Using BIRT with CenterScape

Contents

Trademarks

Bluetooth QD ID: B012541

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Using BIRT with CenterScape Rev. 03 for 1.2.2.1

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BIRT Introduction

RF Code's CenterScape provides a template-based Reporting feature with a limited amount of customization of the report criteria and data content. Standard Reporting does not allow for full customization such as page layout, advanced computations, etc.

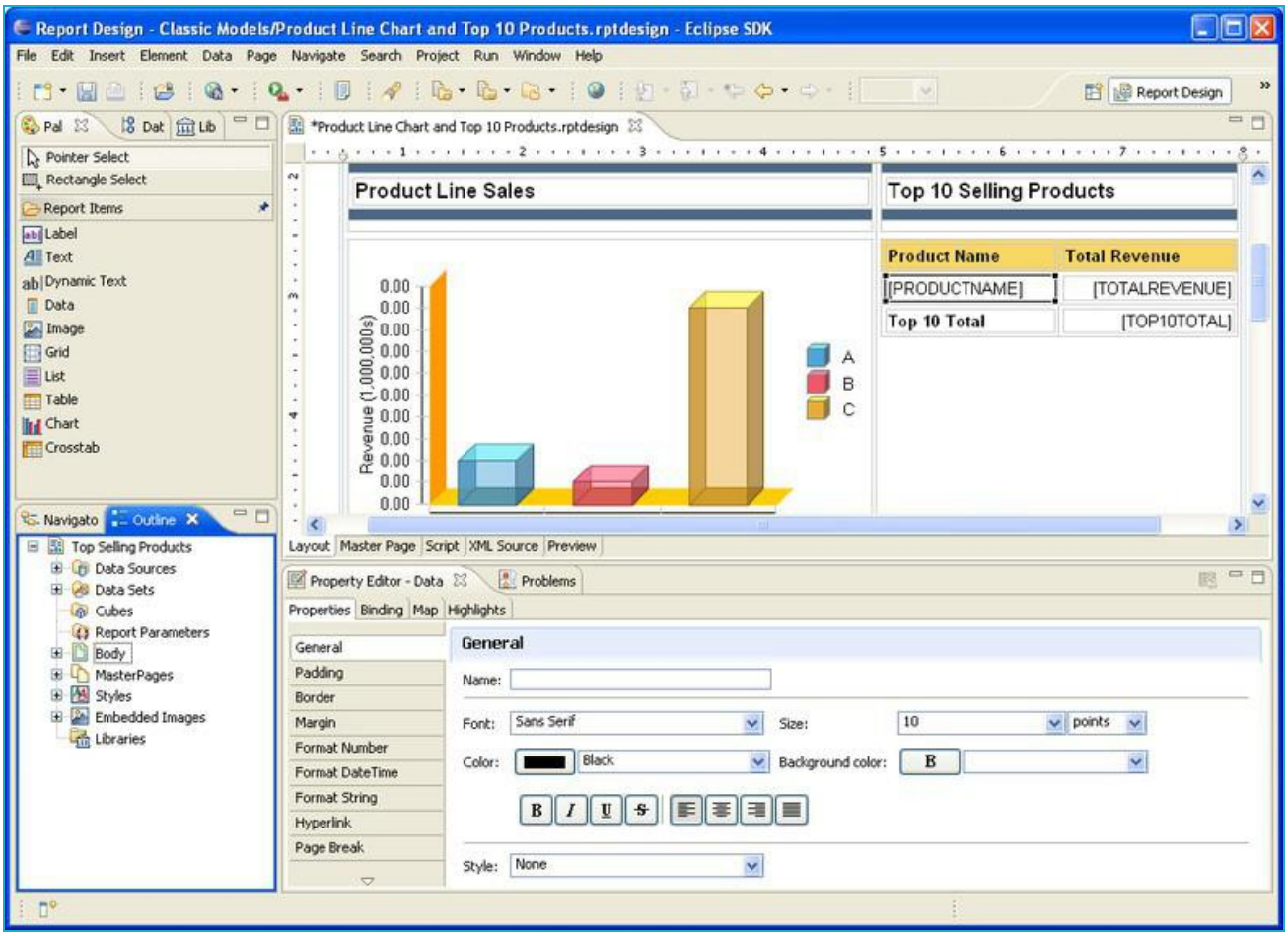
The BIRT (Business Intelligence Reporting Tool) engine integrates seamlessly with CenterScape and allows the user to completely design custom reports with the ability to control every aspect of the report criteria and report output. BIRT is an open-source software project that provides a technology platform to create data visualizations and reports that can be embedded into rich client and web applications. BIRT is part of the Eclipse Foundation (https://www.eclipse.org/birt/).

The BIRT technology platform is comprised of two components:

- BIRT Report Designer:
    - The BIRT Report Designer is an Eclipse-based application that is used to create BIRT report designs. These designs are stored in an openXML format. The Report Designer can be downloaded as a Rich Client Platform (RCP) application, a set of plug-ins to enable the Designer perspective within an existing Eclipse framework install, or as an all-in-one download that includes Eclipse. RF Code includes the BIRT Report Designer on the downloadable CenterScape image provided by RF Code.
- BIRT Report & Chart Engine:
    - The BIRT Report & Chart Engine uses the BIRT Report Designer files to generate and render reports and charts. The Report & Chart Engine is embedded within the CenterScape server application.

BIRT Report Designer Capabilities

The BIRT Report Designer is extremely powerful and offers a wide variety of tools and features to build highly customized reports.



Below are some of the key capabilities of the BIRT Report Designer:

- **Data Explorer:** Organizes data sources (connections) and data sets (queries). The data set editor provides a test feature to ensure the report receives the correct data. Within this view multi-dimensional cubes can be created using existing data sets which can used for building dynamic cross tables. The Data Explorer is also utilized to create the report parameters.
- **Navigator:** Shows the projects and files.
- **Layout View:** WYSIWYG editor that provides drag & drop creation of the presentation portion of the report.
- **Palette:** Contains the standard BIRT report elements such as labels, tables, and charts, and is used in conjunction with the Layout View to design reports.

- **Property Editor:** Presents the most commonly used properties in a convenient format that makes editing quick and easy.
- **Script Editor:** Scripting adds business logic to reports during data access, during report generation, or during viewing. The code editor provides for editing scripts: syntax coloring, auto-complete, debug and more.
- **Outline:** BIRT reports are organized as a tree structure with the overall report as the root, and separate categories for styles, report content, data sources, data sets, report parameters and more. The Outline view provides a compact overview of the entire report structure.
- **Cheat Sheets:** Learning a new tool is always a challenge, but the BIRT Report Designer offers an innovative solution: cheat sheets. These are short bits of documentation that walk you through new tasks.
- **Resource Explorer:** BIRT allows the reuse of report objects, such as tables, data sources and styles. Objects created for reuse are stored in a library file. To browse the contents of report libraries, BIRT supplies a Resource Explorer view. This view lists all libraries within the resource folder, in addition other shared content such as images and JavaScript files.
- **Chart Builder:** Adding Charts to BIRT designs is expedited with the Chart Builder. Chart creation is separated into three phases: Select Chart Type, Select Data, and Format Chart.
- **Expression Builder:** A BIRT expression is a simple script that returns a value. Expressions are used for assigning data values to report elements, building image locations, hyperlinks, parameter default values, and many other places. Expressions are constructed within BIRT using the Expression Builder.

How Reporting with BIRT Templates Works

Since the data schema used in CenterScape is 100% configurable, the BIRT Report Engine cannot easily access the CenterScape SQL database directly. Therefore, some process must supply the data needed by the BIRT Report Engine. For simplicity, CenterScape uses the Standard Report Engine to produce the data set(s) needed to construct the report output. The BIRT Report Engine can utilize a variety of input sources, and one of those is an SQLite file.

The CenterScape Standard Report Engine has the ability to output an SQLite database file. So the Standard Report Engine is utilized to select the appropriate subset of data from the CenterScape database that will be utilized by the BIRT Report Engine.

SQLite is an open-source, self-contained, serverless, zero-configuration, transactional SQL database engine. An SQLite database is a single file that contains all of the information needed by the SQLite database engine.

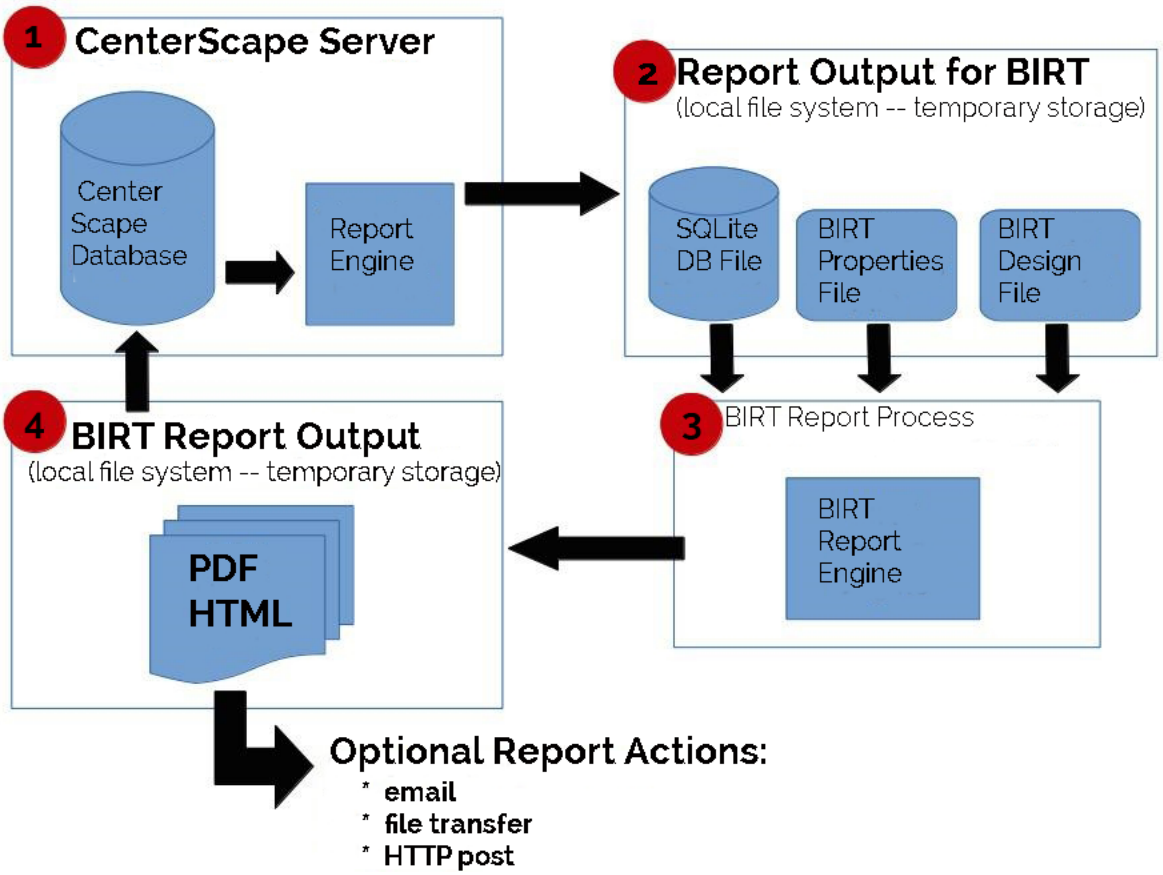
SQLite is fast and flexible, supporting most of the standard SQL query syntax. More information can be found at: https://sqlite.org/

The interaction between CenterScape and the embedded BIRT Report Engine is as follows:

1. The CenterScape Report generator utilizes the Report Engine to extract the defined data from the CenterScape SQL Database.
2. The Report generator writes three files to the local file system of CenterScape:
    - SQLite database file which contains the extracted data
    - BIRT properties file which contains parameters on how to run the BIRT Report Engine
    - BIRT design file (output of the BIRT Report Designer) contains the report definition
3. The Report generator executes the BIRT Report Engine which utilizes the three local files to create the report(s).

4. The Report generator collects the report(s) and stores them in the CenterScape database. It also then executes any configured automated actions (email, file transfer, or HTTP Post) to deliver the report(s).

The diagram below illustrates the interaction and data flow between CenterScape and the embedded BIRT Report Engine.



Step-by-Step: Creating a Report with a BIRT Template

The high-level steps for creating and utilizing Reporting with BIRT Templates are as follows:

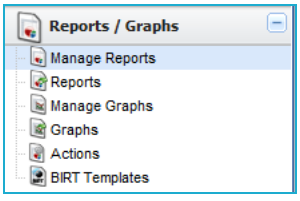
1. Determine the data needed and time frame of the data set.
2. Create a CenterScape Report that produces the desired data set and output this data as an SQLite database file.
3. Use the BIRT Report Designer to create a report that utilizes the SQLite database file.
4. Import the BIRT Report Designer file into CenterScape as a BIRT Report Template.
5. Edit the original Report definition to associate the newly imported BIRT Report Template.
6. Run the Report.
7. View the Report.

Determining Report Content & Required Data

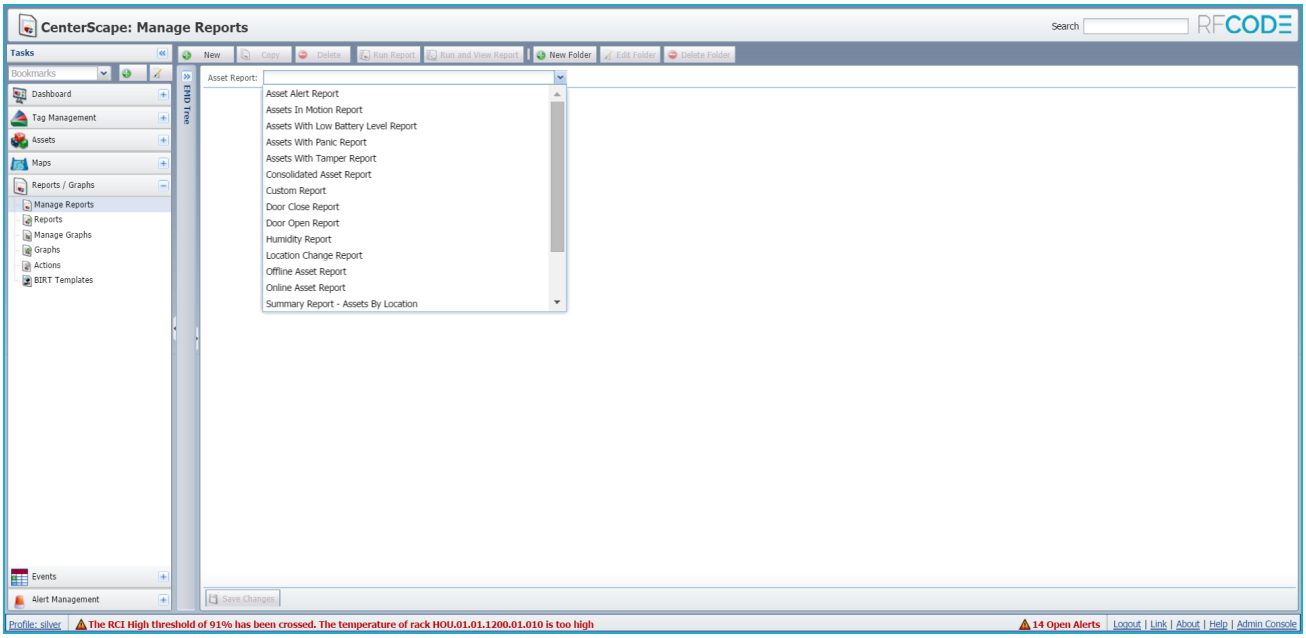
The first step in creating a Report is to determine the contents and purpose of the report. For simplicity, this example report will be based on a temperature sensor's historical data for the last 24 hours. The report output will be a line graph of the temperature values at the top of the page and a table of the report values at the bottom of the page.

Create a CenterScape Report

1. To create the Standard Report, log in to CenterScape. Navigate to **User Console > Reports / Graphs** and select **Manage Reports**.



2. Click the **New** button at the top, then select **Custom Report** from the Asset Report drop-down list.

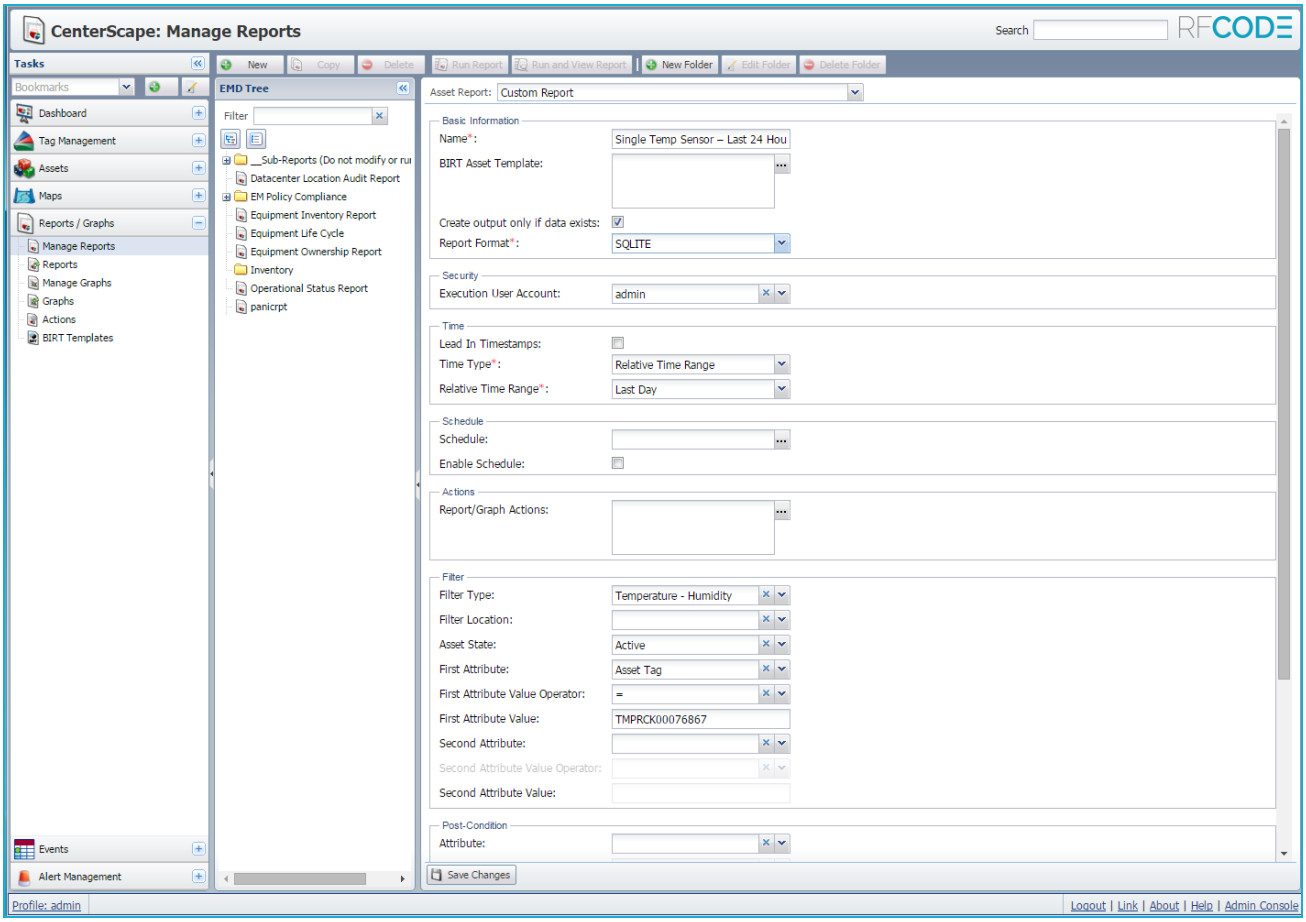


3. In the Custom Report panel, complete the following fields:

- Basic Information:
    - Name: Single Temp Sensor – Last 24 Hours
    - Report Format: SQLITE

NOTE: The Report Format option PREVIEW can be used to confirm settings. Set the format to SQLITE to export data.

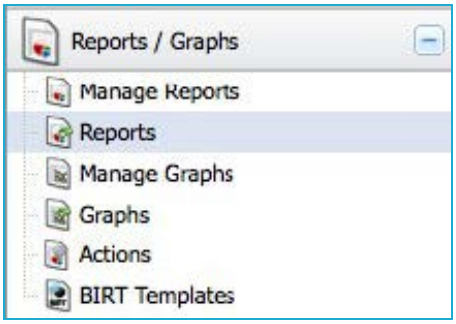
- Time:
    - Time Type: Relative Time Range
    - Relative Time Range: Last Day
- Filter:
    - Filter Type: Temperature – Humidity
    - Asset State: Active
    - First Attribute: Asset Tag
    - First Attribute Value Operator: =
    - First Attribute Value: TMPRCK00076867
- Columns:
    - Attributes: Name, Asset Tag, Temperature



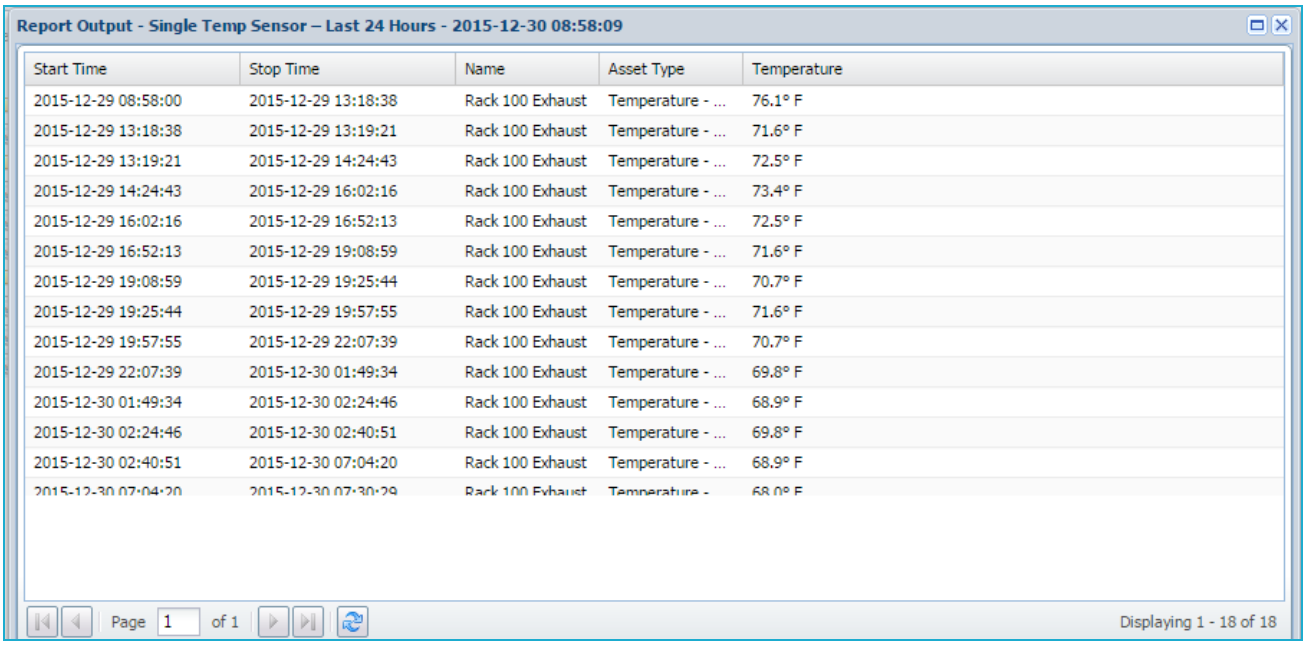
4. Once these fields are properly configured, click the **Save Changes** button at the bottom to save the report. Finally, click the **Run Report** button.

View the Report

1. To view the report output, navigate to **User Console > Reports/Graphs** and select **Reports**.



1. Select the report output from the list, then click the **View** button to view the report. The Report Output window appears, displaying the data defined in the report definition.



Running the BIRT Report Designer

The BIRT Report Designer is included on the CenterScape downloadable image in the “tools\birt” directory. The BIRT Report Designer is based on the Eclipse Framework which is an open-source based integrated development environment. The BIRT Report Designer included with CenterScape is the Eclipse Framework plus the BIRT plug-ins. The BIRT plug-ins can also be easily added to an existing Eclipse Framework installation as well via the “Install New Software” feature of Eclipse.

More details on the BIRT Report Designer installation can be found at the following URL:
http://www.eclipse.org/birt/documentation/install.php

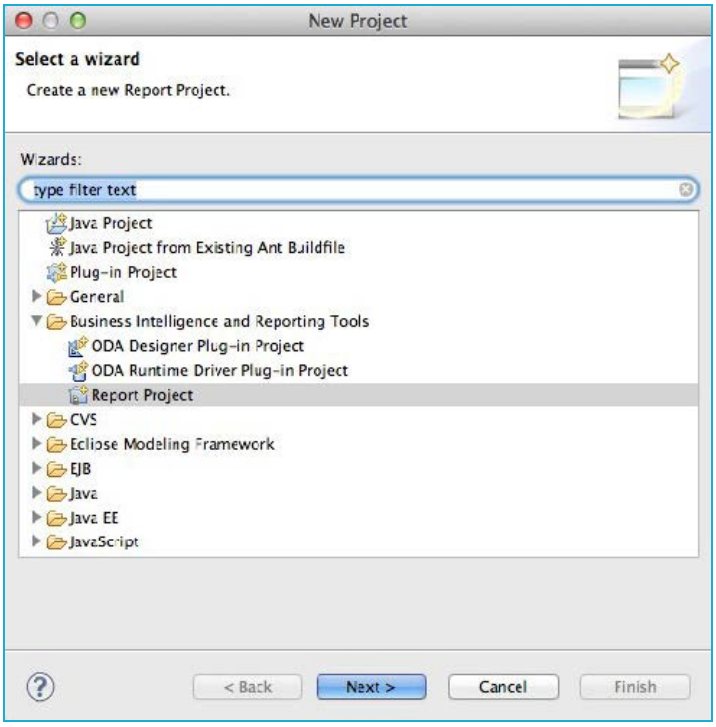
To run BIRT, simply unzip the “birt-report-designer-all-in-one-4_3_1” zip file to your local computer and run the “Eclipse.exe” executable. The Report Designer is run-time only and won’t need to be installed, only unzipped.

Creating a Report with the BIRT Report Designer

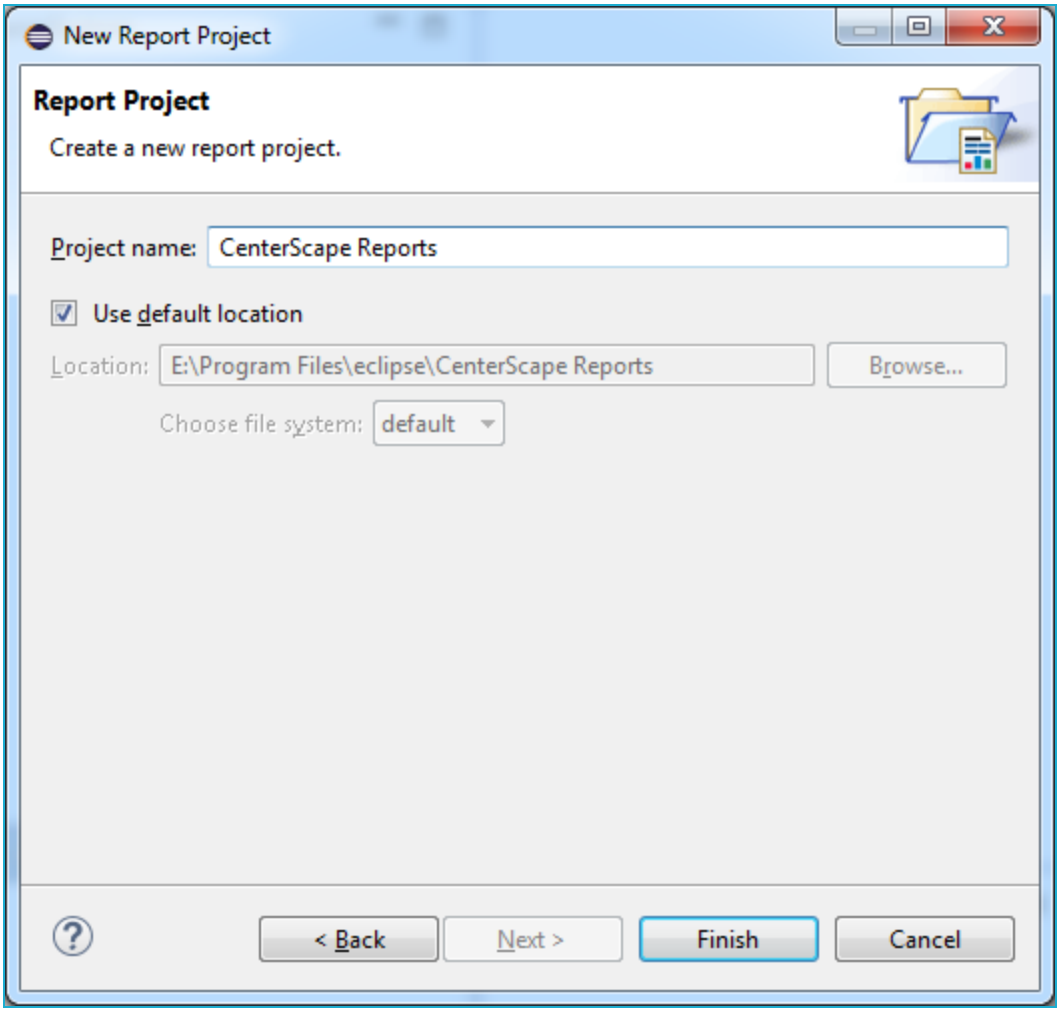
At least one Project must be created before a Report can be set up.

Create a Project

1. Once the BIRT Report Designer is running, the first step is to create a Project: Click on **File > New > Project**.



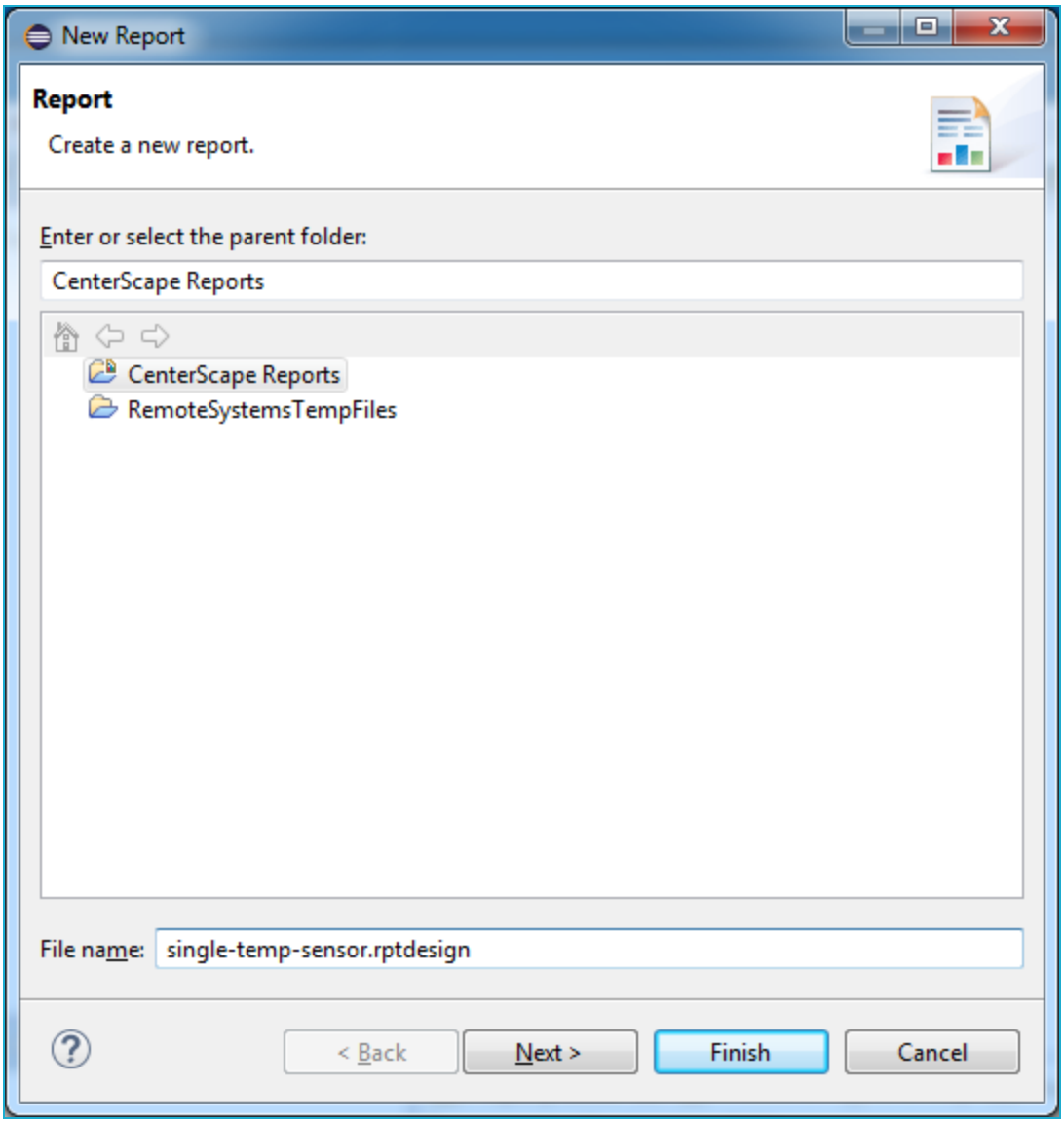
2. Select the **Report Project** from the **Business Intelligence and Reporting Tools** as the wizard type, and click **Next**.
3. Input a name for the Project on the next screen, then click **Finish**.



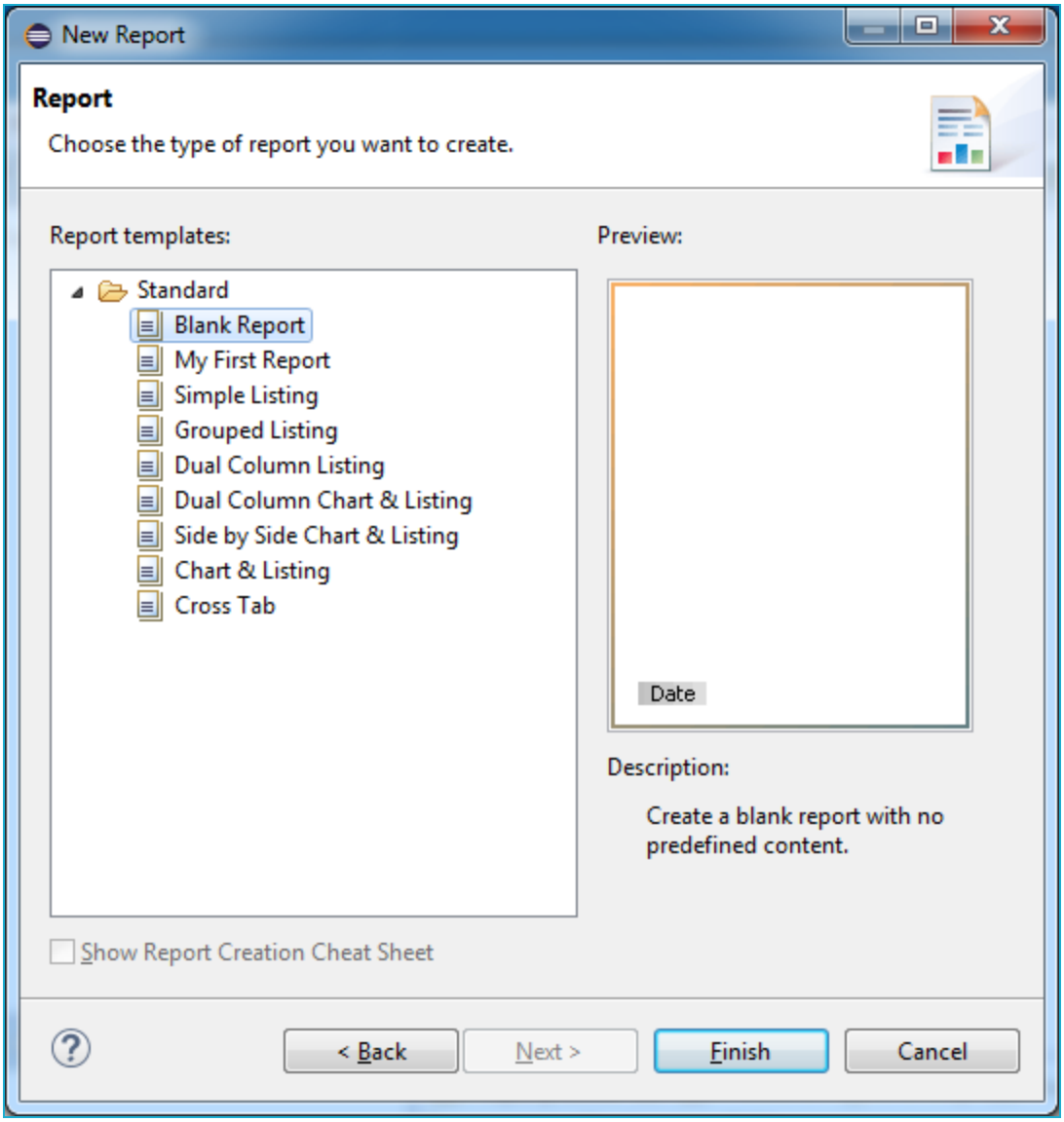
At this point the Project “CenterScape Reports” has been created and is ready for use.

Create a Report Design

1. Click **File > New > Report**.
2. Enter the file name for the new report on the next dialog window ("single-temp-sensor.rptdesign" in this example), then click **Next**.



3. Select the a report template – in this case, "Blank Report"– and then click **Finish**.

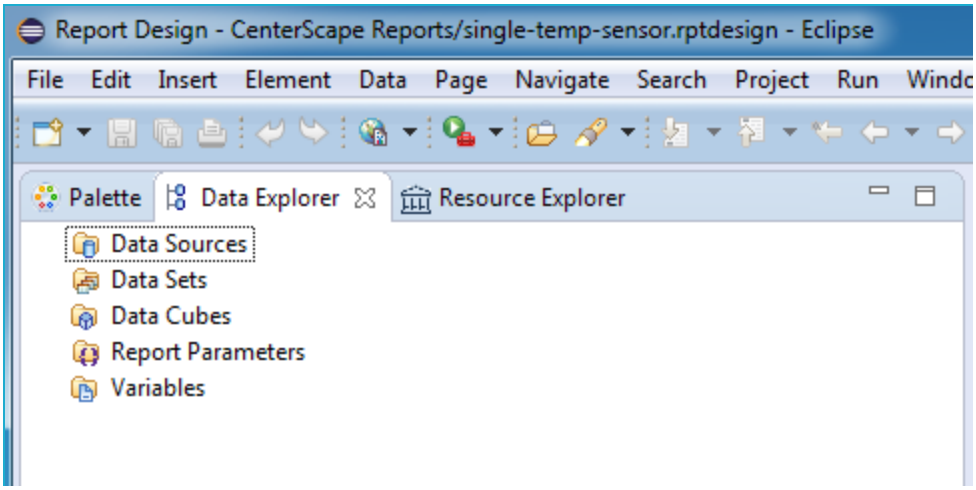


Now the Project is set up and the first report design file is opened in the BIRT Report Designer editor.

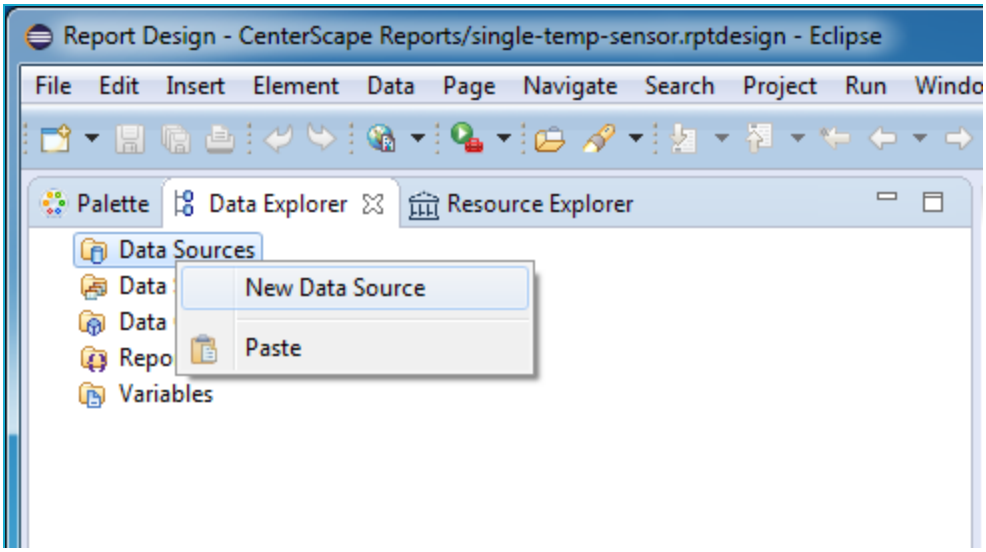
Configure a Data Source

Before a report can be designed, a Data Source and Data Set must be configured. A Data Source is simply a data repository. It can be a connection to an SQL database, an Excel spreadsheet file, a flat text file, an XML data file, or a web services data source. Essentially the BIRT Report Designer needs access to the data that will be used in the report. When creating a BIRT report definition for CenterScape, the SQLite database file (created previously) will be the Data Source. A Data Set is simply an organized (selected) set of data from the Data Source. When creating a BIRT report definition for CenterScape, since the Data Source is an SQLite database, the Data Set be will the data returned from an SQL query of that database.

1. The next step is to configure the report with a data source. The top left view of the BIRT Report Designer has three tabs: Palette, Data Explorer, and Resource Explorer. Select the **Data Explorer** tab.



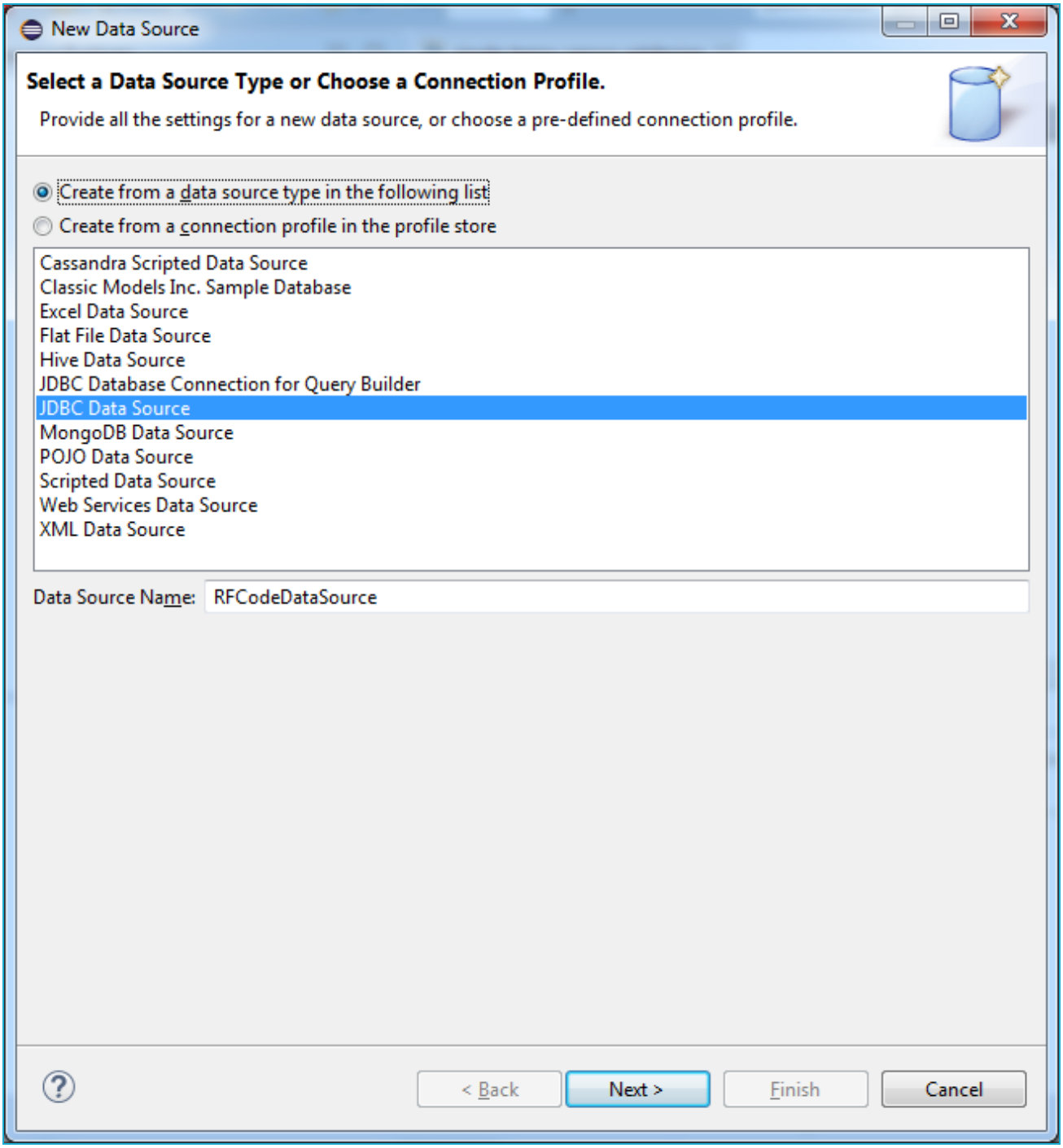
2. Within the Data Explorer tab, right-click the item titled **Data Sources**.
3. From the pop-up menu, select **New Data Source** to create the new data source.



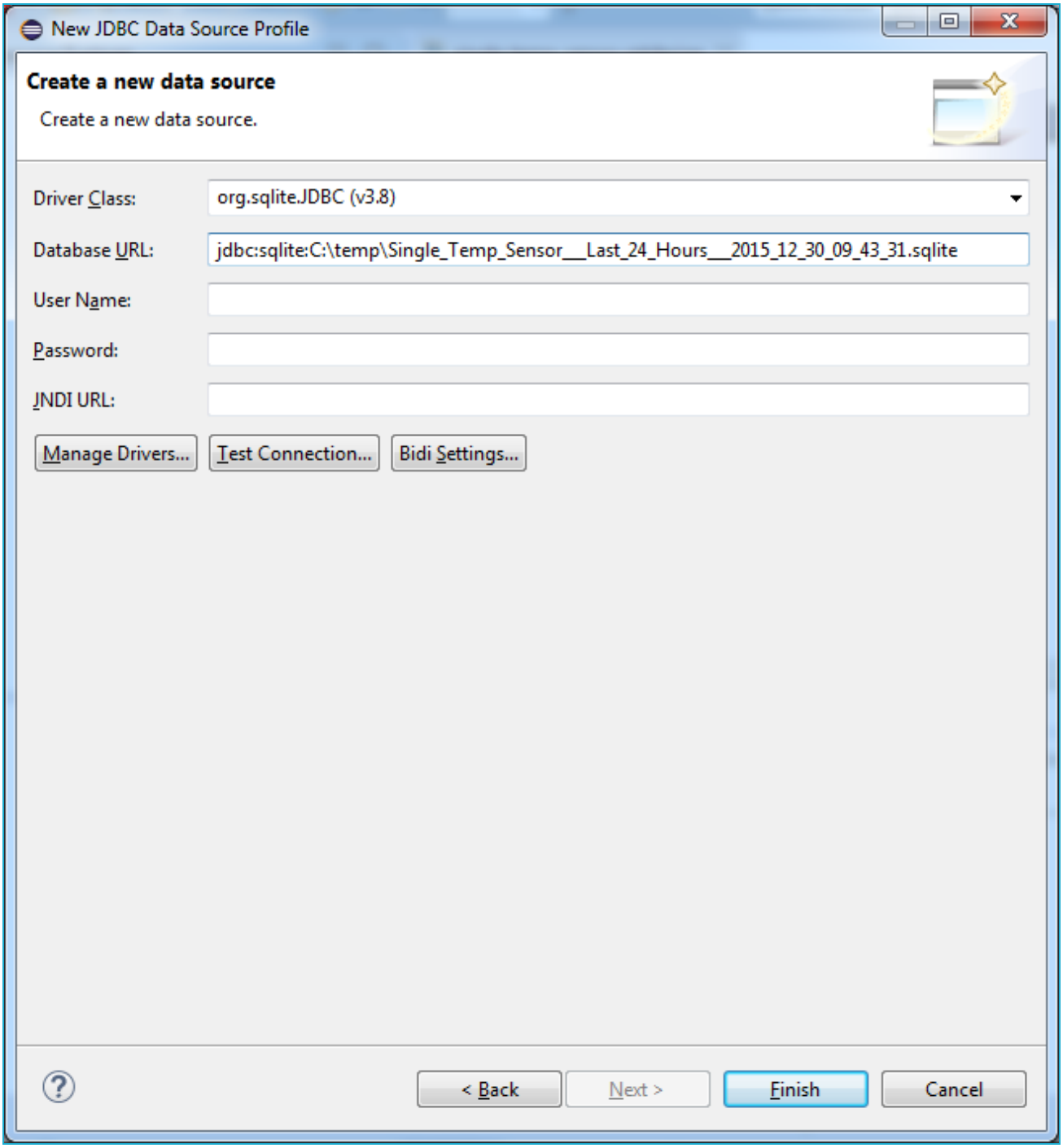
4. The New Data Source wizard will appear. Select the top radio button selection **Create from a data source type in the following list**.

5. In the list below, select **JDBC Data Source**. Finally, below the list the Data Source Name must be entered. In order for the report design to work properly when imported into Center-Scape, the Data Source Name ***must be*** "RFCodeDataSource". Click the **Next** button when the form is complete.

   NOTE: The Data Source Name ***must always be*** "RFCodeDataSource" capitalized using camel-case with no spaces or the report design will not work when imported into CenterScape.



6. The next wizard screen prompts for the JDBC data source information. From the Driver Class pull-down menu, select **org.sqlite.JDBC**. (If JDBC is not a choice, see the note below for more information.) In the Database URL entry field enter the JDBC driver syntax ***jdbc:sqlite:*** followed by the full path and file name of the SQLite database file that was exported from CenterScape.


New JDBC Data Source Profile
Create a new data source
Create a new data source.
Driver Class:
org.sqlite.JDBC (v3.8)
Database URL:
jdbc:sqlite:C:\temp\Single_Temp_Sensor___Last_24_Hours___2015_12_30_09_43_31.sqlite
User Name:
Password:
JNDI URL:
Manage Drivers...
Test Connection...
Bidi Settings...
< Back
Next >
Finish
Cancel

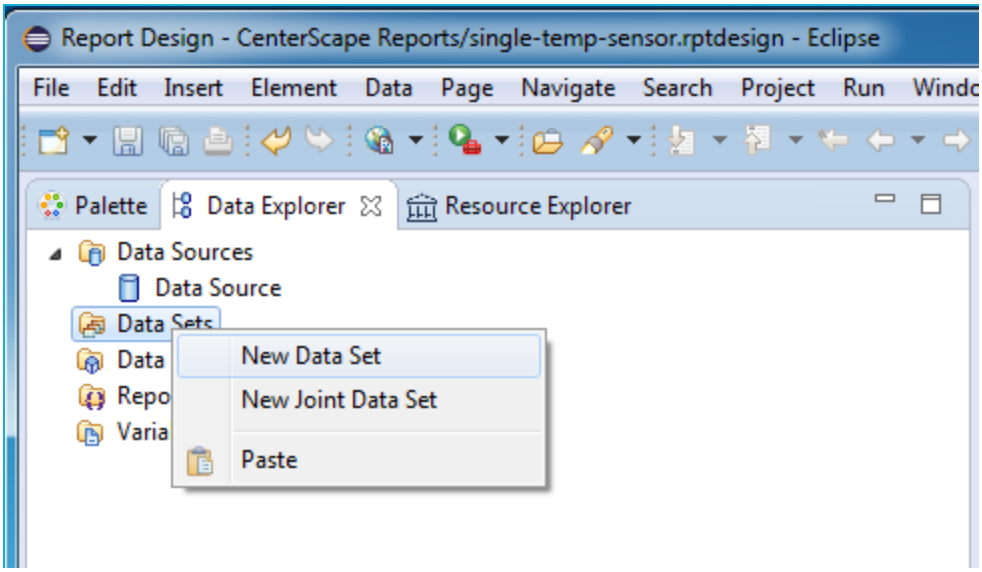
If the "org.sqlite.JDBC" Driver Class is not in the drop-down list, then it must be installed manually. The SQLiteJDBC driver is provided by RF Code on the CenterScape Installation CD and in the downloadable image in the "Tools" directory. The SQLiteJDBC driver can also be downloaded from the following web page: https://bitbucket.org/xerial/sqlite-jdbc/downloads

To install the driver, follow these steps:

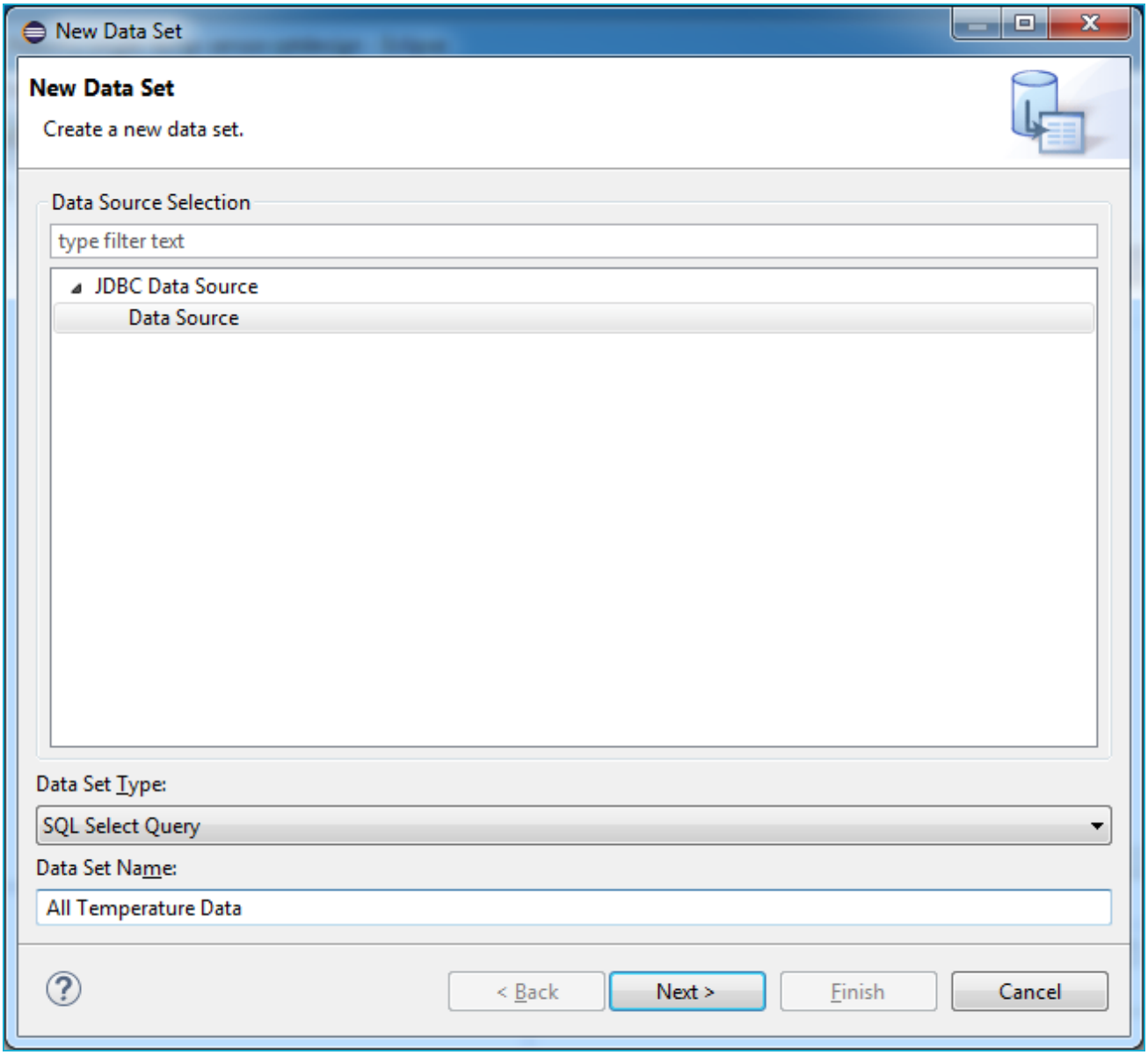
1. Click the **Manage Drivers...** button.
2. From the Manage JDBC Drivers window, click the **Add...** button. Navigate to the SQLiteJDBC driver (JAR file) and click **OK**.
3. Click the **OK** button to complete the install.

Configure a Data Set

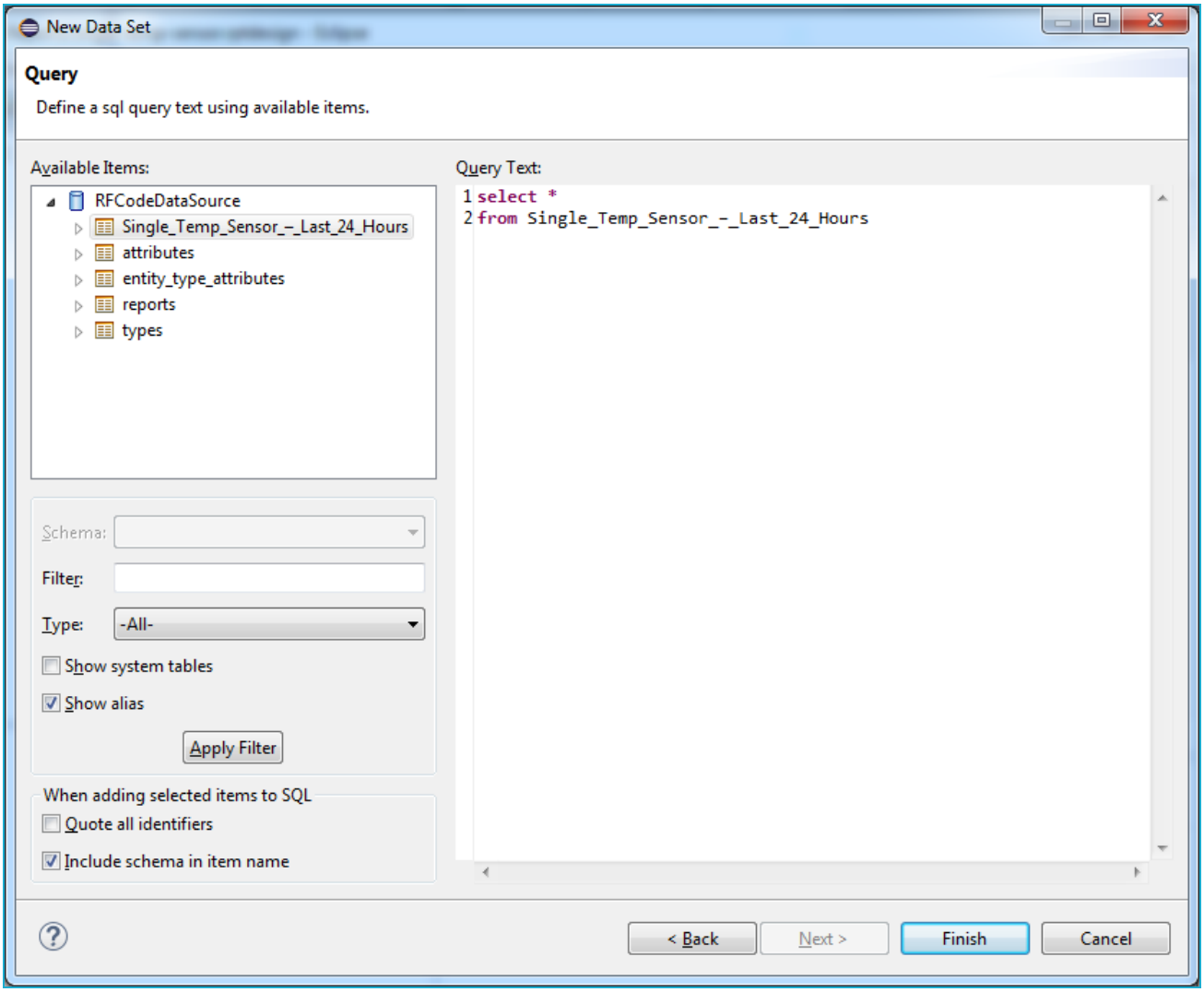
1. Within the Data Explorer tab, right-click the item titled **Data Sets**.
2. From the pop-up menu, select **New Data Set** to create the new data source.



3. The New Data Set Wizard window will appear. Provide the Data Set Name which can be any descriptive name. Leave the other settings in the window at their defaults and click **Next**.



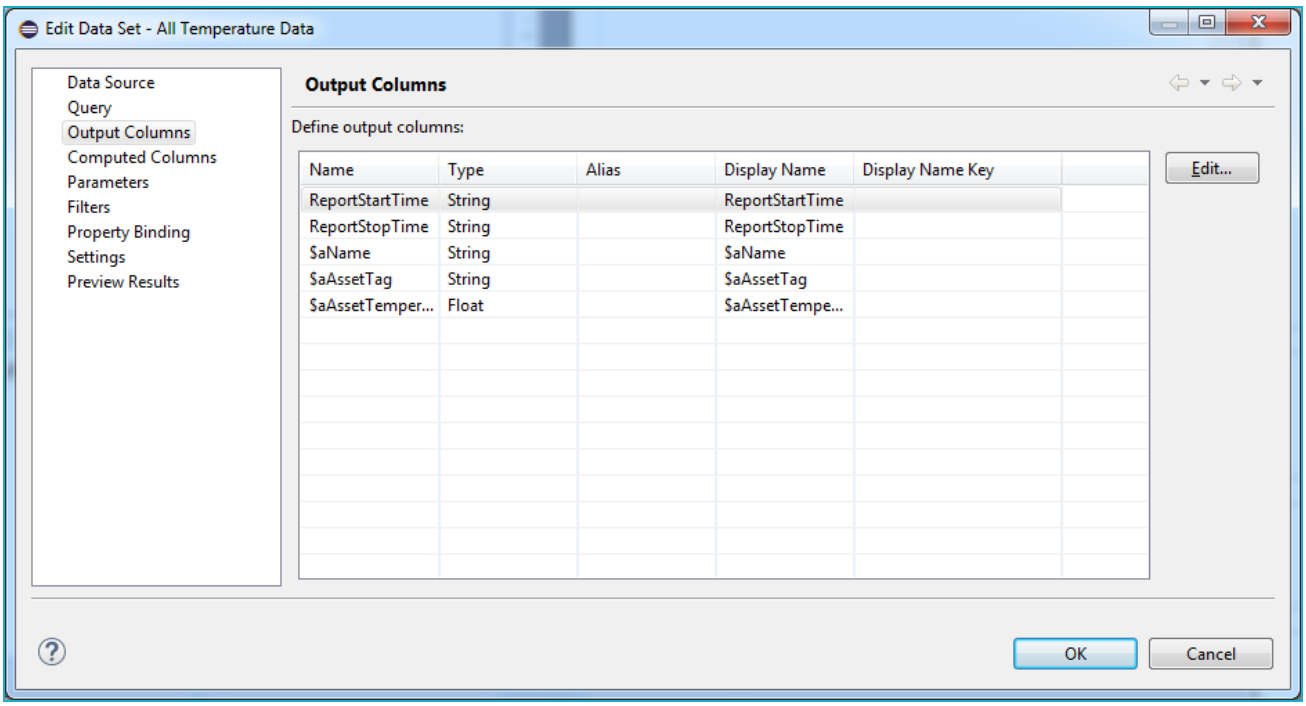
The final page of the Data Set Wizard is where the data query is constructed. In the top left corner of the window, the "RFCodeDataSource" should be listed if things have been properly configured so far. The right side of the window is where the Query Text is entered. Query Text is formatted as SQL statements.



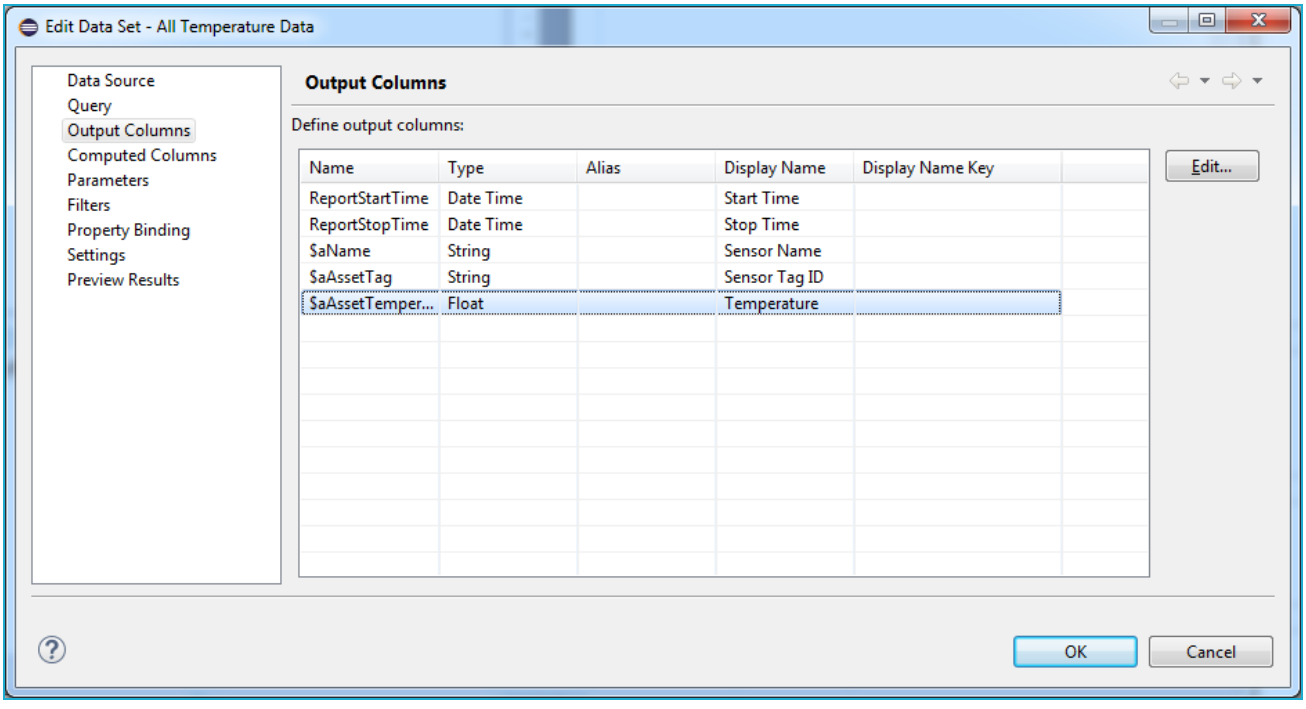
The Data Source in this example is simply a list of temperature values from one temperature sensors, so the query will be a straight-forward "select all" from the table.

4. Double-click the **Single_Temp_Sensor_Last_24_Hours** from the **Available Items:** box to add it after the "from" in the **Query Text:** box. Leaving all other options in their default configuration, click **Finish**.
5. The Data Set Editor window appears with the subtask Output Columns selected. The Data Set Editor provides a way to help the BIRT Report Designer understand the columns of data that result from the SQL query. By default all of the data types are set to "String". These need to be changed to the appropriate data type:
    - ReportStartTime = Date/Time
    - ReportStopTime = Date/Time
    - $aName = String (no change needed)

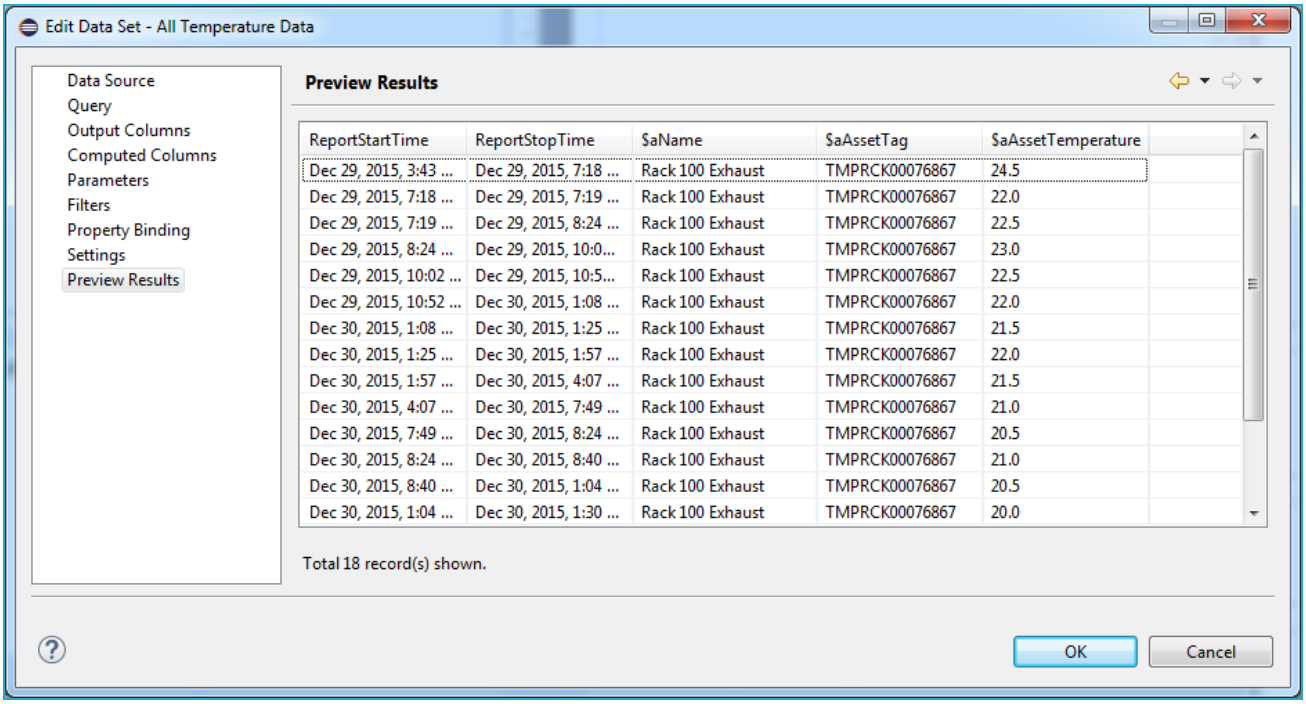
- $aAssetTag = String (no change needed)
- $aAssetTemperature = Float



It may also be desirable to change the "Display Name" of each data element to a more friendly or descriptive name, as in the example below.

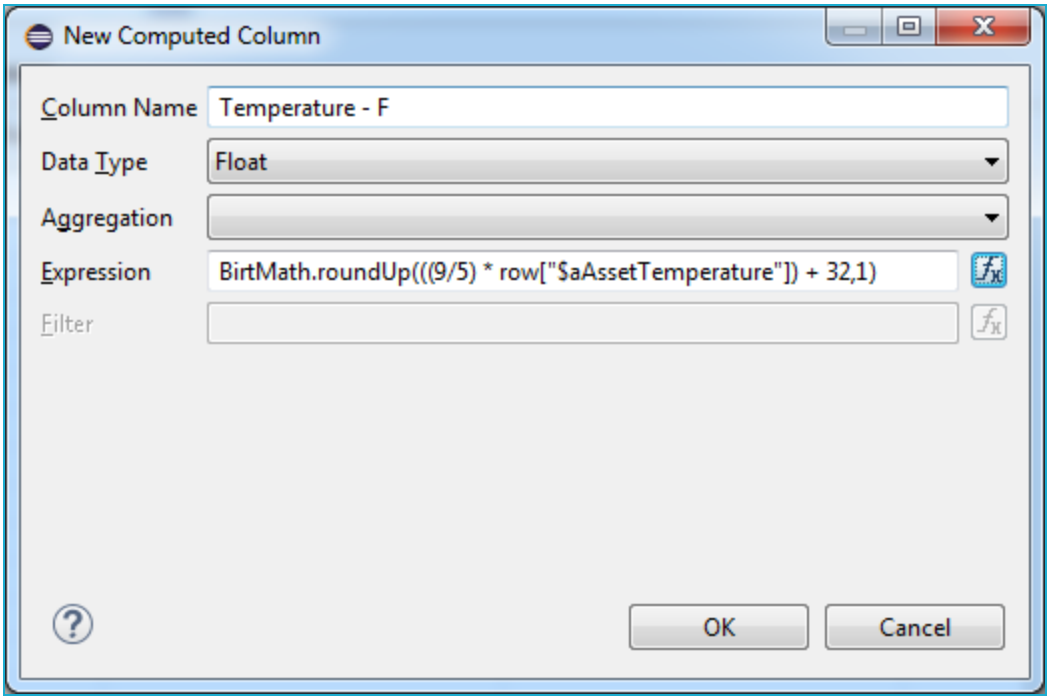


6. The Preview Results subtask displays the resulting data in the Data Set. This is the data that will be utilized in the report.



Notice in the image above that the $aAssetTemperature (last column on right) is displayed in Celsius. The BIRT Report Designer can easily convert the Celsius reading to Fahrenheit. This is accomplished using the Computed Columns subtask.

7. Select the subtask Computed Columns and click the **New** button on the right to create a new computed column.

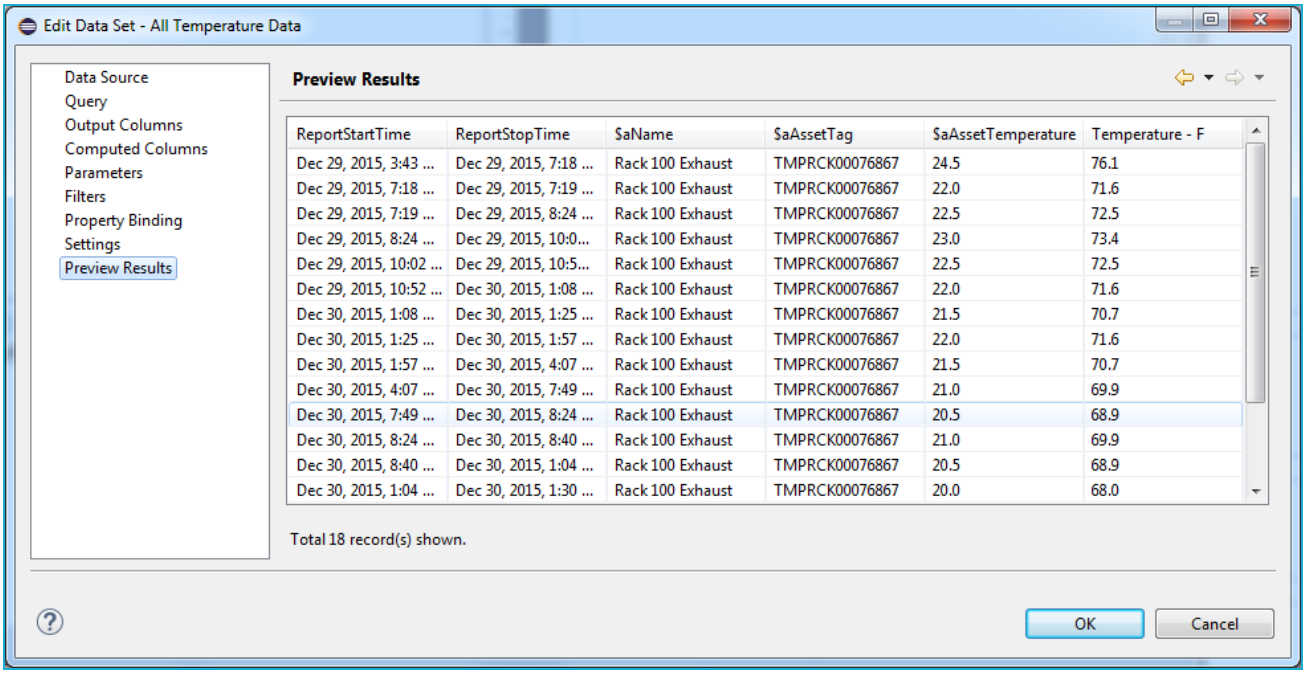


8. Enter a column name of ***Temperature – F***, and set the data type to **Float**. In the expression entry field, enter the following expression:

```
BirtMath.roundUp(((9/5) * row["$aAssetTemperature"]) +
32,1)
```

   NOTE: The details of building the expressions and all of the capabilities of computed data with BIRT is beyond the scope of this paper. Please refer to the BIRT documentation for more information.

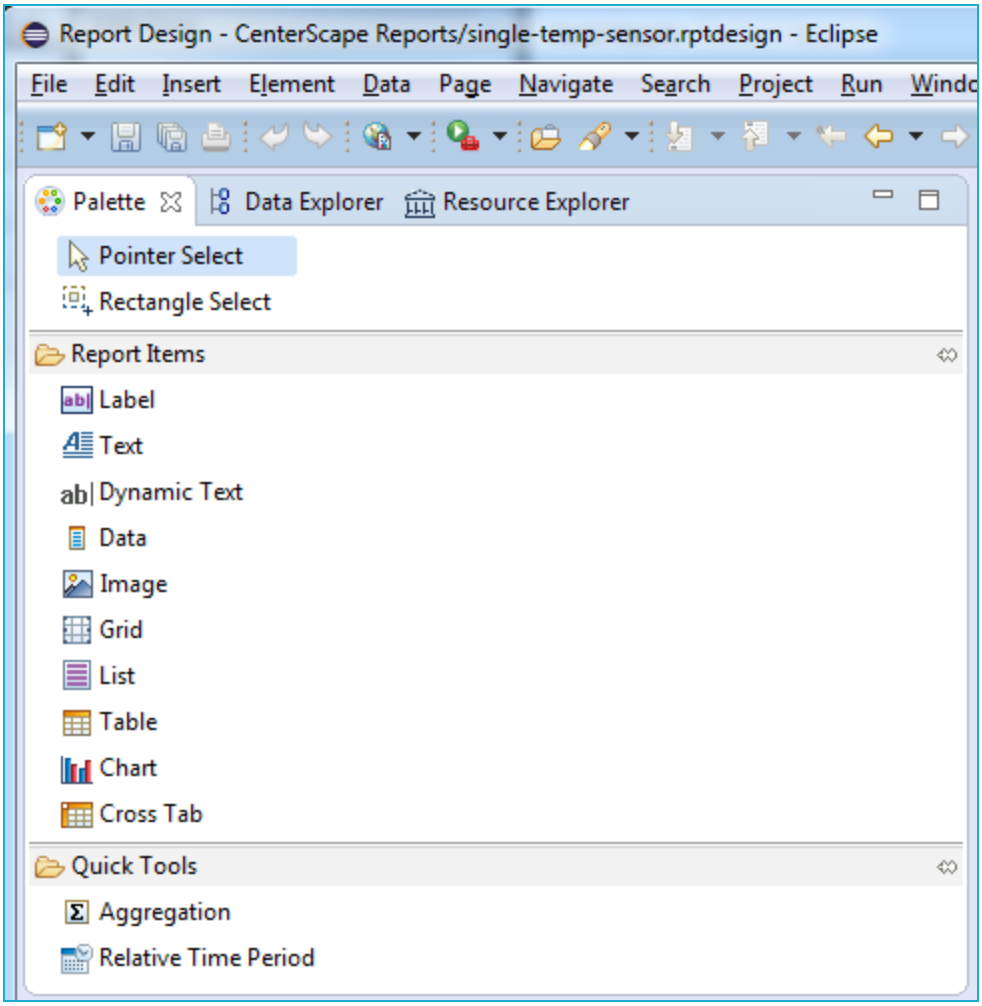
9. Click **OK** to save the new computed column.
10. Now select the **Preview Results** sub-task again, and scroll to the far right to see the new computed column. To close and save the Edit Data Set box, click **OK**.



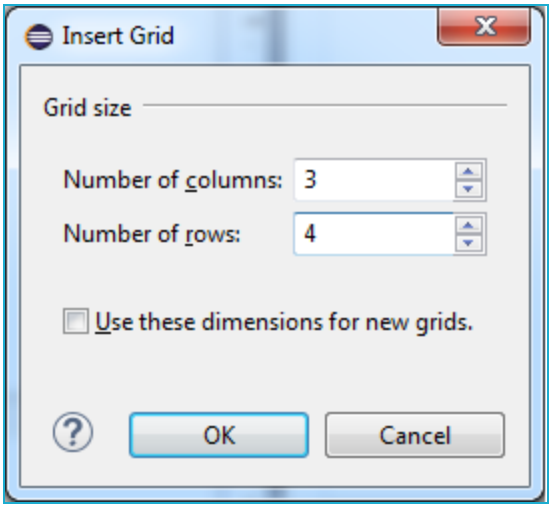
At this point our data is processed and ready to be utilized. The next steps are to create the report layout and visualize the results. The desired output of this report is a line graph at the top of the page and a table of the data at the bottom of the page. The BIRT Report Designer makes this fairly easy to accomplish.

Create the Report Layout

1. In the top left corner of the BIRT Report Designer, click the **Palette** tab to show the list of widgets available for use in a report.



2. One of the easy ways to control where content placed in a report is to use the Grid widget. Drag the Grid widget from the Palette and drag it over to the top line of the report, and then drop it. At this point the Grid Size window appears. The new grid should be comprised of three columns and four rows.



The four rows of the grid will be utilized as follows:

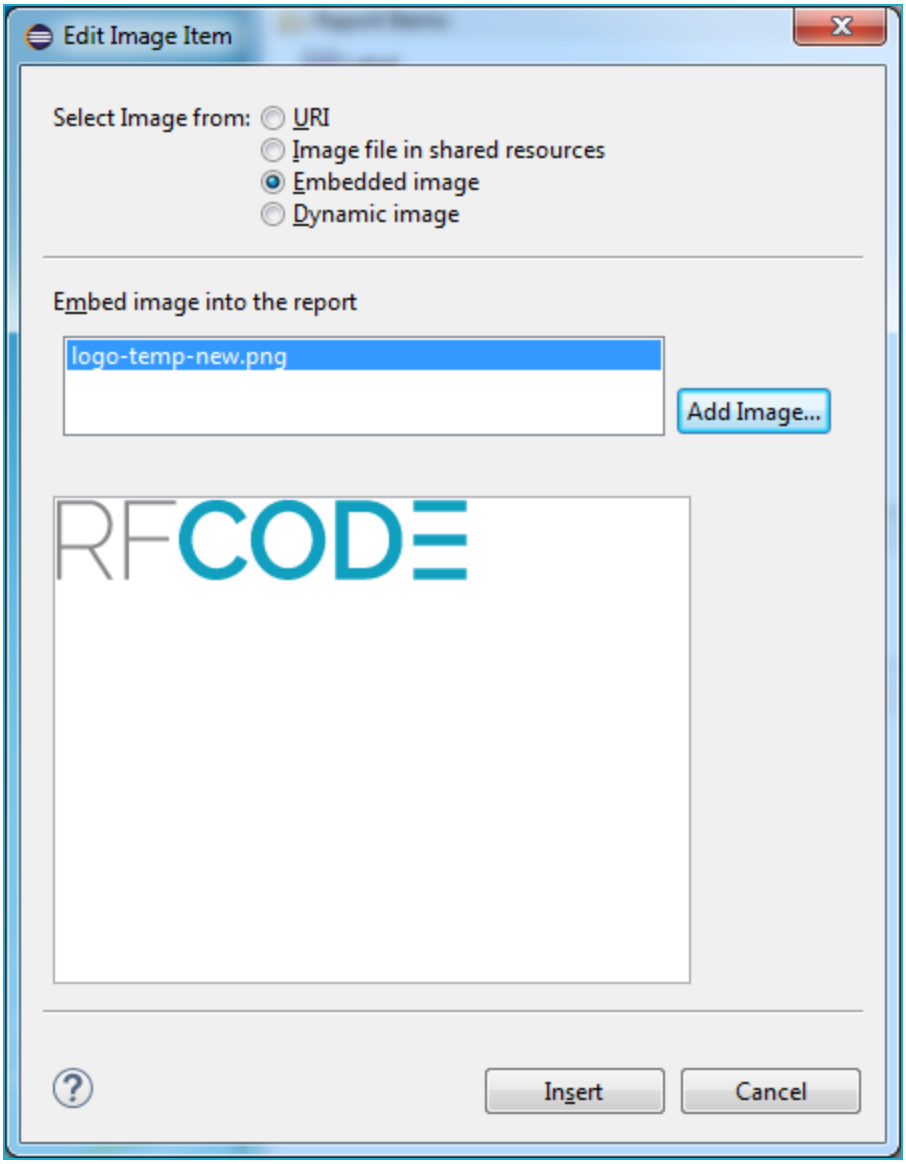
- Row 1 will contain a graphic (logo) image and the title of the report
- Row 2 will contain the chart (line graph)
- Row 3 will be left blank (spacer)
- Row 4 will be contain the table of data

a. To add an image object to the report, drag the Image widget from the palette to the left-most column in the first row of the grid. The Edit Image window will appear.

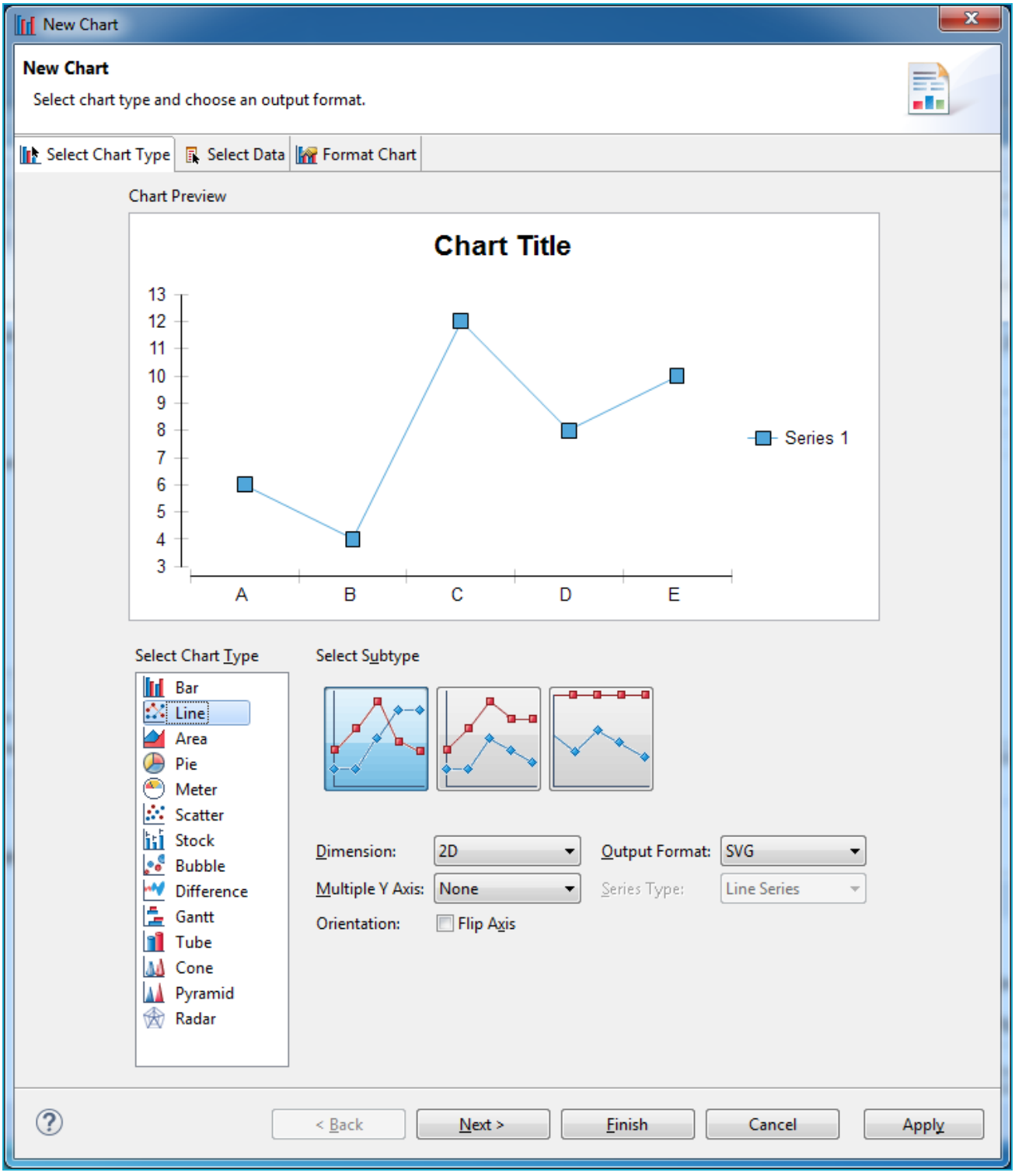
b. Select the third radio button item titled **Embedded image**.

c. Click the **Add Image...** button, and navigate to the image/logo.

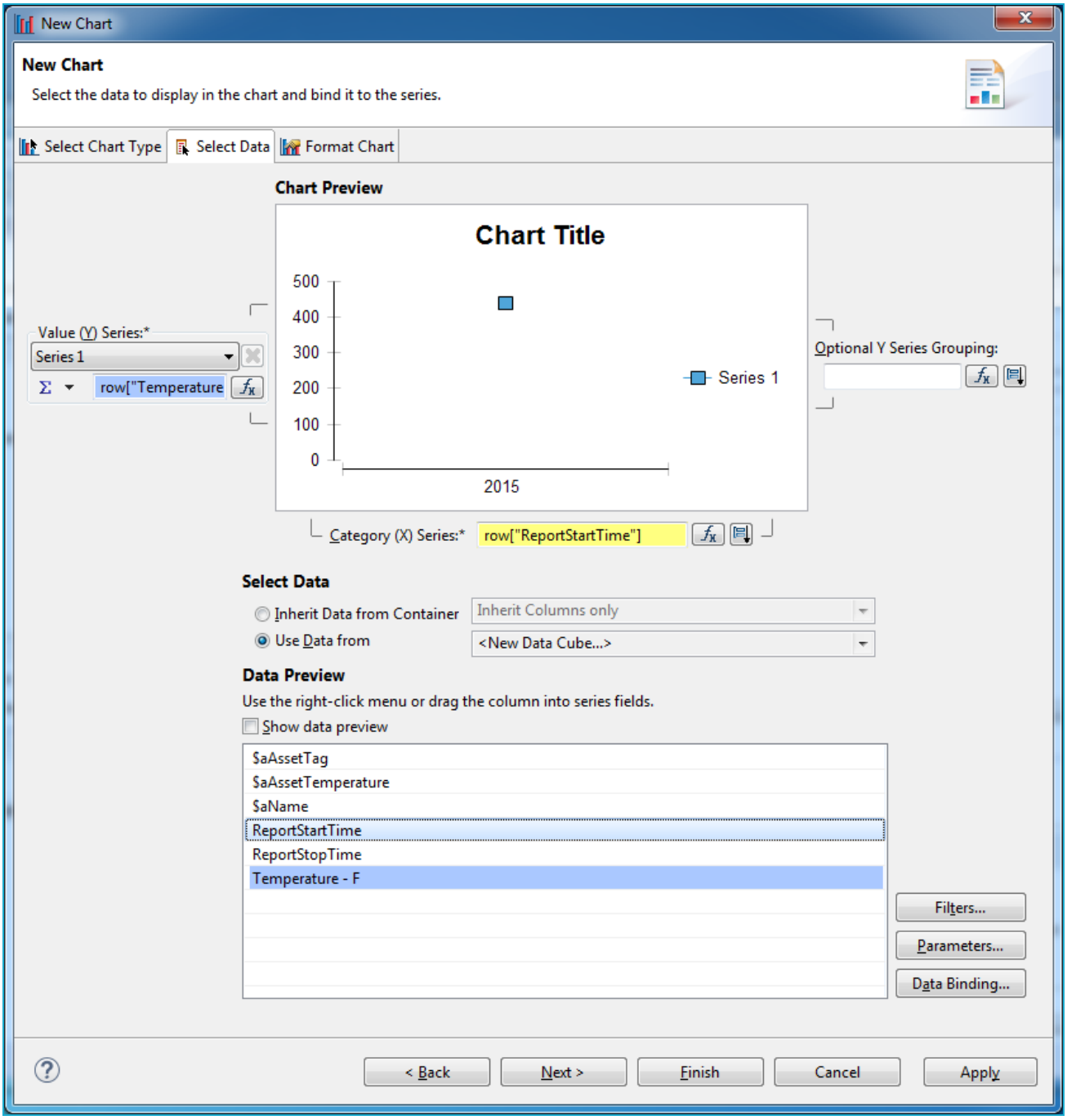
d. Click the **Insert** button to complete the action.



3. The next step is to add the title to the report by selecting the two remaining cells on the first row of the grid, then right-click to access the context menu.
4. From this menu, click **Merge Cells**. Finally drag the Text widget to the merged cells in the top row.
5. Enter the text ***Single Temperature History - Last 24 Hours*** for the title and click **OK**.
6. Select all three cells in the second row of the grid and merge these cells into a single cell.
7. Drag the Chart widget from the palette to the second row of the grid. When this action is complete, the Chart widget editor will appear.



8. From the Select Chart Type tab, select the chart type of **Line**, then click the **Next** button. The Select Data tab will become the visible window.



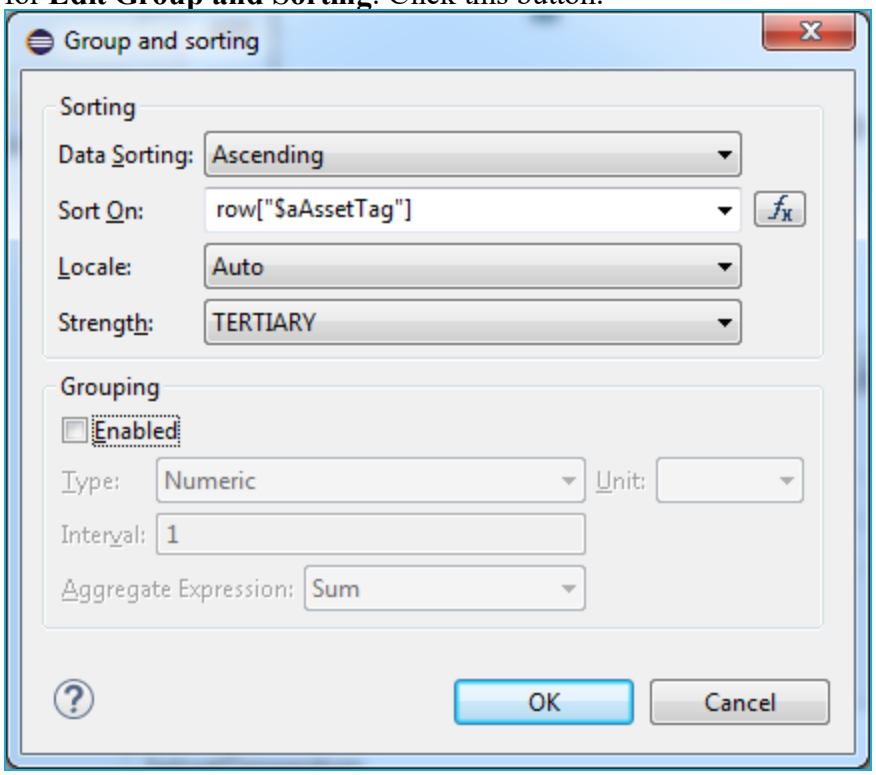
9. From this Select Data tab take the following actions:

a. Beneath the graph example, find the "Select Data" radio buttons and click the second choice, titled **Use Data from**, then select **All Temperature Data** from the drop-down menu. At this point the list of attributes in the "All Temperature Data" Data Set will appear in the list box.

b. Find the item in the list box titled **Temperature – F** and right-click on it. From the context menu click **Plot as Value (Y) Series** to utilize the data from the Y-axis.

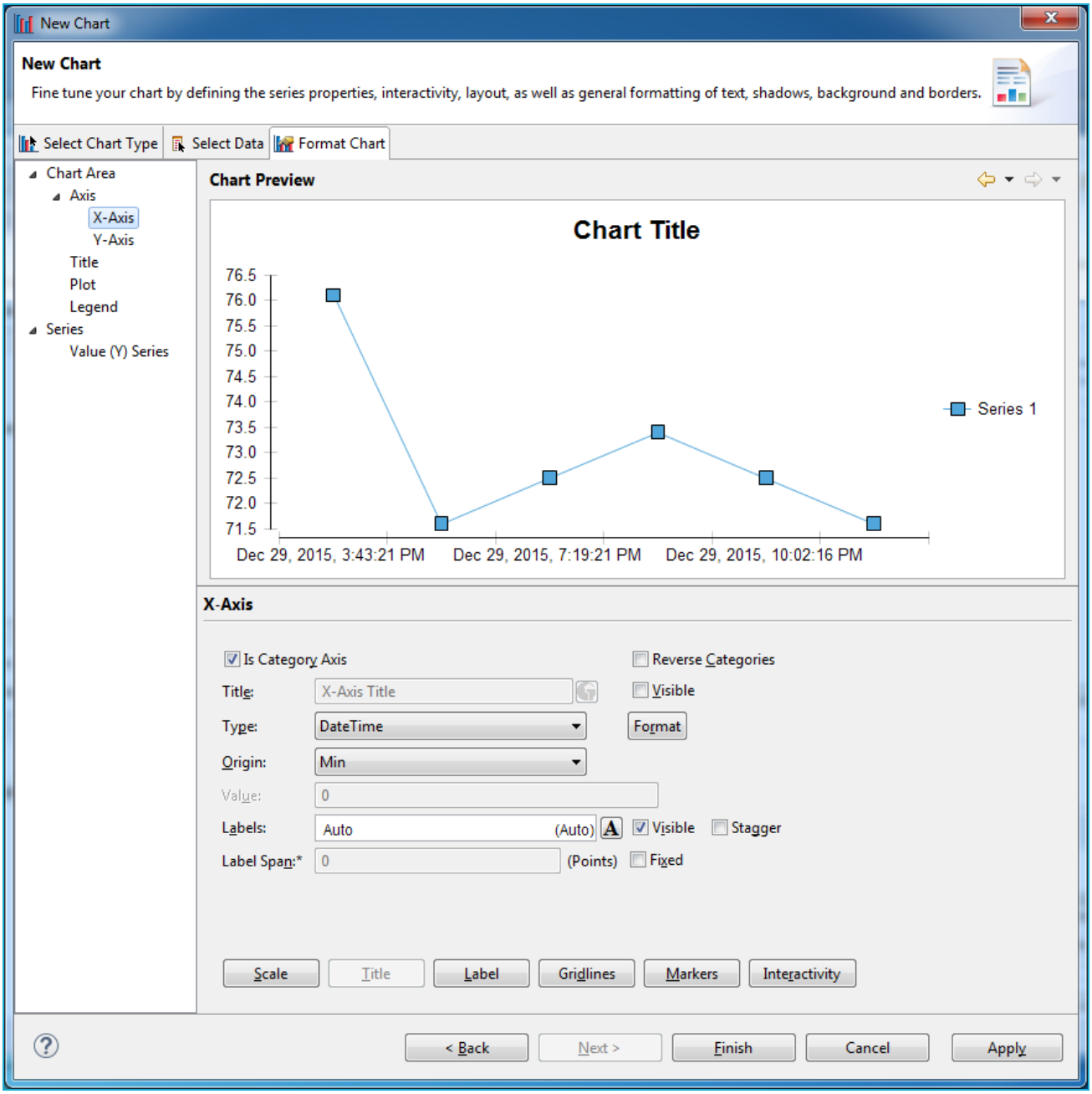
c. Select the item in the list box titled **ReportStartTime** and right-click on it. From the context menu click **Use as Category (X) Axis**.

d. Just beneath the graph example, to the far right of the "Category (X) Series:" label is a button for **Edit Group and Sorting**. Click this button.



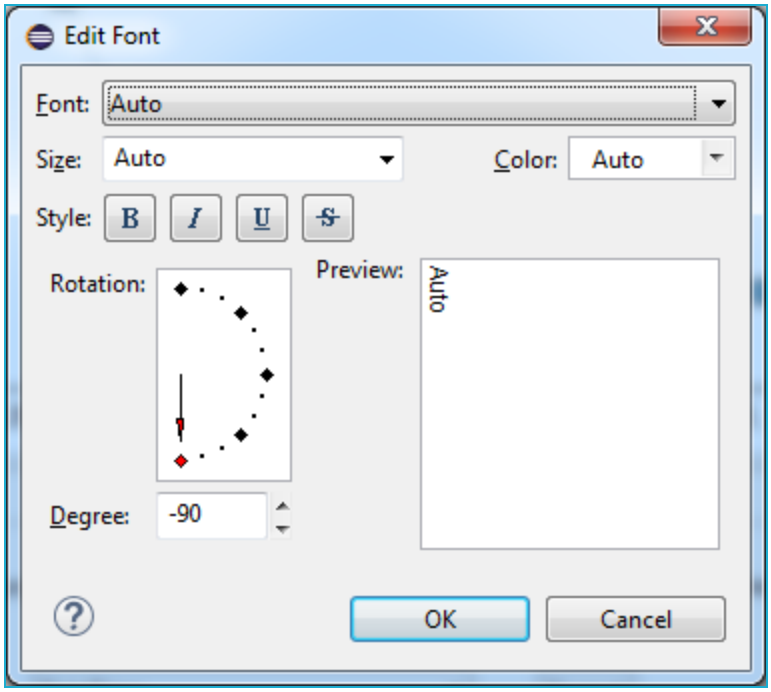
e. From the Group and Sorting window, select **Ascending** for the "Data Sorting" item, then ensure that the "Grouping" checkbox is not checked. Finally, click **OK**.

f. Click the **Next** button at the bottom of the Select Data panel to move to the final tab for configuring the chart – "Format Chart".



10. From the Format Chart tab, take the following actions:

a. From the tree area on the left, select **X-Axis** to display the properties of the X-Axis. Click in the field containing the word **Auto** next to Labels to display the Font Editor window.



b. Set the Rotation Degree to **-90** then click **OK**.

c. From the tree on the left, select **Y-Axis** to display the Y-Axis properties.

d. Enable the **Visible** checkbox next to Title, then type ***Temperature – F*** into the entry field.

e. From the tree on the left, select **Title** to display the Title properties.

f. Enable the **Visible** checkbox next to Chart Title, then type ***Single Temperature Sensor – Last 24 Hours*** into the entry field.

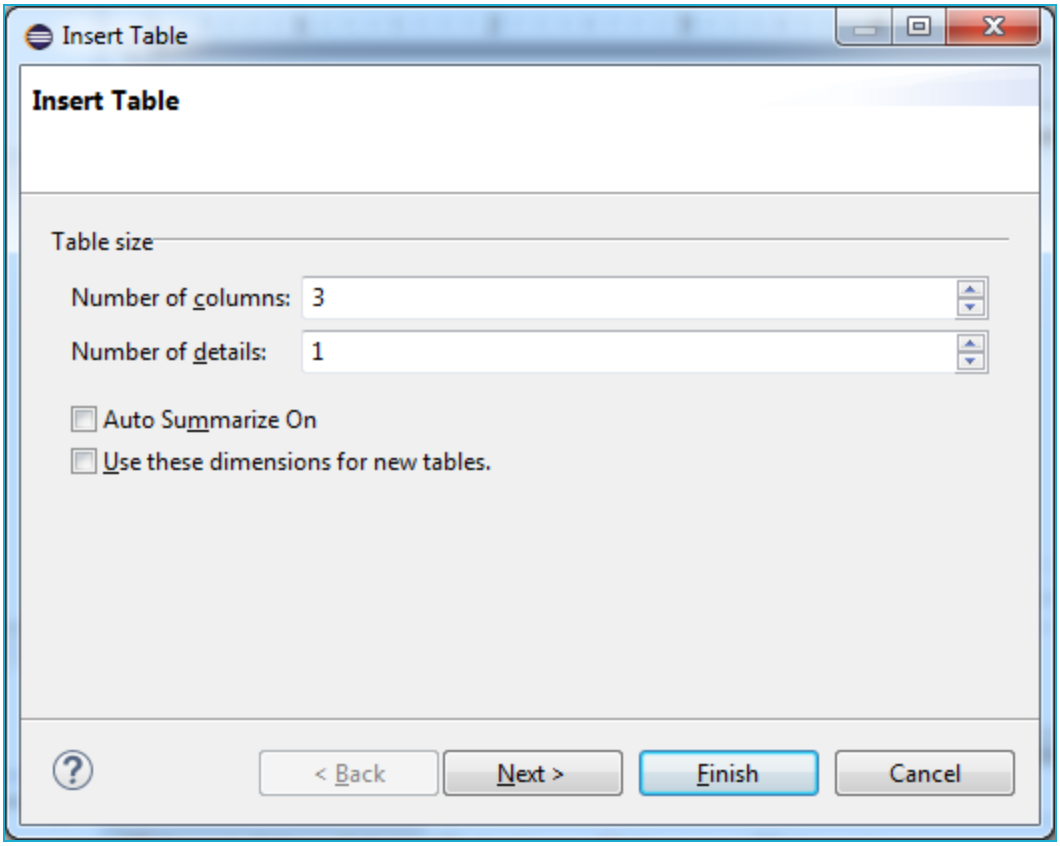
g. From the tree on the left, select **Legend** to display the Legend properties.

h. Disable the Visible checkbox to turn off the legend.

i. At the bottom of the window, click **Apply** and then **Finish**.

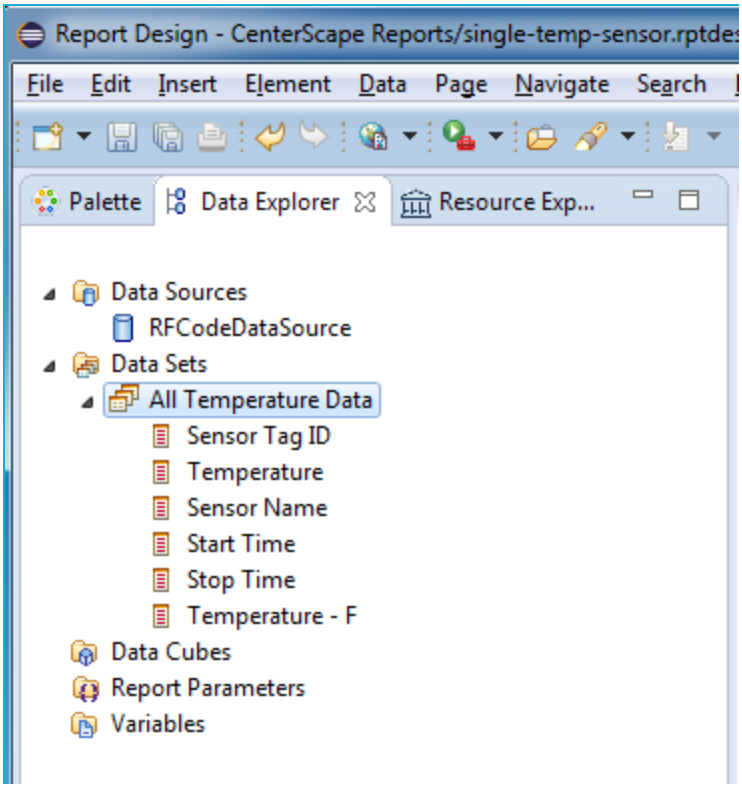
11. At this point the chart content of the report is complete. The next step is to create the data table below the chart.

a. Select all three cells in the last row of the grid, and merge those cells together (via the right-click context menu). Drag the Table widget from the Palette to the newly merged cells on the last row of the grid. At this point the Table editor window will appear.

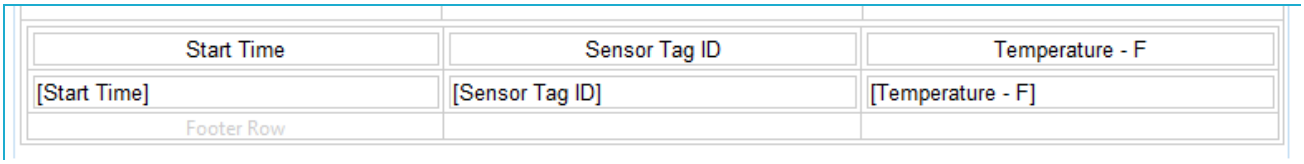


b. Enter ***3*** for the number of columns and ***1*** for the number of detail, then click **Finish**. The table is now created with a "header" row, a "details" row, and a "footer" row. The next step is to configure which information goes into which column of the details row.

c. In the top left corner of the BIRT Report Designer, select **Data Explorer** to display the configured Data Sources and Data Sets again. Expand the Data Sets item, then expand the configured set titled **All Temperature Data**.



d. Drag the item titled **Start Time** to the first column of the details row. Next, drag the item titled **Sensor Tag ID** to the center column of the details row. Finally, drag the item titled **Temperature – F** to the last column of the details row.



The table is now fully configured.

12. Finally, preview the report in the BIRT Report Designer by clicking **Preview** tab. At this point, the report design is complete, and the report is ready for use by CenterScape.
13. **Save** the project before exiting the BIRT Report Designer.

    NOTE: The BIRT Report Designer is an extremely powerful application. The simple example above only illustrates a small fraction of the capabilities of the BIRT Report Designer. There are many tutorials on the Internet both written and video-based that can provide a more detailed education on the product.

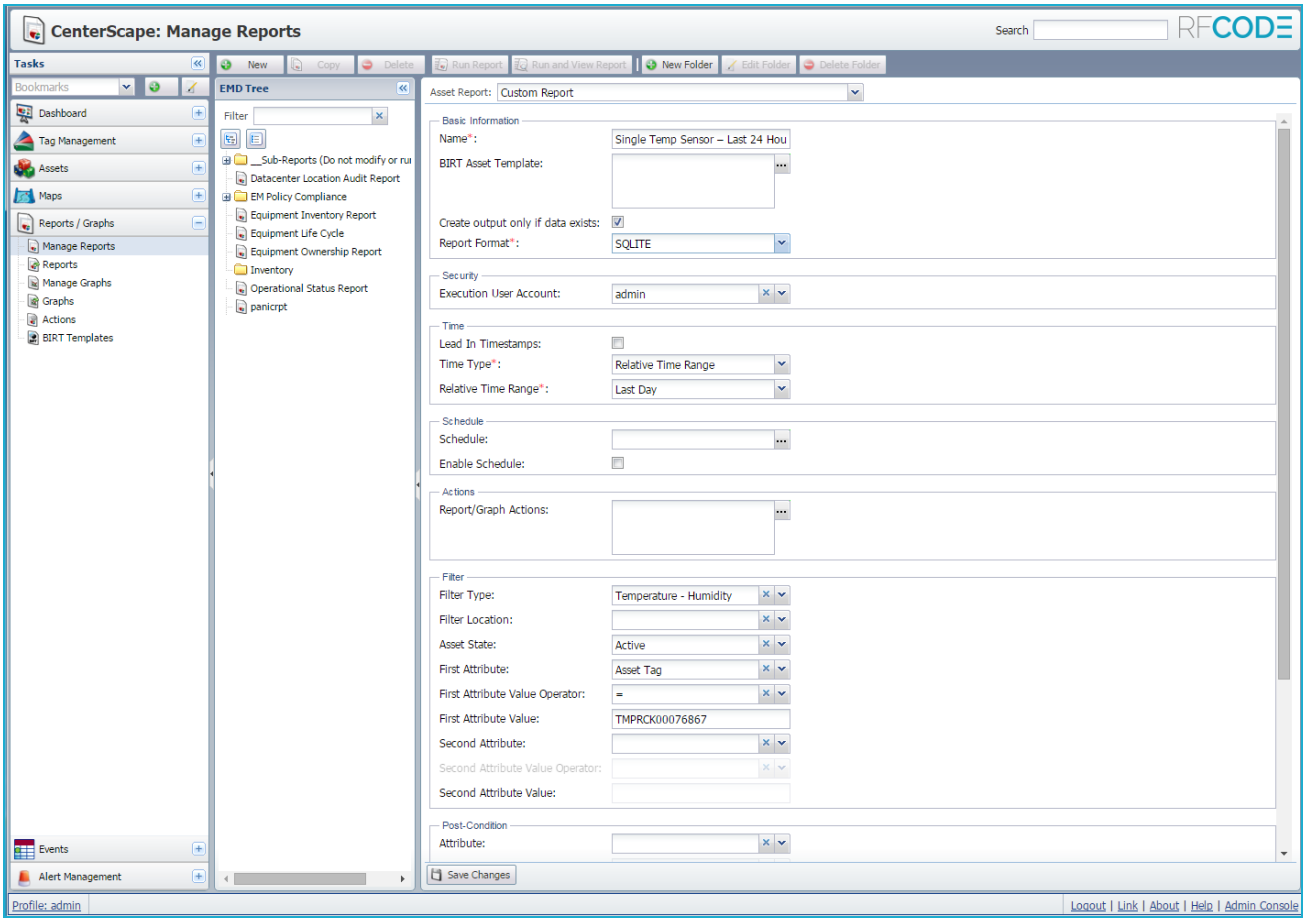
Configuring a BIRT Report in CenterScape

By this point in the process, all of the hard work has been completed. Configuring CenterScape to utilized aReport built by the BIRT Report Designer is a fairly simple and straightforward process. At a high level, the steps are:

1. Create a BIRT Template and import the BIRT report designed.
2. Edit the Report utilized at the beginning of the process, and associate the BIRT Template.
3. Run the Report.

Creating A BIRT Template

1. In CenterScape, navigate to **User Console > Reports/Graphs > BIRT Template**. Click the **New** button at the top to create a new BIRT Template.

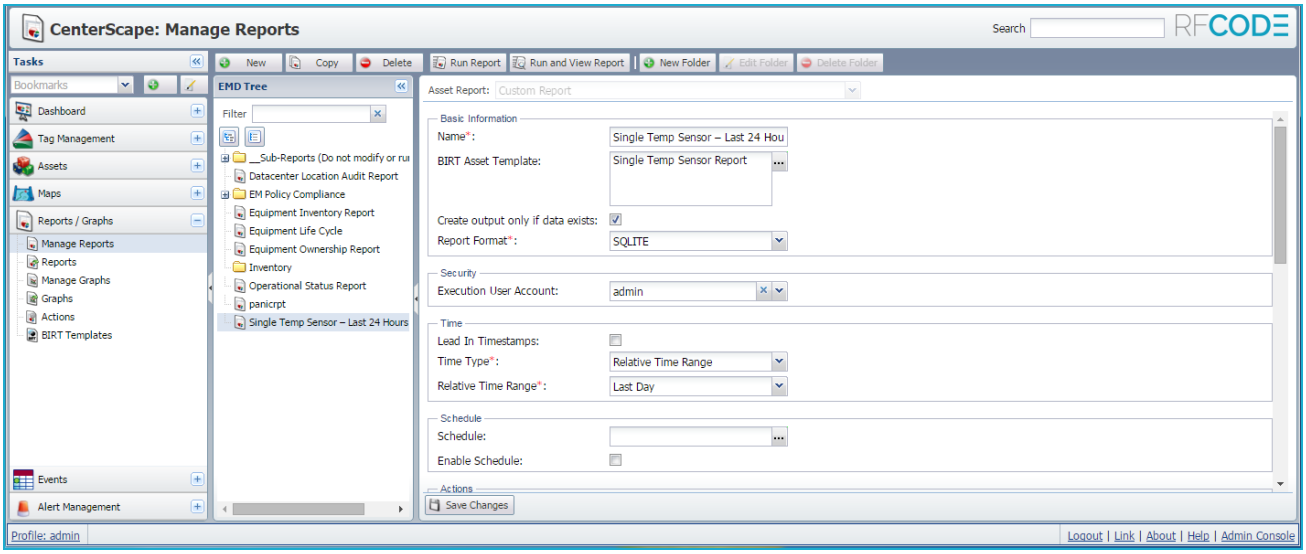


2. Complete the following configuration fields:
    - **Name:** Provide a name for the template – in this example, the name is "Single Temp Sensor Report".
    - **BIRT XML Config:** browse to and select the desired BIRT Report Design file. Navigate to the BIRT Report Designer workspace directory, and select the ".rptdesign" file.
    - **BIRT Output Formats:** The BIRT Engine can output reports in a variety of formats: PDF, Excel, HTML, Word. Select the desired format – in this example, select "PDF".
    - **BIRT Parameters:** The BIRT Parameters and values will remain blank for this example. Refer to Appendix A for more details on BIRT Parameters and how to utilize them.
3. Click **Save Changes** to save the BIRT Template.

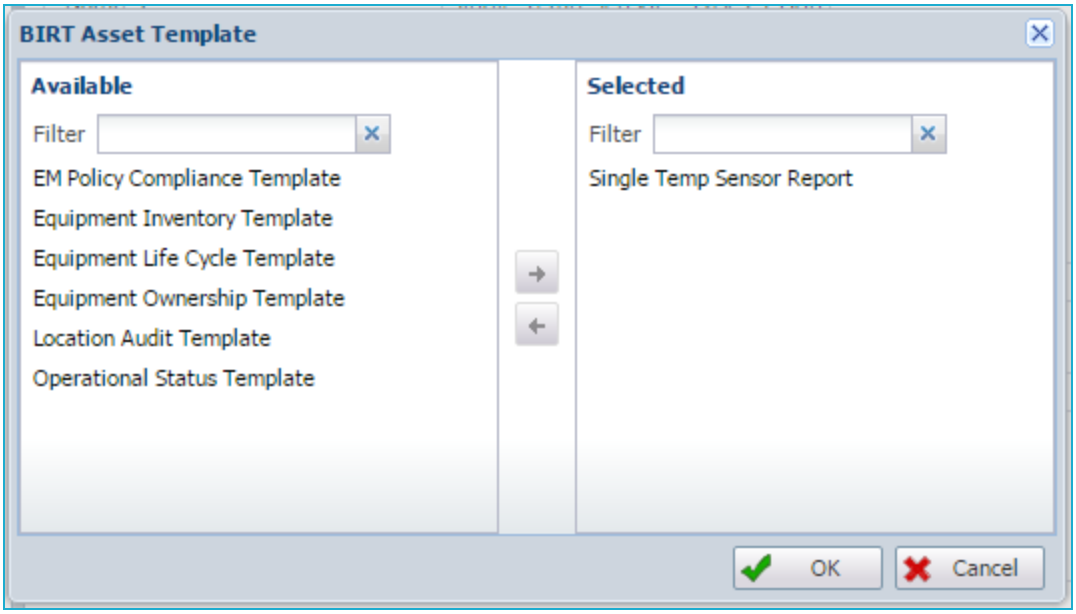
Utilizing a BIRT Template

Now that the BIRT Template is created, the next step is to associate it with the Standard Report that was utilized at the start of this process.

1. From the **Reports / Graphs** task, click on **Manage Reports**.
2. When the list of report definitions appear in the center pane, click on **Single Temp Sensor – Last 24 Hours** to edit it.



3. In the far right pane, in the Basic Information section, click the Ellipsis **[...]** button next to BIRT Asset Template. The window that appears will display all configured BIRT Templates.



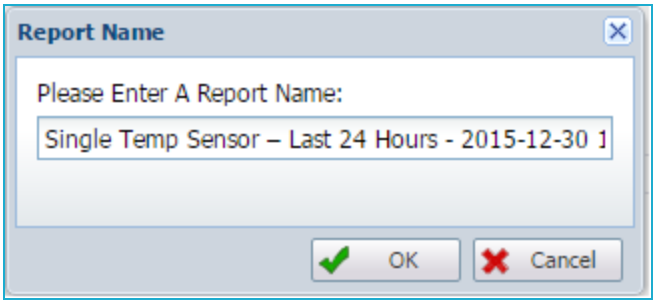
4. Double-click the item **Single Temp Sensor Report** to move it from the Available column to the Selected column, then click **OK**.
5. When returned to the report definition pane, click **Save Changes** at the bottom of the pane.

   NOTE: It is possible to associate multiple BIRT Templates to a single report definition, allowing for multiple report outputs.

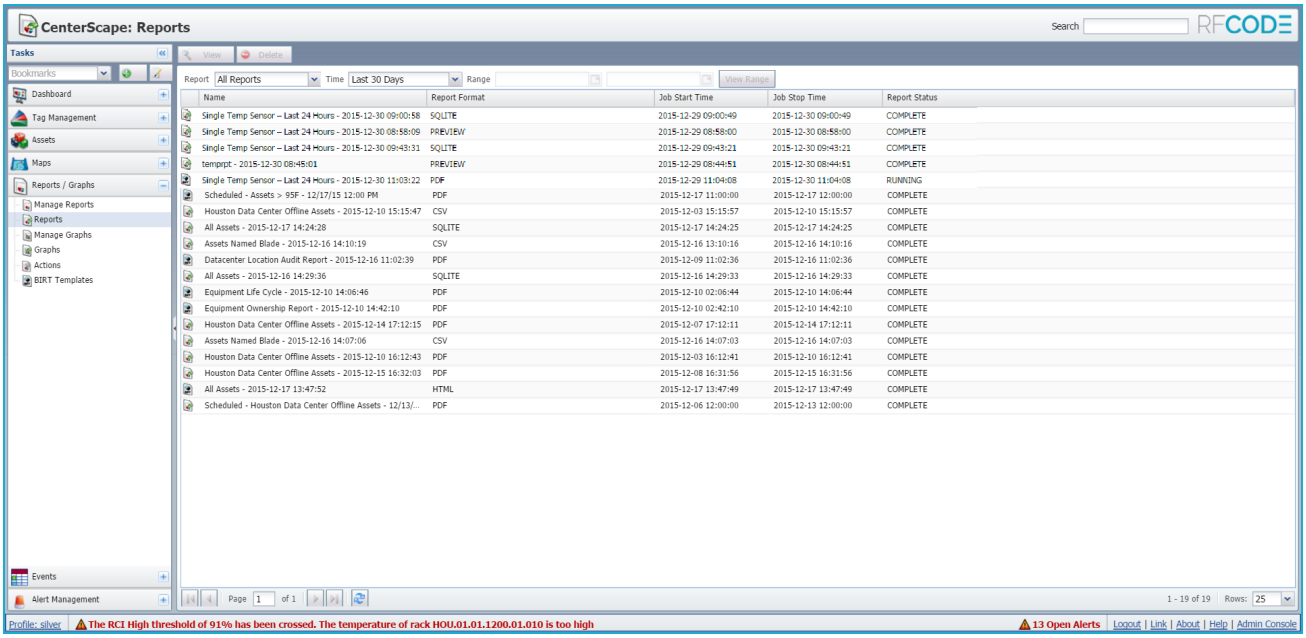
At this point the Report definition that was used to generate the data upon which the report was built has a BIRT report definition associated with it.

Running a Report

Running an Advanced Report is as simple as selecting the report from **Report / Graph > Manage Reports**, then clicking the **Run Report** button at the top of the window. The Report Name window will appear, and the best option is to utilize the default provided name and click **OK**.



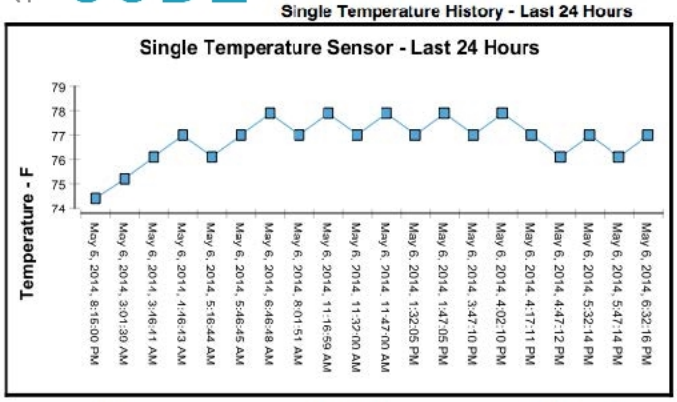
The report engine runs in the background since some complex reports may take a fair bit of time to complete. To see the report execution status and view the report output, click on the **Reports/Graphs > Reports**.



The far right column will display the report status such as Running, Complete, etc. When the report status is Complete, double-click the row to view the output. In this example the report output from the BIRT Template was configured to be a PDF, so the web browser will prompt to save the PDF file. Once the PDF file is downloaded, it can be viewed with a standard PDF viewer.

RFCODE

Single Temperature History - Last 24 Hours



Time	Sensor Tag ID	Temperature - F
May 5, 2014, 8:15 PM	TMPRCK90000001	74.4
May 6, 2014, 3:01 AM	TMPRCK90000001	75.2
May 6, 2014, 3:46 AM	TMPRCK90000001	76.1
May 6, 2014, 4:46 AM	TMPRCK90000001	77
May 6, 2014, 5:16 AM	TMPRCK90000001	76.1
May 6, 2014, 5:46 AM	TMPRCK90000001	77
May 6, 2014, 6:46 AM	TMPRCK90000001	77.9
May 6, 2014, 8:01 AM	TMPRCK90000001	77
May 6, 2014, 11:16 AM	TMPRCK90000001	77.9
May 6, 2014, 11:32 AM	TMPRCK90000001	77
May 6, 2014, 11:47 AM	TMPRCK90000001	77.9
May 6, 2014, 1:32 PM	TMPRCK90000001	77
May 6, 2014, 1:47 PM	TMPRCK90000001	77.9
May 6, 2014, 3:47 PM	TMPRCK90000001	77
May 6, 2014, 4:02 PM	TMPRCK90000001	77.9
May 6, 2014, 4:17 PM	TMPRCK90000001	77
May 6, 2014, 4:47 PM	TMPRCK90000001	76.1
May 6, 2014, 5:32 PM	TMPRCK90000001	77
May 6, 2014, 5:47 PM	TMPRCK90000001	76.1
May 6, 2014, 6:32 PM	TMPRCK90000001	77

Appendix

BIRT Resources

BIRT Tutorials:

- Training Guide for BIRT:
  - http://www.slideshare.net/Aasim_Mahmood/manual-guide-for-birt-eclipse-report-designer#
- Basic BIRT Tutorial:
  - https://www.eclipse.org/birt/documentation/tutorial/
- Building a BIRT Report:
  - http://tinyurl.com/lmfsnj2
- BIRT Tutorial:
  - https://www.youtube.com/watch?v=_h8jJ_YSvgw
- Getting Started with BIRT:
  - http://refcardz.dzone.com/refcardz/birt

BIRT Books:

- **BIRT for Beginners** by Paul Bappoo - http://amzn.com/144574886X
- **BIRT by Example** by Paul Bappoo - http://amzn.com/129111226X
- **BIRT: A Field Guide to Reporting** by Peh, Hague and Tatchell - http://amzn.-com/B0054KOKGQ

RF Code Support and Professional Services

For additional information about functionality that is not described in this document, please visit the RF Code support website and/or contact RF Code Support.

For more information about RF Code Professional Services, refer to rfcode.com/solutions/professional-services