Create queries

After connecting to most data sources, a query needs to be created and assigned a name to retrieve your data. This named query can be assigned to retrieve data for the master report, sub report, or parameter selections. A JDBC data source is used to access data from relational databases using the SQL query language. Pentaho also provides two data modeling layers, Pentaho Metadata Editor and Pentaho Analyzer. The Pentaho metadata layer focuses on reporting. The other layer focuses on analysis (OLAP). Pentaho metadata relies on Pentaho’s MQL query language where Pentaho Analyzer uses Microsoft Multidimensional Expression (MDX) query language.

Note
The default setting for the query is to pull from session-based cache. If you do not want your query to use session-based cache, go to the Master Report tab then the Attributes tab to change the data-cache field to False so that every time the query is run or the report opens, the query will refresh.

Parent Topic

• Products

Child Topics

• Create queries with SQL Query Designer
  You can use the SQL Query Designer interface to create a SQL query to get data. The SQL Query Designer is only available through the JDBC Data Source window. You must already have a JDBC data source configured and tested before using the SQL Query Designer.

• Create queries with Metadata Query Editor
  You can create a metadata query to get data using the Metadata Query Editor. The Metadata Query Editor is only available through the Metadata Data Source Editor window. You must already have a metadata data source configured and tested before using the Metadata Query Designer.

• Create MDX queries
  For Pentaho Analyzer data sets, such as OLAP and OLAP (advanced), you can create MDX queries by specifying a Mondrian cube definition schema file.

• Dynamic query scripting
  For all JDBC, Metadata, and OLAP data sources, you can create a dynamic query through a Groovy or JavaScript script.

• Hadoop Hive-specific SQL limitations

Create queries with SQL Query Designer
You can use the SQL Query Designer interface to create a SQL query to get data. The SQL Query Designer is only available through the JDBC Data Source window. You must already have a JDBC data source configured and tested before using the SQL Query Designer.
See [Connect to a Data Source](https://help.pentaho.com/Documentation/8.3/Products/Create_queries) for more information on connecting to a JDBC data source. NoteSQL Query Designer does not work with Hadoop Hive data sources.

**Parent Topic**

- [Create queries](#)

**Child Topics**

- [Access the SQL Query Designer](#)
- [Apply query filters](#)
- [Refine the query](#)
- [Analyze results](#)
- [Create sub-queries with SQL Query Designer](#)

### Access the SQL Query Designer

Perform the following steps to access the SQL Query Designer:

**Procedure**

1. In the **Data** tab, right-click on **Data Sets** and select JDBC.
   The JDBC Data Source window appears.
2. Select your data source in the **Connections** pane on the left, then click the round green + icon above the **Available Queries** pane on the right.
3. Type a concise yet sufficiently descriptive name for your query in the **Query Name** field.
4. Click the pencil icon above the upper right corner of the **Query** field.
   The SQL Query Designer tool appears, as shown in the following example:
You can use the SQL Query Designer interface to create a SQL query to get data. The SQL Query Designer is only available through the JDBC Data Source window. You must already have a JDBC data source configured and tested before using the SQL Query Designer.

**Apply query filters**

Perform the following steps to apply filters to your query:

**Procedure**

1. Select a schema filter in the menu above the lower left pane and ensure the type filter is set to **Tables**.
2. In the lower left pane, click to select the first table from which you want to refine data, then double-click it to move it to the query workspace.

As shown in the following example, the table you selected appears in the workspace as a sub-window containing all its rows:
3. Check all the rows you want to include in the query.
   By default, all rows are selected. If you only want to select a few rows (or a single row) in your query, click the table name at the top of the sub-window, then click deselect all in the popup menu, and check only the rows you want to include in your query.

4. Repeat the previous step for other tables you want to include in the SQL query.

Parent Topic

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**Refine the query**
Depending on how you might want to further refine your query, you can perform the following steps to join tables, apply conditions, or group and order rows:

**Procedure**

1. To create an SQL JOIN between tables, select a reference key in one table, then drag it to the appropriate row in another table.
To modify the JOIN, right-click its red square, then click edit in the popup menu.

2. To add a condition or expression, right-click a row in the query workspace, and select the appropriate action from the menu.

3. To order or group by a specific row, drag a statement from the SELECT category in the upper left pane and drop it into the GROUP BY or ORDER BY category.

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Analyze results
Perform the following steps to analyze the resulting query:

Procedure

1. To edit the SQL syntax directly, click the syntax tab in the bottom left corner of the SQL Query Designer window.

2. Click Preview to view the unformatted query results.

3. Click OK to finish working on the query.

Results
You now have a data source and at least one query that will return a data set that you can use for reporting.

Parent Topic

- Create queries with SQL Query Designer
  You can use the SQL Query Designer interface to create a SQL query to get data. The SQL Query Designer is only available through the JDBC Data Source window. You must already have a JDBC data source configured and tested before using the SQL Query Designer.

Create sub-queries with SQL Query Designer
You can also design an SQL sub-query for your data source with SQL Query Designer by performing the following steps:

Procedure

1. Right-click on the query and select add where condition or add having condition. The condition.edit window appears.

2. Click on the arrow next to the working query so that the whole path is expanded. Type in the condition and click OK.

3. Click Preview to ensure the query is working. Click OK to exit the condition.edit window.

4. Drag the queries you have created into the workspace, in the Details row. Preview the report to ensure
that everything is working as expected.

Results
You now have an SQL sub-query that returns a data set that you can use for reporting.

Parent Topic

- **Create queries with SQL Query Designer**
  You can use the SQL Query Designer interface to create a SQL query to get data. The SQL Query Designer is only available through the JDBC Data Source window. You must already have a JDBC data source configured and tested before using the SQL Query Designer.

Create queries with Metadata Query Editor

You can create a metadata query to get data using the Metadata Query Editor. The Metadata Query Editor is only available through the Metadata Data Source Editor window. You must already have a metadata data source configured and tested before using the Metadata Query Designer.

See [Connect to a Data Source](#) for more information on connecting to a metadata data source.

Perform the following step to design a metadata query for your data source with the Metadata Query Editor:

**Procedure**

1. In the **Data** tab, right-click on **Data Sets** and select **Metadata**. The Metadata Data Source Editor window appears.
2. Specify your XMI file and solution name, then click the round green + icon above the **Available Queries** pane on the right.
3. Type a concise yet sufficiently descriptive name for your query in the **Query Name** field.
4. With all your metadata data source options properly typed in, click the pencil icon above the upper right corner of the **Query** field. The Query Editor window appears, as shown in the following example:
Note: If the pencil icon is greyed out, then your data source is misconfigured.

5. Select a data set from the **Business Models** menu.
   The list of available tables and columns will update appropriately.

6. Double-click a table to display its columns, click on a column that you want to select, then click the arrow next to the **Selected Columns** box.
   You can select multiple columns by holding down the Ctrl key while clicking on the columns.
   Note: To define a parameter, specify the parameter's name by using curly brackets, `{Parameter Name}` for example. The parameter name must reference the parameter you created in your report. The **Default** value column is used to preview data in the Metadata Data Source Editor, only. To specify, multiple values for a parameter use a “|” (pipe) between your values as shown in the following example:
7. Repeat this process to create conditions for the additional columns by moving a column over to the **Conditions** box. Condition values must be in double quotes (") to be validated in the Query Editor.

8. Move the column by which you want to order your results into the **Order By** box.

9. Click **OK** to finalize the query. Your new query will appear in the **Query** field of the data source configuration window. The **Query** field is editable. If needed, you can modify the query before continuing.

10. Click **OK** to close the Metadata Data Source Editor.

Results
You now have a data source and at least one query that will return a data set that you can use for reporting.

Parent Topic
- [Create queries](#)

### Create MDX queries
For Pentaho Analyzer data sets, such as OLAP and OLAP (advanced), you can create MDX queries by specifying a Mondrian cube definition schema file.

Before you begin
You must be in the Data Source Configuration window to follow this process. You should also have configured a JNDI data source connection.

Perform the following steps to add a MDX query:

Procedure
1. In the Data tab, right-click on Data Sets and select one of the following options to access the Pentaho Analyzer Data Source Editor window:
   - OLAP Pentaho Analysis
   - OLAP Pentaho Analysis (Denormalized)
2. Specify a Mondrian cube definition schema file for Pentaho Analysis Schema File. You can use the Pentaho Schema Workbench to create this file.
3. Select your data source in the Connections pane on the left, then click the round green + icon above the Available Queries pane on the right.
4. Type a concise yet sufficiently descriptive name for your query in the Query Name field.
5. Type an MDX query into the Query pane on the right. See About Multidimensional Expression Language for more information on MDX.
6. Click Preview to view the unformatted query results.
7. Click OK to finish working on the query.

Parent Topic
- Create queries

Dynamic query scripting
For all JDBC, Metadata, and OLAP data sources, you can create a dynamic query through a Groovy or JavaScript script.

The two following scripting extensions are available in Report Designer:

- Global
  used to define shared functions or global variables that are available to all query scripts, and to dynamically change the data source configuration via the init() function.
- Per-Query
  used to customize a query string, calculate the "additional fields" information for query-caching, and post-process the returned table model.

A template for the two scripting languages is supported by default (JavaScript and Groovy). The template contains some guidance and instructions, as well as empty declarations for the functions to call. You can safely delete any function you do not need. If deleted, Report Designer ignores them. You can also load scripts from external sources, but you must ensure that they are available to the report at runtime.

Caution Since most production environments separate the server from the design tools, an external script that is local to Report Designer will probably not be local to the Pentaho Server. If you publish a report to the server, you must either change the path to the external script so that it will work on the server, or find a way to include it in the correct relative path on the Pentaho Server.

Note The scripting backend uses the JSR-223 (javax.script) scripting system. By default, Pentaho only ships with JavaScript and Groovy support. Many more JSR-223 enabled languages are not included but will work in Report Designer. To add support for other languages, you must add the appropriate JAR to both the Pentaho Server and the Pentaho Report Designer classpaths. Despite this capability, Pentaho's support and services contracts...
do not cover any extra scripting language JARs.

Parent Topic

• Create queries

**Hadoop Hive-specific SQL limitations**

A few of the following key limitations in Hive prevent some regular Metadata Editor features from working as intended, and limit the structure of your SQL queries in Report Designer:

• Outer joins are not supported.

• Each column can only be used once in a **SELECT** clause.
  
  Duplicate columns in **SELECT** statements cause errors.

• Conditional joins can only use the **=** conditional unless you use a **WHERE** clause.
  
  Any non-equal conditional in a **FROM** statement forces the Metadata Editor to use a Cartesian join and a **WHERE** clause conditional to limit it.

Parent Topic

• Create queries