are required for the data source type that you're using.

   For example, for file sources you can configure **Delimiter**, **Number of lines to skip**, and **Number of lines to sample**.

6. Click **Save**.

### Set Up Your Data Load

When you create a data loading project, you specify which data columns to load and how you want to load them.

Make sure that you're working in your project. The project name is displayed adjacent to the Jobs tab.

If you haven't already created a data loading project, from the **Projects** menu, select **New**.

1. In the Project view, click the **Data Flows** tab, then click **New**.

2. At the Import Definition into <Project> dialog box, choose a load type:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discover object from catalog</td>
<td>Let Data Sync query the data source and display a list of tables for you. Use this option when you don't know the table names in your data source.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Type list of object names</td>
<td>Enter the names of tables that you want to load. Use this option when you know the table names, so you don't need to query the data source.</td>
</tr>
<tr>
<td>Enter object's properties</td>
<td>Enter a SQL statement or partitioned read to load your data. Use this advanced option when you want more control over the SQL commands that you use.</td>
</tr>
<tr>
<td>manually</td>
<td></td>
</tr>
<tr>
<td>Add target to an existing</td>
<td>Load data into an extra target table. Use this option to load data into multiple tables in the same data flow</td>
</tr>
<tr>
<td>source</td>
<td></td>
</tr>
</tbody>
</table>

3. Follow the on-screen instructions to specify what to load and how to load.

4. To further refine the data loading details, use the other tabs. For example:

- In the Data Flows tab, click **Edit** to drill into source or target details, or update the data load strategy.
- In the Data Flows tab, click **Column Mapping** to add transformations or joins.
- In the Script Processing tab, run SQL commands before, during, or after a data load. For example, you might want to create indexes or remove temporary tables.
- In the Parameters tab, specify run-time values, for example, Last Replication Date.

Select Your Project in Data Sync

Make sure that you have your project displayed in the workarea.

Make sure that you're working in your project. The project name is displayed adjacent to the Jobs tab.

If you haven't already created a data loading project, from the **Projects** menu, select **New**.
Set Up Data Loads from Files

Use Data Sync to load file–based data that you want your analysts and users to analyze.

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics

- Typical Workflow to Load Data from Files With Data Sync
- About Data File Requirements
- Setting Up Data Loads from CSV or XLSX Files Using Data Sync
- Setting Up Data Loads from ZIP Files
- Set Up Data Loads From Secure File Transfer Protocol (SFTP) Sources

Typical Workflow to Load Data from Files With Data Sync

Here are the common tasks for loading business intelligence data from files.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set up your Data Sync environment</td>
<td>Download and install Data Sync on a local machine, and set up your Data Sync environment.</td>
<td>Set Up Data Sync for the First Time</td>
</tr>
<tr>
<td>Prepare your data files</td>
<td>Make sure that your data files meet the formatting requirements for Data Sync.</td>
<td>About Data File Requirements</td>
</tr>
<tr>
<td>Specify connection details for your data target</td>
<td>If you’re loading to a database, specify the connection details of your target database. If you’re loading to flat-files, you can skip this task.</td>
<td>Specify Connection Details for Your Data Target</td>
</tr>
<tr>
<td>Set up your data load</td>
<td>Register the CSV, XLSX, or ZIP files that you want to load, and define a load strategy for you data.</td>
<td>Setting Up Data Loads from CSV or XLSX Files Using Data Sync</td>
</tr>
<tr>
<td>Manage a data load configuration</td>
<td>Make changes to an existing data load from file configuration.</td>
<td>Maintaining File Setup Data</td>
</tr>
<tr>
<td>Load data using Data Sync</td>
<td>Use Data Sync to load data into your target Cloud database.</td>
<td>Starting a Data Load</td>
</tr>
<tr>
<td>Refresh your data regularly</td>
<td>Schedule a regular data load to refresh your data.</td>
<td>Refreshing Data Regularly</td>
</tr>
<tr>
<td>Monitor Data Loads</td>
<td>Monitor the progress of data loads and respond to issues.</td>
<td>Monitoring Data Loads</td>
</tr>
</tbody>
</table>
About Data File Requirements

Before you start to load data from files, make sure that your data files meet the requirements specified here. You can load from a single data file or multiple data files of the same format at the same time.

In the Data Sync system properties, you use the Data File Root Directory property to specify where Data Sync looks by default for data files to import.

You can load Comma Separated Value (CSV) files containing most common delimiters (for example, commas, tabs), or Microsoft Excel XLSX files.

- **Comma Separated Value (CSV)**
  - You can load from a single file, or multiple files at the same time as long as they are in the same format.
  - You can use the Data Sync import wizard to choose from a selection of delimiter types; for example, comma, tab, pipe.
  - You can specify a single character as a delimiter, such as a comma ("","), or space (" "), or a tab ("\t" or "[tab]").
  - You can load from a file that includes a banner, which can be ignored during load. However, the transition from header to data should predictably start from a particular line number.
  - You can load a file that includes timestamps and date strings. However, only one format per file can be used. For example, if there is birth date and hire date, both need to be formatted in the same way. As an example, “yyyy-MM-dd” can be used to interpret timestamp “1968-01-01” as birth date, and “2010-06-31” as hire-date.
  - You enclose a value in double-quotes if the value contains the delimiter as part of the value or the value contains new line characters.

- **Microsoft Excel XLSX**
  - You can load one or more sheets in an XLSX file.
  - You can also choose to load the whole sheet or a range of cells. For example, you might specify that the data section starts in cell D4 and ends in cell J35.
  - The data types are inferred from the cell type in the XLSX file. Before you import data, set the appropriate data types in the XLSX file.
  - Avoid XLSX files with many sheets, because the process that reads the XLSX files is memory intensive. If you have large files, then you might have to set a higher startup memory in the datasync.bat/.sh file.

- **Compressed files containing multiple files (ZIP)**
  - You can load data from multiple data files compressed in a ZIP file. For example, you might have exported data from Fusion Applications in ZIP format.
    (This excludes MS Excel (XLSX) files compressed in a ZIP file, which you must load one at a time.)
  - Each data file must have the same format.
About Error Handling and Logging

When you load data from files, Data Sync stores information in logs to help you deal with errors and exceptions.

When a file is parsed and loaded, errors can result either while reading or writing. Read-related errors most commonly occur when strings are converted to an object of type integer, decimal, or timestamp. Errors also result from invalid formatting, for example, if an attribute contains the delimiter but is not double quoted, or a line does not have as many attributes as the header.

Write-related errors can result from insufficient length or entering null into a non-null attribute. When this type of issue is detected, the errors are logged in a file in the \log directory with the naming convention CR_<Table/File Name>_ <From Connection>_ <To Connection>_ <timestamp>.bad. This log file contains the line number of the problem record, the record itself, and the list of problems that occurred when the file was parsed.

If invalid records are identified, you must correct the original file and rerun the process. If you don’t know how to correct a record in the file at the location specified in the .bad log file, then you skip the record by adding "--" in front of the line in the file (that is, comment out the text).

Track Where Data Originates

You can track where data originates by adding variables for source filename and line number to the target database.

1. Configure your data load on the Source Data tab.
2. Click the Targets tab.
3. Click Map Columns, and add two new columns.
4. For the first new column, click the File Data Transformation field and select FILE_NAME.
5. For the second new column, click the File Data Transformation field and select LINE_NUMBER.

About Data Sets

Data Sync can load your data as a data set that Data Visualization understands.

Data sets are file-based storage objects that you can use to analyze data quickly. When you use Data Sync to load data, you specify the target format as either relational or data set.
Setting Up Data Loads from CSV or XLSX Files Using Data Sync

Before you start loading data, you specify information about your data files, such as the format, which columns or cells to load, and how to handle incremental data.

Before you start, make sure that you have prepared your data files, as specified in About Data File Requirements.

1. In Data Sync, make sure that your project is selected.

If you haven't already created a new data loading project, click Projects, then New, and click Create a New Project.

2. In the Project view, click the Source Data tab, then Data From Objects.

3. At the Select Source dialog, select File source to display the New Source File dialog.

4. Select the file or files that you want to load by doing one of the following:
   - To load from a single data file, enter the full CSV or XLSX file name into the File Name field or click the File Location field and navigate to and select the data file.
     For example, you might enter D:/csvFiles/AIRLINE_TRAFFIC.csv to load a specific file.
     If you don’t specify the full directory path in the File Name field, then Data Sync attempts to locate the specified file in the default file location that is set in the System Property named Data File Root Directory.
   - To load data from multiple files at the same time, use an asterisk (*) as a wildcard in the File Name field, as follows:
     - To load any file that starts with a name AIRLINE_TRAFFIC, enter: D:/csvFiles/AIRLINE_TRAFFIC*.csv
     - To load all files that end with a .csv extension, enter: D:/csvFiles/* .csv

5. Enter a unique descriptive name in the Logical Name field.
   For example, if you’re loading from multiple data files, you might enter My_HR_Data_Combined.

6. Click Next to display the Import Options dialog.
7. Use the Import Options dialog to specify how to process your data files.

For data in CSV format, specify:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codepage</td>
<td>Select the format of the file that you're importing.</td>
</tr>
<tr>
<td>Number of lines to skip</td>
<td>Enter the number of lines to skip in the file, if any. Use this option if your file has a header and the data does not start on the first line. If no lines should be skipped, leave the default, 0.</td>
</tr>
<tr>
<td>First line contains headers</td>
<td>Select this option if your file contains column names in a header. Data Sync parses the first line to generate column names in upper case, and truncates names to 30 characters. If a data file does not contain headers, then Data Sync generates default column names COLUMN_1, COLUMN_2, and so on.</td>
</tr>
<tr>
<td>Delimiter</td>
<td>Select the character that separates field values in the data file. Options include Comma, Pipe, Semi-colon, Space, Tab, Tilde, or Custom. If you have a custom delimiter, then select Custom and enter the single-character delimiter.</td>
</tr>
<tr>
<td>Timestamp format (Java style)</td>
<td>Select the format of timestamp data in your data files.</td>
</tr>
<tr>
<td>Number of lines to be sampled</td>
<td>Leave the default value –1 to analyze all data values when evaluating data.</td>
</tr>
</tbody>
</table>

For data in XLSX format, specify:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timestamp format (Java style)</td>
<td>Select date format that is used in the spreadsheet.</td>
</tr>
<tr>
<td>Range of Cells</td>
<td>Use the Start field to specify the cell ID of where the data starts, for example D10. Use the End field to specify the cell ID of where the data ends, for example H250.</td>
</tr>
<tr>
<td>Select sheets to be imported</td>
<td>If the XLSX file contains multiple sheets and you only want to load data from specific sheets, then click Select sheets to be imported to display the Choose sheets dialog, and move the sheets to that you want to load to the Selected Sheets list.</td>
</tr>
</tbody>
</table>

8. Click Next to display the Select Target Table dialog.

9. In the Target Table option section of the dialog, specify:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Option</td>
<td>Specify whether to load into an existing table or create a new table. If you choose to create a new table, then specify a suitable short name or edit the default name to identify this table in the target data source.</td>
</tr>
<tr>
<td>Choose output option</td>
<td>Select Relational for analysis in enterprise dashboards and analyses. Select Data Set for analysis in Data Visualization.</td>
</tr>
<tr>
<td>Remove duplicates</td>
<td>Select this option if the source XLSX file contains duplicate records and you want Data Sync to select a distinct set of rows based on a certain attribute or set of attributes that you identify as user key columns that can enforce uniqueness and resolve duplicate records.</td>
</tr>
</tbody>
</table>
10. Click **Next** to display the New Source File: Map columns dialog.

11. Use the New Source File: Map columns dialog to verify that the data types and other configuration details are correct. For example, deselect the **Load** option next to columns that you don’t want to load.

12. Specify how you want to handle incremental loads:
   a. Select the **Update Rows on Match** option next to each row.
   b. Select the **Rolling Delete** option next to one of the date fields to prune the data.

13. Use the Import File dialog to review the status message, for example **Success**.

14. On the Target Tables tab, click the **Edit** tab, and set the **Rolling Delete Days** value.

15. Define how you want to handle subsequent operations on the file, such as incremental loading.
   a. Click the **File Data** tab, then click the **File Targets** sub-tab.
   b. Click the **Load Strategy** column to display the Load Strategy dialog.
   c. At the Load Strategy dialog, click **Never delete data** and **Update Table**.
   d. At the Incremental Settings dialog, select the key column or combination of columns that uniquely identify records.
   e. Click **OK**, then click **OK** on the Message dialog prompting you to create an index.

You’re now ready to start loading data using a job. In the **Jobs** view, use the Jobs tab to create a new job, then click **Run Job** when you’re ready to start loading.

### Setting Up Data Loads from ZIP Files

Before you start loading data, you specify information about your data files, such as the format, and how to handle incremental data.

Before you start, make sure that you have prepared your data files, as specified in **About Data File Requirements**.

1. In Data Sync, make sure that your project is selected.

   ![Data Sync Screenshot]

   If you haven’t already created a new data loading project, click **Projects**, then **New**, and click **Create a New Project**.

2. In the Project view, click the **Source Data** tab, then **Manual Entry**.
3. At the Select Source dialog, select **File source** then click **OK**.

4. At the Manual Entry dialog, specify: Enter a unique descriptive name in the **Logical Name** field.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Name</td>
<td>Specify a short meaningful name to identify the data source in Data Sync. For example, FA_HR1. The name must not contain spaces, and must be different from the <strong>Target Name</strong>.</td>
</tr>
<tr>
<td>Target</td>
<td>Click <strong>Create new</strong> to create a new database table or click <strong>Select an existing</strong> to load data to an existing database table.</td>
</tr>
<tr>
<td>Target Name</td>
<td>Specify a short meaningful name to identify the target object in Data Sync. For example, T_FA_HR1. The name must not contain spaces, and must be different from the <strong>Logical Name</strong>. If the target type is Relational or Data Set, then Data Sync uses this name to create the database table or data set.</td>
</tr>
<tr>
<td>Output Option</td>
<td>Select <strong>Relational</strong> for analysis in enterprise dashboards and analyses. Select Data Set for analysis in Data Visualization.</td>
</tr>
</tbody>
</table>

5. At the Message dialog, from the **Data from** list, select **Zipped Delimited File(s)**, then click **OK**.

A Properties dialog presents a list of Name and Value pairs.

6. For each attribute that you want to specify, click the **Value** field and enter a value.

For example, to load only data from CSV files, edit the value of **Extension filter** and specify `.CSV`.

**Note:** You can edit these values later on the **Source Data-Attributes** tab.

7. Save the configuration details, and use the other tabs to refine your data load details as required.

8. Specify a load strategy:

   a. On the Source Data tab, click the **Targets** tab and click the **Load Strategy** field to display the Load Strategy dialog.

   b. Use the Load Strategy dialog to specify how to load data according to your business needs.

   You’re now ready to start loading data using a job. In the **Jobs** view, use the Jobs tab to create a new job, then click **Run Job** when you’re ready to start loading.

---

**Set Up Data Loads From Secure File Transfer Protocol (SFTP) Sources**

Before you start loading data, you specify information about your data files, such as the format, and how to handle incremental data.

Make sure that you’re working in your project. The project name is displayed adjacent to the Jobs tab.
If you haven’t already created a data loading project, from the Projects menu, select New.

1. In the Connections view, create a connection for your SFTP source.
   • In Connection Type, select SFTP Connector.
   • Specify a User and Password for the SFTP source.
   • In URL, specify the internet address of your SFTP source.

2. At the Import Definition dialog box, select Enter object’s properties manually, then click OK.

3. In the Select Source dialog box, and select the name of the source connection that you created in Step 1, then click OK.

4. In the Manual Entry dialog box, specify:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Name</td>
<td>Specify a short meaningful name to identify the data source in Data Sync. For example, FA_HR1. The name must not contain spaces, and must be different from the Target Name.</td>
</tr>
<tr>
<td>Target</td>
<td>Click Create new to create a new database table or click Select an existing to load data to an existing database table.</td>
</tr>
<tr>
<td>Target Name</td>
<td>Specify a short meaningful name to identify the target object in Data Sync. For example, T_FA_HR1. The name must not contain spaces, and must be different from the Logical Name. If the target type is Relational or Data Set, then Data Sync uses this name to create the database table or data set.</td>
</tr>
<tr>
<td>Output Option</td>
<td>Select Relational for analysis in enterprise dashboards and analyses. Select Data Set for analysis in Data Visualization.</td>
</tr>
</tbody>
</table>

5. At the Message dialog box, select Query from the Data from option.

6. In the Properties dialog box, click Value for Query Override and enter a query to load your data.
   For example, select * from orders.

7. Save the details.

8. Specify a load strategy:
   b. Use the Load Strategy dialog box to specify how to load data according to your business needs.
You're now ready to start loading data using a job. In the Jobs view, use the Jobs tab to create a new job, then click Run Job when you're ready to start loading.
Set Up Data Loads from Relational Tables

This topic describes how to load data from relational tables.

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics:
- Typical Workflow to Load Data from Tables
- Setting Up Data Loads from Tables Using Data Sync
- Overriding a Data Load from a Table

Typical Workflow to Load Data from Tables

Here are the common tasks for loading data from database tables.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Data Sync up and running</td>
<td>Download and install Data Sync on a local machine, and set up the Data Sync environment.</td>
<td>Set Up Data Sync for the First Time</td>
</tr>
<tr>
<td>Specify connection details for your data source</td>
<td>Specify the connection details of your source database.</td>
<td>Specify Connection Details for a Data Source</td>
</tr>
<tr>
<td>Specify connection details for your data target</td>
<td>If you’re loading to a database, specify the connection details of your target database. If you’re loading to flat-files, you can skip this task.</td>
<td>Specify Connection Details for Your Data Target</td>
</tr>
<tr>
<td>Set up your data load</td>
<td>Register the tables that you want to load, and define a load strategy for each table.</td>
<td>Setting Up Data Loads from Tables Using Data Sync</td>
</tr>
<tr>
<td>Load data using Data Sync</td>
<td>Use Data Sync to load data into your target Cloud database.</td>
<td>Starting a Data Load</td>
</tr>
<tr>
<td>Load data using a SQL override</td>
<td>Use Data Sync to load data but override the load using a SQL command.</td>
<td>Overriding a Data Load from a Table</td>
</tr>
<tr>
<td>Refresh your data regularly</td>
<td>Schedule a regular data load to refresh your data.</td>
<td>Refreshing Data Regularly</td>
</tr>
<tr>
<td>Monitor Data Loads</td>
<td>Monitor the progress of data loads and respond to issues.</td>
<td>Monitoring Data Loads</td>
</tr>
</tbody>
</table>

Setting Up Data Loads from Tables Using Data Sync

Before you start loading data, you specify which columns to load and how to handle incremental data.

You can import table definitions to load from using any of the defined relational connections. Supported data types include CHAR, VARCHAR, TIMESTAMP, DATE,
NUMBER(n), NUMBER(m,n), CLOB, and BLOB. If a source table has columns with any other data type, those columns are imported with an UNKNOWN data type, are marked as inactive, and aren't included when data is copied.

1. In Data Sync, make sure that your project is selected.

If you haven’t already created a new data loading project, click Projects, then New, and click Create a New Project.

2. In the Project view, click the Source Data tab, then click Data From Objects.

3. At the Select Source dialog, select the name of the connection that you created for your data source, then click OK.

4. Select Discover objects by listing, then click OK.

   Alternatively, if you’re familiar with the source database structure, you can also use the Type list of object names option to specify which columns to load.

5. In the Import Definition into [Project] dialog, use the Search option to display the columns in the data source.

6. Select the Import Definition option next to each table that you want to load.

   Use the Filter field to narrow the list of tables displayed:
   - Enter CONTACT to find an exact match in the database for a table named “CONTACT”.
   - Enter CONTACT* or CONTACT% to find all tables in the database whose name starts with CONTACT.
   - Enter *CONTACT* or %CONTACT% to find all tables in the database whose name contains CONTACT.

7. Click Import Tables to register the source tables and create entries with the same name for target tables.

   Don’t rename tables. Data Sync assumes that the source table name and target table name are the same. If you want to use a different target table name, consider using queries as a source.

   By default, all table attributes are copied. If you want to exclude columns (for example, because they are not needed for analysis or contain sensitive information), then select the table in the Target Tables tab, select the Table Columns sub-tab, and click the Inactive option for the column or columns. If you deactivate a column, then make sure that you inspect the index definitions that might reference inactive columns. Any index that refers to an inactive or deleted column definition is dropped, but is not created. If you would like to deactivate the indexes that may refer to inactive or deleted columns, then right-click the column
and select the **Identify and inactivate invalid indexes** option. This marks any indexes that refer to inactive columns inactive as well.

8. Inspect the column Attributes:
   a. Click the **Target Tables** tab, then click the **Table Columns** tab.
   b. Deselect any columns that are not needed for analysis.

9. For each table, define a strategy.
   a. In the Load Strategy column, click the Load Strategy icon.

   ![Load Strategy dialog](image)

   b. Use the Load Strategy dialog to specify how to process data.
   c. Use the Incremental Settings dialog to select a user-key and a date timestamp column for the incremental processing.

   ![Incremental Settings dialog](image)

   d. Save the details.

You’re now ready to start loading data using a job. In the **Jobs** view, use the Jobs tab to create a new job, then click **Run Job** when you’re ready to start loading.
Overriding a Data Load from a Table

In Data Sync, you can limit the amount of data that is loaded from a source table using a SQL query override.

By default, all data from a source table is copied to the target database. To limit the data loaded, provide a SQL query with a suitable WHERE clause.

1. In Data Sync, make sure that your project is selected.

   ![](image)

   If you haven’t already created a new data loading project, click **Projects**, then **New**, and click **Create a New Project**.

2. In the Project view, click the **Target Objects** tab, then click the **Sources** tab.

3. Click the **Query** field.

4. Click the **Query** field to display the Query dialog, and enter a SQL statement that limits the amount of data that you load.

   For example, to copy one year's worth of data on a table that includes a LAST_UPD date column, you might specify (in Oracle Syntax):
   
   ```sql
   SELECT * FROM TABLE_NAME WHERE LAST_UPD > SYSDATE - 365
   ```

5. Click **OK**.

   You can also review this SQL statement on the **Project Summary** tab using the **Query** option.

When you provide a SQL query override, Data Sync validates the SQL against the database, and prompts you to correct any errors. If the SQL override includes new columns that are not present in the table definition, you're prompted to add them to the target table.

For example, take a case where a CONTACT table is imported. By default, Data Sync issues `SELECT * FROM CONTACT`. You might want to add a column named `UPLOADED_DT` to the table to record when the data is uploaded. To do this, provide a SQL query override such as the following:

```sql
SELECT CONTACT.*, SYSDATE AS UPLOADED_DT FROM CONTACT
```

In this case, Data Sync recognizes that the new column `UPLOADED_DT` does not exist on the target and offers to add it to the table definition.
Set Up Data Loads from SaaS Applications

Using Data Sync, you can schedule regular data loads from SaaS applications such as Oracle Transactional Business Intelligence (OTBI) and Oracle Service Cloud (RightNow).

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics

- Typical Workflow to Load Data from SaaS Applications
- About Loading Data from OTBI Data Sources
- About Loading Data from Oracle Service Cloud (RightNow)
- Specify Connection Details for OTBI Data
- Specify Connection Details for Oracle Service Cloud (RightNow)
- Setting Up Data Loads from OTBI Folders or Subject Areas
- Set Up a Data Load from Oracle Service Cloud (RightNow)

Typical Workflow to Load Data from SaaS Applications

Here are the common tasks for loading data from SaaS Applications.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Data Sync up and running</td>
<td>Download and install Data Sync on a local machine, and set up the Data Sync environment.</td>
<td>Set Up Data Sync for the First Time</td>
</tr>
<tr>
<td>Specify connection details for OTBI</td>
<td>Create a connection in Data Sync.</td>
<td>Specify Connection Details for OTBI Data</td>
</tr>
<tr>
<td>Specify connection details for Oracle Service Cloud (RightNow)</td>
<td>Create a connection in Data Sync.</td>
<td>Specify Connection Details for Oracle Service Cloud (RightNow)</td>
</tr>
<tr>
<td>Decide which data load configuration to use for Oracle Service Cloud (RightNow)</td>
<td>Choose one of the data loading configurations that Data Sync supports.</td>
<td>About Loading Data from Oracle Service Cloud (RightNow)</td>
</tr>
<tr>
<td></td>
<td>• Using a Report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Using a ROQL Query</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Using Objects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Using Named Field IDs</td>
<td></td>
</tr>
<tr>
<td>Specify connection details for your data target</td>
<td>If you're loading to a database, specify the connection details of your target database. If you're loading to flat-files, you can skip this task.</td>
<td>Specify Connection Details for Your Data Target</td>
</tr>
<tr>
<td>Set up a data load for OTBI</td>
<td>Specify information about your data, such as the format, which columns to load, and how to handle incremental data.</td>
<td>Setting Up Data Loads from OTBI Folders or Subject Areas</td>
</tr>
</tbody>
</table>
About Loading Data from OTBI Data Sources

You can use Data Sync to load data from several OTBI data sources.

- Oracle Financials Cloud
- Oracle Human Capital Management Cloud
- Oracle Procurement Cloud
- Oracle Project Management Cloud
- Oracle Sales Cloud
- Oracle Supply Chain Management Cloud

About Loading Data from Oracle Service Cloud (RightNow)

You can use Data Sync to load data from Oracle Service Cloud (RightNow). You can upload data from RightNow Version 15.11 or later. You'll have to upgrade, if you have an older version. You load data from the reporting instance of RightNow, not the transactional instance.

<table>
<thead>
<tr>
<th>Data Load Method</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Reports</td>
<td>If you're familiar with the RightNow desktop application, then this method is relatively easy to set up.</td>
</tr>
<tr>
<td>Using ROQL</td>
<td>If you know precisely what attributes you want to replicate, and are familiar with writing ROQL statements.</td>
</tr>
<tr>
<td>Using Objects</td>
<td>If you know the object that you would like to replicate. Optionally you can specify filters to load a subset of the rows.</td>
</tr>
<tr>
<td>Using Named IDs</td>
<td>If you only want to load specific fields and you know the field IDs.</td>
</tr>
</tbody>
</table>

Generate a data report definition from my RightNow data source

You can use Data Sync to load data from Oracle Service Cloud (RightNow). To perform incremental extracts, you simply need to include a field such as date.
How do I generate a data report definition from my RightNow data source?

- Decide what you need and how much data you need to analyze. For example, you might have five years of data in your RightNow application but you might want to analyze data for the most recent year only.
- Use the RightNow desktop application to create a data report definition.
- Include timestamp data for incremental refresh, and a numeric ID that is used to load the data in manageable chunks.
- In addition to the data report, create a metadata report that includes attributes named MAX_VALUE, MIN_VALUE, and COUNT.
- Keep a note of the unique report IDs. You’ll need to specify these when you set up data loads in Data Sync.

Filter your RightNow data on timestamps

You can use timestamps to filter your RightNow data.

Whichever way you load your RightNow data (by report, ROQL query, or object), you use a filter to specify the data that you want your users to analyze. For example, you might have five years of data in RightNow but you only want to analyze data for the most recent year.

When you specify a timestamp in a query, the timestamp must be in the format:

```
yyyy-MM-ddTHH:mm:ssZ
```

For example, you might filter a query using:

```
updatedtime > '2014-01-01T00:00:00Z'.
```

Specify Connection Details for OTBI Data

To set up a Data Sync environment with an OTBI data source, you specify connection details for your OTBI instance.

<table>
<thead>
<tr>
<th>Field</th>
<th>What to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Connection · Name</td>
<td>A short name to identify this connection in Data Sync and system logs.</td>
</tr>
<tr>
<td>New Connection · Type</td>
<td>Select Oracle BI Connector.</td>
</tr>
<tr>
<td>Edit tab · User</td>
<td>Specify an OTBI user with sufficient administration privileges on the reporting area that you want to load.</td>
</tr>
<tr>
<td>Edit tab · Password</td>
<td>Specify the password for the OTBI user.</td>
</tr>
<tr>
<td>Edit tab · URL</td>
<td>Specify your OTBI URL. For example, <a href="https://otbi.crm.us1.oraclecloud.com">https://otbi.crm.us1.oraclecloud.com</a>.</td>
</tr>
</tbody>
</table>
Specify Connection Details for Oracle Service Cloud (RightNow)

With Data Sync you can load data from Oracle Service Cloud (RightNow).

<table>
<thead>
<tr>
<th>Field</th>
<th>What to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Connection — Name</td>
<td>A short name to identify this connection in Data Sync and system logs.</td>
</tr>
<tr>
<td>New Connection — Type</td>
<td>Oracle Service Cloud (RightNow).</td>
</tr>
<tr>
<td>Edit tab - User and Password</td>
<td>Database user and password for access to the data source. Make sure that the user has sufficient administration privileges on the reporting area that you want to load.</td>
</tr>
<tr>
<td>Edit tab - URL</td>
<td>Specify the URL for your Oracle Service Cloud (RightNow) instance, for example, <a href="https://integration-test.rightnowdemo.com/">https://integration-test.rightnowdemo.com/</a>.</td>
</tr>
<tr>
<td>Edit tab - Timezone</td>
<td>UTC00:00 (recommended).</td>
</tr>
</tbody>
</table>

Setting Up Data Loads from OTBI Folders or Subject Areas

Before you start loading data, you specify information about your data, such as the format, which columns to load, and how to handle incremental data.

1. In Data Sync, make sure that your project is selected.

   ![Data Sync Interface]

   If you haven’t already created a new data loading project, click Projects, then New, and click Create a New Project.

2. In the Project view, click the Source Data tab, then click Manual Entry.

3. At the Select Source dialog, and select the name of the connection that you created for your data, then click OK.

4. At Manual Entry dialog, specify the following details.
<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Name</td>
<td>Specify a short description name to identify this data in Data Sync. For example, to load data from a report named Activity Report, you might specify ActivityReportEMEA.</td>
</tr>
<tr>
<td>Target Name</td>
<td>Enter the name that you want to use for the target table. For example, to load data from a report named Activity Report, you might specify OTBI_ACTIVITY_REPORT_EMEA.</td>
</tr>
<tr>
<td>Output Option</td>
<td>Select <strong>Relational</strong> for analysis in enterprise dashboards and analyses. Select <strong>Data Set</strong> for analysis in Data Visualization.</td>
</tr>
<tr>
<td>DB Connection</td>
<td>Select your OTBI data source. This list shows data sources that you specified on the Connections dialog.</td>
</tr>
</tbody>
</table>

5. Click **OK** to display the Message dialog.

6. At the **Data from** option, select the type of pluggable source that you want to load from.
   - To load using a SQL command, select **Logical SQL**.
   - To load from an OTBI report, select **Report**.
   - To load from a table in OTBI, select **Subject Area.Table**.

7. Click **OK** to display the Properties dialog.

   The Properties dialog shows a Name and Value pair for the Report, Subject Area, or SQL statement, depending on the pluggable source type you selected in Step 5.

8. Click the **Value** field to display the Value dialog.

9. Use the Value dialog to specify one of the following:
   - To load using a SQL command, enter the SQL statement. For example,
     ```sql
     SELECT "CRM - Sales Predictor Input"."Customer"."City" s_1, "CRM - Sales Predictor Input"."Order Item Revenue Facts"."Order Date" s_2, "CRM - Sales Predictor Input"."Order Item Revenue Facts"."Product Name" s_3 FROM "CRM - Sales Predictor Input"
     ```
   - To load from an OTBI report, enter the full path to the report. For example, `/shared/Custom/Customer Relationship Management/Activity Report`.

   The example screenshot shows the Value configured for an OTBI report.
- To load from a table in OTBI, enter "<Subject Area name>".<Table name>. For example, "CRM - Sales Predictor Input".Revenue.

10. Click OK.

11. Specify a load strategy:
   a. In the lower pane, click the Edit tab and click the Load Strategy field to display the Load Strategy dialog.
   b. Use the Load Strategy dialog to specify how to load data according to your business needs.

12. To specify how to handle incremental updates, on the lower pane click Mapping, and use the Mapping dialog to configure the data upload according to your business needs.

   If required, you can use the Pluggable Attributes tab to review and update the Name and Value pair for the Report, Subject Area, or SQL statement, depending on the pluggable source type you selected in Step 5.

   You're now ready to start loading data using a job. In the Jobs view, use the Jobs tab to create a new job, then click Run Job when you're ready to start loading.

Set Up a Data Load from Oracle Service Cloud (RightNow)

Before you start loading data, you specify information about your data, such as the format, which columns to load, and how to handle incremental data.

If you want to load from a report, first use the RightNow desktop application to generate a report containing the data you want to load. Note down the report ID of the data report and the report ID of the associated helper report.

Make sure that you're working in your project. The project name is displayed adjacent to the Jobs tab.

If you haven't already created a data loading project, from the Projects menu, select New.

1. In the Project view, click Data Flows, then click New.

2. At the Import Definition dialog box, select Enter object's properties manually, then click OK.

3. In the Select Source dialog box, and select the name of the source connection that you created for your Oracle Service Cloud data source, then click OK.

4. In the Manual Entry dialog box, specify:
5. At the Message dialog, use the **Data from** option to specify a load type.
   
   For example, select Analytics Reports (to use a report), ROQL (to use a query).

6. In the Properties dialog, configure the load details.

7. Specify a load strategy:
   
   a. In the lower pane, click **Edit** and click the **Load Strategy** field.
   
   b. Use the Load Strategy dialog box to specify how to load data according to your business needs.

   Review the new data source on the Pluggable Source Data page, and look at the Pluggable Attributes tab to verify the report details.

You’re now ready to start loading data using a job. In the **Jobs** view, use the Jobs tab to create a new job, then click **Run Job** when you’re ready to start loading.

### Load Details for Oracle Service Cloud Loads

When you set up a data load from Oracle Service Cloud, you use the Properties dialog box to specify details about your data load. The properties you specify depend on whether your data load uses a Report, ROQL Query, Named ID, or a Metadata Query.

#### Report Properties

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytics Report id</td>
<td>Enter the ID for the data report that you generated in Oracle Service Cloud, for example, 100777.</td>
</tr>
<tr>
<td>Helper Analytics Report id</td>
<td>Enter ID for the associated metadata report that you generated in Oracle Service Cloud, (containing MAX_VALUE, MIN_VALUE, and COUNT), for example, 100779.</td>
</tr>
<tr>
<td>Numeric Column</td>
<td>The name of the numeric column that you’re using to load your data in manageable chunks. For example, Incident ID.</td>
</tr>
</tbody>
</table>

| Maximum number of rows to read at a time | Leave the default value. |

#### ROQL Query Properties
### Field or Element | Description
--- | ---
**ROQL Tabular Query** Specify a ROQL SQL statement that defines the data you want to load. Use a WHERE clause to filter the data that you want to analyze. For example, to load data from the most recent year, you might enter:  
```sql
SELECT * FROM incidents WHERE updatedtime > '2014-01-01T00:00:00Z'
```

**ROQL Tabular Query Objects** Specify the RightNow native objects that you want to load, separated by a comma. For example, `location, incidents`. For any objects that are used but not specified here, Data Sync defaults the datatype to VARCHAR(200). Use the Project > Target Tables/ Data Sets > Table Columns tab to verify data types and update the data type if required.

**Numeric Column** Specify the name of the numeric column that you’re using to load data in manageable chunks, for example, `id`.

**Get Maximum Numeric Value Query** Specify a ROQL query to obtain the maximum value for the column specified in the Numeric Column field, using the same WHERE clause that you used to limit the data in the ROQL Tabular Query field. This query obtains the upper boundary of the data filter. For example, to load data from the most recent year, you might enter:  
```sql
SELECT MAX(ID) FROM incidents WHERE updatedtime > '2014-01-01T00:00:00Z'
```

**Get Minimum Numeric Value Query** Specify a ROQL query to obtain the minimum value for the column specified in the Numeric Column field, using the same WHERE clause that you used to limit the data in the ROQL Tabular Query field. This query obtains the lower boundary of the data filter. For example, to load data from the most recent year, you might enter:  
```sql
SELECT MIN(ID) FROM incidents WHERE updatedtime > '2014-01-01T00:00:00Z'
```

**Get Total Count Query** Specify a ROQL query to obtain the number of rows for the column specified in the Numeric Column field, using the same WHERE clause that you used to limit the data in the ROQL Tabular Query field. This query obtains the number of rows in your filtered data. For example, to load data from the most recent year, you might enter:  
```sql
SELECT COUNT(*) FROM incidents WHERE updatedtime > '2014-01-01T00:00:00Z'
```

**Maximum number of rows to read at a time** Leave the default value.

### Named ID Properties

#### Field or Element | Description
--- | ---
**Named Id Listing** Click Value, and use the Value dialog box to specify a one or more field IDs, with each ID on a new line. For example:

- `incidents.assignedTo.staffGroup`
- `incidents.banner.importanceFlag`

**Insert unspecified row for every Named Id** Specify `true`.
### Metadata Query Properties

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROQL Query Conditions</td>
<td>Specify a WHERE clause to limit the amount of data returned to a manageable size. For example, to load data from the most recent year, you might enter: <code>updatedtime &gt; '2014-01-01T00:00:00Z'</code>.</td>
</tr>
<tr>
<td>Numeric Column</td>
<td>Specify the name of the numeric column that you’re using to load data in manageable chunks, for example, <code>id</code>.</td>
</tr>
<tr>
<td>Maximum number of rows to read at a time</td>
<td>Don’t change the default value.</td>
</tr>
</tbody>
</table>
Set Up Data Loads from JDBC Data Sources

Use Data Sync to load data from most data sources that support JDBC.

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics:
- Typical Workflow to Load Data from JDBC Data Sources
- About Loading Data from JDBC Data Sources
- Specify Connection Details for Generic JDBC Sources
- Specifying Connection Details for NetSuite Data
- Setting Up a Data Load from a JDBC Data Source Using Metadata Objects

Typical Workflow to Load Data from JDBC Data Sources

Here are the common tasks for loading data from data sources that support JDBC, such as Greenplum, Salesforce, and Redshift.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Data Sync up and running</td>
<td>Download and install Data Sync on a local machine, and set up the Data Sync environment.</td>
<td>Set Up Data Sync for the First Time</td>
</tr>
<tr>
<td>Specify connection details for the data source</td>
<td>Create a connection in Data Sync.</td>
<td>Specify Connection Details for Generic JDBC Sources</td>
</tr>
<tr>
<td>Specify connection details for your data target</td>
<td>If you’re loading to a database, specify the connection details of your target database. If you’re loading to flat-files, you can skip this task.</td>
<td>Specify Connection Details for Your Data Target</td>
</tr>
<tr>
<td>Set up a data load from a JDBC data source</td>
<td>Specify information about your data, such as the format, which columns to load, and how to handle incremental data.</td>
<td>Setting Up a Data Load from a JDBC Data Source Using Metadata Objects</td>
</tr>
<tr>
<td>Load the data using Data Sync</td>
<td>Use Data Sync to load data into your target cloud database.</td>
<td>Starting a Data Load</td>
</tr>
<tr>
<td>Refresh your data regularly</td>
<td>Schedule regular data loads to refresh your data.</td>
<td>Refreshing Data Regularly</td>
</tr>
<tr>
<td>Monitor data loads</td>
<td>Monitor the progress of data loads and respond to issues.</td>
<td>Monitoring Data Loads</td>
</tr>
</tbody>
</table>
About Loading Data from JDBC Data Sources

You can use Data Sync to load data from most generic Java Data Base Connectivity (JDBC) data source types.

Data Sync is pre-installed with JDBC libraries for commonly used data sources, but you can also install your own JDBC libraries. The pre-installed JDBC libraries are:

- Greenplum
- Hive
- Impala
- Informix
- MongoDB
- PostgreSQL
- Redshift
- Salesforce
- Sybase

These JDBC libraries are installed on the Data Sync client machine in the folder `<Data Sync installation folder>\lib\generic_jdbc`. For example, the MongoDB library is wlmongodb.jar. If you want to use a different JDBC library, you can install your own JDBC library files in the folder `<Data Sync installation folder>\lib`.

To perform incremental extracts, you simply need to include a timestamp attribute, which tracks when a record is inserted or updated.

About Supported Data Loading Methods for JDBC

Data Sync supports four main data loading methods for JDBC data sources. You choose a data loading type to use on the Import Definition dialog box.

<table>
<thead>
<tr>
<th>Options on the Import Definition dialog box</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discover object from catalog or Type list of object names</td>
<td>If your JDBC driver supports the querying of the metadata dictionary, click <strong>Discover object from catalog</strong> to display available tables and columns. If you know the tables and columns in the data source, you can also selectively import specific objects by selecting <strong>Type list of object names</strong> and specifying the column names.</td>
</tr>
<tr>
<td>Enter object's properties manually (Query)</td>
<td>Specify a query whose results can be replicated to a table. You must specify a query with a WHERE clause only, as additional filters can be appended to the query. Don’t use a query with ORDER BY or HAVING or GROUP BY clauses. If necessary, use a query with sub-queries. For example, <code>SELECT contact_name, order_dt from (SELECT contact_name, max(order_dt) FROM orders group by contact_name) recent_orders</code>.</td>
</tr>
</tbody>
</table>
Options on the Import Definition dialog box | Description
--- | ---
Enter object’s properties manually/Day-based partitioned read from an object | Use this method if you cannot load all of the data at once. Specify the records to be read for a specified number of days at a time based on a time-stamp column. Specify:
- Object Name - the name of the table or object in the data source.
- Periodicity Column - a column/Attribute whose data type is either date/time-stamp which can be used to partition the data.
- Partition Read (Number of Days) - the number of days of data to read at a time.
- Filter Conditions - filter conditions to limit the data. Don’t use the **WHERE** key word. The filter clause can be a complex or nested expression that can be processed by the supported data source.

Enter object’s properties manually/Day-based partitioned read from a query | Use this method if you can’t load all of the data at once. You can specify the records to be read for a specified number of days at a time based on a time-stamp column. Specify:
- Object Name - the name of the table or object in the data source.
- Periodicity Column - a column or attribute whose data type is either date or time-stamp that can be used to partition the data.
- Partition Read (Number of Days) - the number of days of data to read at a time.
- Filter Conditions - filter conditions to limit the data. The filter clause can be a complex or nested expression that can be processed by the supported data source. Don’t use the **WHERE** key word.

---

**Example JDBC Drivers and URLs**

When you create a connection to a JDBC data source, you specify a Driver and URL.

<table>
<thead>
<tr>
<th>Source</th>
<th>Driver</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hive</td>
<td>com.oracle.bi.jdbc.hive.HiveDriver</td>
<td>jdbc:hive://HOST_NAME:PORT_NUMBER;DatabaseName=DATABASE_NAME</td>
</tr>
<tr>
<td>MongoDB</td>
<td>com.oracle.bi.jdbc.mongodb.MongoDBDriver</td>
<td>jdbc:oracle:mongodb://HOST_NAME:PORT_NUMBER;DatabaseName=DATABASE_NAME;</td>
</tr>
<tr>
<td>NetSuite</td>
<td>com.netsuite.jdbc.openaccess.OpenAccessDriver</td>
<td>jdbc:ns://{Server Host};{Server Port};{Server DataSource};{Server Data Source};{encrypted:1};{Cipher Suite};{CustomProperties}={AccountID}={Account Id};{RoleID}={Role Id}</td>
</tr>
<tr>
<td>Postgres</td>
<td>com.oracle.bi.jdbc.postgresql.PostgreSQLDriver</td>
<td>jdbc:oracle:postgresql://HOST_NAME:PORT_NUMBER;DatabaseName=DATABASE_NAME</td>
</tr>
</tbody>
</table>
Specify Connection Details for Generic JDBC Sources

With Data Sync you can load data from many commonly used JDBC sources.

What information do I need to connect Data Sync to my JDBC data source?

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Connection — Name</td>
<td>A short name to identify this connection in Data Sync and system logs.</td>
</tr>
<tr>
<td>New Connection — Type</td>
<td>Generic JDBC.</td>
</tr>
<tr>
<td>Edit tab — User and Password</td>
<td>User and password for access to the data source. Make sure that the user has sufficient administration privileges on the reporting area that you want to load.</td>
</tr>
<tr>
<td>Edit tab — URL</td>
<td>Specify the URL for your JDBC data source using the information from the URL column in the Example Drivers and URLs table. For example, for GreenPlum, a URL in this format: jdbc:oracle:greenplum://hostname: [port]</td>
</tr>
<tr>
<td>Edit tab — JDBC Driver</td>
<td>Copy the appropriate driver information from the Driver column in the Example Drivers and URLs table. For example, for GreenPlum, enter com.oracle.bi.jdbc.greenplum.GreenplumDrive</td>
</tr>
</tbody>
</table>
Specifying Connection Details for NetSuite Data

To set up a Data Sync environment with a NetSuite data source, you specify connection details for your NetSuite instance.

1. Install the NetSuite JDBC driver:
   a. Download the JDBC driver installer from NetSuite and install it.
   b. From the installed directory, copy NQjc.jar to the \lib folder in your Data Sync installation directory.
   c. If Data Sync is already running, exit and restart.

2. In Data Sync, click **Connections**.

3. Click **New** to display the **Select connection type** dialog, select Generic JDBC, then click **OK**.

4. At the **Select connection values** dialog, specify a unique name to identify the connection, then click **OK**.

   Data Sync adds your new connection to the list.

5. On the Edit tab, specify the following details:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Specify a NetSuite user with sufficient administration privileges on the reporting area that you want to load.</td>
</tr>
<tr>
<td>Password</td>
<td>Specify the password for the NetSuite user.</td>
</tr>
</tbody>
</table>
### Field or Element | Description
--- | ---
**URL** | Specify:

```
jdbc:ns://{Server Host}:{Server Port};ServerDataSource={Server Data Source};encrypted=1;Ciphersuites={Cipher Suite};CustomProperties=(AccountID={AccountId};RoleID={Role Id})
```

For example:

```
jdbc:ns://my.netsuite.com:1708;ServerDataSource=NetSuite.com;encrypted=1;Ciphersuites=TLS_RSA_WITH_AES_128_CBC_SHA;CustomProperties=(AccountID=TSTDRV1660232;RoleID=3)
```

6. Click **Test Connection**, then save your details.

### Setting Up a Data Load from a JDBC Data Source Using Metadata Objects

In Data Sync, you can specify the columns that you want to load, and optionally specify a data filter that selects a specific sub-set of data.

1. In Data Sync, make sure that your project is selected.

   ![Image of Data Sync interface](image.png)

   If you haven’t already created a new data loading project, click **Projects**, then **New**, and click **Create a New Project**.

2. In the Project view, click the **Source Data** tab, then click **Data from Objects(s)**.

3. At the Select Source dialog, and select the name of the connection that you created for your data, then click **OK**.

4. Click **Discover objects by listing**.

5. At the Import Definition dialog, select the JDBC connection that you created for your data source in the **Source** list, and use the **Filter** field to specify the first few characters of the column that you want to load, plus the wildcard character (*), then click **Search**. For example, to search for incidents, you might enter `incid*`. 
6. Select the objects that you want to load by clicking the Import Definition check box for each object, select the appropriate Output Option, then click Import.

7. When the import is complete, select the new record in the Pluggable Source Data list.

8. Display the Pluggable Attributes sub-tab, and specify the attributes.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;Query type&gt; Query Conditions</strong></td>
<td>Specify a WHERE clause to limit the amount of data returned to a manageable size. For example, to load data from the most recent year, you might enter:</td>
</tr>
<tr>
<td></td>
<td>updatedtime &gt; '2014-01-01T00:00:00Z'</td>
</tr>
<tr>
<td>Numeric Column</td>
<td>Specify the name of the numeric column that you’re using to load data in manageable chunks, for example, id.</td>
</tr>
<tr>
<td>Maximum number of rows to read at a time</td>
<td>Leave the default value.</td>
</tr>
</tbody>
</table>

9. Specify a load strategy:
   
   a. In the lower pane, click the Edit tab and click the Load Strategy field to display the Load Strategy dialog.
   
   b. Use the Load Strategy dialog to specify how to load data according to your business needs.

You’re now ready to start loading data using a job. In the Jobs view, use the Jobs tab to create a new job, then click Run Job when you’re ready to start loading.
Set Up Data Loads to Oracle Essbase

Use Data Sync to load data to Oracle Essbase. This enables your users to analyze data in Essbase cubes.

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics:

- Typical Workflow to Load Data to Oracle Essbase
- Specify Connection Details for an Oracle Essbase Target
- Setting Up Data Loads to Essbase Using Data Sync

Typical Workflow to Load Data to Oracle Essbase

Here are the common tasks for loading data to Oracle Essbase.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an Essbase cube and a rules file</td>
<td>In Essbase, create a cube and a rules file, and verify that the cube dimensions match the dimensions in the data source.</td>
<td>Load Data and Dimensions from Data Sync to Essbase in Using Oracle Analytics Cloud - Essbase.</td>
</tr>
<tr>
<td>Get Data Sync up and running</td>
<td>Install the latest Data Sync version on a local machine, and set up a Data Sync environment.</td>
<td>Set Up Data Sync for the First Time</td>
</tr>
<tr>
<td>Specify connection details for your data target</td>
<td>In Data Sync, specify the location of your Essbase data target.</td>
<td>Specify Connection Details for an Oracle Essbase Target</td>
</tr>
<tr>
<td>Specify connection details for your data source</td>
<td>Specify the connection details of your source database.</td>
<td>Specify Connection Details for a Data Source</td>
</tr>
<tr>
<td>Set up your data load</td>
<td>In Data Sync, specify information about your data, such as the format, which columns to load, and how to handle incremental data.</td>
<td>Setting Up Data Loads to Essbase Using Data Sync</td>
</tr>
<tr>
<td>Load the data using Data Sync</td>
<td>In Data Sync, load data into Essbase.</td>
<td>Starting a Data Load</td>
</tr>
<tr>
<td>Refresh your data regularly</td>
<td>In Data Sync, schedule regular data loads to refresh your data.</td>
<td>Refreshing Data Regularly</td>
</tr>
<tr>
<td>Monitor data loads</td>
<td>In Data Sync, monitor the progress of data loads and respond to issues.</td>
<td>Monitoring Data Loads</td>
</tr>
</tbody>
</table>
Specify Connection Details for an Oracle Essbase Target

To set up a data load to Oracle Essbase, you create a connection and specify connection details for your Essbase target database.

### Tutorial

<table>
<thead>
<tr>
<th>Field</th>
<th>What to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Connection — Name</td>
<td>A short name to identify this connection in Data Sync and system logs.</td>
</tr>
<tr>
<td>New Connection — Type</td>
<td>Essbase.</td>
</tr>
<tr>
<td>Edit tab - User and Password</td>
<td>The database user and password for access to the data source. Make sure that the user has sufficient administration privileges on the reporting area that you want to load.</td>
</tr>
<tr>
<td>Edit tab - URL</td>
<td>The URL for your Essbase instance. For example, <a href="https://myEssbase-">https://myEssbase-</a> myDomain.analytics.us2.oraclecloud.com/essbase/agent.</td>
</tr>
</tbody>
</table>

You also have to specify connection details for your data source.

### Setting Up Data Loads to Essbase Using Data Sync

To load data to Essbase, you first specify information about your data files, such as the format, which columns, and how to handle incremental data.

Before you start, make sure that you have specified connection details for your data source and data target using the **Connections** view in Data Sync.

1. Create a new project.
   a. From the **Projects** menu, click **New**.
   b. Click **Create a New Project** and in the adjacent box specify a project name.
   c. Click **OK**.
2. Make sure that your project is selected in the project field.
   ![Project view](image)

3. In the Project view, click the **Source Data** tab, and specify details of your data source.
You can either let Data Sync query the data source for you (the easier method), or if you know the data source structure you can specify your own query. Do one of the following:

To let Data Sync query the data source for you:

a. Click **Data From Object(s)** to display the **Select Source** dialog, specify the connection to your data source, then click OK to display the Import Definition dialog.

b. Click **Discover Objects by Listing**, and click OK to display the next **Import Definition** dialog.

c. Use the next **Import Definition** dialog to search for and select one or more source tables.
   
   To select a table, click the **Import Definition** option.

d. At the **Output Format** drop-down list, select **Essbase**, then click **Import**.
   
   Wait while Data Sync imports the table structure(s).

To specify your own query:

a. Click **Manual Entry** to display the **Select Source** dialog, specify the connection to your data source, then click OK to display the **Manual Entry** dialog.

b. Use the **Logical Name** field to specify a short readable name for the data load, then use the **Target** options to specify an existing or new target table name in the Essbase target.

   Make sure that the target name matches the table name in your Essbase cube.

c. At the **Choose output format** drop-down list, select **Essbase**, then click OK.

d. At the **Message** dialog, select **Query** from the **Data From** drop-down list, and click OK to display the **Properties** dialog.

e. Use the **Value** field for the **Query Override** property to specify your query, then click OK.

   For example, **SELECT ID, FIRSTNAME, SECONDNAME, EMAIL FROM CONTACTS**

   **Note:**

   Make sure that the order of the columns in the SQL statement matches the order of the columns defined in the Essbase load rule.

   For example, for the Product dimension, if the Essbase rules file lists the order of fields as **PRODUCT_NUMBER, PRODUCT_NAME, PRODUCT_TYPE**, then the order of selection of columns from your SQL query should be the same: **SELECT PRODUCT_NUMBER, PRODUCT_NAME, PRODUCT_TYPE FROM PRODUCTS**.

4. Click the **Source Data** tab, then click the **Target Objects** sub-tab, and use the **Load Strategy** option to verify that the strategy is **Update Table**.
   
   You can use the Load Strategy field to define an incremental filter column if you want to load only incremental data. Make sure that you have included one or more incremental columns based on user key and filter column (of type date/timestamp).
If the filter column is not part of the cube definition, you can delete it from the Target Object, Columns tab.

5. Click the **Target Objects** top-level tab, then click the **Attributes** tab, and specify the Essbase-specific attributes.

   - **Load Type (Dimension Build/Data Load)** - Specify the type of data load. When adding more to dimensions, use Dimension Build or DB as the type. When adding data/measures to the cube, select **Data Load** or **DL** as type.

   - **Frequent Commits (true/false)** - If loading from a data source is slow, connections can time-out. When set to false, the commits happen per batch of data worth 30KB. Setting this to true can cause slow performance.

   - **Timestamp Format** – If you’re loading time-stamp (of type `timestamp`), you can select the string format in which the time-stamp is loaded.

   - **Data Debug** – If you want to make debugging easier, change the **Data Debug** attribute to ‘true’. Data Sync generates a debug file under the `data \object_name` directory in addition to sending data to Essbase. If you’re also loading test data using Oracle Analytics Cloud - Essbase, you can compare that test data with data in the debug file.

6. Click the **Project Summary** tab, and use the **Group Name** and **Group Order** fields on the **Edit** tab to order the data.

   You order groups in ascending order so that only one data flow can populate a cube at one time. When groups are ordered, Data Sync doesn’t try to load a dimension build and a data load process simultaneously in the same cube. When the same dimensional data is to be populated across cubes, add as many targets as there are cubes from the source data, using the **New Target Object** option.

   Specify short and readable group names. Load one group per cube and group them first by dimensions and second by facts and measures.

   You’re now ready to start loading data using a job. In the **Jobs** view, use the Jobs tab to create a new job, then click **Run Job** when you’re ready to start loading.
Load Data With Data Sync

Use Data Sync to load data that you want your analysts and users to analyze.
To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics

- Starting a Data Load
- Monitoring Data Loads
- Maintaining File Setup Data
- Refreshing Data Regularly
- Reviewing Load Strategies

Starting a Data Load

After you have set up your data in Data Sync, you use a job to load the data from the data source into the data target.

When you create a Project, Data Sync creates a default job for you to load your data. You can use this job or create your own job to:

- Load data once only (for example, for a full initial load).
- Load data regularly (for example, for incremental loads).

1. In the Jobs view, make sure that your project is selected in the project field.

2. Click the Jobs tab, click New, and use the New Job dialog to specify details.
3. Click Run Job to display the New Job dialog, specify jobs options, then click Next.
4. Click Override With for the data source named TARGET, and select the target connection that you created for your project.

For example:

- If you created a target connection named MyDBaaS, select it here.
- To load to a flat file, select File source.
5. Click **Finish** to start the data load.

   In the Jobs view, use the Runs tab to monitor the progress of the data load.

### Monitoring Data Loads

When you load data, you use Data Sync to monitor progress and respond to loading issues.

1. In the **Jobs** view, and make sure that your project is selected in the project field.

   ![Monitoring Data Loads](image)

2. Click the **Current Jobs** tab to monitor in-progress data loads.

   For example, review the **Run Status** and **Status Description** fields. Click **Abort** to stop a data load, or **Restart** to re-try a data load after making corrections or changes in Data Sync.

   Use the **Tasks** and **Task Details** tabs for more detailed information.

3. Click the **History** tab to monitor completed data loads.

4. Click the **Tasks** tab to drill into the data load details.

   **Tip:** To monitor incomplete data loading jobs for all projects, use the **Cross-project Current Jobs** dialog. This dialog is displayed when you click the server status icon in the top right-hand corner of the screen.

### Maintaining File Setup Data

After you've set up a data load from one or more CSV or XLSX files, you might want to change the load configuration. For example, you might want to change the name of the target table, or remove duplicate records when you load data.

1. In Data Sync, make sure that your project is selected.

   ![Maintaining File Setup Data](image)
2. In the Project view, use Project tabs to configure the data load.
   - Use the **Source Data** tab to configure attributes related to the data source.
   - Use the **Target Objects** tab to configure attributes related to the data target.
   - Use the **Pre/Post SQL Processing** tab to run SQL scripts and stored procedures before or after data loads.
   - Use the **Parameters** tab to configure data load variables, such as replication dates and times.
   - Use the **Project Summary** tab to review the project and configure column mappings.

### Refreshing Data Regularly

After you’ve set up your data load, you use a job to load the data from the data source into the target database. You can use Data Sync to refresh data regularly by scheduling a job.

**Note:**

Before you start, on the **Jobs** sub-tab, configure a job. You can either use the default job that Data Sync created for you based on the current project name, or create your own job.

1. In the **Jobs** view, make sure that your project is selected in the project field.

2. Click the **Job Schedules** tab, then click **New** to display the **New Schedule** dialog.
3. Use the **Name** field to identify the data that you’re loading.
4. In the **Job** list, select the job that Data Sync created for you, or that you created yourself.
5. Use the **Recurrence Pattern** area to specify when and how regularly you want to load the data.
6. Specify a **Start date** and **End date**.
7. Click **Save**.
   - At the specified date and time, the data load will start.
Reviewing Load Strategies

You review an existing load strategy for a project to see how Data Sync is loading data so that you can make changes if required.

1. In Data Sync, make sure that your project is selected in the project field.

2. In the Project view, click the Source Data tab.

3. In the list of sources defined for the project, select the source that you want to review.

4. Click Target Objects, and click the Load Strategy column to display the Load Strategy dialog.

5. Review the settings and make changes if required.
Transform Your Data

Use Data Sync to transform your relational data as you load it. For example, you can apply default values, calculations, conversions, concatenations, splits, SQL commands, joins and lookups, and create new target data columns based on any supported SQL expressions.

Tutorial

To get started loading data, see Quick Guide to Loading Data With Data Sync.

Topics:
- Typical Workflow to Transform Data With Data Sync
- About Transforming Your Data
- Transforming Your Data With Default Values, Conversions, and Calculations
- Transforming Your Data With New Target Columns
- Transforming Your Data Using Joins
- Transforming Your Data Using Surrogate Keys
- Track Information About Your Data
- Manipulate Your Data Before, During, or After Data Loads

Typical Workflow to Transform Data With Data Sync

Here are the common tasks for transforming data.

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure your data load as normal</td>
<td>Configure a data load for your data source type. For example, your source data might be file-based, in relational tables, OTBI, or Oracle Service Cloud.</td>
<td>Refer to the configuration instructions appropriate for your data source type.</td>
</tr>
</tbody>
</table>
You can use Data Sync to transform your data.

You can use Data Sync to transform relational data if you're loading data into either Oracle Database Cloud Service or an on-premises database that is configured using the ‘Oracle (Thin)’ connection type.

These transformation types are supported:

- **Uppercase** - Convert lower-case characters to upper-case.
- **Lowercase** - Convert upper-case characters to lower-case.
- **Trim** - Remove part of a field.
- **Number** - Convert a string to a number by stripping away non-numeric characters.
- **Mask (Custom, Simple, Null)** - Hide parts of data fields. For example, you might want to hide credit-card numbers, or hide the first 12 digits of credit-card numbers.
- **Obfuscate (various)** - Scramble data. For example, you might want to convert credit-card numbers to strings of alpha-numeric characters, or add a 30% variance to age data.
- **Obfuscate dates** - Convert dates to a date range. For example, you might want to show approximate date of birth.
Transforming Your Data With Default Values, Conversions, and Calculations

Use Data Sync to transform and cleanse your relational data.
For example, you can apply default values, calculations, conversions, and concatenations.

**Note:**
You can use Data Sync to transform relational data if you're loading data into either Database As A Service or an on-premises database that is configured using the ‘Oracle (Thin)’ connection type.

1. Create a new Project for your data and configure the data load.
   For example, use the Source Data tab to specify the type and location of your data using either the **Data From Object(s)** option or the **Manual Entry** option.
2. In the Project view, click **Source Data**, then click **Target Objects**, then click **Map Columns** to display the Map Columns dialog.
3. Select a column to edit.
4. Apply your transformation:
   - To apply a default value, click **Target Expression** to display the Expression dialog, then click **Default** and enter the value that you want to store in the target column.
     For example, enter 0, or enter No value.
   - To calculate a value, click **Target Expression** to display the Expression dialog, and enter a SQL expression.
     For example, to calculate a Return on Investment (ROI) value, you might enter \((\text{REVENUE} * (\text{DISCNT\_RATE}/100)) - \text{COST}\).
   - To convert a value, click **Target Expression** to display the Expression dialog, and enter a SQL expression.
     Examples: To concatenate two columns, you might enter \(\text{TITLE} || \text{FIRSTNAME} || \text{LASTNAME}\). To convert a timestamp in \text{ORDER\_DAY\_DT}, you might enter \(\text{TO\_NUMBER(TO\_CHAR(ORDER\_DAY\_DT, 'YYYYMMDD'))}\). To convert \text{LASTNAME} to upper-case, you might enter \(\text{UPPER(\text{LASTNAME})}\).

Transforming Your Data With New Target Columns

Use Data Sync to create a new column in your target database.
For example, you might calculate return on investment and store the value in a new column.
1. Create a new Project for your data and configure the data load.
   For example, use the Source Data tab to specify the type and location of your data
   using either the Data From Object(s) option or the Manual Entry option.

2. In the Project view, click Source Data, then click Target Objects, then click Map
   Columns to display the Map Columns dialog.

3. Click New, and specify the details of the column that you want to create.
   For example, specify a name, type, target name, and so on.

4. Click Target Expression, and use the Expression dialog to specify a SQL
   expression that defines your target column.
   For example, for a return on investment value, you might enter (REVENUE * (DISCNT_RATE/100)) – COST.

5. Click Unmapped Columns, and add the new column to the Selected Columns
   list.

Transforming Your Data Using Surrogate Keys

Use Data Sync to improve performance by creating surrogate keys.
For example, if your source data contains a variable-length email address, you might
create a numeric surrogate key that makes data loading more efficient.

1. Create a new Project for your data and configure the data load.
   For example, use the Source Data tab to specify the type and location of your data
   using either the Data From Object(s) option or the Manual Entry option.

2. In the Project view, click Source Data, then click Target Objects, then click Map
   Columns to display the Map Columns dialog.

3. Select a column to edit.

4. Click the Target Expression field to display the Expression dialog,

5. Click Default, and select $SURROGATE_KEY.
   You can now use this key to improve the performance of your reporting queries
   when there is more than one natural key column, or when the natural key is a
   variable character ('varchar') column.
Transforming Your Data Using Joins

With Data Sync, you can use joins to transform and cleanse your relational data.

For example, you can de-normalize data, resolve foreign keys based on natural keys, or perform a calculation based on values in a different table.

**Note:**

You can use Data Sync to transform relational data if you’re loading data into either Database As A Service or an on-premises database that is configured using the ‘Oracle (Thin)’ connection type.

1. Create a new Project for your data and configure the data load.
   For example, use the Source Data tab to specify the type and location of your data using either the **Data From Object(s)** option or the **Manual Entry** option.

2. In the Project view, click **Source Data**, then click **Target Objects**, then click **Map Columns** to display the Map Columns dialog.

3. If required, add additional columns to the target table.

4. Click **Joins**.
   Use the **Joins** dialog to create and manage joins for the current project.

1. On the **Joins** dialog, click New, and define the following:
   - Use the **Name** field to specify a short user-friendly name to identify the join in Data Sync.
   - Use the **Table Names** field to specify the names of the tables to join, separated by commas.
     If the tables being looked–up are populated by the same job, Data Sync populates the lookup tables before running this data flow.
   - Use the **Join** field to specify a SQL command that creates the join.
     You can join more than one table in a join statement (in the ANSI SQL style). You can also define aliases for the tables that you're joining. When defining an alias, make sure that the expression for the columns is specified as alias.columnName. The base table is a runtime stage table, therefore you must prepend the table name with %%.
     For example, if we are loading ORDER table with a join to PRODUCT table, the join condition might be:
     ```sql
     INNER JOIN PRODUCT ON %%ORDER.PRODUCT_ID = PRODUCT.PRODUCT_ID
     Or:
     LEFT OUTER JOIN PRODUCT ON %%ORDER.PRODUCT_ID = PRODUCT.PRODUCT_ID
     ```

2. If the join returns more than one possible match, then use an aggregate function while referring to a column from this join statement.
   If the join does result in multiple matches, check the “Yields Multiple Matches” property.
1. Add columns to the target table (click **Target Tables/DataSets**, then **Table Columns**) with the appropriate data type.

2. On the **Map Columns** dialog, click **Unmapped Columns**.

3. On the Choose Columns dialog, move the new columns to the **Selected Columns** list and click **OK**.

4. For the new column, click **Target Expression**, choose the lookup being used, and in the expression specify a valid expression referring to any column from this join or any of the base columns.

   If the lookup yields multiple matches, use a valid aggregate function such as MIN, MAX, COUNT, AVG etc. For example MIN(PRODUCT.PRODUCT_NAME).

**Track Information About Your Data**

Use Data Sync to store information about your source data. You can use Data Sync to transform relational data if you're loading data into either Oracle Database Cloud Service or an on-premises database that is configured using the 'Oracle (Thin)' connection type.

For example, you can record the date on which data was loaded.

1. Create a new Project for your data and configure the data load.

   For example, use the Source Data tab to specify the type and location of your data using either the **Data From Object(s)** option or the **Manual Entry** option.

2. In the Project view, click **Data Flows**, select the data flow you want to edit, then click the **Column Mapping** subtab.

3. Select a column, then click **Target Expression**.

4. In the Expression dialog box, click **Default**, and select the data you want to track:
   - **UPSERT_TIMESTAMP** – Track the date and time of the data load.
   - **DML_CODE** – Track the update type, that is 'I' for insert or 'U' for update.

**Manipulate Your Data Before, During, or After Data Loads**

Use Data Sync to run SQL statements before, during, or after a data load. For example, to improve data load performance, you might create a table index before you start a data load. You can use Data Sync to transform relational data if you're loading data into either Database As A Service or an on-premises database that is configured using the 'Oracle (Thin)' connection type.

1. In the Project view, select your data loading project.

2. Click **Script Processing**, then click **New**.

3. In the Edit tab, specify the following details.

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short name to identify the update in the Data Sync client tool and in system logs.</td>
</tr>
<tr>
<td>SQL(s)/Stored Procedure(s)</td>
<td>Display the SQL(s)/Stored Procedure(s) dialog box, where you define your SQL statements and functions.</td>
</tr>
<tr>
<td>Field or element</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Pre/Post/During</td>
<td>Choose Pre to execute the SQL code before each data load. Choose Post to execute the SQL code after each data load. Choose During to execute the SQL code in between tasks in a data load.</td>
</tr>
<tr>
<td>Inactive</td>
<td>Activate or inactivate the process.</td>
</tr>
</tbody>
</table>

4. (Optional) Click **SQL Source Tables**, and specify the source tables that the SQL statements read from.

This helps to optimize the overall execution time. If you don’t specify source tables, Data Sync defers the step until all extraction tasks are complete in the current project.

5. (Optional) Click **SQL Target Tables**, and specify target tables to update before SQL execution.

In addition, this tab enables you to specify when to truncate a table (similar to providing a load strategy).
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
10

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.

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.

If you modeled your business data with Oracle BI Enterprise Edition, you don’t have to start from scratch with Data Modeler. You can upload your data model to the cloud.

When building a data model, 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.

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>
</tbody>
</table>
Component | Description
--- | ---
Dimension Tables | 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.

Joins | 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.

Hierarchies | 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.

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.

Video

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>
</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

You need the BI Data Model Author role to use Data Modeler. Ask your administrator to give you access if you don't see this option.

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

3. Click the name of a model to open it in Data Modeler.

4. To start a new model, click Create 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 as 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. Action menus are represented by a gear icon (⚙️).

Action menus contain actions that are relevant for a particular object or context, and are visible when the object is selected. For example, select a source object in the Database menu in the left pane to see its action menu.

A global Model Actions menu is also provided in the upper right corner. You use the global Model Actions menu for tasks that apply to the entire data model, such as clearing, closing, refreshing, or unlocking the model.

You can also use action menus to delete individual data model objects. Note the following about deleting objects:

• You must lock the model to delete an object.
• 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. For example, you can't delete a dimension table that is joined to another table until the join is removed. Similarly, you can't delete a column that's used in an expression, or a source view that's being used in another view.
• Objects aren't truly deleted until changes are published, with the exception of source views. Source views are deleted when you complete the action.

Lock a Data Model

You must always lock the data model before making any changes. Click Lock to Edit to lock the data model.
Always publish changes you want to keep before leaving Data Modeler for an extended length of time. When your HTTP browser session times out (after 20 minutes of inactivity), the lock is released and any unpublished changes are discarded.

Similarly, closing a browser ends the HTTP session and discards any unpublished changes. However, closing the browser does not release the lock. In this case, you can start a new session in a new browser and sign in with the same user name. When you attempt to lock the model in the new session, Data Modeler asks whether you want to reacquire the lock.

**Change Database Views**

You must also lock the model if you want to change database views from Data Modeler. Changes you make to database views are immediately saved to the database. This is different to data model changes which are only saved when you publish them.

Locking the model prevents other users from changing database views using Data Modeler. The lock does not stop someone from modifying database objects using other tools, such as APEX and SQL Developer.

**Override Locks**

If you have administrative privileges, you can override locks set by other users. To do this, select **Override Lock** from the global Model Actions menu in the upper right corner. Overriding a lock discards changes made by other users in their browser sessions. You must have the BIServiceAdministrator role to override a lock.

**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.

![Refresh Source Objects](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.

![Image of Data Model Properties](image)

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 and Table Overview](Image)

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.

![Data Preview](Image)

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_F11"."UNITS",
"BICS_REVENUE_F11"."ORDER_KEY",
"BICS_REVENUE_F11"."REVENUE",
"BICS_REVENUE_F11"."PROD_KEY",
"BICS_REVENUE_F11"."REVENUE"/"BICS_REVENUE_F11"."UNITS" AS AVERAGE_REVENUE
FROM "BICS_REVENUE_F11"
```

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.

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.

![Filters](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.

![Value](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.

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.

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</td>
<td>For dimension tables only. Set properties for hierarchies associated with this dimension table.</td>
</tr>
<tr>
<td>Enable unbalanced hierarchies</td>
<td></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>
</tbody>
</table>
| **Aggregation** | For fact tables only. Click to select a type of aggregation for the column from the list, or select Set Aggregation from the Column Actions menu. Aggregation types include:  
None: Applies 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 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. |
| **Available** | Click to mark a column as Available or Unavailable to choose whether that column is displayed in analyses that are created. You can also select Mark as Unavailable or Mark as Available from the Column Actions menu. |
| **Edit All** | You can click to edit properties for individual columns in the table, or select Edit All to edit all rows at once. |
| **Add Column** | Click Add Column to display the Column editor and create a new column. |
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.

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.

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.

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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, \( \text{Sum(UnitPrice} \times \text{Quantity}) \).

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 measures</td>
<td>Set custom aggregation levels for measures that are different from the default level</td>
<td>Set Aggregation Levels for Measures</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

After creating dimension tables, you can add hierarchies and levels to those tables.

A hierarchy is a system of levels in a dimension that are related to each other by one-to-many relationships. For example, the Geography hierarchy might include levels for Country, State, and City.

When fact tables and dimension tables are joined, a default hierarchy is created. You can’t add hierarchies for a particular dimension table until it has been joined to a fact table. Columns used in a join from a dimension table are used as key columns for the detail level in a hierarchy.

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. The upper part of the Add Level box shows dimension columns that haven’t yet been used in a level.
   The lower part of the box shows shared levels that have already been used in another hierarchy for this table.
   Select the dimension column or shared level that you want to use.
5. Continue to click Add Level and select the appropriate columns or shared levels, until you’ve added all the levels.
6. 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.
7. 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.
When you edit a shared level, the changes are made in all instances of the level. For example, if you change Country Name to Country, the level name is changed in all hierarchies where the shared level is used.

8. To delete a level, right-click the level and then click Delete, or click the level and select Delete level from the Level dialog. You can't delete the default Total and Detail levels.

When you delete a shared level, you can choose whether to delete it from the current hierarchy only, or to delete it from all hierarchies.

For example, assume you want to delete the shared level Country Name from the current hierarchy only, called Hierarchy 1. Right-click the level in Hierarchy 1, select Delete, then select from Hierarchy 1.

Tip:

Selecting Delete level from the Level dialog only deletes the level from the current hierarchy. To remove a shared level from all hierarchies, right-click the level and select Delete, then select from all hierarchies.

9. Deselect Available if you don't want the hierarchy visible in analyses.

10. To add another hierarchy, click Add Hierarchy and repeat the steps in this procedure. Or, 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. Change settings on the Overview tab as needed:
   • Time dimension — Specifies that hierarchies for this dimension table support a time dimension. Hierarchies for time dimensions cannot 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

You can set custom aggregation levels for a measure.

See About Setting Aggregation Levels for Measures.

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.

   Tip:
   The fact table must be joined to at least one dimension table.

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**:
      
      ```sql
      SELECT prod-name FROM products
      ```
      
      — **Return multiple values with a query like**:
      
      ```sql
      SELECT 'MyVariable', prod-name FROM products
      ```
      
      **For multiple values, always use the format**:
      
      ```sql
      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.

   ![Variable Properties and Starting Value](image)

   **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.

![Roles and Permissions interface](image)

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.
Tip:
If you deny access to a table, access to all columns in that table is implicitly denied as well.

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.

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.

<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 BI Service Administrator, BI Data Model Author, and BI Data Load Author. 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 BI Content Author and DV Content Author. Allows users to create and share content.</td>
</tr>
<tr>
<td>ServiceViewer</td>
<td>Member of BI Consumer and DV Consumer. 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>
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 **Service Administration**, and then click **Administer 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.

Note:

Users who are signed in can change their own passwords at any time.

1. Open the Console.
2. Click Service Administration, and then click Administer Users and Roles.
3. Click Users.
4. Navigate to the user, click , and 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**.

Remember to use your new password the next time you sign in.

If you’re signed in as the administrator who set up Oracle Analytics Cloud, you’re asked to use a script to change your password. See Change the WebLogic Administrator Password in *Administering Oracle Analytics Cloud - Classic*.

### 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 <a href="#">Add Your Own Application Roles</a>.</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>Service Administrator</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 Service Administrator</td>
<td>Service Administrator</td>
</tr>
<tr>
<td>BI Data Load Author</td>
<td>Allows users to load data using REST APIs and Data Sync.</td>
<td>BI Service Administrator</td>
<td>Service Administrator</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>Service User</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>Service User</td>
</tr>
<tr>
<td>DV Consumer</td>
<td>Allows users to explore data visualizations.</td>
<td>DV Content Author</td>
<td>Service Viewer</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>Service Viewer</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 [Administer 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 **Service Administration**, and then click **Administer 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.

   ![Note](image)

   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.
   
   ![Note](image)

   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.

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

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.
   c. Click **OK**.

**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 **Service Administration**, and then click **Administer 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 **Service Administration**, and then click **Administer Users and Roles**.
3. Click the **Roles** tab.

   ![Application Role Management](image)

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:
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 **Service Administration**, and then click **Administer Users and Roles**.
3. Click the **Application Roles** tab.
4. Click **Add**.
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 **Service Administration**, and then click **Administer 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 Service Administration, and then click Manage 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 Service Administration, and then click Administer 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.
Enable Users to Search Data Sets

If a visualization user adds a data set and wants other users to be able to search it using BI Ask, they ask an administrator to certify the data set. Administrators use certification to control how much compute time is consumed by indexing data sets, which can affect system performance.

Before you can certify a data set, the user must have shared the data set with you.

1. In Console, navigate to the Data page, and 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.

   When the data is indexed, other users can search it in BI Ask on the home page.
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 but 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></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>Connection Parameters</td>
<td>Connection parameters, such as host, port, user name, and password.</td>
<td>Optional</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>Snapshot Option</td>
<td>Description</td>
<td>Optional?</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</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>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>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>– Data Model and Subject Areas</td>
<td>Data models and subject areas that users create.</td>
<td>Always included</td>
</tr>
<tr>
<td>– Catalog Content</td>
<td>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>
<tr>
<td>– Shared Folders and Projects</td>
<td>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.</td>
<td>Always included</td>
</tr>
<tr>
<td>– User Folders and Projects</td>
<td>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.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
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 remain 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 but 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
- Edit Snapshot Descriptions
- Delete Snapshots

**Take a Snapshot**

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

1. Click **Console**.
2. Click **Service Administration**, and then click **Manage 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.

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, any user currently signed in has his session terminated.
- After you restore from a snapshot, you must allow a few minutes for restored content to refresh through your system. For a large snapshot, allow approximately 15 to 20 minutes.
- 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 **Service Administration**, and then click **Manage 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 Service Administration, and then click Manage 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 Service Administration Manage 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 **Service Administration Manage 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 Oracle Business Intelligence 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 **Service Administration Manage 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, overwrite current artifacts, such as your catalog, with information from the snapshot.

1. Click Console.

2. Click Service Administration Manage 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 Oracle Business Intelligence archive file (.bar) that contains your snapshot. You can only upload snapshots taken from Oracle Analytics Cloud.

5. Enter the snapshot password.

   You set the password during the download process.

6. Click OK.

The uploaded snapshot is displayed in the list of saved snapshots.

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, and between development, test, and production environments.

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.

<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</td>
<td>Oracle Analytics Cloud</td>
</tr>
<tr>
<td>Oracle Analytics Cloud - Classic</td>
<td>Oracle Analytics Cloud</td>
</tr>
</tbody>
</table>

Prerequisites for Migration

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

- 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 My Services. 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.

<table>
<thead>
<tr>
<th>Content, Configuration, and Other Items Not Migrated</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 <a href="#">Set Up a Virus Scanner</a>.</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 <a href="#">Set Up an Email Server to Deliver Reports</a>.</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 <a href="#">Upload Snapshots</a>.</td>
</tr>
<tr>
<td>Job history</td>
<td>Available in a future release.</td>
</tr>
</tbody>
</table>
**Content, Configuration, and Other Items Not Migrated**

<table>
<thead>
<tr>
<th>Users (and groups)</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<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>Take a snapshot on the source</td>
<td>Capture the content you want to migrate on the source system.</td>
<td>Take a Snapshot</td>
</tr>
<tr>
<td>Download the snapshot locally</td>
<td>Download the snapshot that you want to migrate to your local file system.</td>
<td>Download Snapshots</td>
</tr>
<tr>
<td>Upload the snapshot to the target</td>
<td>Sign in to the target system and upload the snapshot.</td>
<td>Upload Snapshots</td>
</tr>
<tr>
<td>Restore the snapshot content</td>
<td>Select the newly uploaded snapshot in the list of saved snapshots and restore the content in the snapshot.</td>
<td>Restore from a Snapshot</td>
</tr>
<tr>
<td>Migrate data files</td>
<td>(Only if the restore process fails due to connection issues) Use the Data Migration utility to migrate and restore data files from another environment.</td>
<td>Migrate File-based Data</td>
</tr>
<tr>
<td>Reconfigure your virus scanner</td>
<td>Record the virus scanner configuration in your source environment and use it to configure your virus scanner on the target.</td>
<td>Set Up a Virus Scanner</td>
</tr>
<tr>
<td>Reconfigure your mail server</td>
<td>Record the SMTP mail server configuration in your source environment and use it to configure your mail server on the target.</td>
<td>Set Up an Email Server to Deliver Reports</td>
</tr>
<tr>
<td>(Optional) Migrate other snapshots</td>
<td>Download individual snapshots that you want to migrate and then upload them to your target environment, as required.</td>
<td>Download Snapshots Upload Snapshots</td>
</tr>
</tbody>
</table>
### Task Description

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrate users and groups</td>
<td>Use export and import features in Oracle Identity Cloud Service to migrate users and roles from one identity domain to another.</td>
<td>Manage Oracle Identity Cloud Service Users</td>
</tr>
<tr>
<td>Migrate 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>
<td></td>
</tr>
</tbody>
</table>

### Migrate File-based Data

Users can 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 all the data files with the rest of your content, by including them in the snapshot with the rest of your other content. Sometimes when you restore the snapshot, data files aren't restored due to network connectivity or storage access issues. For such cases, Oracle Analytics Cloud offers a Data Migration utility that enables you to move your data files to the new location. Any map-related plug-ins and extension files for data visualization that users uploaded are moved too.

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 some environment details.
   - Check your local environment. You need Java 1.8 or later to run the migration utility.
   - Verify that the source and target Oracle Analytics Cloud both use the latest version of Oracle Analytics Cloud (105.1.x or later). The Data Migration utility isn't available in earlier versions.
     The version of your service is displayed in My Services. If you're not sure, check with your administrator.
   - Check you can access Oracle Analytics Cloud (both source and target) from the local environment where you plan to run this utility.
   - Check that the target Oracle Analytics Cloud environment has access to the source environment where the data files are stored.

2. Download the Data Migration utility.
   - In Oracle Analytics Cloud, click **Console, Service Administration**, and then click **Manage 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.

   - 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]
   #MigrateData : Migrate Oracle Analytics Cloud (OAC) data files to different target environment
   # Source OAC URL
   SOURCE_OAC_URL=http://<Source Oracle Analytics Cloud Hostname>:<Source Port>
   # Source OAC Username
   SOURCE_OAC_USERNAME=<Source Oracle Analytics Cloud Username>
   # Source OAC Bar Path, created with 'includedata' option
   BAR_PATH=<Source OAC BAR Path>
   # Target OAC URL
   TARGET_OAC_URL=http://<Target Oracle Analytics Cloud Hostname>:<Target Port>
   # Target OAC Username
   TARGET_OAC_USERNAME=<Source Oracle Analytics Cloud Username>

5. If you want to download data from your source Oracle Analytics Cloud to your local environment and subsequently upload the data to the target Oracle Analytics Cloud environment, configure sections [DownloadDataFragments] and [UploadDataFragments] in config.properties.

   [DownloadDataFiles]
   #Download Data Files: Download data files from Oracle Analytics Cloud storage to a local repository
   # Source OAC URL
   SOURCE_OAC_URL=http://<Source Oracle Analytics Cloud Hostname>:<Source Port>
   # Source OAC Username
   SOURCE_OAC_USERNAME=<Source Oracle Analytics Cloud Username>
   # Source OAC Bar Path, created with 'includedata' option
   BAR_PATH=<Source OAC BAR Path>
   # Data fragment directory. Make sure you have enough space to download data files
   DATA_FRAGMENTS_DIRECTORY=<Data Fragments Directory>
   # Data Fragment Size. Default is 500MB
   MAX_DATA_FRAGMENT_SIZE_IN_MB=500

   [UploadDataFragments]
   #Upload Data Files: Upload data files to Oracle Analytics Cloud
   # Target OAC URL
6. Run the `migrate-oac-data.jar` file in your local environment.

Usage:

```
```

Where:

- `-config configfile`: Name of the `config.properties` file
- `-d`: Downloads data locally using information in `config.properties`
- `-help`: Prints 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 you must restore the same snapshot that failed earlier.
   a. Open the Console, click **Service Administration**, and then **Manage Snapshots**.
   b. Select the snapshot containing your data files.
   c. Select the **Custom** restore option, and then select the option **File-based data**.
   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 Oracle Analytics Developer Client Tools

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, Set Up a Public Container to Share 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, Suspend and Resume Deliveries, Restore and Enable Delivery Schedules</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>
<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>
</tbody>
</table>
Understanding Administration Tools

You administer Oracle Analytics Cloud from the Console and My Services (Oracle Cloud).

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>
<tbody>
<tr>
<td>Oracle Analytics Cloud</td>
<td>Console</td>
<td>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.</td>
</tr>
<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 are familiar with this product. See About the Classic Administration Page.</td>
</tr>
<tr>
<td>Oracle Cloud</td>
<td>My Services</td>
<td>Use My Services to perform lifecycle tasks, such as create, delete, patch, restore, and scale, and to monitor usage metrics.</td>
</tr>
</tbody>
</table>

### Table: Administration Tools

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<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>
</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>Administration Console</td>
<td>Opens service administration pages available through the Console. See Manage What Users Can See and Do and Take Snapshots and Restore.</td>
</tr>
<tr>
<td>Mail Settings</td>
<td>This option is available through the Console. See Set Up an Email Server to Deliver Reports.</td>
</tr>
<tr>
<td>Virus Scanner Settings</td>
<td>This option is available through the Console. See Set Up a Virus Scanner.</td>
</tr>
<tr>
<td>Deliveries</td>
<td>This option is available through the Console. See Send Email Reports and Track Deliveries.</td>
</tr>
<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</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>
<tr>
<td>Manage Map Data</td>
<td>Define how users display their data on maps. See Manage Map Information for Analyses.</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.

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 (.rpd) 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 with an External Connection.
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 **Service Administration - Manage Connections**.
3. Click **New Connection**.
4. Enter a meaningful **Name** and **Description** that you'll remember and business modelers will recognize.
5. Enter database connection information for your Oracle Database Cloud Service. Ask the database administrator to provide the connection details.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connect Using</strong></td>
<td>Select how you want to connect to the database.</td>
</tr>
<tr>
<td>Host</td>
<td>Address of the database server or the host's name.</td>
</tr>
<tr>
<td>Port</td>
<td>Port number on which the database server is listening for incoming connections.</td>
</tr>
<tr>
<td><strong>Service Name</strong></td>
<td>Service Name — Network service name of the database.</td>
</tr>
<tr>
<td><strong>Enable SSL</strong></td>
<td>Select to secure this connection using SSL. If you haven’t done so already, upload a wallet with SSL certificates.</td>
</tr>
<tr>
<td><strong>Connect as</strong></td>
<td>Database user name.</td>
</tr>
<tr>
<td><strong>Password</strong></td>
<td>User's password to access the database.</td>
</tr>
<tr>
<td><strong>Enable SSL</strong></td>
<td>Enables SSL on the database connection.</td>
</tr>
</tbody>
</table>

6. Click **Test** to verify the connection.
7. 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 any database you connect to. 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 **Service Administration - Manage Connections**.
3. If you've not done so already, upload a wallet file containing SSL certificates to Oracle Analytics Cloud:
   a. Click **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 Service Administration.
3. Click Configure Virus Scanner.
4. Enter the host and port of the virus scanning server.
   For example, my.virus.scanning.serverexample.com.
5. Click Test to verify the connection.

Set Up Social Channels for Sharing Visualizations

Set up social channels, such as Twitter, 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 will display and users can start to share their data visualization through that channel.

1. Click Console.
2. Click Social.
3. To enable users to share data visualizations on Twitter:
   a. Select Twitter, and then Activate.
   b. Click Update to save.
4. To enable users to share data visualizations on Slack:
   a. Set up 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>
</tbody>
</table>
5. 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 set one up now.
   c. Select **Activate**. Once set up, the menu option that enables users to share their data visualization will display
   d. Click **Update** to save.

6. To enable users to share data visualizations on Oracle Content and Experience Cloud Service:
   a. Select **Oracle Content and Experience Cloud Service**, and then **Activate**.
   b. Enter connection information for the document service where users can post their content.
   c. Click **Test** to verify that Oracle Analytics Cloud can connect to Oracle Content and Experience Cloud Service.
   d. Click **Update** to save.

**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 tile on your My Services dashboard, click the Action Menu and select View Details. The REST Endpoint value for the service is displayed under Additional Information. 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 Service Administration.

3. Click Configure Mail Settings.

4. Enter the name of the SMTP Server and Port you want to use to deliver emails.
   For example, mymail.domainexample.com.

5. For Display Name of Sender and Email Address of Sender, enter the name and email address you want to see in the “From” field on emails delivering reports.

6. 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.

7. 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.

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

9. 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**
- **Email Security Alert**

#### Send Email Reports Once, Weekly, or Daily

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

1. On the Classic home page, 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.

1. Click **Console**.
2. Click **Service Administration**.
3. 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**.

4. 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**.

5. 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.

6. 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.

7. 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**.

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

9. 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 **Service Administration**.
3. Click **Monitor Deliveries**.
4. To access everyone’s deliveries in addition to your own, click the Action menu for the page, and select **Admin View**.
5. 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**.

6. 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 **Service Administration**.
3. Click **Monitor Deliveries**.
4. To restore deliveries, click the **Action** menu for the page and select **Restore Deliveries**.

   Click **OK** to confirm. Recently restored deliveries display **Disabled 🔴**.

5. To activate a delivery, click the Action menu for the delivery, and select **Edit Delivery**.

   Enable, and if necessary, redefine the delivery schedule.

6. 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.
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 Oracle Analytics Developer Client Tools
- 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 with an External Connection
Note:
Administrators can use snapshots to migrate content, as well as data models from Oracle BI Enterprise Edition. See Migrate Oracle Analytics Cloud Using Snapshots.

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. Validate the data model file (the RPD file).
   Run consistency checks using Consistency Check Manager in Oracle BI Administration Tool.
3. 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.

4. 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.

5. 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 **Service Administration - Manage Snapshots**.
4. Take a snapshot of the current data model in case you need to restore this version.
5. 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.

Pre-requisites

- 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 Oracle Analytics Developer Client Tools.
- 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.

Download and Install Oracle Analytics Developer Client Tools

Download Oracle Analytics Developer Client Tools if you want to edit data models in the cloud or configure connections to on-premises databases for Remote Data Connector. You install Oracle Analytics Developer Client Tool on a Windows machine on the same network as your database. The download pack also includes Catalog Manager.

1. Download the latest Oracle Analytics Developer Client Tool.
   a. Navigate to:
   b. Click Accept license agreement.
   c. To start the download, click the latest Oracle Analytics Developer Client Tool link.
      If you’re not sure which version to download, ask your Oracle Analytics administrator.

2. Install Oracle Analytics Developer Client Tool.
   a. From the downloaded ZIP file, extract the setup_bi_client-5.0.0.0.0-win64.exe file.
   b. In the local download area, double-click the setup_bi_client-5.0.0.0.0-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**, or **Catalog Manager**.

## 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 <code>bootstrap</code>.</td>
</tr>
<tr>
<td>Host name</td>
<td>The <strong>Oracle Analytics Cloud URL</strong> link address without the <code>https://</code> at the start or the <code>/dv/ui</code> part at the end of the URL. For example, <code>oac123456-oacppacm12345.uscom-central-1.oraclecloud.com</code>. To obtain your <strong>Oracle Analytics Cloud URL</strong> link address, in Oracle Cloud My Services, navigate to your Oracle Analytics Cloud instance, click <strong>Manage this instance</strong>, copy the link address for <strong>Oracle Analytics Cloud URL</strong>.</td>
</tr>
<tr>
<td>Port number</td>
<td>Specify 443 for Oracle Analytics Cloud deployed with Oracle Identity Cloud Service. Specify 80 for Oracle Analytics Cloud deployed without Oracle Identity Cloud Service.</td>
</tr>
<tr>
<td>SSL</td>
<td>Select this option. For the <strong>Trust Store</strong> value, click <strong>Browse</strong> and select the default JDK key store that's bundled with JRE: <code>&lt;BI client domain home&gt;\oracle_common\jdk\jre\lib\security\cacerts</code> 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).</td>
</tr>
<tr>
<td>Proxy</td>
<td>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.</td>
</tr>
</tbody>
</table>

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:
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>
</table>
| 401: Unauthorized OR Authentication failure | The login credentials are invalid.  
• Make sure the user account exists.  
• Make sure you spelled the user name and password correctly.  
• Make sure the password doesn't contain an exclamation mark (!)  
• Make sure the user has the BI Service Administrator application role. |
| 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) OR Error initializing TLS secure connection or Proxy exception: Remote host closed connection during handshake | 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.  
• Make sure you've specified the correct host name and port number. See Connect to a Data Model in the Cloud.  
• If the datamodel.log file reports Connection timed out, check whether the Oracle Analytics Developer Client Tool machine is in a proxy-enabled network. If it is, ask your network administrator for the proxy server and port, and specify these when you connect to your data model.  
• If you can't diagnose a connection issue using the client side log files and you're in a Customer Managed deployment, check server side log files bi-lcm-rest.log.0 and bi_server1.out. For example, if the database user doesn't have the BIServiceAdministrator application role, the bi_server1.out file shows an error similar to: oracle.bi.restkit.security.auth.RequiredGroupAuthoriser> <BEA-000000> <Failed authorisation for user: weblogic> |
Connect to a Data Source with an External Connection

Administrators can define database connections for data models using the Console in Oracle Analytics Cloud. If you want to use the same 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.

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 Storage.
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. |
| 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. |
Field | Description
--- | ---
BI Key Columns Area | 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 Layer Key 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 BI Key Delimiter field.

Use the various options in this area:
- **Add** — 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.
- **Delete** — Deletes the selected key column.
- **Edit** — Lets you edit the data columns associated with a layer.

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.

Show Qualified Names | Specifies whether to display the fully qualified name of the column in the BI Key Columns Area or simply the column name.

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. To allow users to embed content from other domains in their BI reports, click **Add Domain** under **Allow importing from**.

4. To allow users to embed their BI reports in content located on other domains, click **Add Domain** under **Allow embedding in**.

5. Enter the name of the safe domain. Use formats such as:
   - www.example.com
   - *.example.com
   - https:

6. For any safe domain you allow content to be imported from, select the types of resources you want to allow and block any resource types you don’t consider safe.

7. 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.

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 set up a full crawl.
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 set up a full crawl.

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. Schedule when to run the crawl. Click Select Date and Time and specify the month, year, time, and time zone.
5. Schedule how often to run the crawl. Enter values for Run Every and Frequency to choose the best interval between crawls.

By default, a crawl runs once a day. The index updates automatically as users add or modify content.
6. For catalog crawls, select Index User Folders 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.

7. Select the folders you want to crawl and exclude any folders with content you don’t want others to find when they search.

   First select **Index User Folders**, and then select either **Index** or **Don't Index** from the Crawl Status list for each folder.

8. 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.

9. 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

If a visualization user adds a data set and wants other users to be able to search it using BI Ask, they ask an administrator to certify the data set. Administrators use certification to control how much compute time is consumed by indexing data sets, which can affect system performance.

Before you can certify a data set, the user must have shared the data set with you.

1. In **Console**, navigate to the **Data** page, and 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**.

   When the data is indexed, other users can search it in BI Ask on the home page.
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.

1. Click Console.
2. Click Service Administration - Monitor Sessions and Query Caches.
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).

   The table provides details about the users who are signed in:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User ID</td>
<td>The name that the user entered when they signed in.</td>
</tr>
<tr>
<td>Session ID</td>
<td>A unique identifier assigned by Oracle Analytics Cloud for each user session.</td>
</tr>
<tr>
<td>Browser Info</td>
<td>Information about the browser used to sign in.</td>
</tr>
<tr>
<td>Logged On</td>
<td>Time when the user signed in.</td>
</tr>
<tr>
<td>Last Access</td>
<td>Time stamp for the last activity for this user. This can be any kind of activity, such as switching from one page to another.</td>
</tr>
</tbody>
</table>

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 Service Administration - Monitor Sessions and Query Caches.
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>• Starting — The analysis is starting to run.</td>
</tr>
<tr>
<td></td>
<td>• Waiting on Parent — A view in the analysis is waiting for data to be returned for the query.</td>
</tr>
<tr>
<td></td>
<td>• Running — The analysis is currently running.</td>
</tr>
<tr>
<td></td>
<td>• Finished — The analysis has finished.</td>
</tr>
<tr>
<td></td>
<td>• Queued — The system is waiting for a thread to become available so the analysis can be processed.</td>
</tr>
<tr>
<td></td>
<td>• Canceling — The application is in the process of canceling the analysis.</td>
</tr>
<tr>
<td></td>
<td>• Error — 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>• Cancel — 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>• Close — Clears the cache entry associated with this analysis. Is displayed for completed analyses.</td>
</tr>
<tr>
<td></td>
<td>• View Log — Displays the log of a query executed for this analysis.</td>
</tr>
<tr>
<td></td>
<td>• Diagnostic — 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>
<tr>
<td>Statement</td>
<td>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.</td>
</tr>
<tr>
<td>Information</td>
<td>Usage tracking information (for example, what analysis contained the query).</td>
</tr>
<tr>
<td>Records</td>
<td>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).</td>
</tr>
</tbody>
</table>

4. Optionally, click **Close All Cursors** to removes 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. Results aren’t formatted and you can’t save SQL statements that you issue directly.

Not all SQL functions and procedures are supported, such as the NQSSetSessionVariables() procedure.

1. Click **Console**.
2. Click **Service Administration - Issue SQL**.
3. Enter the SQL statement. For example:

   ```sql
   SELECT
     XSA('weblogic'. 'SalesTargets')."Columns"."E1 Sales Rep Name" s_1,
     XSA('weblogic'. 'SalesTargets')."Columns"."P4 Brand" s_2,
     XSA('weblogic'. 'SalesTargets')."Columns"."T03 Per Name Qtr" s_3,
     XSA('weblogic'. 'SalesTargets')."Columns"."Target Revenue" s_4
   FROM XSA('weblogic'. 'SalesTargets')
   ORDER BY 2 ASC NULLS LAST, 3 ASC NULLS LAST, 4 ASC NULLS LAST
   FETCH FIRST 65001 ROWS ONLY
   ```

4. Change the **Logging Level** if required.
   
   Each user receives a default logging level. Select **Default** in this box to use your default level.

5. Specify whether to run the query against cached data.
   
   Deselect **Use Oracle BI Presentation Services Cache** to specify that you don’t want the query to use cached data. In general, avoid deselecting this box as disabling the cache has potential performance degradation issues.

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.
   When you navigate away from the Manage Themes page, you'll see the new theme. If no styles have the Active check box selected, you see the default Oracle logo and color scheme.
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>A short user-friendly name for a custom page and dashboard style. This name is also 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 display a custom logo to replace the default Oracle logo, choose Select Logo to display a Browse option. Use the Browse option to 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>Use these to 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.

- Supported data sources include:
  - Oracle Planning and Budgeting Cloud Service Version 17.10.34
  - Enterprise Planning Cloud Service
  - Tax Reporting Cloud Service
  - Oracle Financial Consolidation and Close Cloud Service

- 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.

- A Windows 64–bit machine on which to run Oracle Analytics Developer Client Tool.
- Oracle Analytics Developer Client Tool V105.1. Download it from Oracle Technology Network and install it on a local Windows 64–bit machine.
- If you're deploying Oracle Analytics Cloud, (that is, on OCI 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, OCI 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:
    [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, use Oracle BI Administration Tool to import the Planning and Budgeting application:
   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.
### Option | Description
--- | ---
**Connection Type** | Select Hyperion ADM.

**URL** Specify the connection URL as:

```
```

For example:

```
```

**Provider Type** Select Hyperion Planning.

**User Name and Password** Specify the name and password of a user with administration privileges.

When the import is complete, review the metadata in the Physical Layer.

2. 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.
b. Verify the data model and save it as an .rpd file.

3. 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**.

4. Upload the data model to Oracle Analytics Cloud. From the **File** menu, click **Cloud**, then click **Upload**, and enter connection information.

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.
Replicate Your Data

Use a data replication flow to copy data from a data source to a data target for analysis in Oracle Analytics Cloud.

1. Set up a connection for the data source:
   a. From the Home page, click Create, Replication Connection, and then select the type of data source you want to copy data from.
      
      For example, you might select Oracle Service Cloud. If you’re replicating data from Oracle Fusion Applications, select Oracle Fusion Application Storage.
   b. At the Create Connection dialog, specify the connection details.

2. Set up a connection for the 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.
      
      For example, you might select Oracle Big Data Cloud.
   b. In the Create Connection dialog, specify the connection details.

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.

   The Data Replication designer page is displayed.
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, `FscmTopModel1AM.TaskDffBIAM.FLEX_BI_TaskDFF`, then click **Add** to add the view to the **Replicate Objects** list and enable you to select fields.
   
   - When you select a table, all table attributes are selected by default. Use the check boxes on the right-hand pane to deselect the attributes that you don’t want to replicate. You can also change the target table and column names, or change the load type from incremental to full. Repeat this process for each table that you’re replicating.
   
   - 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. Primary keys are also used to extract data page by page by chunking data using page offsets when the data to extract is more than what the source server allows in one export request (source governance limits). With composite Primary Keys, the key columns are used in order, so make sure that you define primary key columns with the most unique column added first, followed by the least unique columns (parent/child, master/detail).
     
     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 semi-colon). 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>&quot;<strong>DATASTORE</strong>.LookupType not in ('GROUPING_SEPARATOR','HZ_FORMAT_DELIMITERS','ICX_NUMERIC_CHARACTERS')&quot;</td>
</tr>
<tr>
<td>Oracle RightNow</td>
<td>lookupname like 'Admin%'</td>
</tr>
<tr>
<td></td>
<td>id &gt; 2</td>
</tr>
<tr>
<td>Eloqua</td>
<td>'((Account.Field(M_Annual_Revenue1)))' &gt; '2000'</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. The Incremental option only applies to tables that have a primary key defined and also have 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**.

**Replicate Your Data Regularly**

You can schedule replication data flows to run on a regular basis. For example, if your source data changes weekly, you might replicate your data once per week to keep the target data up-to-date.

1. In the Home page, click the **Navigator** bar, **Data**, and then **Data Replications**.

   A list of data flows that you can schedule is displayed. If you haven't already created a data flow to replicate your data, do that first.

2. Right-click the replication data flow that you want to execute regularly and click **New Schedule**.

3. In the Schedule dialog, specify when to start the job and how often you want the job to run.

4. Click **OK** to save the schedule.

   You can monitor the progress of all scheduled jobs by clicking **Console** and then **Jobs**.

5. To change the schedule:

   a. Right-click the replication data flow that you created the schedule for, click **Inspect**, and click **Schedule**.
b. Change the settings and save the changes.

Modify a Data Replication Flow

You can change how your data is replicated by modifying the replication data flow that loads your data.

1. From the **Navigator** bar, click **Data**, then click **Data Replications**.
2. Right-click the replication data flow that you want to modify, and click **Open**.
3. Modify your replication data flow, and then click **Save**.

The next time the data loads, the modified replication data flow will be used.

To modify the schedule for a replication data flow, right-click the replication data flow and click **Schedule**.

Monitor and Troubleshoot a Data Replication Flow

You can monitor a replication data flow to check progress, troubleshoot issues, and more.

If an error occurs during a replication data flow and the data flow 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 data flow:
   a. In **Console**, click **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 data flow:
   a. In the Home page, click the **Navigator** bar, **Data**, and then **Data Replications**.
b. Right-click the replication data flow that you want to investigate, and click **Run Details**.

The Run Details dialog shows detailed information about the last data load operation. For example, you can see how many rows were loaded for each table and detailed error messages for each table.

**About 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 such as Oracle Service Cloud (RightNow).

**Prerequisites for Data Replication**

Before you start, make sure you have the correct components required for data replication.

You need the following:

- A supported data source, such as Oracle Service Cloud (RightNow) or Oracle Talent Acquisition Cloud.
- A supported data target, such as Oracle Database or Oracle Big Data Cloud in which to replicate your data.
- BI Cloud Connector (if you’re replicating data from Oracle Fusion Applications, you deploy BI Cloud Connector in the Oracle Fusion Applications environment).
- Oracle Storage Cloud Classic

**Information You Need For Data Replication**

Before you start, make sure you have the required details for Data replication.

You need the following details:

- The host name, storage service name, and container name of your Oracle Storage Cloud Classic instance. Use this information to configure Oracle BI Cloud Connector to point to your Oracle Storage Cloud Classic instance.
- The `https://fa_url/biacm` link for your Oracle BI Cloud Connector.
- The host name and connection details for your Oracle Fusion Applications instance.
- The REST Endpoint URL for your Storage Cloud Classic 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 My Services Console, then navigate to Main Menu, Services, then Storage Cloud Classic. Then click **Account** and copy the REST Endpoint URL.
What Data Sources Can I Replicate?

You can replicate data from numerous sources.

• Oracle Eloqua
• Oracle Fusion Applications
• 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 Database Cloud Service
• Oracle Big Data Cloud
• Oracle Autonomous Data Warehouse

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

About Data Replication from Oracle Fusion Applications Data Sources

When you replicate data from an Oracle Fusion Applications data source, use these additional replication 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 in sync 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, Service Administration, and then click Manage 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:

    java -jar migration-tool.jar out oracle_home domain_home instance_homeOptional export_jar_location
For example:

```
java -jar migration-tool.jar out /u01/app/oracle/bi /u01/app/instance/domains/example.com/myDomain /u01/app/instance/BIInstance /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, Service Administration, and then click Manage 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 a snapshot, you include the data model, dashboards and analyses, and application roles required in Oracle Analytics Cloud. See Migrate Oracle Analytics Cloud Using Snapshots.

### 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 Configure Systems Settings page.

<table>
<thead>
<tr>
<th>System Setting</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currencies XML</td>
<td>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</td>
</tr>
<tr>
<td>User Currency Preferences XML</td>
<td>Determines whether users see a Currency option in their My Account preferences dialog and the list of currencies that's available to them. If you provide the Currency option, users can select which currency they prefer to view currency columns in analyses and dashboards. Restart Required: Yes</td>
</tr>
</tbody>
</table>
| Support Auto Complete                 | Enables or disables the auto-complete functionality available in prompts.科恩的。  
  • true — Turns auto-complete on, 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.  
  • false — Turns auto-complete off, which means that the auto-complete fields in the My Account and Dashboard Properties dialogs aren't available.  
  Valid Values: true, false  
  Default: false  
  Restart Required: Yes |
| Case Insensitive Auto Complete        | Specifies whether, when a user enters a prompt value in analyses and dashboards, the auto-complete functionality is case-insensitive.科恩的。  
  • true — Case isn't considered when a user enters a prompt value such as “Oracle” or “oracle.”  
  • false — Case is considered when a user enters a prompt value, so the user must enter “Oracle” and not “oracle” to find the Oracle record.  
  Valid Values: true, false  
  Default: true  
  Restart Required: Yes |
### System Setting

<table>
<thead>
<tr>
<th>Matching Level</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
</tbody>
</table>

- **StartsWith** — Searches for a match that begins with the text that the user types. For example, the user types "M" and the following stored values are displayed: "MicroPod" and "MP3 Speakers System".
- **WordStartsWith** — Searches for a match at the beginning of a word or group of words. For example, the user types "C" and the following values are displayed: "ComCell", "MPEG Camcorder", and "7 Megapixel Digital Camera".
- **MatchAll** — Searches for any match within the word or words. 

**Valid Values:** MatchAll, StartsWith, WordStartsWith  
**Default:** MatchAll  
**Restart Required:** Yes

### 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 show the term "NULL" above the column separator in the drop-down list. 
- **never** — Never show the term "NULL" in the drop-down list.  
- **asDataValue** — Display 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
<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, including JavaScript.</td>
</tr>
<tr>
<td></td>
<td>• true — Display the option Contains HTML Markup 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>• false — Hide the option Contains HTML Markup. Users can enter only plain text.</td>
</tr>
<tr>
<td></td>
<td><strong>Valid Values:</strong> true, false</td>
</tr>
<tr>
<td></td>
<td><strong>Default:</strong> false</td>
</tr>
<tr>
<td></td>
<td><strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td>Default Data Offset Timezone</td>
<td>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 &quot;unknown&quot;. If you want to specify a different offset value for each user, enter the session variable DATA_TZ. <strong>Example:</strong> GMT-05:00 or -300, which means minus 5 hours. <strong>Example:</strong> DATA_TZ <strong>Default:</strong> No value. Equivalent to Greenwich Mean Time (GMT), 0 offset. <strong>Restart Required:</strong> Yes</td>
</tr>
<tr>
<td>System Setting</td>
<td>More Information</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Default User Preferred Timezone</td>
<td>Specifies a default preferred time zone that users see in analyses and dashboards users before they select their own in the My Account Preferences dialog. If you don’t set this option, then the value is the local time zone from Oracle BI Presentation Services. Enter one of the time zones specified in the TimeZones.xml file. If you want to specify a different preferred time zone for each user, enter the session variable TIMEZONE. Example: (GMT-08:00) Pacific Time (US &amp; Canada); Tijuana Example: TIMEZONE Default: No value. Restart Required: Yes</td>
</tr>
<tr>
<td>Default Scrolling Enabled</td>
<td>Specifies how data scrolls in table views, table, pivot table views, heat matrix views, simple trellis views, and advanced trellis views. • true — Data displays with a fixed header and content scrolling controls for users to browse the data. • false — Data displays with content paging controls for users to browse the data. Valid Values: true, false Default: true Restart Required: Yes</td>
</tr>
<tr>
<td>Cache Enable</td>
<td>Specifies whether or not Oracle Analytics Cloud caches data queries. • yes — Data caching is enabled. • no — Caching is disabled. Valid Values: yes, no Default: yes Restart Required: Yes</td>
</tr>
<tr>
<td>System Setting</td>
<td>More Information</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Connection Externalization Enabled     | Specifies whether or not to externalize any database connections that administrators set up 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 with an External Connection](#).  
  • **yes** — Externalize the database connections that administrators define for data models through Console.  
  • **no** — 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.  
  
  **Valid Values:** yes, no  
  **Default:** yes  
  **Restart Required:** Yes |
| 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 |
System Setting | More Information
--- | ---
Evaluate Support Level | Specifies who can issue database functions; EVALUATE, EVALUATE_ANALYTIC, EVALUATE_AGGR, and EVALUATE_PREDICATE. By default (0), the EVALUATE database functions are disabled.

- 1 — Service administrators only. Users with the BI Service Administrator application role can invoke EVALUATE database functions.
- 2 — Anyone. Any user who signs in to Oracle Analytics Cloud can invoke EVALUATE database functions.
- 0 (or any other value) — No one. All EVALUATE database functions are disabled in Oracle Analytics Cloud.

Valid Values: 0, 1, 2
Default: 0
Restart Required: Yes

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 Service Administration.
3. Click Configure System Settings.
4. Update the Property Value.
5. If required, click Restart and then click OK to confirm.
   Wait a few moments for the changes to refresh through the system.

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 Service Administration.
3. Click Manage Connections.
4. Click Update Cloud Storage Password.
5. Enter the Storage Password.
6. 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 My Services 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.
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
• Add Translations for the Catalog and Reports
• Enable Diagnostics

About Administering Pixel-Perfect Publishing

Administrator configures the components required for pixel-perfect publishing.

Administrators must use the Manage BI Publisher option in the Classic Administration page to set up and configure several components before users start building pixel-prefect 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>• Document Cloud Services</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 BI Publisher.
5. On the BI Publisher Administration page, select the required option.
Configure System Maintenance Properties

This topic describes how to configure Oracle BI 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 Oracle BI 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 BI Publisher fails to connect to a data source through the defined JDBC or JNDI connection, Oracle BI 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, Oracle BI 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 BI Publisher 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.

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. BI Publisher (BIP) System Topic

The BIP 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: BIP_System_T</td>
<td>Passed</td>
</tr>
<tr>
<td>Queue: BIP_Burst_Nob_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Burst_Report_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_Email_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_Fax_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_FTP_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_Print_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_Summer_Quarter_Q</td>
<td>0 pending</td>
</tr>
<tr>
<td>Queue: BIP_Delivery_Pax_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.
• 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
The Quartz section provides information on these components, as shown in the figure below.

- Quartz Configuration
- Quartz Initialization

### Set Up Data Sources

This topic describes how to set up data sources for Oracle BI 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 XML Feed
- 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 Oracle BI 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.
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 BI Publisher 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

Oracle BI 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, Oracle BI Publisher enables you to select “Use Proxy Authentication”. When you select Use Proxy Authentication, Oracle BI Publisher passes the user name of the individual user (as logged into Oracle BI Publisher) to the data source and thus preserves the client identity and privileges when the Oracle BI 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 Oracle BI 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
        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:

```
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);
    END BIP_LOG;
```

Another sample usage might be to insert a row to the LOGTAB table every time a user connects or disconnects:
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 09:51:34.0000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 10:23:57.0000000000</td>
<td>AMFinish</td>
</tr>
<tr>
<td>administrator</td>
<td>14-MAY-10 09:51:38.0000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>administrator</td>
<td>14-MAY-10 09:51:38.0000000000</td>
<td>AMFinish</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 09:51:42.0000000000</td>
<td>AMStart</td>
</tr>
<tr>
<td>oracle</td>
<td>14-MAY-10 09:51:42.0000000000</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. Select a client a certificate.

   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. 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 data source.

   If you have defined a backup data source, the security settings are passed to the backup data source.

Create a Secured JDBC Connection

You can upload a JDBC client certificate and set up an SSL based JDBC connection to a secured database.

To create a JDBC connection to a secured database:

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 connection string.

   For example, jdbc:oracle:thin:@/"+host+":"+port+"/"+serviceName
For cloud databases such as Autonomous Data Warehouse, we recommend the use of TCPS strings:
```
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 cwallet.sso file 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. A confirmation message is displayed.
8. 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.

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 OLAP type.
5. Enter the connection string for the OLAP database.

Following are examples for each of the supported OLAP types:
- Oracle's Hyperion Essbase
Set Up Data Sources

6. Enter the user name and password for the OLAP database.

7. Click **Test Connection**.

   You get a confirmation message if the connection details are correct.

8. Define security for this data source. Move 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.

### Set Up a Connection to a Web Service

Oracle BI Publisher supports Web service data sources that return valid XML data.

You must make the distinction between simple and complex when you define the Web service connection. Additional configuration may be required to access external Web services depending on your system's security. If the WSDL URL is outside the company firewall.

Oracle BI Publisher supports:

- Web services that return both simple and complex data types.
- Private Web Service connections
- Only Basic and Digest authentication for Web service data sources.
- Only document/literal Web services

### Add a Simple Web Service

You can add a simple Web service as a data source.

To add a simple Web service as a data source:

1. From the Administration page, click **Web Service Connection**.

2. On the Web Services tab, 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 suffix for the web service connection
   For example, stockquote.asmx?WSDL
7. (Optional) Enter the session timeout in minutes.
8. Deselect **Complex Type** to designate the connection as a simple Web service.
9. Define security for this data source. Move 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 data source.
10. Click **Apply** to save the data source connection.

## Add a Complex Web Service

You can add a complex Web service as a data source.

To add a complex 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 **Complex Type** to designate the connection as a complex Web service.
9. Select the security header from **WS-Security**.
   - **2002** — Enables the "WS-Security" Username Token with the 2002
     namespace: [http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wsssecurity-secesxt-1.0.xsd](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wsssecurity-secesxt-1.0.xsd)
   - **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](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#PasswordText)
10. Select the authentication type.
    If you select HTTP, the user name and password information are passed through
    HTTP headers. If you select SOAP, the user name and password information are
    passed through XML SOAP envelope headers.
11. (Optional) Enter the user name and password for the web service
12. Select **WSDL protected by HTTP basic auth** if the access to the WSDL is
    protected by user name and password.
13. Define security for this data source. Move 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 data source. The security settings are passed
    to the backup data source.
14. Click Apply.

Set Up a Connection to an HTTP XML Feed

HTTP (XML Feed) data sources enable your data model designers to build data models from RSS and XML feeds over the Web by retrieving data through the HTTP GET method.

To add a HTTP XML as a 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 for the web service connection in the Realm field. For example, xmlpserver/services/v2/SecurityService?wsdl.
7. Enter the user name and password required to access the data source on the database.
8. Define security for this data source. Move 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 data source.

The security settings are passed down to the backup data source.

Set Up a Connection to a Content Server

Content Server data source enables you to retrieve a text attachment content stored in Universal Content Management (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. Click Apply to save the data source details.

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 Oracle BI Publisher reports. It also describes how to set up the HTTP notification server.

**Topics:**

- Configure Delivery Options
- Add a Printer
- Add a Fax Server
- Add an E-Mail Server
- Add an HTTP Server
- Add an FTP Server
- Add a Content Server
- Add a Common UNIX Printing System (CUPS) Server
- Add a Cloud Server

### Configure Delivery Options

Use the Delivery Configuration Options page to set general properties for e-mail deliveries and notifications from BI Publisher and for defining the SSL certificate file.

To configure delivery options:

1. From the Administration page, select **Delivery Configuration**.
2. Enter the following properties:

   - **SSL Certificate File** — If SSL is enabled for your installation, then you can leave this field empty if you want to use the default certificates built-in with Oracle BI Publisher. SSL works with the default certificate if the server uses the certificate signed by a trusted certificate authority such as Verisign. This field is mandatory only if the user uses the SSL with a self-signed certificate. The self-signed certificate means the certificate is signed by a non-trusted certificate authority (usually the user).

   - **E-mail From Address** — Enter the From address to appear on e-mail report deliveries from the Oracle BI Publisher server. The default value is bipublisher-report@oracle.com.

   - **Delivery Notification E-mail From Address** — Enter the From address to appear on notifications delivered from the Oracle BI Publisher server. The default value is bipublisher-notification@oracle.com.

   - **Success Notification Subject** — Enter the subject line to display for e-mail notification recipients when the report status is Success.

   - **Warning Notification Subject** — Enter the subject line to display for e-mail notification recipients when the report status is Warning.
• **Failure Notification Subject** — Enter the subject line to display for e-mail notification recipients when the report status is Failed.

• **Skipped Notification Subject** — Enter the subject line to display for e-mail notification recipients when the report status is Skipped.

## Add a Printer

Regardless of whether Oracle BI Publisher is running on Linux, Unix, or Windows, the printer destination can be any IPP server.

The IPP server can be the printer itself, which is the easiest option, but if the printer does not natively support IPP, you can set up a print server that does support IPP (such as CUPS) and connect Oracle BI Publisher to the print server and then the print server to the printer. In this print server scenario, the print server can run on any operating system.

To send fax from Oracle BI Publisher, you must set up Common Unix Printing Service (CUPS) and the fax4CUPS extension, to enable connection to your fax server from Oracle BI Publisher. The fax set up requires this plugin to the CUPS server on the operating system. Note that the Administration page makes the distinction between a fax and a printer server in the UI, so that users can pick one or the other or both at runtime. Even though the fax and printer server that the users see can both use a single CUPS server.

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.

Two types of security are supported: Basic and Digest.

### About Printing PDF

PDF is a popular output format for business reports and is printable from viewer software such as Adobe Reader. However, some reports require printing directly from the report server. For example, paychecks and invoices are usually printed as scheduled batch jobs. Some newer 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 cannot print PDF documents directly.

To print PDF documents directly from the Oracle BI Publisher server if your printer or print server does not support printing PDF, you have the following options:

- Select one of Oracle BI Publisher’s filters: PDF to PostScript or PDF to PCL.
- Configure a custom, or third-party filter.

After completing all other required fields for the print server, you can schedule reports to print directly from the Oracle BI Publisher server to any printer in your system that supports PostScript Level 2.

## Set Up a Printer

You set up printers from the Administration page.

To set up a printer:

1. From the Admin page select **Printer** and select **Add Server**.
2. Enter the following required fields:
   • **Server Name** — Enter a unique name. Example: Localprinter
   • **URI** — Enter the Uniform Resource Identifier for the printer.
     Example: ipp://myhost:631/printers/myprinter
     Example URI syntax for Windows IPP server: http://ip-address/printers/name-printer/.printer

3. Enter a **Filter** (optional).
   A filter enables you to call a conversion utility to convert the PDF generated by Oracle BI Publisher to a file format supported by your specific printer type. Oracle BI Publisher provides the following filters:
   • **PDF to PostScript**
     Oracle BI Publisher includes a PDF to PostScript filter. This filter converts PDF to PostScript Level 2. Select **PDF to PostScript** from the list to use Oracle BI Publisher's predefined filter.
   • **PDF to PCL**
     To convert PDF to PCL, select **PDF to PCL**. This automatically populates the **Filter Command** field.
     Oracle BI Publisher supports the PDF to PCL conversion only for font selection requirements for check printing. For generic printing requirements, use the PDF to PostScript filter. 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.

   **About Custom Filters**

   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 are trying to call IPP printers directly or IPP printers on Microsoft Internet Information Service (IIS). Unlike CUPS, those print servers do not translate the print file to a format the printer can understand, therefore only limited document formats are supported. 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** field:
   ```
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 field:
   ```
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).

4. Optionally enter the following fields if appropriate:
   • **Security fields** — Username and Password, Authentication Type (None, Basic, Digest) and Encryption Type (None, SSL).
   • **Proxy Server fields** — Host, Port, User Name, Password, Authentication Type (None, Basic, Digest)

### Add a Fax Server

To send fax from Oracle BI Publisher, you must set up Common Unix Printing Service (CUPS) and the fax4CUPS extension, to enable fax transmissions from Oracle BI Publisher.

See the following resources for information about setting up CUPS and the fax4CUPS extension:

To set up fax delivery:

1. From the Administration page, select **Fax** and then select **Add Server**.
2. Enter the following required fields:
   • **Server Name** — Enter a unique name. Example: Localprinter
   • **URI** — Enter the Uniform Resource Identifier for the printer. Example: ipp://myhost:631/printers/myprinter
3. Enter a **Filter** (optional).

A filter enables you to call a conversion utility to convert the PDF generated by Oracle BI Publisher to a file format supported by your specific printer type. Oracle BI Publisher provides the following filters:

• **PDF to PostScript**
  
  Oracle BI Publisher includes a PDF to PostScript filter. This filter converts PDF to PostScript Level 2. Select **PDF to PostScript** from the list to use Oracle BI Publisher's predefined filter.

• **PDF to PCL**

  To convert PDF to PCL, select **PDF to PCL**. This automatically populates the **Filter Command** field.

  Oracle BI Publisher supports the PDF to PCL conversion only for font selection requirements for check printing. For generic printing requirements, use the PDF to PostScript filter. 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.

### About Custom Filters

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 are trying to call IPP printers directly or IPP printers on Microsoft Internet Information Service (IIS). Unlike CUPS, those print servers
do not translate the print file to a format the printer can understand, therefore only limited document formats are supported. 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 field:

```
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 field:

```
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).

4. Optionally enter the following fields if appropriate:

- Security fields — Username and Password, Authentication Type (None, Basic, Digest) and Encryption Type (None, SSL).
- Proxy Server fields — Host, Port, User Name, Password, Authentication Type (None, Basic, Digest)

## Add an E-Mail Server

You add an e-mail server from the Administration page.

To add an e-mail server:

1. From the Administration page, select Email. This displays the list of servers that have been added. Select Add Server.
2. Enter the Server Name, Host, and Port for the e-mail server.
3. Select a Secure Connection method to use for connections with the e-mail server. The options are:
   - None
   - SSL — Use Secure Socket Layer.
   - TLS (Transport Layer Security) — Use TLS when the server supports the protocol; SSL is accepted in the response.
   - TLS Required — If the server does not support TLS, then the connection is not made.
4. Optionally enter the following fields if appropriate:
   - General fields — Port
   - Security fields — Username and Password.
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 Oracle BI 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, select HTTP to display the list of servers that have been added. Select Add Server.
2. Enter a name for the server, and enter the URL. When the report finishes processing, Oracle BI Publisher posts form data for Job ID, report URL and Job Status.
3. Enter the Security information, if required. If your server is password protected, enter the Username and Password. Select the Authentication Type: None, Basic, or Digest; and Encryption Type: None or SSL.
4. If the notification is to be sent through a proxy server, enter the fully qualified Host name, the Port, the Username and Password, and Authentication Type of the proxy server.

Add an FTP Server

You can add an FTP server from the Administration page.

If the destination file name supplied to the Oracle BI Publisher scheduler contains non-ascii characters, Oracle BI Publisher will use UTF-8 encoding 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 server:

1. From the Administration page, under Delivery, click FTP to display the list of servers that have been added.
2. Click Add Server.
3. Enter the following fields for the FTP server:
   - **Server Name** — For example, myFTPserver.
   - **Host** — For example, example.com.
   - **Port** — The default for FTP is 21.
   - **Use Secure FTP** — Select this box to enable Secure FTP (SFTP). Ensure you set the Port to 22 for SFTP.
   - **Use Passive Mode** — Passive mode is recommended when the FTP server is behind a firewall.
• **Host Key Fingerprint** — Host key verification is a key security feature. If `<hostKeyFingerprint>` value is set, the value must match the fingerprint calculated from server's host key at runtime. If it does not match, an exception error is thrown. When you connect the first time, the Delivery Manager API allows you to retrieve the server key fingerprint.

• **Create files with Part extension when copy is in process** — Select this box if you want Oracle BI Publisher to create the file on the FTP server with a .part extension while the file is transferring. The .part extension indicates that the file transfer is not complete. 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.

4. Enter the Security information, if required.
   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.

5. Enter **Proxy Server** information — Host, Port, Username, Password, Authentication type

**Configure a Secure FTP Connection**

You can configure a secure FTP connection by using a SSH private key file.

To configure a secure FTP connection using a SSH private key file:

1. Upload the SSH private key file in the Upload Center tab in the System Maintenance page.

2. In the Add Server page for FTP delivery connections, specify the values for the **Server Name** and **Host** fields.

3. Select **Use Secure FTP**.

4. In the Security section, select **Private Key** from the **Authentication Type** dropdown list.

5. In the **Private Key File** field, specify the SSH private key file that you uploaded in Upload Center.

6. In the **Private Key Password** field, enter the passphrase for the private key

7. Click **Test Connection**.

   When the test connection is successful, the **Host Key Fingerprint** field in the General section is populated with the host key value returned from the server.

   The connection to the server must use the same host key. If the server host key changes (due to a modification in the server configuration or the re-installation of the server software, for example), the connection to the server might be rejected because of the host key mismatch. In this case, update the value in **Host Key Fingerprint**, and test the connection again.

   You can save the configuration only if the connection test is successful.

8. Click **Apply** to save the configuration.
SSH Options for SFTP

Secure File Transfer Protocol (SFTP) is based on the Secure Shell technology (SSH). Oracle BI 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>Cipher Suites</td>
<td>• 3des-cbc</td>
</tr>
<tr>
<td></td>
<td>• blowfish-cbc</td>
</tr>
<tr>
<td></td>
<td>• aes128-cbc</td>
</tr>
<tr>
<td></td>
<td>• aes128-ctr</td>
</tr>
<tr>
<td></td>
<td>• aes192-ctr</td>
</tr>
<tr>
<td></td>
<td>• aes256-ctr</td>
</tr>
<tr>
<td></td>
<td>You can use aes192-ctr and aes256-ctr cipher suites only when BI Publisher is running on a JVM on which the Java Cryptography Extension (JCE) unlimited strength jurisdiction policy files are installed.</td>
</tr>
<tr>
<td>Key Exchange Method</td>
<td>• diffie-hellman-group1-sha1</td>
</tr>
<tr>
<td></td>
<td>• diffie-hellman-group14-sha1</td>
</tr>
<tr>
<td></td>
<td>• diffie-hellman-group-exchange-sha1</td>
</tr>
<tr>
<td></td>
<td>• diffie-hellman-group-exchange-sha256</td>
</tr>
<tr>
<td></td>
<td>You can use diffie-hellman-group-exchange-sha256 key exchange methods only when BI Publisher is running on a JVM on which the Java Cryptography Extension (JCE) unlimited strength jurisdiction policy files are installed.</td>
</tr>
<tr>
<td>Public Key Algorithm</td>
<td>• ssh-dss</td>
</tr>
<tr>
<td></td>
<td>• ssh-rsa</td>
</tr>
</tbody>
</table>

Add a Content Server

You can deliver documents generated by Oracle BI Publisher to your Oracle WebContent Server.

Oracle BI Publisher’s integration with the content server provides the following features:

- At run time, 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), Oracle BI Publisher enables the report author to map the custom metadata fields defined in Content Profile Rule Sets to data fields in the data model.

Oracle BI 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 BI 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 connection to a content server as a delivery destination:

1. From the Administration page, under Delivery, click Content Server to display the list of servers that have been added. 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. To enable the inclusion of custom metadata with your report documents delivered to the content server, select the Enable Custom Metadata check box. This option must be selected to enable the custom metadata options in the Data Model Editor and the Scheduler.

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 a Cloud Server

BI Publisher can deliver reports to Oracle Document Cloud Services through a cloud server for enabling easy access and report sharing on the cloud.

To add a cloud server
1. From the Administration page, under Delivery, click Document Cloud Services.
2. Click Add Server.
3. In the Server Name field, type the name of the cloud server through which BI Publisher must deliver the reports to Oracle Document Cloud Services.
4. In the URI field, type the URI of the cloud server. For example, https://host.oraclecloud.com.
5. In the Username and Password fields, provide the credentials for accessing the cloud server.
6. Click Test Connection to ensure that the cloud server connection works.
7. Click Apply to save.

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
- PPTX Output Properties
- HTML Output Properties
- FO Processing Properties
- RTF Template Properties
- PDF Template Properties
- Excel Template Properties
- CSV Output Properties
- Excel 2007 Output Properties
- EText Output Properties
- All Outputs Properties
• Memory Guard & Data Model Properties
• Define Font Mappings
• Define Currency Formats

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 “true” or “false” 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 “true” 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 “true” to hide the viewer application’s toolbar when the document is active.</td>
<td>false</td>
<td>pdf-hide-toolbar</td>
</tr>
<tr>
<td>Replace smart quotes</td>
<td>Specify “false” 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 “true” 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 “true” if you want to encrypt the PDF output. You can then also specify the following properties: • Open document password • Modify permissions password • Encryption Level</td>
<td>false</td>
<td>pdf-security</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>Open document password</td>
<td>This password is required for opening the document. It enables users to open the document only.</td>
<td>N/A</td>
<td>pdf-open-password</td>
</tr>
<tr>
<td></td>
<td>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></td>
<td></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>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;. 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-changes-the-document</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>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>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>
</tbody>
</table>
| Use only one shared resources object for all pages | The default mode of Oracle BI 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:  
  • Viewing may take longer for a large file with many SVG objects  
  • 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. 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. | true    | pdf-use-one-resources       |

### PDF Navigation Panel Initial View

Controls the navigation panel view that is presented when a user first opens a PDF report. The following options are supported:

• Panels Collapsed - displays the PDF document with the navigation panel collapsed.  
• Bookmarks Open (default) - displays the bookmark links for easy navigation.  
• Pages Open - displays a clickable thumbnail view of each page of the PDF.

### Bookmarks Open

**pdf-pagemode**

### 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 &quot;true&quot; 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 Oracle BI 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>
<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>Signature field width</td>
<td>Enter in points (72 points equal one inch) the desired width of the inserted digital signature field. This applies only if you are also setting the <strong>Signature field x coordinate</strong> and <strong>Signature field Y coordinate</strong> properties.</td>
<td>0</td>
<td>signature-field-width</td>
</tr>
<tr>
<td>Signature field height</td>
<td>Enter in points (72 points equal one inch) the desired height of the inserted digital signature field. This applies only if you are also setting the <strong>Signature field x coordinate</strong> and <strong>Signature field Y coordinate</strong> properties.</td>
<td>0</td>
<td>signature-field-height</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>
</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>
</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>
</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>
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).

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 <code>&lt;bi publisher repository&gt;/Admin/Configuration</code>. 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 &quot;Reference name,&quot; 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 &quot;true&quot; 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 &quot;true&quot; 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 <code>&lt;FontName&gt;:&lt;size&gt;</code> 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 &quot;true&quot; 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 &quot;true&quot; to protect the document for tracked changes.</td>
<td>false</td>
<td>rtf-protect-document-for-tracked-changes</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>Default font</td>
<td>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 <code>&lt;FontName&gt;:&lt;size&gt;</code> 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.</td>
<td>Arial:12</td>
<td>rtf-output-default-font</td>
</tr>
<tr>
<td>Enable widow orphan</td>
<td>Set to &quot;true&quot; 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.</td>
<td>false</td>
<td>rtf-enable-widow-orphan</td>
</tr>
</tbody>
</table>

### 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 “false” 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 “false” 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 “true” 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 “true” 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: • Generated table of contents • Navigation links at the top and bottom of the page • Ability to skip to a specific page within the HTML document • Search for strings within the HTML document using the browser’s search capability • Zoom in and out on the HTML document using the browser’s zoom capability Note that these features are supported for online viewing through the report viewer only.</td>
<td>false</td>
<td>html-reduce-padding</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>
### 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>
</table>
| Extract attribute sets | 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 | Auto    | rtf-extract-attribute-sets |
| Enable XPath rewriting  | 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 "false" to disable this feature.                                 | true    | rtf-rewrite-path     |
### Property Name | Description | Default | Configuration Name
--- | --- | --- | ---
Characters used for checkbox | The default PDF output font does not include a glyph to represent a checkbox. If the template contains a checkbox, use this property to define a Unicode font for the representation of checkboxes in the PDF output. You must define the Unicode font number for the "checked" state and the Unicode font number for the "unchecked" state using the following syntax: `<fontname>;<unicode font number for true value>'s glyph >;<unicode font number for false value>'s glyph>`
Example: Albany WT J; 9746;9747/A Note that the font that you specify must be made available at runtime. | Albany WT J; 9746;9747/A | rtf-checkbox-glyph

## 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, 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, scheduled reports that use the XPT template are processed in-memory. Use this setting for reports that contain smaller amounts of data.</td>
<td>true</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.
### 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>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>).</td>
</tr>
<tr>
<td>Remove leading and trailing white space</td>
<td>Specify &quot;True&quot; 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 &quot;False&quot; to remove the UTF-8 BOM signature from the output.</td>
<td>true</td>
</tr>
</tbody>
</table>

#### Property Name: Show grid lines
Set to true to show the Excel table grid lines in the report output. Default: false

#### Property Name: Page break as a new sheet
When set to “True” a page break that is specified in the report template generates a new sheet in the Excel workbook. Default: true

#### Property Name: Minimum column width
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. Default: 3 (in points, 0.04 inch)

#### Property Name: Minimum row height
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. Default: 1 (in points, 0.01 inch)

#### Property Name: Keep values in same column
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. Default: False
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</td>
<td>reserved. Do not update unless instructed by Oracle.</td>
<td>false</td>
</tr>
</tbody>
</table>

Memory Guard & Data Model Properties

Memory guard safeguards your system against memory failures caused by report requests that generate excessive data.

Memory guard and data model properties are described in Memory Guard Properties and Configure Data Model Properties.

Key Features

The section gives you information on the key features of memory guard and data model properties.

The full set of properties is listed in Configure Data Model Properties. The properties enable you to protect against out of memory errors and enhance data processing by setting controls such as:

- Maximum data size for reports
- Maximum data size for scheduled reports
- Minimum free memory size
- SQL pruning for unused data set columns
- Time out for SQL queries and also for reporting

The following section highlights some of the properties and provides detail on how the system responds to the settings:

- Restrict Maximum Data Sizes for Report Processing
- Configure Free Memory Threshold
- Set Data Engine Properties

Restrict Maximum Data Sizes for Report Processing

By restricting the data size for report processing, you can prevent out of memory errors that can occur when a query returns data more than what the system can handle.

You can specify:

- A maximum data size for online processing
- A maximum data size for offline (scheduled report) processing
Specify a Maximum Data Size Allowed for Online Processing

You can specify a maximum data size for online report viewing.

The **Maximum report data size for online reports** property enables you to specify a maximum data size allowed for online report viewing. When you set a maximum data size, the following occurs when a user opens a report for online viewing:

1. A user submits a report to view online in the browser.
2. The data engine generates the data for the report.
3. Before document generation, the size of the data (in bytes) is inspected.
4. If the data generated is larger than the maximum setting, the report processing is ended. The user gets the following message:

   Report data size (NNNNN bytes) exceeds the maximum limit (314572800 bytes). Report stopped processing. Either re-run with parameters that reduce the data or schedule this report. Contact your Administrator if you have questions.

The user can then either set parameters (if available for the report) to limit the data and resubmit online; or use the scheduler to submit the report.

The default value for this property is 300 MB.

Specify a Maximum Data Size Allowed for Offline (Scheduled Report) Processing

You can specify a maximum data size for scheduled reports.

The **Maximum report data size for offline (scheduled) reports** property enables you to specify a maximum data size allowed for scheduled reports. When you set a maximum data size, the following occurs when a scheduled report job executes:

1. The scheduler commences processing of a report job.
2. The data engine generates the data for the report.
3. If the data generated is larger than the maximum setting, the report processing is ended. The scheduled report job fails with the following status message:

   Report data size (NNNNN bytes) exceeds the maximum limit (524288000 bytes). Report stopped processing.

The user can then set parameters (if available for the report) to limit the data.

The default value for this property is 500 MB.

Configure Free Memory Threshold

This set of properties helps you to protect against out of memory conditions by establishing a minimum available free memory space.

This set of properties enables your system to automatically protect free memory availability and intelligently process reports with large data sets based on this availability.

- Specify A Minimum Free Memory Threshold for Report Processing
- Specify Maximum Report Data Size Under the Free Memory Threshold
- Set Minimum Time Span Between Garbage Collection Runs
• Set Maximum Wait Time for Free Memory to Come Back Above the Threshold

Specify A Minimum Free Memory Threshold for Report Processing

Property: **Free memory threshold**

This setting enables you to specify a minimum value for free JVM space. This enables you to control whether to run a report based on two factors: current usage and the size of the report data. This feature requires the setting of several properties that work together. You specify the threshold JVM space, the report maximum report size that will be allowed when the JVM falls below the threshold, and the maximum wait time to pause the report to wait for more JVM free space to become available.

When you set these properties, the following occurs when a user opens a report for online viewing:

1. A user submits a report to view online in the browser.
2. The data engine generates the data for the report.
3. JVM memory is inspected. If the available JVM memory is above the **Free memory threshold** property value, the report processes as usual and there is no system intervention.

   If the available JVM memory is below the threshold value, the size of the report data is inspected and compared to the property setting for **Maximum report data size under the free memory threshold**. If the report data is below this threshold, then the report continues processing.

   If the report data size exceeds the threshold, then the report is paused to wait for free memory to become available. The report will wait for the time specified in the property **Maximum Wait Time for Free Memory to Come Back Above Threshold Value**. If the free memory does not rise back above the minimum in the wait period specified, the report request is rejected.

The default value for this property is 500 MB.

**Specify Maximum Report Data Size Under the Free Memory Threshold**

Property: **Maximum report data size under the free memory threshold**

Default value: (value of Free Memory Threshold)/10

Maximum single report data size allowed when free JVM memory is under the specified threshold value set in **Free memory threshold**. For example (assuming the default setting), if the data generated for a single report exceeds one-tenth of the value set for **Free memory threshold**, then processing is terminated. Therefore if the Free memory threshold is set to 100 MB and a single report data extract exceeds 10 MB, then the report processing is terminated.

This property takes effect only when **Free memory threshold** is set to be a positive value.

**Set Minimum Time Span Between Garbage Collection Runs**

Minimum time span in seconds between any two subsequent garbage collection runs. Set this value to avoid overrunning JVM garbage collection. The server enforces the minimum of 120 seconds, which means the value will be reset to 120 seconds if it falls below the minimum.

The default is 300 seconds.
Set Maximum Wait Time for Free Memory to Come Back Above the Threshold

The maximum time in seconds that a run-report request will wait for free JVM memory to come back above the threshold value. This property value takes effect only when a positive value for Free memory threshold is specified.

If the free memory becomes available within the time specified, the request will proceed immediately to generate the document. If free memory is still below the threshold value after the time specified, the request is rejected. For online requests, the larger this property value, the longer the browser will wait for a request to run.

The default for this property is 30 seconds.

Set Data Engine Properties

The data engine property settings provide additional points to protect your system against out of memory errors.

These include:

• Set Maximum Data Size That Can Be Generated by the Data Engine
• Set Maximum Sample Data Size
• Set Automatic Database Fetch Size

Set Maximum Data Size That Can Be Generated by the Data Engine

This property is used only when you generate XML data via data model editor. In a normal report generation scenario, since template is chosen always, memory guard side properties (maximum report data size for online/offline for each template type) take precedence over this property.

Setting maximum data size sets an absolute limit to the data that can be generated from the execution of a data model. This setting applies to both online report requests and to requests submitted through the scheduler. When the size of the file generated by the data engine exceeds the limit, the data engine terminates execution of the data model and throws the exception:

"oracle.xdo.dataengine.diagnostic.XMLSizeLimitException: XML Output (NNNNNNbytes) generated exceeds specified file size limit (NNNNNBytes).!!!!!!!".

If the report request was submitted through the scheduler, the job will show as failed in the Report Job History page. The exception error noted above displays when you rest your cursor over the status. If the report request was submitted online, the user will get the error "Unable to retrieve the data XML."

Set Maximum Sample Data Size

A sample data set is required for all data models. The sample data is used during template design. Sample data can be generated by the data model editor or uploaded to the data model. Large sample data sets can impact the performance of the design tools.

Set this property to limit the size of the sample data file that can be uploaded to the data model.
Set Automatic Database Fetch Size

This setting calculates and sets database fetch size at run time depending on total number of data set columns and total number of query columns. Setting this property will override the server-level and data model-level database fetch size properties. When set, this property takes effect for all data models and can significantly slow processing time. This setting is recommended for implementations of Oracle BI Publisher that frequently process complex queries of hundreds of columns, such as Oracle Fusion Applications implementations. This setting is not recommended for most general implementations of Oracle BI Publisher.

What Are Memory Guard Features?

BI Publisher provides a set of features to protect against out-of-memory errors by blocking report requests that generate excessive amounts of data or consume excessive amount of memory.

These memory guard features consist of a set of properties. The properties set the conditions and processing points at which data size and free memory availability are inspected to determine whether the system continues to process a report request or terminates processing.

Memory Guard Properties

The Runtime Configuration page lists the default values of the memory guard properties.

<table>
<thead>
<tr>
<th>Property description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum report data size for online reports</td>
<td>300MB</td>
</tr>
<tr>
<td>Maximum report data size for offline (scheduled) reports</td>
<td>500MB</td>
</tr>
<tr>
<td>Maximum report data size for bursting reports</td>
<td>Maximum report data size for offline (scheduled) reports</td>
</tr>
<tr>
<td>Free memory threshold</td>
<td>500MB</td>
</tr>
<tr>
<td>Maximum report data size under the free memory threshold</td>
<td>free_memory_threshold/10</td>
</tr>
<tr>
<td>Minimum time span between 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>30 (seconds)</td>
</tr>
<tr>
<td>Timeout for online report</td>
<td>535 (seconds)</td>
</tr>
<tr>
<td>Maximum rows for CSV output</td>
<td>1000000</td>
</tr>
</tbody>
</table>

Configure Data Model Properties

Set the data model properties in the Runtime Configuration page.
<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>Maximum XML data size in that can be generated from the execution of a data model. This setting applies to both online report requests and to requests submitted through the scheduler. When the size of the file generated by the data engine exceeds the value set for this property, the data engine terminates execution of the data model and throws an exception. Validation rule: [1-9][0-9]*[KB</td>
<td>MB</td>
</tr>
<tr>
<td>Maximum sample data size limit</td>
<td>Maximum file size of a sample data file that can be uploaded to the data model editor.</td>
<td>1MB</td>
</tr>
<tr>
<td>Enable Data Model scalable mode</td>
<td>Processing large data sets requires the use of large amounts of RAM. To prevent running out of memory, activate scalable mode for the data engine. In scalable mode, the data engine takes advantage of disk space when it processes the data. You can also set this property for specific data models. The data model setting overrides the system setting here.</td>
<td>True</td>
</tr>
<tr>
<td>Property</td>
<td>Description</td>
<td>Default</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>Enable Auto DB fetch size mode</td>
<td>When set to True, Oracle BI Publisher calculates and sets database fetch size at run time according to the total number of data set columns and total number of query columns. This setting avoids out of memory conditions, but can significantly slow processing times. When set to True, any other <strong>DB fetch size</strong> settings are ignored. This setting is recommended for implementations of Oracle BI Publisher that frequently process complex queries of hundreds of columns, such as Oracle Fusion Applications implementations. This setting is not recommended for most general implementations of Oracle BI Publisher. This property overrides the data model- level database fetch size properties. When set, this property takes effect for all data models and can significantly slow processing time.</td>
<td>True</td>
</tr>
<tr>
<td>DB fetch size</td>
<td>The maximum database fetch size for a data model. This property value takes effect only when <strong>Enable Auto DB fetch size mode</strong> is set to False. When the fetch size is met, the rows are written to a temp file and another fetch is executed; this process is repeated until all the rows are returned to the temp file. A smaller fetch size requires more round trips from Oracle BI Publisher to the database and can impact overall processing time; however, the smaller data chunks ensure against excessive memory usage. This property can also be set at the data model level. The data model setting overrides the server property.</td>
<td>20 (rows)</td>
</tr>
<tr>
<td>Property</td>
<td>Description</td>
<td>Default</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>SQL Query Timeout</td>
<td>Timeout for SQL query-based data models. If the SQL query is still processing when the timeout value is met, the error “Failed to retrieve data xml.” is returned. This property can also be set at the data model level. The data model setting overrides the server property here. Irrespective of the settings at the instance level or data model level, the maximum SQL query timeout is 10 minutes for all BI Publisher reports running online. This avoids stuck threads and server outages.</td>
<td>600 seconds</td>
</tr>
<tr>
<td>Enable Data Model diagnostic</td>
<td>If you set this property to true, Oracle BI Publisher writes the data set details, memory, and SQL execution time information to the log file. Oracle recommends setting this property to true only for debugging purposes. When set to true, processing time is increased.</td>
<td>False</td>
</tr>
<tr>
<td>Enable SQL Session Trace</td>
<td>If you set this property to true, for every SQL query that is executed, Oracle BI Publisher writes a SQL session trace log to the database. A database administrator can examine the log. Oracle recommends that you turn this property on only in test and development environments. To enable this property, the user that you define for the database connection must be granted the Alter Session privilege on the database (Syntax: GRANT ALTER SESSION TO &lt;USER NAME&gt;). See Set Up a JDBC Connection to the Data Source.</td>
<td>False</td>
</tr>
<tr>
<td>Enable SQL Pruning</td>
<td>Applies to Oracle Database queries only 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. Setting this property enhances processing time and reduces memory usage. Note that Enable SQL Pruning is also a data model-level property that can be turned on or off for particular data models to override this server-level setting. 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>
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<td>ALBANYWT.ttf</td>
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<td>TrueType (Japanese flavor)</td>
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<tr>
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<td>ALBANWTK.ttf</td>
<td>TrueType (Korean flavor)</td>
</tr>
<tr>
<td>4</td>
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<td>ALBANWTS.ttf</td>
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<td>6</td>
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<td>TrueType (Japanese flavor, Fixed width)</td>
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<tr>
<td>7</td>
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<td>bold</td>
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<td>TrueType (Japanese flavor, Fixed width)</td>
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<tr>
<td>8</td>
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<td>ADUOK.ttf</td>
<td>TrueType (Korean flavor, Fixed width)</td>
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<td>ADUOKB.ttf</td>
<td>TrueType (Korean flavor, Fixed width)</td>
</tr>
<tr>
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<td>ADUOSC.ttf</td>
<td>TrueType (Simplified Chinese flavor, Fixed width)</td>
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<tr>
<td>9</td>
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<td>bold</td>
<td>ADUOSCB.ttf</td>
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<td>ADUOTC.ttf</td>
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<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.

![Currency Formats](image)

**Apply a Digital Signature in PDF Documents**

This topic describes how to apply a digital signature in the PDF documents generated by Oracle BI Publisher.

Topics:

- About Digital Signature on a PDF Document
- Prerequisites and Limitations
About Digital Signature on a PDF Document

Oracle BI Publisher supports digital signatures on PDF output documents. Digital signatures enable you to verify the authenticity of the documents you send and receive. Oracle BI Publisher can access your digital signature file from a central, 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 Oracle BI Publisher, you must be aware of a few limitations.

Keep the following limitations in mind:
- You can register only a single digital ID with Oracle BI Publisher.
- Only the reports scheduled in Oracle BI 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 Oracle BI 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 ID in the BI 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 Oracle BI Publisher scheduler, choosing PDF output. When the report completes, it is signed with your digital ID in the specified location of the document.

### Register Your Digital Signature ID and Assign Authorized Roles

BI Publisher supports the identification of a single digital ID file.

To register a digital ID in the Oracle BI Publisher Administration page:

1. On the Administration tab, under **Security Center**, click **Digital Signature**.
2. Select the digital ID file you uploaded in Upload Center and enter the password for the digital ID.
3. Enable the Roles that must have the authority to sign documents with this digital ID. 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, use the following option:

- 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 Oracle BI 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.
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.

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

Oracle BI 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 Oracle BI 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 Oracle BI 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 Oracle BI 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 Oracle BI Publisher (.xpt) templates can be translated from the Properties page.

Template translation includes:

- RTF templates
- RTF sub templates
- Style templates
- Oracle BI Publisher templates (.xpt)

To access the Properties page, click the Properties link for the layout in the Report Editor, as shown below.
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**.
   
   Oracle BI 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**.
   
   Oracle BI 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 Oracle BI Publisher

You can run the Template Manager to upload the translated XLIFF file to Oracle BI 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 Oracle BI 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.

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.
Part V
Reference

This part provides reference information.

Appendices:

- Frequently Asked Questions
- Troubleshoot
- Expression Editor Reference
- Data Sync Reference
This reference provides answers to common questions asked by administrators and business intelligence analysts responsible for loading and modeling data in Oracle Analytics Cloud.

Topics:

• Top FAQs to Load Data
  – What data load methods can I use?
  – How does Data Sync load data?
  – Can I load non-UTF8 data?
  – For the full list of data loading FAQs, see Top FAQs to Load Data.

• 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 Load Data

The top FAQs for loading data are identified in this topic.

Where can I download Data Sync?

Oracle Technology Network.
Can I use Data Sync to transform my relational data?
Yes. You can use Data Sync to transform relational data if you're loading data into either Oracle Database Cloud Service or an on-premises database that is configured using the 'Oracle (Thin)' connection type.

How do I transform my relational data?
Follow the workflow described in Typical Workflow to Transform Data With Data Sync.

Can I use Data Sync to transform my Data Sets?
No.

What data load methods can I use?
- Use Data Sync to load data from flat files, relational tables, OTBI, Oracle Service Cloud, or JDBC data sources. See Help: About Data Sync.

How does Data Sync load data?
Data Sync loads data directly to Database Cloud Service using JDBC.

Can I use the REST API to load data?
No.

Can I drop tables I don’t want any more?
Yes. Use Oracle Application Express SQL Workshop to drop (that is, remove) tables in Database Cloud Service. You can also use Data Sync to drop tables.

Can I load non-UTF8 data?
Yes. Data Sync supports a range of data formats. For a full list, see https://docs.oracle.com/javase/7/docs/api/java/nio/charset/Charset.html.

Can I change the batch size Data Sync uses to load data?
- With Database Cloud Service, the answer is Yes. For direct load into Database Cloud Service, the batch size is 10,000, and for initial loads, Data Sync uses parallel writes, which means that at any given time about 20,000 records may be written to the target.

Can I change the number of parallel processes that Data Sync uses?
No. For Database Cloud Service and on-premises targets, this is set to ten.

Is there a limit to the number of rows that Data Sync can load?
There is no limit to the amount of data that Data Sync can load. The size of your data storage dictates how much data you can load. For data sets, the storage limit is 50MB.

Can I allow for errors?
Yes. You can specify how many bad or invalid records that Data Sync tolerates. Click View, then System Properties to set Max Number Of Errors.
Where do I control the amount of memory allocated to Data Sync?

The default setting for Data Sync is 2GB. Data Sync initiates a separate Java process every time it runs a job. The memory requirement for the main Data Sync process is controlled by the -xmx parameter in datasync.bat/.sh. For individual jobs, memory values are read from conf-shared/jvm_parameters.txt.

If you're loading large amounts of data, then you can allocate more memory. You can also reduce the memory allocation if the hardware has limited memory for the Data Sync process.

Can I have multiple instances of Data Sync running on the same machine?

Yes. Install Data Sync again in a different directory and run it from there.

Can I duplicate my Data Sync environment?

Yes. Install Data Sync again in a different directory. When you run Data Sync for the first time, you'll see an option to copy an existing environment.

Can I integrate Data Sync jobs with other enterprise processes?

Yes. You can configure Data Sync to start jobs with external triggers – either in the form of a file or a database polling mechanism.

Can multiple users run Data Sync at the same time?

No. Data Sync is a single user tool. You can install Data Sync on a machine that allows for remote access by multiple users and start Data Sync whenever the machine starts up. However, you must avoid having multiple users access Data Sync at the same time. Remote users run datasyncclient.bat/.sh to access the environment.

Can I load data to multiple targets?

Yes. There’re two ways to do this.

- **Use a new job** — By default, Data Sync loads data to the default connection named TARGET. To upload data to a different connection:
  1. In the Connections view, create a new connection to the extra data target. For example, create a new connection named TARGET2 with connection details for your new target.
  2. In the Jobs view, navigate to Jobs, then Job.
  3. Click New, provide a job name (for example, RightNow-Job2), and click Next. The New Job dialog displays the default source and target connections for the project.
  4. In the Data Source column, select TARGET.
  5. Click the Override With column next to TARGET to display a list of available connections, and select the new target connection that you created in step 1 (for example, a connection named TARGET2).
  6. In the Project or Jobs workarea, click Run Job, and select the new job (for example, RightNow-Job2).

- **Use a second Data Sync installation on the same machine:**
1. Install Data Sync again in a different directory.

2. Export the metadata from the first environment (click **Tools** then **Export**) and import into the second (click **Tools** then **Import**).

   When you import metadata for the first time, select **Logical** and **System**. Subsequent imports need only **Logical** to be checked. In addition, select the **Truncate** option.

3. In the second environment, configure the connection named TARGET to a different URL or database.

   By using a different URL or database target, you can isolate changes, which might be useful for testing.

---

**Can I make the Data Sync process start automatically when a Windows machine is rebooted?**

Yes. See question Can I configure Data Sync as a Windows Service?.

**Can I stop Data Sync creating or altering tables automatically?**

Yes. Click **View**, **System Properties**, and set **Automatically Create/Alter Tables** to false.

**Can I drop/alter/create just the schema objects from Data Sync?**

Yes. Right-click on a table, and select **Drop/Create/Alter Tables/DataSets**.

**Can I load data from multiple sources?**

Yes. Create as many sources as you want and define a separate data flow for each source. You might find it more convenient to create a different project for each source. Alternatively, you can combine flows from different sources in a single project.

**Can I load a subset of the tables in my project?**

No. The granularity of a job is the project itself. All tables in a project are loaded when you run a job.

One workaround is to deactivate the tables that you do not want to load. You deactivate tables using the **Inactive** option on the Relational Data tab, File Targets tab (File Data), or Pluggable Source Data tab, depending on the type of the source. Another workaround is to create a separate project that only includes the subset of tables that you want to load.

**I want to start my Data Sync install again from scratch? Can I do that?**

Yes. If you have a test or proof of concept project that you want to throw away and start all over again, open a command window, navigate to the Data Sync installation directory, and run:

On Windows:

```
dataasync.bat -clean
```
On UNIX:

`.datasync.sh -clean`

I have multiple jobs. Can I make one job run as soon as another job finishes?

Yes. At the beginning and end of a job, a file is created in the `log\jobSignal` directory. You can use these files to trigger another job. For information about configuring a job to listen for file signals, see Help: Trigger One Job After Another Automatically. You can use the same files for any other process to listen for when the job starts and ends.

Can I configure Data Sync as a Windows Service?

Yes. You can configure the Data Sync server on a Windows machine to keep running after you log off and to start automatically when the machine reboots. Use the Windows Task Scheduler (`taskschd.msc`) to create a new task and set these options:

- On the General tab:
  - Enter the user account that will run the task (this will typically be a network account).
  - Select Run whether user is logged on or not.
  - Select Run with highest privileges.
- On the Triggers tab:
  - Create a new trigger.
  - In the Begin the task list, select At Startup.
- On the Actions tab:
  - Create a new action.
  - In the Program/Script field, enter the full path and name of the bat file for the Data Sync server – that is, `<Data Sync install directory>\startserver.bat`.
  - In the Start in (optional) field enter `<Data Sync install directory>`.
- On the Conditions tab, review the default values and set field values as appropriate.
- On the Settings tab, review the default values and set field values as appropriate, then click OK.
- When prompted, enter the password of the user account.

If you see the error “A specified logon session does not exist”, you will have to use a network account. For more information, see https://blogs.technet.microsoft.com/askperf/2012/04/18/task-scheduler-error-a-specified-logon-session-does-not-exist/.

When your machine starts up, this task launches the Data Sync server. You won’t see the Data Sync server as an icon in the system tray. Instead you’ll see a javaw.exe process in the Windows Task Manager (Processes tab).

To start the Data Sync client, double-click `datasyncClient.bat`.

To shut down the Data Sync Server, double-click `stopserver.bat`. 
Can I deploy Data Sync on a Cloud Compute Node?

Yes. You need a VNC session to see the Data Sync tool. This option enables a cloud-to-cloud data replication solution for SaaS sources supported by Data Sync, without needing an on-premises server to host Data Sync.

Can I monitor incomplete data loading jobs in all of my projects

Yes. Click the server status icon in the top right-hand corner of the screen to display the Cross-project Current Jobs dialog.

**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 Loading Issues
  – I can't start Data Sync
  – I can't connect Data Sync to my database
  – I get errors when I load data using Data Sync
  – Data Sync isn't reading my CSV file correctly
  – I can't connect Data Sync to my service

• 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 Loading Issues

This topic describes common problems that you might encounter when loading data and explains how to solve them.

Load Data Using Data Sync

I can’t start Data Sync

Verify that you installed Java JDK 1.7 or later and configured Data Sync's config.bat/.sh to point to this Java home. Data Sync doesn't work with JRE. Data Sync requires the JavaDB installed with JDK.
To check that you have JavaDB, look for a subdirectory named `db` in your Java install directory.

**I can't connect Data Sync to my database**

Data Sync ships with an Oracle 11.2 version of the JDBC driver. For all other supported databases, you must copy the appropriate JDBC driver to the `datasync\lib` directory.

Some vendors install multiple versions of the JDBC drivers compatible with different Java versions. Use only the JDBC driver files that relate to the Java version that Data Sync is configured to use. Oracle recommends that you do not have multiple versions of the JDBC drivers.

**I get errors when I load data using Data Sync**

Data Sync displays some status and error information on the Jobs tab and publishes more detailed information to log files:

- Current Jobs tab
  - Run Status
  - Status Description
- Run logs (.log)
  - A log file for each job is saved in a separate directory under the `\log` directory. The naming convention used is `<Job Name>.<Process ID>`.
- Bad records (.bad)
  - Errors caused by bad records are logged to a .bad file in the same directory as the log file. The .bad file logs the row that caused the issue and the error message for that row.

The Status Description field displays .log and .bad file details.

If you need more help, create a ZIP file of the contents of the log file directory and contact Oracle Support Services.

**I get error code 500 [BICS-DATALOAD] when I load data sets in Data Sync**

If you see this error when loading data sets, check that none of your data set files exceeds the maximum data set storage limit of 50MB.

**Data Sync isn't reading my CSV file correctly**

Find out which delimiter the CSV file is using and configure Data Sync to use the same delimiter. To verify the delimiter, in Project view display the File Data tab, display the Edit sub-tab, and click the `File` value to display the File Information dialog, and review the `Delimiter` option. If the delimiter is set correctly, then check that the `Codepage` setting matches the character set of your data file. The default character set in Data Sync is UTF-8, but your data file might be encoded with a different character set, for example ISO-8859-1 or US-ASCII.

The Java platform supports a range of character sets. See [https://docs.oracle.com/javase/7/docs/api/java/nio/charset/Charset.html](https://docs.oracle.com/javase/7/docs/api/java/nio/charset/Charset.html).
I can’t connect Data Sync to my service

If your environment is using a proxy server, then you need to set some proxy options in Data Sync. Click Views, System Properties, and then enter values for Proxy Host and Proxy Port.

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, \textit{GROUP BY} clause, \textit{HAVING} clause
- \textit{ORDER BY} clause
- \textit{OR} keyword in \textit{WHERE} clause
- \textit{UNION} clause

- \textbf{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.

  \textbf{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.

\textbf{Troubleshoot Administration Issues}

This topic describes common problems that you might encounter when performing administration tasks and explains how to solve them.

\textbf{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: \textbf{Users and Roles}, \textbf{Snapshots}, \textbf{Connections}, \textbf{Safe Domains}, \textbf{Sessions and Query Cache}, \textbf{Issue SQL}, \textbf{Map Data}, \textbf{Virus Scanner}, \textbf{Mail Settings}, \textbf{Search Index}.

Ask an administrator to verify your permissions. See \textbf{Assigning Application Roles to Users}.

\textbf{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; BETWEEN 100.0 AND 5000.0</td>
<td>Determines if a value is between two non-inclusive bounds. BETWEEN [LowerBound] AND [UpperBound]</td>
<td></td>
</tr>
</tbody>
</table>

BETWEEN can be preceded with NOT to negate the condition.
<table>
<thead>
<tr>
<th>Operator</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<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></td>
<td>Plus sign for addition.</td>
<td>+</td>
</tr>
<tr>
<td>-</td>
<td></td>
<td>Minus sign for subtraction.</td>
<td>-</td>
</tr>
</tbody>
</table>
| * or X   |          | Multiply sign for multiplication. | *
|          |          |                           | X |
| /        |          | Divide by sign for division. | / |
| %        |          | Percentage | % |
| ||       |          | Character string concatenation. | || |
| (        |          | Open parenthesis. | ( |
| )        |          | Closed parenthesis. | ) |
| >        |          | Greater than sign, indicating values higher than the comparison. | > |
| <        |          | Less than sign, indicating values lower than the comparison. | < |
| =        |          | Equal sign, indicating the same value. | = |
| >=       |          | Greater than or equal to sign, indicating values the same or higher than the comparison. | >= |
| <=       |          | Less than or equal to sign, indicating values the same or lower than the comparison. | <= |
| <>       |          | Not equal to, indicating values higher or lower, but different. | <> |
| ,        |          | Comma, used to separate elements in a list. | , |

### Conditional Expressions

You use conditional expressions to create expressions that convert values.

The conditional expressions described in this section are building blocks for creating expressions that convert a value from one form to another.
Follow these rules:
- In CASE statements, AND has precedence over OR
- Strings must be in single quotes

<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>CASE (Switch)</td>
<td>CASE Score-par WHEN -5 THEN 'Birdie on Par 6' WHEN -4 THEN 'Must be Tiger' WHEN -3 THEN 'Three under par' WHEN -2 THEN 'Two under par' WHEN -1 THEN 'Birdie' WHEN 0 THEN 'Par' WHEN 1 THEN 'Bogey' WHEN 2 THEN 'Double Bogey' ELSE 'Triple Bogey or Worse' END</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.</td>
<td>CASE expr1 WHEN expr2 THEN expr3 ELSE expr4 END</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the first expression matches an expression in multiple WHEN clauses, only the expression following the first match is assigned.</td>
<td></td>
</tr>
</tbody>
</table>

| IfCase > Else | ELSE [expr] |
| IfCase > IfNull | assertNotNull([expr],[value]) |
| IfCase > NullIf | nullIf([expr],[expr]) |
| IfCase > When | WHEN [Condition] THEN [expr] |
| IfCase > Case | CASE WHEN [Condition] THEN [expr] END |
| SwitchCase > Else | ELSE [expr] |
### 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.

<p>| Function   | Example                        | Description                                                                                                                                                                                                 | Syntax                           |
|------------|未经授权(sales AT month, region) | 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”. | AGGREGATE(measure AT level [, level1, levelN]) |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<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>AvgDistinct</td>
<td></td>
<td>Calculates the average (mean) of all distinct values of an expression.</td>
<td>Avg(DISTINCT 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. expr is any expression that evaluates to a numerical value. integer is any positive integer. Represents the bottom number of rankings displayed in the result set, 1 being the lowest rank.</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>
<td>-------------</td>
<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. expr is any expression that evaluates to a numerical value. integer is any positive integer. Represents the average of the last n rows of data.</td>
<td>MAVG(expr, 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(expr)</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(expr)</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(expr)</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 &quot;percentile&quot; (with numbers ranging from 1 to 100, with 100 representing the high end of the sort). expr is any expression that evaluates to a numerical value. numTiles is a positive, nonnull integer that represents the number of tiles.</td>
<td>NTILE(expr, 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). expr is any expression that evaluates to a numerical value.</td>
<td>PERCENTILE(expr)</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...). expr is any expression that evaluates to a numerical value.</td>
<td>RANK(expr)</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(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>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. expr is any expression that evaluates to a numerical value.</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. expr is any expression that evaluates to a numerical value. integer is any positive integer. Represents the top number of rankings displayed in the result set, 1 being the highest rank.</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>
<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>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>DayOfWeek</td>
<td>DayOfWeek(Order_Date)</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>DAYOFWEEK(expr)</td>
</tr>
<tr>
<td>DayOfYear</td>
<td>DayOfYear(Order_Date)</td>
<td>Returns the number (between 1 and 366) corresponding to the day of the year for a specified date expression.</td>
<td>DAYOFYEAR(expr)</td>
</tr>
<tr>
<td>Day_Of_Quarter</td>
<td>Day_Of_Quarter(Order_Date)</td>
<td>Returns a number (between 1 and 92) corresponding to the day of the quarter for the specified date expression.</td>
<td>DAY_OF_QUARTER(expr)</td>
</tr>
<tr>
<td>Hour</td>
<td>Hour(Order_Time)</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>HOUR(expr)</td>
</tr>
<tr>
<td>Minute</td>
<td>Minute(Order_Time)</td>
<td>Returns a number (between 0 and 59) corresponding to the minute for a specified time expression.</td>
<td>MINUTE(expr)</td>
</tr>
<tr>
<td>Month</td>
<td>Month(Order_Time)</td>
<td>Returns the number (between 1 and 12) corresponding to the month for a specified date expression.</td>
<td>MONTH(expr)</td>
</tr>
<tr>
<td>MonthName</td>
<td>MonthName(Order_Time)</td>
<td>Returns the name of the month for a specified date expression.</td>
<td>MONTHNAME(expr)</td>
</tr>
<tr>
<td>Month_Of_Quarter</td>
<td>Month_Of_Quarter(Order_Date)</td>
<td>Returns the number (between 1 and 3) corresponding to the month in the quarter for a specified date expression.</td>
<td>MONTH_OF_QUARTER(expr)</td>
</tr>
<tr>
<td>Now</td>
<td>Now()</td>
<td>Returns the current timestamp. The Now function is equivalent to the Current_Timestamp function.</td>
<td>NOW()</td>
</tr>
<tr>
<td>Quarter_Of_Year</td>
<td>Quarter_Of_Year(Order_Date)</td>
<td>Returns the number (between 1 and 4) corresponding to the quarter of the year for a specified date expression.</td>
<td>QUARTER_OF_YEAR(expr)</td>
</tr>
<tr>
<td>Second</td>
<td>Second(Order_Time)</td>
<td>Returns the number (between 0 and 59) corresponding to the seconds for a specified time expression.</td>
<td>SECOND(expr)</td>
</tr>
<tr>
<td>TimeStampAdd</td>
<td>TimeStampAdd(SQL_TSI_MONTH, 12, Time.&quot;Order Date&quot;)</td>
<td>Adds a specified number of intervals to a timestamp, and returns a single timestamp. Interval options are: SQL_TSI_SECOND, SQL_TSI_MINUTE, SQL_TSI_HOUR, SQL_TSI_DAY, SQL_TSI_WEEK, SQL_TSI_MONTH, SQL_TSI_QUARTER, SQL_TSI_YEAR</td>
<td>TIMESTAMPPADD(interval, expr, timestamp)</td>
</tr>
<tr>
<td>TimeStampDiff</td>
<td>TimeStampDiff(QL_TSI_MONTH, Time.&quot;Order Date&quot;, CURRENT_DATE)</td>
<td>Returns the total number of specified intervals between two timestamps. Use the same intervals as TimeStampAdd.</td>
<td>TIMESTAMPPDIFF(interval, expr, timestamp2)</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>Week_Of_Quarter</td>
<td>Week_Of_Quarter(Order_Date)</td>
<td>Returns a number (between 1 and 13) corresponding to the week of the quarter for the specified date expression.</td>
<td>WEEK_OF_QUARTER(expr)</td>
</tr>
<tr>
<td>Week_Of_Year</td>
<td>Week_Of_Year(Order_Date)</td>
<td>Returns a number (between 1 and 53) corresponding to the week of the year for the specified date expression.</td>
<td>WEEK_OF_YEAR(expr)</td>
</tr>
<tr>
<td>Year</td>
<td>Year(Order_Date)</td>
<td>Returns the year for the specified date expression.</td>
<td>YEAR(expr)</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>Cast</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>IfNull</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>IndexCol</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>NullIf</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>To_DateTime</td>
<td>SELECT To_DateTime('2009-03-0301:01:00', 'yyyy-mm-dd hh:mm:ss') FROM sales</td>
<td>Converts string literals of dateTime format to a DateTime data type.</td>
<td>To_DateTime([expression], [literal])</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>Rmax</td>
<td>SELECT month, profit, Rmax(profit) FROM sales</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>Function</td>
<td>Example</td>
<td>Description</td>
<td>Syntax</td>
</tr>
<tr>
<td>----------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>Rmin</td>
<td>SELECT month, profit, Rmin(profit) FROM sales</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>SELECT month, revenue, Rsum(revenue) as RUNNING_SUM FROM sales</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>TopN(Sales, 10)</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>SELECT EVALUATE('instr(%1, %2)', address, 'Foster City') FROM employees</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>EVALUATE_AGGR('REGR_SLOPE(%1, %2)', sales.quantity, market.marketkey)</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. expr is any expression that evaluates to a numerical value.</td>
<td>ABS(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>Acos</td>
<td>Acos(1)</td>
<td>Calculates the arc cosine of a numeric expression. expr is any expression that evaluates to a numerical value.</td>
<td>ACOS(expr)</td>
</tr>
<tr>
<td>Asin</td>
<td>Asin(1)</td>
<td>Calculates the arc sine of a numeric expression. expr is any expression that evaluates to a numerical value.</td>
<td>ASIN(expr)</td>
</tr>
<tr>
<td>Atan</td>
<td>Atan(1)</td>
<td>Calculates the arc tangent of a numeric expression. expr is any expression that evaluates to a numerical value.</td>
<td>ATAN(expr)</td>
</tr>
<tr>
<td>Atan2</td>
<td>Atan2(1, 2)</td>
<td>Calculates the arc tangent of (\frac{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. expr is any expression that evaluates to a numerical value.</td>
<td>COS(expr)</td>
</tr>
<tr>
<td>Cot</td>
<td>Cot(1)</td>
<td>Calculates the cotangent of a numeric expression. expr is any expression that evaluates to a numerical value.</td>
<td>COT(expr)</td>
</tr>
<tr>
<td>Degrees</td>
<td>Degrees(1)</td>
<td>Converts an expression from radians to degrees. expr is any expression that evaluates to a numerical value.</td>
<td>DEGREES(expr)</td>
</tr>
<tr>
<td>Exp</td>
<td>Exp(4)</td>
<td>Sends the value to the power specified. Calculates (e) raised to the (n)-th power, where (e) is the base of the natural logarithm.</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. expr is any expression that evaluates to a numerical value.</td>
<td>LOG(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>Log10</td>
<td>Log10(1)</td>
<td>Calculates the base 10 logarithm of an expression.</td>
<td>LOG10(expr)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>expr is any expression that evaluates to a numerical value.</td>
<td></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.</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>RandFromSeed</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 ( n ) digits of precision.</td>
<td>ROUND(expr, integer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>expr is any expression that evaluates to a numerical value.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>integer is any positive integer that represents the number of digits of precision.</td>
<td></td>
</tr>
<tr>
<td>Sign</td>
<td>Sign(Profit)</td>
<td>This function returns the following:</td>
<td>SIGN(expr)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 if the numeric expression evaluates to a positive number</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• -1 if the numeric expression evaluates to a negative number</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0 if the numeric expression evaluates to zero</td>
<td></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.</td>
<td>TAN(expr)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>expr is any expression that evaluates to a numerical value.</td>
<td></td>
</tr>
</tbody>
</table>
### Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Truncate</strong></td>
<td><code>Truncate(45.12345, 2)</code></td>
<td>Truncates a decimal number to return a specified number of places from the decimal point. expr is any expression that evaluates to a numerical value. integer is any positive integer that represents the number of characters to the right of the decimal place to return.</td>
<td>TRUNCATE(expr, integer)</td>
</tr>
</tbody>
</table>

### Running Aggregate Functions

Running aggregate functions perform...
<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. expr 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. expr 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). expr 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. expr 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. expr 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. exprs are expressions that evaluate to character strings, separated by commas.</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</td>
<td>Inserts a specified character string into a specified location in another character string.</td>
<td>( \text{INSERT}(\text{expr1}, \text{integer1}, \text{integer2}, \text{expr2}) )</td>
</tr>
<tr>
<td></td>
<td>Insert('123456', 2, 3, 'abcd') FROM table</td>
<td>expr1 is any expression that evaluates to a character string. Identifies the target character string. integer1 is any positive integer that represents the number of characters from the beginning of the target string where the second string is to be inserted. integer2 is any positive integer that represents the number of characters in the target string to be replaced by the second string. expr2 is any expression that evaluates to a character string. Identifies the character string to be inserted into the target string.</td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>SELECT</td>
<td>Returns a specified number of characters from the left of a string.</td>
<td>( \text{LEFT}(\text{expr}, \text{integer}) )</td>
</tr>
<tr>
<td></td>
<td>Left('123456', 3) FROM table</td>
<td>expr is any expression that evaluates to a character string integer is any positive integer that represents the number of characters from the left of the string to return.</td>
<td></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.</td>
<td>( \text{LENGTH}(\text{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. expr1 is any expression that evaluates to a character string. Identifies the string for which to search. expr2 is any expression that evaluates to a character string. Identifies the string to be searched.</td>
<td>( \text{LOCATE}(\text{expr1}, \text{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. expr1 is any expression that evaluates to a character string. Identifies the string for which to search. expr2 is any expression that evaluates to a character string. Identifies the string to be searched. integer is any positive (nonzero) integer that represents the starting position to begin to look for the character string.</td>
<td>( \text{LOCATEN}(\text{expr1}, \text{expr2}, \text{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. expr 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. expr 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 strExpr1 in a character expression. If strExpr1 isn't found, the function returns 0.</td>
<td>POSITION(expr1 IN expr2)</td>
</tr>
<tr>
<td>Repeat</td>
<td>Repeat('abc', 4)</td>
<td>Repeats a specified expression n times. expr is any expression that evaluates to a character string. integer is any positive integer that represents the number of times to repeat the character string.</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. expr1 is any expression that evaluates to a character string. This is the string in which characters are to be replaced. expr2 is any expression that evaluates to a character string. This second string identifies the characters from the first string that are to be replaced. expr3 is any expression that evaluates to a character string. This third string specifies the characters to substitute into the first string.</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. expr is any expression that evaluates to a character string. integer is any positive integer that represents the number of characters from the right of the string to return</td>
<td>RIGHT(expr, integer)</td>
</tr>
<tr>
<td>Space</td>
<td>Space(2)</td>
<td>Inserts blank spaces. integer 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>Substring('abcdef' FROM 2)</td>
<td>Creates a new string starting from a fixed number of characters into the original string. Expr is any expression that evaluates to a character string. startPos is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.</td>
<td>Substring([SourceString] FROM [StartPostition])</td>
</tr>
<tr>
<td>SubstringN</td>
<td>Substring('abcdef' FROM 2 FOR 3)</td>
<td>Like Substring, creates a new string starting from a fixed number of characters into the original string. SubstringN includes an integer argument that enables you to specify the length of the new string, in number of characters. Expr is any expression that evaluates to a character string. startPos is any positive integer that represents the number of characters from the start of the left side of the string where the result is to begin.</td>
<td>SUBSTRING(expr FROM startPos FOR length)</td>
</tr>
<tr>
<td>TrimBoth</td>
<td>Trim(BOTH ' ' FROM ' <em>abcdef</em> ')</td>
<td>Strips specified leading and trailing characters from a character string. char is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. Expr is any expression that evaluates to a character string.</td>
<td>TRIM(BOTH char FROM expr)</td>
</tr>
<tr>
<td>TrimLeading</td>
<td>Trim(LEADING ' ' FROM ' _abcdef' )</td>
<td>Strips specified leading characters from a character string. char is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. Expr is any expression that evaluates to a character string.</td>
<td>TRIM(LEADING char FROM expr)</td>
</tr>
<tr>
<td>TrimTrailing</td>
<td>Trim(TRAILING ' ' FROM 'abcdef_' )</td>
<td>Strips specified trailing characters from a character string. char is any single character. If you omit this specification (and the required single quotes), a blank character is used as the default. Expr is any expression that evaluates to a character string.</td>
<td>TRIM(TRAILING char FROM expr)</td>
</tr>
<tr>
<td>Upper</td>
<td>Upper(Customer_Name)</td>
<td>Converts a character string to uppercase. Expr is any expression that evaluates to a character string.</td>
<td>UPPER(expr)</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></td>
<td>Returns the name of the Oracle BI subject area to which you are logged on.</td>
<td><strong>DATABASE()</strong></td>
</tr>
<tr>
<td>User</td>
<td></td>
<td>Returns the user name for the Oracle BI Repository to which you are logged on.</td>
<td><strong>USER()</strong></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><code>SELECT Year_ID, Ago(sales, year, 1)</code></td>
<td>Calculates the aggregated value of a measure from the current time to a specified time period in the past. For example, <strong>AGO</strong> can produce sales for every month of the current quarter and the corresponding quarter-ago sales.</td>
<td><strong>AGO(expr, time_level, offset)</strong></td>
</tr>
<tr>
<td>Periodrolling</td>
<td><code>SELECT Month_ID, Periodrolling (monthly_sales, -1, 1)</code></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, <strong>PERIODROLLING</strong> can compute sales for a period that starts at a quarter before and ends at a quarter after the current quarter. measure is the name of a measure column. x x is an integer that specifies the offset from the current time. y specifies the number of time units over which the function will compute. hierarchy is an optional argument that specifies the name of a hierarchy in a time dimension, such as yr, mon, day, that you want to use to compute the time window.</td>
<td><strong>PERIODROLLING(measure, x [,y])</strong></td>
</tr>
<tr>
<td>ToDate</td>
<td><code>SELECT Year_ID, Month_ID, ToDate (sales, year)</code></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. expr is an expression that references at least one measure column. time_level is the type of time period, such as quarter, month, or year.</td>
<td><strong>TODATE(expr, time_level)</strong></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>Forecast</td>
<td>FORECAST(numeric_expr, ([series]), output_column_name, options, [runtime_binded_options])</td>
<td>Creates a time-series model of the specified measure over the series using either Exponential Smoothing or ARIMA and outputs a forecast for a set of periods as specified by numPeriods. numeric_expr represents the measure to forecast. series is the time grain at which the forecast model is built. It is a list of one or more time dimension columns. If series is omitted, the time grain is determined from the query. output_column_name is the output column. The valid values are ‘forecast’, ‘low’, ‘high’, ‘predictionInterval’. options is a string list of name=value pairs separated by ‘;’. The value can include %1 ... %N, which can be specified using runtime_binded_options. runtime_binded_options is an optional comma separated list of runtime binded columns or literal expressions.</td>
<td>FORECAST(numeric_expr, ([series]), output_column_name, options, [runtime_binded_options])</td>
</tr>
</tbody>
</table>

### 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>
<tr>
<td>TimeStamp</td>
<td>TIMESTAMP [2014-04-09 12:00:00]</td>
<td>Inserts a specific timestamp.</td>
<td>TIMESTAMP [yyyy-mm-dd hh:mi:ss]</td>
</tr>
</tbody>
</table>

### 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.
Data Sync Reference

This topic includes links to reference information about installing and using Data Sync to load data for analysis.

Topics

- Help: About Data Sync
- Help: Clear the Cache After Uploading Data
- Help: Connection Types and Connection Values
- Help: Connections View
- Help: Consolidate Data from Multiple Sources
- Help: Create and Modify Data Sets
- Help: Create and Modify Tables
- Help: Cross-project Current Jobs Dialog Box
- Help: Runs Dialog
- Help: Email Configuration Dialog Box and Recipients Dialog Box
- Help: Export Dialog Box and Import Dialog Box
- Help: Schedules Dialog
- Help: Jobs View
- Help: Load Strategy Dialog Box
- Help: Column Mapping tab
- Help: Mark as Completed Dialog Box
- Help: New Job Dialog Box
- Help: Parameters/Execution Parameters Tab
- Help: Patch Alerts Dialog Box
- Help: Pre/Post SQL Processing Dialog Box
- Help: Properties Dialog Box
- Help: Source Data Dialog Box
- Help: System Properties Dialog Box
- Help: TriggerJobs from Other Tools
- Help: Trigger One Job After Another Automatically
- Help: Upload Data to Multiple Cloud Targets
- Help: Welcome Dialog Box
Help: About Data Sync

Use Data Sync to upload and manage data. You can load data from files (CSV and XLSX), various relational sources (tables, views, SQL statements), OTBI, JDBC data sources, and Oracle Service Cloud. You can load to relational tables, data sets, Essbase cubes, or flat-files.

Use Data Sync when you want to:

- Load data from both Oracle and non-Oracle data sources, including CLOB and BLOB format.
- Transform your data while loading it, including formatting, joining, masking, and scrambling.
- Load a combination of data sources, such as CSV and Oracle relational data.
- Perform incremental data loads or rolling deletes.
- Perform insert-only or append strategies.
- Merge data from multiple sources.
- Schedule data loads. You can replace, append, and update data in tables by scheduling data loads and using the Load Strategy option of this utility.


Video

After downloading and installing Data Sync, configure your working environment, then, you’re ready to start loading data.

Use Data Sync to load data to:

- Oracle Database Cloud Service
- Essbase
- Flat files (CSV format)
- Relational or Data Sets

Use Data Sync when you want to:

- Load data sources other than Oracle.
- Load a combination of data sources, such as CSV, XLSX, and Oracle relational files.
- Perform incremental data loads or rolling deletes.
- Perform insert-only or append strategies.
- Merge data from multiple sources.
- Transform your data (if you’re using Database As A Service as a target).
- Schedule data loads. You can replace, append, and update data in tables by scheduling data loads and using the Load Strategy option of this utility.

Use Data Sync to load data from these databases:
• Oracle
• DB2
• Fusion Applications, including CLOB and BLOB data.
• Microsoft SQL Server
• MySQL
• Teradata
• TimesTen

Load data from generic JDBC data sources too, for example:
• Greenplum
• Hive
• Impala
• Informix
• MongoDB
• NetSuite
• PostgreSQL
• Redshift
• Salesforce
• Sybase

Help: Clear the Cache After Uploading Data

By default, the data cache is deleted after each job run.

By default, the data cache for data model objects is deleted at the end of every completed job run. To support this functionality, grant the user registered to upload data the BI Data Modeler role.

Jobs run to completion regardless of whether the attempt to purge the cache succeeds.

Note:

Upon job completion, log off and log back on to see the effect of the purged cache. Changes may take several minutes.

If you do not wish to have the cache deleted, set the Delete Data Cache system property to false.
Help: Column Mapping tab

Use this tab to review how source columns are mapped to target columns, and to transform your relational data. For example, you might convert values to upper-case, create calculations, or create lookups.

Column Mapping/Mapping Dialog

You typically use this dialog box to configure data transformations.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joins</td>
<td>Display the Joins dialog box, where you can create lookups and denormalize data. See Creating Joins below.</td>
</tr>
<tr>
<td>Manage Target Columns</td>
<td>Use this option to display the Manage Target Columns dialog:</td>
</tr>
<tr>
<td></td>
<td>• New target column - Add a new column to the target database, and specify values for name, type, length, and precision.</td>
</tr>
<tr>
<td></td>
<td>• New unmapped column - Add a new column to the target database. For example, create a new column that concatenates FIRSTNAME and LASTNAME.</td>
</tr>
<tr>
<td></td>
<td>• New target column - Rename the currently selected column. For example, you might make a column name more human-readable.</td>
</tr>
<tr>
<td>Data Transformation</td>
<td>Apply simple transformations to target columns. For example, you might convert text to upper-case, or use the FILE_NAME option to track where data originates. Alternatively, you can transform data using any supported SQL expression in the Target Expression field.</td>
</tr>
<tr>
<td>Field or Element</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Target Expression</td>
<td>Apply more complex transformations to target columns. Click here to display the Expression dialog box, which enables you to build a SQL expression to transform your data.</td>
</tr>
<tr>
<td></td>
<td>On the Expression editor, enter column names or click column names in the left-hand pane to copy them into the expression. Note that tables named with %% are staging tables.</td>
</tr>
<tr>
<td></td>
<td>Examples:</td>
</tr>
<tr>
<td></td>
<td>• To specify a default value, click the <strong>Target Expression</strong> field to display the Expression dialog box, and use the <strong>Default</strong> option to enter a default value, or select one of the installed values (for example, % %UPsert_TIMESTAMP).</td>
</tr>
<tr>
<td></td>
<td>• To create a surrogate key, on the Column Mappings dialog box click <strong>New</strong>, specify the details, click the <strong>Target Expression</strong> field, and on the Expression dialog box select % %SURROGATE_KEY in the <strong>Default</strong> option.</td>
</tr>
<tr>
<td></td>
<td>• To calculate or update the target value, on the Column Mappings dialog box click <strong>New</strong>, specify the details, click the <strong>Target Expression</strong> field, and on the Expression dialog box use the <strong>Expression</strong> option to specify the calculation. For example, if you want to specify a COST value as '0' if it's less than '0' and assign a default '0' if no value is available in the data source, then specify CASE WHEN COST &lt; 0 THEN 0 ELSE COST END in the <strong>Expression</strong> field and enter 0 in the <strong>Default</strong> field.</td>
</tr>
<tr>
<td></td>
<td>• To create a new target column, on the Column Mappings dialog box click <strong>New</strong>, and specify the target column details. Click <strong>Target Expression</strong>, and on the Expression dialog box use the <strong>Expression</strong> option to specify the calculation. For example, if you want to create a Return On Investment value based on Cost and Discount Rate, then you might specify (REVENUE * (DISCNT_RATE/100)) - COST in the <strong>Expression</strong> field and enter 0 in the <strong>Default</strong> field. Then click <strong>Unmapped Columns</strong>, and on the Choose Columns dialog box add the new column to the <strong>Selected Columns</strong> field.</td>
</tr>
<tr>
<td></td>
<td>• To concatenate data, on the Column Mappings dialog box click the <strong>Target Expression</strong> field for the target column, and on the Expression dialog box use the <strong>Expression</strong> option to specify the concatenation expression. For example, if you want to concatenate a FULL NAME field, then you might specify last_name</td>
</tr>
</tbody>
</table>
To add runtime values to the target data, on the Column Mappings dialog box click the Target Expression field for the target column, and on the Expression dialog box click Default to choose the value to add, for example, `%%SURROGATE_KEY` (requires a CHAR data type up to 38 in length), `%UPsert_TIMESTAMP` (requires a DATE data type), or `%%DML_CODE` (‘I’ for insert or ‘U’ for update, which requires a CHAR(1) data type).

To create a target value based on any supported SQL expression, on the Column Mappings dialog box click the Target Expression field for the target column, and on the Expression dialog box use the Expression field to specify the SQL statement.

To track where data originates, on the Column Mappings dialog box, add two new columns. For the first new column, click Data Transformation and select FILE_NAME. For the second new column, click Data Transformation and select LINE_NUMBER.

Creating Joins

You can use joins to denormalize data, and perform data lookups. Click Joins to display the Joins dialog box, which enables you to manage your lookups and joins.
To create a new join, click **New**, and specify the following details:

- **Name.** Specify a short user-friendly name to identify the join in Data Sync. For example, `LOOKUP_CUSTOMER`.
- **Table Names.** Click this field to display the Table Names dialog box, where you specify the names of the tables to join, separated by commas. For example, `PRODUCT, ORDERS`.
- **Join.** Click this field to display the Join dialog, where you build your join SQL statement. On the **Join editor**, enter table or column names, or click table or column names in the left-hand pane to copy them into the expression. Note that tables named with `%%` are staging tables. You can join more than one table in a join statement (in the ANSI SQL style). You can also define aliases for the tables you're joining, using `alias.columnName`. The base table is a runtime stage table, therefore you should refer to it as the target table name prepended with `%%`. For example, to load ORDER table with a join to PRODUCT table, specify:

  $$\text{INNER JOIN PRODUCT ON } \text{%%ORDER.PRODUCT_ID} = \text{PRODUCT.PRODUCT_ID}$$

Or:

  $$\text{LEFT OUTER JOIN PRODUCT ON } \text{%%ORDER.PRODUCT_ID} = \text{PRODUCT.PRODUCT_ID}$$

**Note:**

If a join is expected to have one match, use an inner join. If a join is expected to have multiple matches, use an outer join.

- **Yields Multiple Matches.** Click this option if a join is expected to return multiple matches. If it yields more than one possible match, then use an aggregate function that refers to a column from this join statement.
- **Inactive.** Deactivate or activate the join.

## Help: Connection Types and Connection Values

You set up connections to specify where your target Cloud service or Essbase target is and where your data sources are.

### Connection Types

<table>
<thead>
<tr>
<th>Connection Type</th>
<th>Use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2</td>
<td>DB2 database sources.</td>
</tr>
<tr>
<td>Delimited file</td>
<td>CSV (Comma Separated Value) and Microsoft Excel data sources, and CSV targets.</td>
</tr>
</tbody>
</table>
### Connection Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essbase</td>
<td>Essbase database targets.</td>
</tr>
<tr>
<td>File source</td>
<td>CSV and Microsoft Excel data sources, and CSV (flat-file) targets.</td>
</tr>
<tr>
<td>Generic JDBC</td>
<td>JDBC database sources.</td>
</tr>
<tr>
<td>DB2</td>
<td>DB2 database sources.</td>
</tr>
<tr>
<td>MSSQL</td>
<td>MSSQL database sources.</td>
</tr>
<tr>
<td>MySQL</td>
<td>MySQL database sources.</td>
</tr>
<tr>
<td>Oracle (BICS)</td>
<td>Oracle Database Cloud Service database targets (if you're connecting via HTTPS).</td>
</tr>
<tr>
<td>Oracle (OCI8) or Oracle (Thin)</td>
<td>Oracle database sources or targets (if you're connecting directly).</td>
</tr>
<tr>
<td>Oracle BI Connector</td>
<td>OTBI database sources.</td>
</tr>
<tr>
<td>Oracle Service Cloud (RightNow)</td>
<td>Oracle Service Cloud database sources.</td>
</tr>
<tr>
<td>Oracle UCM Connector</td>
<td>Oracle WebCenter Content sources.</td>
</tr>
<tr>
<td>SFTP Connector</td>
<td>Secure File Transfer Protocol sources.</td>
</tr>
<tr>
<td>Taleo BI Connector</td>
<td>Taleo database sources.</td>
</tr>
<tr>
<td>Teradata</td>
<td>Teradata database sources.</td>
</tr>
<tr>
<td>TimesTen</td>
<td>TimesTen database sources.</td>
</tr>
</tbody>
</table>

### Connection Values

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short and unique name to identify the connection in Data Sync.</td>
</tr>
<tr>
<td>Connection String</td>
<td>Specify the full URL of the data source. For example, the connection string for a DB2 data source might be <code>jdbc:db2:db2.mycompany.com/data</code>.</td>
</tr>
</tbody>
</table>

### Help: Connections View

You set up connections to specify where your data sources and data targets are. For example, your data source might be an Oracle database and your data targets might be Essbase and flat file (for offline analysis or backup).

#### Source/Targets list

This list shows existing connections that have been setup for data sources and data targets.

#### Specifying Connection Details for a Data Target

See [Specify Connection Details for Your Data Target](#).

#### Specifying Connection Details for a Data Source

See [Specify Connection Details for a Data Source](#).
If you’re loading data only from data files, then you don’t need a connection in Data Sync. Go straight to the Project view, click the **Source Data** tab, click **Data From Objects**, and at the Select Source dialog click **File Source**.

For information about specifying connection details for a specific database type:

– JDBC sources, see [Specify Connection Details for Generic JDBC Sources](#).

– Oracle Service Cloud (RightNow) sources, see [Specify Connection Details for Oracle Service Cloud (RightNow)](#).

– OTBI sources, see [Specify Connection Details for OTBI Data](#).

– NetSuite sources, see [Specifying Connection Details for NetSuite Data](#).

### Using Advanced Properties

If a connection types require additional information, then this tab displays a name/value list for the required pieces of information.

**Generate Number of records to read at a time**

**Default length of string datatypes**

### Using Refresh Dates

Use this tab to review the date that your data was last refreshed.

### Help: Consolidate Data from Multiple Sources

If you have different data sources in your environment, you may want to consolidate your data for analytic purposes.

Data sources can be categorized as either different, the same type and version, or the same type but different version.

**Different (Heterogeneous Sources)**

Heterogeneous sources are of different types, for example CRM, Oracle EBS, Peoplesoft, JDEdwards, and so on. The sources typically contain mutually exclusive sets of tables. You can either choose to use the same project or different ones. A single project is convenient when you have a single schedule to upload the data. Multiple projects, one per source are convenient when you need to schedule dataload at different times and/or multiple people work on them.

**Same type and version (Homogenous Same Version)**

Homogenous sources of the same version occur when you have the same kind of source, but multiple instances of it. For example, you could have two instances of CRM, one used for North America and the other for Europe. You can manage data extraction from both of these sources with a single project.

To manage data extraction for homogenous sources of the same version in the example described, consider the following tips and requirements:

- Create a connection for the database in North America and another for the one used for Europe.
- Use one of the databases for identifying the tables and queries to replicate.
• Test the load process from one source.
• Create a new job, where you can map the existing source (with which you defined metadata) to the new one.
• Schedule the jobs separately.

Same type but different version (Homogenous Different Version)

Homogenous sources of different versions are very similar to the case of homogenous sources of the same version. The only difference is that there are tables that may have the same name but different structures and schema definitions. There are two ways of performing data upload: using a single project or using multiple projects, one per type of source.

To use a single project:
• Use one source as a primary source to import the table definitions.
• Use Query as a means of importing data from the others.
• If there are new attributes from the queries, add them to the target table definition.

To use multiple projects:
• Create individual projects, one per version of the source system.
• Import tables and queries from sources into their respective projects.
• Take care that the target tables to have similar datatypes. For example, if COLUMN1 for Table1 in source1 is of type VARCHAR, and the same table column has a type of DATE in the other, the data loads from one or the other source will fail.

Help: Create and Modify Data Sets

You can use Data Sync to load your data as data sets.

• When you configure your project on the Data Flows tab, select **Data Set** as the **Output Format** option.

• Data Sync creates the target data set automatically with default settings. String and timestamp based data is characterized as attributes, and numeric data is characterized as measures.

• You can modify data sets. Subsequent data loads preserve customizations.

• You can add more attributes to your data set in subsequent data loads. These attributes are created in the data set but are not enabled.

• If a subsequent data load changes the datatype of any attribute, or removes an existing attribute, then Data Sync reports an error. To correct this error, delete the data set and re-create it (in the Project view, display the Target Tables/Data Sets tab, right-click the table and click **Drop/Create/Alter Tables/Data Sets**).

• The maximum data set size is 50MB. Data uploads fail if the data set exceeds the 50MB limit.
Help: Create and Modify Tables

During and prior to data load to a Cloud Service target, tables are created automatically and can be manually created.

When you load data, target tables are created on your Cloud schema automatically prior to loading the data. For subsequent data load runs, the table definition from your local repository is compared against that in your Cloud schema, and altered dynamically. You can also create the tables prior to load manually by navigating to the Target Tables tab in the Project view, right-clicking, choosing Drop/Create/Alter Tables, and selecting your target. This process causes errors if the table is not alterable. Examples of such situations include:

- Changing a null column into a not null column.
- Changing the data-type.
- Reducing the length or precision.

If errors are reported, you can manually drop and re-create the table by right-clicking the target table in the Target Tables list in the Project view and selecting Drop/Create/Alter tables.

**Note:**
Dropping and re-creating the table clears the refresh date for that table. This will force a full load on the table in the subsequent load.

Create and Modify Other Types of Tables

For trial run purposes or testing, you might use Data Sync to load data to somewhere other than your target Cloud database, such as a on-premises database. In this case, you should create and alter the tables manually prior to data load. Navigate to the Target Tables tab in the Project view, right-click, and select Drop/Create/Alter Tables.

About System Columns

As Data Sync streams the data to your Cloud service, communication-related failures can occur. To address this scenario, Data Sync automatically retries 10 times before reporting a failure. In the case of an insert/append scenario, in order to prevent data duplication, retries within a streaming process or across job restarts require data clean-up before each attempt. For every table that gets loaded, Data Sync adds the following system columns in order to enable this functionality:

- **DSYS_INSTANCE_ID:** Tracks the Data Sync installation instance ID.
- **DSYS_PROCESS_ID:** Tracks the process ID assigned to a certain run of the job.
- **DSYS_BATCH_ID:** Tracks the batch that is trying to upload the data. Each table load streams multiple batches (currently of 3,000 rows), with each batch assigned a unique number.
About Rolling Deletes

If you wish to load a subset of your data for the past 'n' number of days, you can control this behavior by providing a SQL Query Override. However, as time passes, the data in the Cloud schema continues to accumulate. If you want to limit data in the Cloud schema to a certain period and periodically purge older data, you can specify Rolling Delete Days at the target table level. For example, for the CONTACT table, if you want to purge all data greater than a year, in the Target Tables tab in the Project view, enter 365 for Rolling Delete Days for the table. You can set this in the table list or in the Edit sub-tab.

It is important to define an index on the column used to identify the older records. This improves data load performance.

Help: Cross-project Current Jobs Dialog Box

Monitor all incomplete data loading jobs. This dialog is displayed when you click the server status icon in the top right-hand corner of the Data Sync window.

Use this dialog to monitor incomplete jobs in all of your projects, for example, jobs that are running, queued, or failed. If you find an incomplete job that you want to investigate further, make a note of the project name in the Project column, then in the Jobs view, select that project and click Runs. Here you can diagnose issues, review audit information, drill into individual task details, and restart or abort the tasks.

Help: Source Data Dialog Box

You use this tab to specify details about your source data, such as what type of data source (for example, database or flat-file), which columns to load, and how to process incremental loads. You can use a single source definition to load data into multiple targets. To add a new target to the existing source, use the New Target Object option.

Source Data Dialog Box

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data From Object(s)</td>
<td>Use this option to specify which database and tables you want to load. You either select tables that Data Sync finds, or specify the table names of tables you want to load. Use this option if you don’t know the structure of the source database, and you want Data Sync to analyze the structure and show you.</td>
</tr>
<tr>
<td>Manual Entry</td>
<td>Use this option to specify which database and tables you want to load, by specifying a query. Use this option when you know the structure of the source database.</td>
</tr>
<tr>
<td>New Target Object</td>
<td>Use this option to create a new table for loading data in the target database.</td>
</tr>
<tr>
<td>Update Definition</td>
<td>Use this option to refresh the project data with the latest configuration details.</td>
</tr>
<tr>
<td>&lt;List of data loading projects&gt;</td>
<td>View a list of your existing data loading projects. To view details, click the file name in the File column or use the File field on the Edit tab to display file setup information.</td>
</tr>
<tr>
<td>Edit tab</td>
<td>This tab shows the project being loaded.</td>
</tr>
<tr>
<td>Field or element</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Columns tab</td>
<td>This tab shows details about the columns being loaded.</td>
</tr>
<tr>
<td>Target tab</td>
<td>This tab shows the target table details, including table name and load strategy. To view or edit the load strategy, click the <strong>Load Strategy</strong> field. Click <strong>Map Columns</strong> to view details of how source data columns map to target table columns, create lookups, and transform relational data.</td>
</tr>
<tr>
<td>Attributes tab</td>
<td>This tab shows the data columns identified in the data file. For example, if you’re loading a spreadsheet, the attributes are the spreadsheet columns.</td>
</tr>
</tbody>
</table>

**New Source File Wizard**

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Source</td>
<td>Use this dialog box to navigate to and select a local data file, for example, a CSV file or XLSX file. Click <strong>File Location</strong> and use the <strong>Open</strong> dialog box to navigate to and select a data file. The <strong>File Name</strong> and <strong>Logical Name</strong> fields are populated automatically, but you can edit these if required. To clean up the data files after loading, click the <strong>Delete file(s) upon successful load</strong>. Before you use this option, for reference, make sure that you back up the data files in a different location.</td>
</tr>
</tbody>
</table>
| Import Options (for spreadsheet files) | Use this dialog box to specify information about your data file.  
• **First line contains headers** - select this option if the first line of your spreadsheet contains headers that identify each column. If you clear this option, Data Sync will assign column names for you (COLUMN_1, COLUMN_2, and so on).  
• **Timestamp format (Java style)** - specify the format of timestamp data in your data file.  
• **Range of Cells** - (specific to spreadsheet files) specify the start cell and end cell of your data, including the header row, if you have one. If the data file has a header row and you select the **First line contains headers** option but omit the header row from the range, then the first data row will be misinterpreted as the header.  
• **Select sheets to be imported** - (specific to spreadsheet files) click to display the **Choose Sheets** dialog, which enables you to specify which sheets to load.  
• **Number of lines to be sampled** - specify how many lines of data are analyzed by Data Sync to determine the syntax and structure. |
| Import Options (for CSV files) | Use this dialog box to specify information about your data file. |
| Configure Target | Use this dialog box to specify information about where to load your data.  
• **Select an existing** - Click to display the **Target Options** dialog, which enables you to select an existing target table.  
• **Create new** - Use this option to create a new target table with the name that you specify in the adjacent text box.  
• **Choose output format** — Use this option to select the type of output. |
Loading From Files

To set the global default directory for source data files, navigate to the System Properties dialog and specify a full directory path for the property named **Data File Root Directory**.

To set a directory for source data files for a specific project, in the **Project** view, navigate to **Source Data** tab, then the **Attributes** tab, and specify a full directory path for the property named **Input Directory**.

Before importing files, it is important to review the file format by opening the file in a text editor to identify the delimiters, determine the number of lines to skip, and ensure that each record is on a new line.

About File Format Requirements

File format definitions and requirements include the following:

- You can specify a single character as delimiter. It can be a comma (",”), or space (” “) or a tab ("\t" or "[tab]").
- When an attribute contains the delimiter as part of the value, the whole value needs to be double quoted.
- An attribute can contain new line characters, in which case it also needs to be double quoted.
- A file can have a banner, which can be ignored during load. However, the transition from header to data should predictably start from a certain line number.
- A file can have timestamp and date strings. However, only one format per file can be used. For example, if there is birth date and hire date, both need to be formatted in the same way. As an example, "yyyy-MM-dd" can be used to interpret timestamp "1968-01-01" as birth date, and "2010-06-31" as hire-date.

Refer to [http://docs.oracle.com/javase/7/docs/api/java/text/SimpleDateFormat.html](http://docs.oracle.com/javase/7/docs/api/java/text/SimpleDateFormat.html) for various formatting possibilities.

About Error Handling and Logging

When a file is parsed and loaded, errors can result either while reading or writing. Read-related errors are mainly due to conversion of strings to an object of type integer, decimal, or timestamps. They can also result from bad formatting. For example, if an attribute contains the delimiter and it's not double quoted, or a line does not have as many attributes as the header. When there are bad records, the process fails.

Write-related errors can result from insufficient length or entering null into a not null attribute.

When such records are encountered, the errors are logged in a file in the log directory with the naming convention **CR_<Table/File Name>_<From Connection>_<To Connection>_<timestamp>.bad**.

This log file contains information including the line number of the bad record, the record itself, and what problems occurred when parsing the file.

Once the bad records are identified, fix the original file and rerun the process. If you are unsure about how to fix a record in the file at the location specified in the .bad log file, you can comment it out by adding -- in front of the line in the file.
Importing Files

When you import files, Data Sync estimates the data types and other characteristics of the data and allows you to edit the values before creating a corresponding Oracle Analytics Cloud Service data source in the Target Objects tab and registering the columns to load the data into. By default, up to 10,000 rows are taken as a sample to identify the data types. You can specify that a higher or lower number of rows be sampled, or choose -1 to read the whole file, though it may take longer to parse the whole file.

During import, the tool estimates the length of string attributes in the file so that the corresponding target table definition can accommodate the data. If it is a string representation, then the length is computed in increments of 50. If the length is more than 50% of the computed length, the next increment is used. The following table illustrates how the length is computed.

<table>
<thead>
<tr>
<th>Maximum length of string in sample data</th>
<th>Computed length</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>27</td>
<td>100</td>
</tr>
<tr>
<td>55</td>
<td>100</td>
</tr>
</tbody>
</table>

Help: Data Transform Dialog Box

Use this dialog box to add transformations to your data. For example, you might convert values to upper-case, create lookups, or scramble sensitive data.

You typically use this dialog box to configure data transformations.

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of transformation types</td>
<td>Transformations that you can apply to the currently selected column. The column type determines the transformations that you can apply (as specified in the Source Column Type value on the Column Mapping tab). Click Description to view instructions for that option.</td>
</tr>
<tr>
<td>Parameters</td>
<td>Values that you specify to configure the selected transformation type. For example, if you transform a number column and select Obfuscate Numbers, you specify a percentage variance value by which to scramble the number.</td>
</tr>
<tr>
<td>Test</td>
<td>Click Test and review the Sample Output field to see the effect of the selected transformation and parameters on the text in the Sample Text field.</td>
</tr>
</tbody>
</table>

Help: Email Configuration Dialog Box and Recipients Dialog Box

You can send data load reports by email to one or more recipients. Emails are sent from the email account that you configured on the Email Configuration dialog box.
Email Configuration Dialog Box

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Name</td>
<td>The user name for the email account.</td>
</tr>
<tr>
<td>Password</td>
<td>The password for the user name provided. (Only required if you select <strong>Needs Authentication</strong>.)</td>
</tr>
<tr>
<td>Email Server</td>
<td>The host name of the email server.</td>
</tr>
<tr>
<td>Email Server Port</td>
<td>The port where the email server listens.</td>
</tr>
<tr>
<td>Email Address</td>
<td>The email address of the user.</td>
</tr>
<tr>
<td>Needs Authentication</td>
<td>Specifies whether the corporate email server requires authentication.</td>
</tr>
<tr>
<td>Send Test Email</td>
<td>Click to test the details by sending an email to the specified email account.</td>
</tr>
</tbody>
</table>

Recipients Dialog Box

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the user to be notified.</td>
</tr>
<tr>
<td>Email Address</td>
<td>The email address where the notification is sent.</td>
</tr>
<tr>
<td>Inactive</td>
<td>Indicates whether the email notification for this recipient is active or inactive. When checked, the person is not included in the email broadcast.</td>
</tr>
</tbody>
</table>

Help: Export Dialog Box and Import Dialog Box

You can use the Export and Import features to migrate one Data Sync environment to another environment. For example, you might migrate Data Sync from a test environment to a production environment.

Before You Start

Data Sync behavior relating to the target folder is as follows:

- If the target folder is empty, Data Sync exports the metadata without a warning.
- If the target folder contains Data Sync metadata, the client issues a warning and you must click **OK** to proceed with the export. The export process replaces all content in the target folder.
- If the target folder has non-Data Sync metadata as well as Data Sync metadata, the client issues a warning, and you must click **OK** to proceed with the export. The export process replaces all content in the folder. All non-Data Sync metadata is deleted.
- If the target folder has only non-Data Sync metadata, Data Sync cannot export into the specified target folder.
Exporting Metadata

You use the export feature to create a copy of source system-specific metadata that you can use to migrate Data Sync. For example, you might export metadata from your test environment, and then import the metadata into your production environment.

1. In Data Sync, from the Tools menu, select Export.
2. Select the directory to which you want to export metadata, or accept the default directory.
3. Select the appropriate categories of metadata you want to export:
   • Logical: Exports all information contained in the Project view.
   • System: Exports all information contained in the Connections view, except passwords for servers and database connections.
   • Run Time: Exports information about jobs and schedules contained in the Jobs view.
   • User Data: (Applicable to Data Sync standalone authentication only) Exports users, roles, and passwords.

   Note:
   When importing roles and passwords, if the encryption key in the target repository is different to the encryption key in the source repository, the roles and passwords will be unreadable.

4. Select the appropriate applications that you want to export metadata for.
5. Verify the export process by reviewing the log file <Domain_Home>\log \export.log. You can use the Overwrite Log File option to overwrite earlier export logs.

Importing Metadata

You can use the import feature to migrate source system-specific Data Sync metadata into a Data Sync environment. For example, if you previously exported metadata from your test environment, you might import the metadata into the production environment.

1. In Data Sync, from Tools menu, select Import.
2. Select the directory from which you want to import metadata, or accept the default directory.
3. Select the appropriate categories of metadata you want to import:
   • Logical: Imports all information contained in the Project view.
   • System: Imports all information contained in the Connections view, except passwords for servers and database connections.
   • Run Time: Imports information about jobs and schedules contained in the Jobs view.

4. Select the appropriate applications for which you want to import metadata.
5. To import metadata into a blank repository or to completely replace selected categories of the current metadata in the repository, select **Truncate repository tables**. This option overwrites the content in the current repository. It also greatly increases the speed of the import process.

6. To import new records and update existing records, select **Update existing records**. If you don't select this check box, Data Sync inserts only new records. This option isn't available if you select the **Truncate Repository Tables** option.

7. (Optional) Select **Enable bulk mode** to insert the imported metadata into the repository as an array insert. You should elect this option only if you also selected the **Truncate Repository Tables** option. This action increases the speed of the import process.

8. Click **OK**.

9. Verify the import process by reviewing the log file `<Domain_Home>/log\import.log`.

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**Help: Jobs View**

A job is a data load process. A run is an executed data-loading job. For example, if you run a job twice, then you'll see two run records on the Runs tab.

---

**Note:**

See *Quick Guide to Loading Data With Data Sync.*

---

Use:

- The Jobs tab to create data loading jobs that you can run once only or run regularly.
- The Schedules tab to load data regularly.
- The Runs tab to manage recently started data loads.

**Starting a Data Load Using a Job**

In the **Jobs** tab, create a new job, and use the lower tabs to change the default data load configuration settings. Then click **Run Job** to start loading data.

If you're loading data to Oracle Database Cloud Service, then on the Edit tab use the **Cloud Connection for Cache Purging** option to specify the cache to purge after each job run. If you leave the **Cloud Connection for Cache Purging** field blank, it might take longer for the new data to appear in your BI reports.

**More About Working with Jobs**

When you create a project, use the **Jobs** tab to create a job to load your data. When you select a job, the Ordered Tasks subtab shows the tasks that are run when you click **Run Job**. (You don't see tasks until a job has started.)

If more than one job is in an incomplete status (such as **Running** or **Failed** or **Stopped**), the job fails. If a job fails, you might have to manually mark the status as **Completed** before you can restart it. To mark a run as completed, in the Runs dialog, right-click the run entry and select **Mark as Completed**.
Restarting Jobs Automatically

Data loads to the cloud can fail due to network issues, and might succeed when the data load is rerun. If you want Data Sync to automatically retry upon failure, you can set the number of retries at the job level using the # Retries field on the Edit subtab.

Refining Jobs

<table>
<thead>
<tr>
<th>What do I want to do?</th>
<th>Use this tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the order of tasks that are included in the data-loading job.</td>
<td>Ordered Tasks</td>
</tr>
<tr>
<td>Notify people automatically with a status email when data has been loaded.</td>
<td>Email Recipients</td>
</tr>
<tr>
<td>Specify data loading behavior that is specific to the type of data source being used.</td>
<td>Connectivity Parameters</td>
</tr>
<tr>
<td>Customize a data load or override a project-level parameter with a job-level parameter (known as an execution parameter).</td>
<td>Execution Parameters</td>
</tr>
</tbody>
</table>

Purging Run Details

To remove details of completed data loads, click Tools, then Purge Run Details. Use the Purging Run History dialog box to specify how much history data to remove. For example, select All completed runs to remove run records with a Run Status of Completed. To minimize the Data Sync repository size, deselect the Keep run definitions option. Don’t forget that deleted run information cannot be recovered. To keep a summary of each run but remove the tasks, task details, and audit trail details, select the Keep run definitions option.

Help: Load Strategy Dialog Box

Before you load data, you define how the data will be loaded by choosing a load strategy.

About Load Strategies

A load strategy defines how your data is loaded from a specific data source into your target. When you choose a load strategy that incrementally loads the data, Data Sync requires you to define a user key to uniquely identify a record on the target side, and a DATE/TIMESTAMP-based column which can be used to identify the incremental data. If an index is not available, then Data Sync prompts you to create an index.

An Example Load Strategy

You have a table with CONTACT_ID as the unique identifier for any record, and a date column LAST_UPD whose value is updated to the current timestamp whenever a record is created or updated. Here, you would choose CONTACT_ID for user key and LAST_UPD column as the filter.

When data is loaded for the first time, Data Sync issues a SELECT * FROM CONTACT statement. If the first load happened on January 1, 2014 at 10:00 AM, the subsequent load would issue the following SQL statement (Oracle syntax): SELECT * FROM CONTACT WHERE LAST_UPD > TO_DATE('01-01-2014 10:00', 'MM-DD-YYYY HH24:MI'). The record set then compares the CONTACT_ID value to the
CONTACT_ID in the existing target data. Any record without a match is inserted. Any records with a match are updated. It is important that the source system contains an index for the incremental filter column.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace data in table</td>
<td>Delete any existing data and reload data always. Also applies to loads where a unique key is not available. Does not require a primary key or filter column. The table is truncated before the data load on each run. Any indexes are dropped prior to data load and recreated after load. The table is analyzed at the end to update statistics.</td>
</tr>
<tr>
<td>Append data to table</td>
<td>New data is added to the table without checking for any prior existence of data. This does not require a primary key or filter column. The table is never truncated. If registered indexes do not exist on the provisioned schema, they are created after the data load.</td>
</tr>
<tr>
<td>Update table (Add new records)</td>
<td>This requires a primary key or filter column. If the data with the user key is not available, then it is inserted, else the record is ignored. During the initial run, the table is truncated before the first load. Indexes are dropped prior to the data load, and recreated after the load. The table is analyzed at the end to update statistics.</td>
</tr>
<tr>
<td></td>
<td>During incremental runs, the table is not truncated. Data is applied incrementally, and any missing indexes are created. The table is analyzed at the end. If any index is marked as Always drop and create, those indexes do get dropped and created even during incremental runs.</td>
</tr>
<tr>
<td>Update table (Update existing</td>
<td>This requires a primary key or filter column. If the data with the user key is available, then it is updated, else it is ignored. During the initial run, the table is truncated before the first load. Indexes are dropped prior to the data load, and recreated after the load. The table is analyzed at the end to update any statistics.</td>
</tr>
<tr>
<td>records)</td>
<td>During incremental runs, the table is not truncated. Data is applied incrementally, and any missing indexes are created. The table is analyzed at the end. If any index is marked as Always drop and create, those indexes do get dropped and created even during incremental runs.</td>
</tr>
</tbody>
</table>

**Help: Mark as Completed Dialog Box**

Cancel the current data load by changing the status of the job run to **Completed**.

To confirm that you do want to cancel the current data loading job run, enter the random code displayed into the text box, then click **Yes**. When you restart the job by clicking **Run Job**, Data Sync will create a new job run instead of restarting the failed job run. You can monitor the new job run on the **Current Jobs** tab.
Help: New Job Dialog Box

Specify a data source and data target for your new data loading job.

- **Job name**: Specify a unique name to identify the data loading job.
- **Data Source**: This column displays the connection name for your data source (for example, your RightNow data source) and the connection name for your data target. If you want to use the defaults specified, click **Finish**. If you want to change either the data source or data target for this job, use the **Override With** option.
- **Override With**: Use this option to change the data source or data target for this data loading job. For example, you want to perform a test run from a smaller RightNow data set with a connection named RightNow-Test01. Here, you click the **Override With** column for the RightNow table row, and select **RightNow-Test01**. When you run the new job, Data Sync will load from the smaller RightNow data set rather than the full data set.

Similarly, to test a data load, you might want to change the default data target to a different data target.

Help: Parameters/Execution Parameters Tab

You use parameters to customize your data loads at run time. You can define parameters at project-level and job-level.

**Using Parameters**

Parameters enable you to dynamically customize the way you load data. For example, if you want to load data from the previous one year, you might create a parameter named `NUM_YEARS_TO_EXTRACT` and set the value to 1. Then, you can use this variable in a query override (to reference a parameter, you prefix the parameter name with `%%`), for example:

```
SELECT * FROM MY_REVENUE WHERE CREATED < SYSDATE - (%
%NUM_YEARS_TO_EXTRACT *365)
```

If you want to change the number of years’ data to load, you don’t have to edit the SQL query, you use the Parameter tab in the Project view to change the value.

You can also use parameters to configure your data loads with a number of commonly used runtime variables that provide job information, such as `ETL_START_TIME`, `CURRENT_TIMESTAMP`, and `CURRENT_PROCESS_ID`.

**Project-level versus Job-level Parameters**

You can define parameters:

- At the Project level, in the Project view using the Parameter tab.
- At the Job level, in the Jobs view using the Execution Parameters tab. Remember that an execution parameter overrides a project-level parameter with the same name.

You can override a project-level parameter using an execution parameter with the same name set at the job level. For example, your project loads five years of data by default, but for a test environment you might want to load one year of data only. In this scenario you have a parameter named `NUMBER_YEARS_TO_EXTRACT` defined with...
the value 5 on the Parameter tab in the Project view. For the default job, TARGET is pointing to a production environment. You create a new job in the same project, and on Execution Parameters tab in the Jobs view you create an execution parameter with the same name `NUMBER_YEARS_TO_EXTRACT` and set its value to 1.

Specify these details:

<table>
<thead>
<tr>
<th>Field or Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short name (less than 20 characters) with no spaces to identify the parameter in Data Sync.</td>
</tr>
<tr>
<td>Data Type</td>
<td>Select <strong>Text</strong> or <strong>Timestamp</strong>, depending on what runtime variable you want to attach to the parameter.</td>
</tr>
<tr>
<td>Load Type</td>
<td>Specify <strong>Full</strong> for the initial full data load, Incremental for a repeated incremental load, or <strong>Both</strong> to apply the parameter to the initial full data load and the repeated incremental load.</td>
</tr>
<tr>
<td>Value</td>
<td>Click this field to display the Enter Parameter Value dialog, where you specify a static value, runtime value, or SQL statement that returns a value. See ‘What Dynamic Runtime Variables Are Available?’.</td>
</tr>
<tr>
<td>Inactive</td>
<td>Select this field to deactivate a variable. For example, if you created a parameter for testing a data load, you might turn it off when you move to production. Before you deactivate a variable, make sure that it's not being used. If you deactivate a parameter that is being used by a SQL command, the SQL command will fail if no override value is available.</td>
</tr>
</tbody>
</table>

**What Dynamic Runtime Variables Are Available?**

For parameters of type **Text**, these variables are available.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%CURRENT_PROCESS_ID</td>
<td>The current run's process ID.</td>
</tr>
<tr>
<td>%LAST_PROCESS_ID</td>
<td>The last successful run's process ID.</td>
</tr>
<tr>
<td>%SOURCE_TABLE_OWNER</td>
<td>The dataflow's source connection's Schema Name/Table owner as defined by the user.</td>
</tr>
<tr>
<td>%TARGET_TABLE_OWNER</td>
<td>The dataflow's target connection's Schema Name/Table Owner as defined by the user.</td>
</tr>
<tr>
<td>%SOURCE_DBNAME</td>
<td>The dataflow's source connection name.</td>
</tr>
<tr>
<td>%TARGET_DB_NAME</td>
<td>The dataflow's target connection name.</td>
</tr>
<tr>
<td>%READ_MODE</td>
<td>The read mode indicating whether the data read is a full read or incremental read.</td>
</tr>
<tr>
<td>%WRITE_MODE</td>
<td>The write mode indicating whether the data is written by replacing data or incrementally applied (append or upsert mode).</td>
</tr>
</tbody>
</table>

For parameters of type **Timestamp**, these variables are available.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%ETL_START_TIME</td>
<td>The local timestamp of when the job started.</td>
</tr>
<tr>
<td>Variable name</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>%CURRENT_TIMESTAMP</td>
<td>The current local timestamp of when the parameter is evaluated just before the execution of a task.</td>
</tr>
<tr>
<td>%SOURCE_REFRESH_TIMESTAMP</td>
<td>The timestamp of the last successful job which touched the source table.</td>
</tr>
<tr>
<td>%TARGET_REFRESH_TIMESTAMP</td>
<td>The timestamp of the last successful job which touched the target table.</td>
</tr>
<tr>
<td>%SOURCE_PRUNED_REFRESH_TIMESTAMP</td>
<td>The last refresh timestamp of the source minus the prune time specified at the connectivity parameters of the job.</td>
</tr>
</tbody>
</table>

**Note:**

When using generic JDBC data sources, choose the custom format and provide the date representation in the Java timestamp format. If you don’t use this format, Data Sync can’t evaluate the timestamp.

---

**Help: Patch Alerts Dialog Box**

To display a list of patches that have been applied to your Data Sync installation, click the **New patch alerts** icon in the top right hand corner of the Data Sync main screen.

**Help: Pre/Post SQL Processing Dialog Box**

This view enables you to edit your target Oracle Database Cloud Service data before or after a data load.

**Edit Tab**

The Edit tab displays details of the post load processing operation that is currently selected.
<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;List of processes&gt;</td>
<td>View and edit processing operations for the current project. Click the SQL(s)/stored Procedure(s) field to display the SQL(s)/Stored Procedure(s) dialog box and review SQL statements and functions, and add new logic.</td>
</tr>
<tr>
<td></td>
<td>Use the <strong>Inactive</strong> option to activate or deactivate the logic.</td>
</tr>
<tr>
<td></td>
<td>To create a new operation, click <strong>New</strong>, specify a name for the process, use the <strong>Pre/Post</strong> option to specify whether to execute the SQL before or after the data load, and use the SQL(s)/stored Procedure(s) option to display the SQL(s)/Stored Procedure(s) dialog box, which enables you to define your SQL statements and functions.</td>
</tr>
<tr>
<td></td>
<td>Notes about SQL Statements:</td>
</tr>
<tr>
<td></td>
<td>• SQL statements and procedures execute one after the other in the order specified in the list.</td>
</tr>
<tr>
<td></td>
<td>• Oracle recommends that you design SQL statements as re-entrant. If failures or restarts occur, then all statements are re-executed irrespective of where the prior failure happened.</td>
</tr>
<tr>
<td></td>
<td>• In the <strong>Sql Statement</strong> box, you can specify parameters that are defined on the Parameters tab or Execution Parameters tab. To specify a parameter, either enter the parameter name prefixed with <code>%%</code>, or expand the FUNCTIONS &amp; PARAMETERS\SOURCE SYSTEM PARAMETERS tree node and double-click a parameter name.</td>
</tr>
<tr>
<td>Name</td>
<td>Specify a short name to identify the SQL processing operations in the Data Sync client tool and in log files.</td>
</tr>
<tr>
<td>SQL(s)/Stored Procedure(s)</td>
<td>Display the SQL(s)/Stored Procedure(s) dialog box where you define your SQL statements and functions:</td>
</tr>
<tr>
<td><strong>Field or element</strong></td>
<td>Use to</td>
</tr>
<tr>
<td>&lt;List of processes&gt;</td>
<td>Review the list of SQL statements or stored procedures available to your project. Use the <strong>Load Type</strong> value to specify whether to execute the logic at initial load only, incremental load only, or at every load. Use the <strong>Continue on Fail</strong> value to specify whether to continue the SQL statement or procedure if an error occurs. Use the <strong>Retries</strong> value to specify how many times you want Data Sync to re-execute the SQL statement or procedure after a failure.</td>
</tr>
<tr>
<td>Add</td>
<td>Add a SQL statement or stored procedure. Use the <strong>Sql Statement</strong> box to specify the SQL statement.</td>
</tr>
<tr>
<td>Delete</td>
<td>Remove the selected SQL statement or stored procedure.</td>
</tr>
<tr>
<td>Sql Statement</td>
<td>Enter your SQL statement. You can also use PL SQL blocks. For example, begin &lt;SQL commands&gt; end;</td>
</tr>
<tr>
<td>Comment</td>
<td>Document your business logic by explaining the purpose and scope of the SQL statement.</td>
</tr>
<tr>
<td><strong>Pre/Post</strong></td>
<td>Choose <strong>Pre</strong> or <strong>Post</strong> to specify whether to execute the SQL code before data load (using <strong>Pre</strong>) or after data load (using <strong>Post</strong>).</td>
</tr>
<tr>
<td><strong>Inactive</strong></td>
<td>Activate or inactivate the process.</td>
</tr>
</tbody>
</table>
SQL Source Tables Tab

Specifying source tables is optional. You specify source tables to identify the tables that SQL statements read from. When specified, as soon as the extraction of the source tables is complete, the specified SQL statements execute, even if there are other tables still being extracted. This helps to optimize the overall execution time. If you don’t specify source tables, Data Sync defers the step until all extraction tasks are complete in the current project.

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Use to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add/Remove</td>
<td>Display the Choose Tables dialog box, where you specify the tables to include in your SQL processing operation.</td>
</tr>
<tr>
<td>Remove</td>
<td>Remove the selected table from the load processing setup.</td>
</tr>
</tbody>
</table>

SQL Target Tables Tab

Specifying target tables is optional. You specify target tables to edit tables before SQL execution (for example, to create or alter tables), or perform analysis after SQL execution (for example, to analyze table statements). In addition, this tab enables you to specify when to truncate a table (similar to providing a load strategy).

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Use to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add/Remove</td>
<td>Display the Choose Tables dialog box, where you specify the tables to include in your SQL processing operation.</td>
</tr>
<tr>
<td>Remove</td>
<td>Remove the selected table from the load processing setup.</td>
</tr>
<tr>
<td>Truncate Always</td>
<td>Use this option if a SQL statement creates an aggregate table with content that is fully refreshed.</td>
</tr>
<tr>
<td>Truncate For Full Load</td>
<td>Use this option if SQL statements append or updates existing data.</td>
</tr>
</tbody>
</table>

Help: Properties Dialog Box

You use properties to specify the data you want to load and how you load it.

For example, to set up a data load from a RightNow report, you specify the report ID of the data report and the report ID of the metadata report. You can review your property settings later in the Pluggable Attributes tab.

Choosing Which Properties to Display

Click the list and select from:

- Original — display the default list of Names and Values for the type of data load that you’ve selected.

Specifying Values

Click the Value field and use the displayed dialog box to enter or copy in a value. For example, you might copy in a SQL statement or ROQL statement.
Specifying Timestamps in RightNow Queries

When you specify a timestamp in a query on an Oracle Service Cloud RightNow data source, the timestamp must be in the format:

```
yyyy-MM-ddTHH:mm:ssZ
```

For example, you might filter a query using:

```
updatedtime > '2014-01-01T00:00:00Z'.
```

Using Partition Reads

Specify a partition read when a query would otherwise load more records than the maximum fetch size allowed for your data source or target Cloud service, or as a workaround to memory issues.

Help: Runs Dialog

The Runs dialog shows in-progress, completed, or failed data loading jobs.

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Jobs <em>&lt;List of job runs&gt;</em></td>
<td>Each time a job starts, a new job run is created and displayed in this list with the name and a process ID to uniquely identify the job run. The job run is displayed in this list until it is completed, in which case it is removed from this list and transferred to the History list of job runs. If a job run fails (with Run Status=Failed), it remains in the Current Jobs list until it is either:</td>
</tr>
<tr>
<td></td>
<td>• Restarted and is successful (the Run Status is set to Completed).</td>
</tr>
<tr>
<td></td>
<td>• Manually set to Completed. That is, you right-click the job run and select Mark as Completed. If you do this, a new job run is created when you restart the job; otherwise the original job run is restarted.</td>
</tr>
<tr>
<td>Edit</td>
<td>Displays the status of the job run, which you can edit.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the details of the job run, including log files, messages, and various timestamps and metrics. The run log files are stored in the log directory. One directory per run is created with a naming convention of CR_&lt;Table/File Name&gt;<em>&lt;From Connection&gt;</em>&lt;To Connection&gt;_&lt;Timestamp&gt;.log.</td>
</tr>
</tbody>
</table>
Field or element | Description
--- | ---
Tasks | The Task Details tab elaborates on the line items for the data flow. The task details typically contain the following details:
  - **Truncate Table**: When the load strategy is set to Replace data in table or when loading a table (without the never delete data option) for the first time, truncate table is executed.
  - **Drop Index**: When a table is truncated, all the indexes on the table are dropped prior to the data load. The indexes whose Drop/Create Always property is checked, always get dropped prior to the data load, even if the table is incrementally loaded.
  - **Insert/Update/Append/Upsert**: Depending on the load strategy, an appropriate command is used to load the data.
  - **Create Index**: When an index is dropped, it gets created after the data is loaded. Any new index that is registered which does not exist on the cloud also is created.
  - **Analyze table**: After data load and index creation, the table is analyzed.

Audit Trail | Displays the details of job run tasks.

**About Table Analysis**

To maximise performance, Data Sync only analyzes tables during initial loads and when tables are modified.

**Abandoning a Failed Run**

If for some reason you want to abandon a failed run, right-click its record in the Current Jobs tab and select **Mark as Completed**, which updates the job status to Completed. A subsequent request starts a new run.

**Performing a Complete Reload of Data**

To perform a complete refresh of your data (that is, reload all tables), on the **Tools** menu, select **Re-extract and load all data**. The next job run is performed in Full mode rather than Incremental mode, and reads and loads all data.

If you want to reload a single table, in the Connections view, select the table, display the **Refresh Dates** tab, click **Re-Extract Data**, and click **Selected record only**. In the Re-Extract Data dialog box, click **All Data** and click **OK**. The next run will extract all data from the source table and reload the table.

**Reloading Data that is Already Loaded**

Data Sync remembers when a table is loaded into the database, which is typically the start time of the job. If your source database is in a different time zone, the value is adjusted accordingly. You can view this timestamp in the Refresh Dates tab of the Connections view.

For incremental loads, the run looks for records whose filter column value has changed since the timestamp of the last load. For example, take a load run after a load performed on June 1st, 2014 10:00 PM, only changes after that time would be extracted and loaded. You can modify the date to set it to a previous timestamp by clicking the **Re-Extract Data** button and providing a new value in the Re-Extract Data dialog box. For example, if you were to set the timestamp to March 1st, 2014 10:00
PM, the next run would look for data that changed since March 1st rather than June 1st.

**Help: Schedules Dialog**

You schedule jobs to load your data regularly. For example, you might perform an incremental data load once per week. Before you start, you first create a job using the Jobs tab.

1. Select the **Schedules** tab to open the scheduler.
2. In the Edit tab, specify a short **Name** to identify the schedule in Data Sync.
3. Specify the following details:

<table>
<thead>
<tr>
<th>Field</th>
<th>What to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specify a short name to identify the schedule in Data Sync.</td>
</tr>
<tr>
<td>Job</td>
<td>Select the data load that you want to schedule by selecting a Job. Data Sync creates a default job when you create a project, named <code>&lt;Project name&gt;-Job&lt;n&gt;</code>. You can run this job, or run a different job that you created yourself.</td>
</tr>
<tr>
<td>Run Only Once</td>
<td>Select this option to load data only once.</td>
</tr>
<tr>
<td>Inactive</td>
<td>Select this option to deactivate the data load schedule.</td>
</tr>
<tr>
<td>Restart Failed</td>
<td>Select this option to reload data automatically if an error is detected. Data Sync will restart the failed job. If this option isn't selected, then you have to manually restart failed jobs or mark them as completed.</td>
</tr>
<tr>
<td>Run Once Only</td>
<td>Select this option to load the data once and hide recurrence options.</td>
</tr>
<tr>
<td>Recurrence Pattern</td>
<td>Specify how frequently you want to load your data. These options are only available when the <strong>Run Only Once</strong> option is not selected.</td>
</tr>
<tr>
<td>Start date/End date</td>
<td>Specify when to start and stop the data loads.</td>
</tr>
</tbody>
</table>

4. Click **Save**.

In the top pane, you can view and select schedules and view their status and other properties. In the Next Run column for a schedule, click the button to open a Date dialog box, in which you can specify a new date to run the scheduled job on. Upon this change, the schedule resumes under the recurrence pattern you specify when creating the schedule.

**Help: System Properties Dialog Box**

System Properties enable you to customize your Data Sync environment. To review system properties, select **System Properties** from the **Views** menu. To change a system property, click the **Value** column and enter your changes.
<table>
<thead>
<tr>
<th>Property</th>
<th>Use to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow Clients To Remember User Password</td>
<td>Specify whether you can start Data Sync without specifying a repository password each time you log in. When set to true, you can start Data Sync without entering a password if you selected the Remember password option on the previous login. When set to false, you must always enter a password, even if you selected the Remember password option the last time you logged in.</td>
</tr>
<tr>
<td>Automatically Create/Alter Tables</td>
<td>Specify whether Data Sync creates targets tables for you when data is loaded. We recommend that you use the default value (true).</td>
</tr>
<tr>
<td>Concurrency Level</td>
<td>Specify the maximum number of jobs that can run in parallel. When concurrency of 1 is set, ETL runs in the same process space with the Data Sync. When multiple jobs are allowed, they run as separate operating system processes. Any invalid value is interpreted as 1. (Restart the Data Sync server to deploy changes.)</td>
</tr>
<tr>
<td>Data File Root Directory</td>
<td>Specify a default directory for importing data files. When set, the directory defaults to this location when registering a file to be uploaded.</td>
</tr>
<tr>
<td>Delete Data Cache</td>
<td>When you create a data loading job, you must also use the <strong>Cloud Connection for Cache Purging</strong> option on the Edit tab to specify which cache to purge.</td>
</tr>
<tr>
<td>Heartbeat Interval</td>
<td>Specify how often (in seconds) Data Sync performs consistency and diagnostics checks. Don't change the default value of 900 seconds (15 minutes) unless advised by Oracle Support. Specifying more frequent checks can negatively affect performance.</td>
</tr>
<tr>
<td>Maximum number of run history entries to preserve</td>
<td>Specify the maximum number of run history entries to preserve. Older entries in the run history are purged. A value less than or equal to zero preserves everything. This is not recommended for Data Sync, where the repository is maintained in the Java database.</td>
</tr>
<tr>
<td>Payload Size (MB)</td>
<td>Specify the maximum size of each load operation that Data Sync does during a data load. You can increase this value to a maximum of 20 MB if you're loading data tables with large numbers of columns. Data Sync calculates the most efficient way to load data taking into account this value.</td>
</tr>
<tr>
<td>Proxy Host/Proxy Port</td>
<td>Specify details of your proxy server, if you have one. If you don't have a proxy server, then leave these values empty. (Restart the Data Sync server to deploy changes.)</td>
</tr>
<tr>
<td>Purge Run Log Files</td>
<td>Specify how many days Data Sync stores logging information. For example, set to 30 to keep log directories for 30 days. When set to -1, log directories and files are never deleted. If you set the value to below seven, Data Sync defaults this to seven. (Restart the Data Sync server to deploy changes.) Data Sync creates a unique directory for each run for storing the log files under the server\log directory. The naming convention for the log directories is of the format: &lt;Job_Name&gt;.&lt;Process_ID&gt;.</td>
</tr>
<tr>
<td>Repository Name</td>
<td>Specify the name of your Data Sync repository. (Restart the Data Sync server to deploy changes.)</td>
</tr>
<tr>
<td>Server Log Level</td>
<td>Specify how much log information to collect. Values are case sensitive:</td>
</tr>
<tr>
<td></td>
<td>• <strong>FINEST</strong> collects the maximum amount of information, and is suitable for debugging and testing.</td>
</tr>
<tr>
<td></td>
<td>• <strong>SEVERE</strong> collects a medium amount of critical information such as error conditions, and is suitable for production environments.</td>
</tr>
<tr>
<td></td>
<td>• <strong>INFO</strong> collects a minimum amount of general information, and is suitable for production environments.</td>
</tr>
<tr>
<td>Property</td>
<td>Use to</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Test Run</td>
<td>Specify that Data Sync ignores data loading errors. When set to <strong>true</strong>, data load errors are ignored and changes are effective for the next job.</td>
</tr>
<tr>
<td>Verify And Create Non-Existing Indices</td>
<td>Specify whether Data Sync should check the physical database for an index and create one if it's not present. This is true even for incremental loads.</td>
</tr>
</tbody>
</table>

**Help: TriggerJobs from Other Tools**

In some cases, you might want to trigger a data load from an external process.

There are three ways of integrating with other processes: file-based, command line based, and SQL-based.

**File-Based Integration**

Edit the `on_demand_job.xml` file located in the `conf-shared` directory, and specify a file that will trigger a specified job. The `TriggerFile` job parameter enables you to specify a job and a file whose existence triggers the job. For example:

- Create an empty text file named `abc.txt` in the `conf-shared` directory. Then edit the `on_demand_job.xml` file and set the `TriggerFile` parameter to:
  ```xml
  <TriggerFile job="Job1" file="c:\abc.txt"/>
  ```

In this example, Data Sync polls for the presence of the `abc.txt` file, and when found it triggers `Job1` execution and then deletes the `abc.txt` file.

You can also specify time windows for polling, as in this example in which file polling happens between the 12:00 AM and 2:30 AM and between 6:00PM and 8:00PM every day:

```xml
<TriggerFile job="Job2" file="c:\xyz.txt">
  <TimeWindow startTime="00:00" endTime="02:30"/>
  <TimeWindow startTime="19:00" endTime="20:00"/>
</TriggerFile>
```

**Command Line Based Integration**

Use the `datasyncCmdLine.bat` or `.sh` file to start a job and to obtain the status of a running job. The instructions for using this file are contained within the file as REM comments. The `datasyncCmdLine` file works in conjunction with the `dac.properties` file.

**SQL-Based Integration**

Use SQL-based integration when an external process needs to dictate when a job can begin, if it can perform a SQL operation on a data source. To integrate using this method, you create a trigger table that can be polled to initiate a job.

1. In the **Connections** view, create a connection.
2. Navigate to the `conf-shared` directory and edit the `on_demand_job.xml` file. Edit the following properties:
The polling interval.

The datasource name that has the trigger table.

The time periods between which Data Sync should poll the table.

3. Create a table on that data source called JOB_TRIGGER containing the following four columns:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Datatype</th>
<th>Length</th>
<th>Values</th>
<th>Unique</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIQUE_KEY</td>
<td>VARCHAR</td>
<td>250</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>JOB_NAME</td>
<td>VARCHAR</td>
<td>250</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>EFFECTIVE_DT</td>
<td>DATE</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>INACTIVE_FLG</td>
<td>CHAR</td>
<td>1</td>
<td>Y/N</td>
<td>No</td>
</tr>
</tbody>
</table>

Example of the Data Definition Language for a trigger table and index:

```sql
CREATE TABLE JOB_TRIGGER
(
UNIQUE_KEY VARCHAR(250) NOT NULL,
JOB_NAME VARCHAR(250) NOT NULL,
EFFECTIVE_DT DATE NOT NULL,
INACTIVE_FLG CHAR(1) DEFAULT 'N' NOT NULL
);
CREATE INDEX JOB_TRIGGER_U1 ON JOB_TRIGGER(UNIQUE_KEY);
```

An entry in this table now triggers the job upload. As soon as the job request is started, the entry is deleted. You can also specify during which period polling should occur.

Help: Trigger One Job After Another Automatically

In some situations, you may want a job triggered upon completion of another job.

Common scenarios in which you may want a job triggered upon completion of another job include, but are not limited to, the following:

- If there are multiple jobs writing to the same target, you want to stagger them because there is a governance that limits the number of dataloads that can occur for a connection.
- By default, within a project, all the tables, SQL queries, and file data get loaded in parallel, with no specific order other than staggering dataflows that write to the same table. If you would like the tables to be staggered, for example to load details first and then summaries, then you can create two separate projects, one for the detail tables and the other for the parent tables. When the job that loads the details is complete, you want to trigger the parent summary loads.

To enable this, when the job starts a signal file with a naming pattern `<JOB_NAME_WITH_NO_SPACES>_StartSignal.txt` is created in the log \jobSignal directory for each run of the job. A file with the naming pattern `<JOB_NAME_WITH_NO_SPACES>_CompletedSignal.txt` is created when the job completes successfully, or `<JOB_NAME_WITH_NO_SPACES>_FailedSignal.txt`
when the job fails. These files can be used with the Data Sync’s file poll mechanism to chain jobs to meet your needs. For more information about the file poll mechanism, see Help: Trigger Jobs from Other Tools.

Help: Upload Data to Multiple Cloud Targets

You can load to multiple data targets using one project. For example, you might want to load to development and production simultaneously.

1. In Connections view, create a connection for the target database.
2. In the Project view, click Data Flows and configure your data load.
3. For each additional data target to which you want to load:
   a. Click Target Objects, then click New, and follow the wizard to specify a new data source and data target.
   b. Use the Column Mapping dialog to select the columns to load, then click OK.

When you’re ready to load your data, use the Jobs view to review the load configuration, and click Run Job to start loading the data.

Help: Welcome Dialog Box

Use this dialog box to start working in an existing data loading project or create a new data loading project.

You use projects to manage your data loads. For example, if you want to load data from two separate data sources, Data1 and Data2, you typically create a separate project for each data source. When you create or select a project, you'll be working in that project when you’re in the Project view or Jobs view.

<table>
<thead>
<tr>
<th>Field or element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a New Project</td>
<td>Create a new data loading project using a descriptive name (30 characters maximum) that you specify in the box adjacent to this option, then click OK.</td>
</tr>
<tr>
<td>Select an Existing Project</td>
<td>If you’ve previously created a data-loading project, select it from the list, then click OK. If you don’t know which project you want to work in, click Skip Create/Select a Project.</td>
</tr>
<tr>
<td>Skip Create/Select a Project</td>
<td>Start Data Sync without selecting a data project, for example, you might want to create some connections to a data source and a data target. In the main Data Sync work area, you can also select a project to work in the Project view or Jobs view using the list to the left of the Run Job option.</td>
</tr>
</tbody>
</table>