

User Guide

Version 2021.2

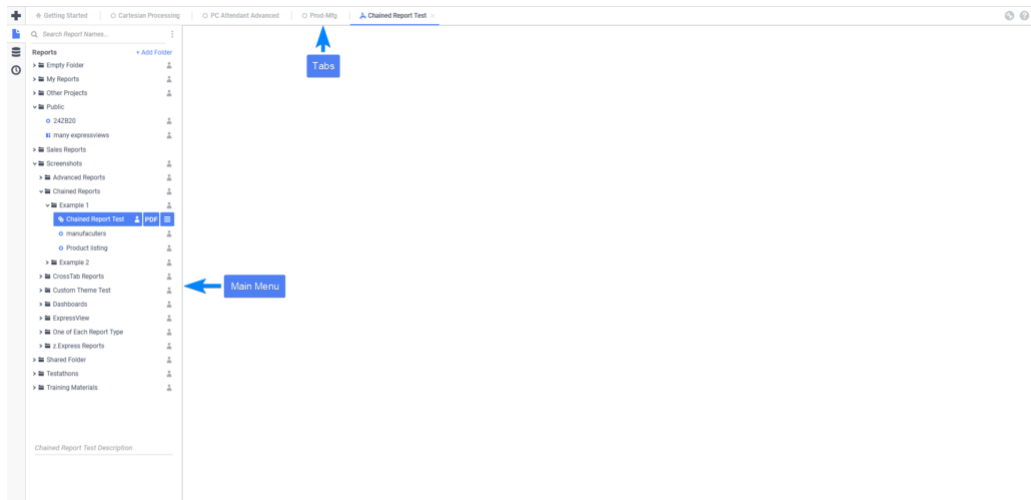
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Navigating the Application

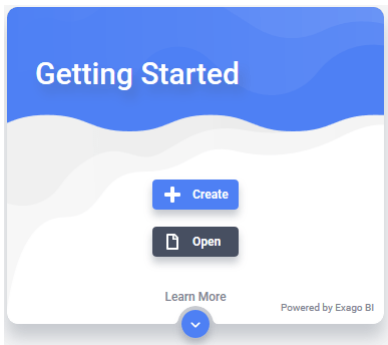
This application consists of two sections. On the left is the Main Menu and on the right are Tabs. The Main Menu displays the available reports, folders, and buttons. Tabs can contain the New Report Wizard, report outputs, design windows, or help pages.



Main interface showing the main menu and tabs

Getting Started

The **Getting Started** tab will be first tab displayed when entering the application in most cases. The default Getting Started page has three clickable actions:



- **+ Create** – click to to open the **Create New Report** menu to create a new report.
- **Open** – click to open the **Report Tree**. The search field at the top of the tree will be highlighted, and the cursor will be moved there
- **Learn More** – click to open the **Contextual Help** system

Main Menu

Through the Main Menu, you can:

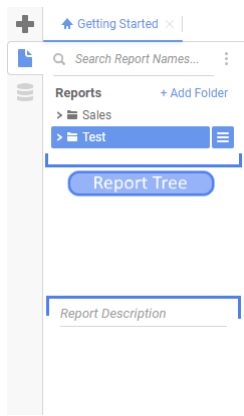
- Create new reports
- Search for reports
- Read report descriptions
- Run Reports
- Export reports to other types (Excel, PDF, RTF, and CSV)
- Duplicate reports to save time setting up similar reports
- Edit reports
- Schedule reports to be emailed or archived
- Manage folders and report storage

The main menu, depending on system configuration, has three or four mode icons on the left-side. They are:

- **+ Create New Report**
- **📁 Browse Reports**
- **📊 View Data Objects**
- **🕒 View Schedule Manager**

The active mode is indicated with a blue icon, for example when the Browse Reports mode is selected, the icon looks like this: . Click on the icons to change the Main Menu mode or click on the currently active icon to collapse the main menu and hide it. To show the main menu again, click on any of the icons.

The Main Menu can be broken down into two components: the Report Tree and the Report Descriptions Window.



The Report Tree and Report Description

Report Tree

The Report Tree contains the individual user’s view of their applicable Folders/Sub-Folders and the Reports contained within them.

A

Search field at the top of the Report Tree allows for easily finding a report by name or description. Click the **Search Options** icon and choose to either *Search by Name* only or to *Include Description* in the search. If *Include Description* is checked, either press the **Enter** key or click the **Search** icon on the right to start the search.

Status icons in each content item’s row indicate its status:

- **Read Only** “ content cannot be modified in any way (as designated by the administrator), with the Reports and Sub-Folders within inheriting the same permissions (unless otherwise specified).
- **Owner** “ content is owned by the current user. Owners of content have full access to the item and may rename, move, and delete it for all users.

NOTE

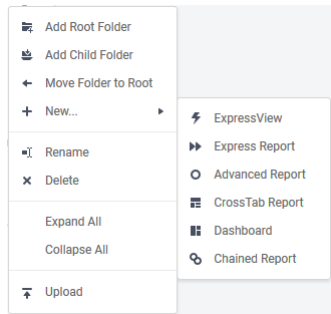
A system administrator can still restrict access to content you may own. In this case, the **Read Only** icon will appear in place of the **Owner** icon.

A user can view a list of a folder’s contents by either:

- double-clicking the folder name
- left-clicking the **Expand** icon next to the folder name

Right-Clicking on Folders

If a user right-clicks on a folder they have access to (it is not marked read only) within the Report Tree, a menu with the following options appears. The system administrator can enable or disable certain options, so the menu in your system may appear slightly different.



- **Add Root Folder** “ create a new folder in the root (top) folder.
- **Add Child Folder** “ create a new sub-folder within the existing folder.
- **Move Folder To Root** “ moves the folder to the root of the tree.
- **New...** “ add a new report to the folder and specify the report type.
 - ExpressView
 - Express Report
 - Advanced Report
 - Dashboard
 - Chained Report
- **Rename** “ rename the folder.
- **Delete** “ delete the folder. If the **Owner** deletes the folder, it is deleted for all users of the system. If someone other than the owner deletes the folder, it is deleted for that user only.

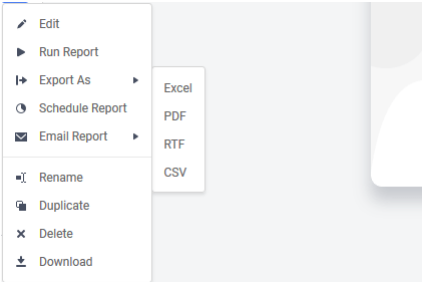
NOTE

A folder and all of its sub-folders must be empty for all users in order to delete the folder.

- **Expand All** expands the contents of the relevant folder, including all of its sub-folders
- **Collapse All** collapses the contents of the relevant folder, including all of its sub-folders.
- **Upload** upload a local copy of a report definition file to the folder.

Right-Clicking on Reports

The system administrator can enable or disable certain options, so the menu in your system may appear slightly different.

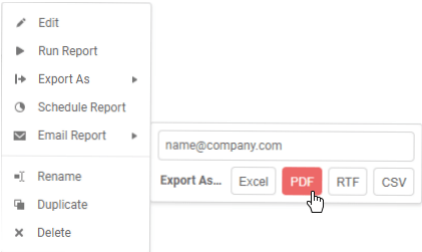


- **Edit** opens the Report Designer screen for the selected report.
- **Run Report** executes the report and displays it in HTML format.
- **Export As** allows the user to execute a report in any of the following formats:
 - *Excel* as a Microsoft Excel workbook
 - *PDF* as a Portable Document Format (PDF) file
 - *PDF (Chained Report)* v2021.2+ available only for Dashboards, each tile appears as a page in a Portable Document Format (PDF) file. See Exporting Dashboards for more information.
 - *PDF (Snapshot)* v2021.2+ available only for Dashboards, an image of the Dashboard as it appears on screen appears in a single page of a Portable Document Format (PDF) file. See Exporting Dashboards for more information.
 - *RTF* as a Rich Text Format (RTF) file
 - *CSV* as a plain-text Comma Separated Values (CSV) file

NOTE

If one of these export types is unavailable, it may have been disabled by your administrator or by the user who created the report.

- **Schedule Report** Schedule a report to run immediately, at a later time, or at regular intervals. For more information on scheduling reports, review the Scheduling a Report article.
- **Email Report** email a report immediately to a specified email address. Clicking an **Export As...** option allows the user to specify the export format type.



Sending a copy of the report by e-mail as a PDF attachment to

- **Rename** rename the report.

NOTE

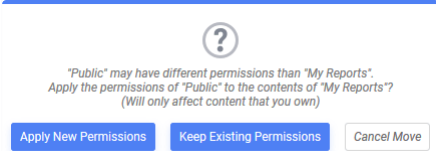
In versions *pre-v2020.1* if a report is renamed that is used on a composite report (i.e. a Dashboard, Chained Report or a Scheduled Report), an error message will appear when attempting to Execute or Edit it as the link will be broken.

- **Duplicate** duplicate a report and place it in a specified folder
- **Delete** delete the selected report. If the **Owner** deletes the report, it is deleted for all users of the system. If someone other than the owner deletes the report, it is deleted for that user only.
- **Download** Download this report's definition file to the local computer.

Moving Reports and Folders

If someone **other than the owner** of a report or folder moves it from one folder to another, the item is moved only for that user.

If the **owner** of the content item moves it, it is moved for all users. The owner's permissions are "sticky" for that item. The owner will retain the same level of permission they had before the item was moved. If the **owner** moves a folder to one where the permissions are different than its current location, they will be prompted how to handle the permissions after the move:



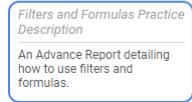
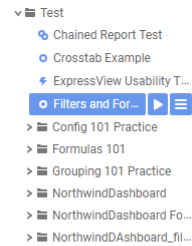
Folder Move confirmation prompt

These changes only affect content that the current user owns:

- **Apply New Permissions** – apply the access permissions of the destination folder to content you own.
Example: if moving *My Reports* to *Public*, any user of the system will gain access to the content in *My Reports* you own. The permissions don't change for content other users own.
- **Keep Existing Permissions** – do not apply the access permissions of the destination folder, retain the permissions the content currently has.
Example: if moving *My Reports* to *Public*, only the current user will have access to the items in *My Reports*.
- **Cancel Move** – do not move the folder and leave it in its current location

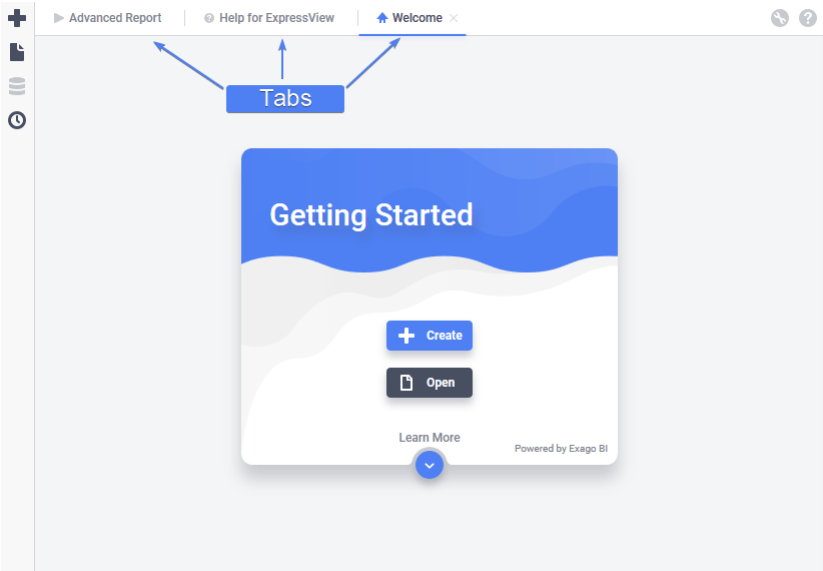
Report Description Window

This window displays the description of the selected report. If the report was never given a description, this window remains blank when the report is selected in the Report Tree. For more info on Report Descriptions, please see Report Types.



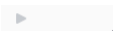
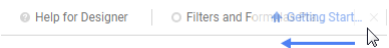
Tabs

Tabs make up the application's main interface. This is where users build, design, and view reports as well as access dashboards and help pages.



Getting Started tab v2020.1+

Tabs can be rearranged by clicking and dragging them left or right.



A flashing tab name indicates the report has refreshed and there is new information to view

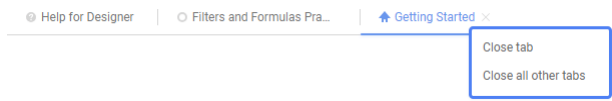
A save reminder indicator, in the form of a small circle, will appear if changes made to the report have not yet been saved (v2021.1+).



The tab on the right named Employee Information has changes waiting to be saved

Close tabs by either:

- clicking the **Close Tab** icon to the right of the tab name
- clicking the third mouse button (typically the scroll wheel) anywhere on the tab name
- right-clicking on a tab displays additional Tab options, such as closing the tab or closing all other tabs.

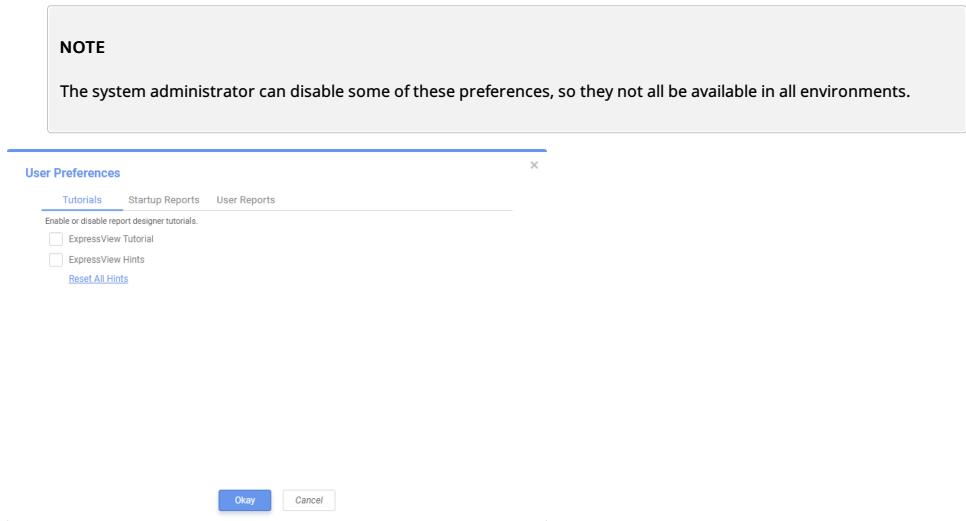


Options for closing user interface tabs

User Preferences

Clicking on the **User Preferences**

icon in the top-right corner of the window opens the User Preferences dialog. The User Preferences dialog contains tabs: **Startup Reports** and **User Reports**.



User Preferences dialog

Startup Reports Tab

A **startup report** is a report, Dashboard or ExpressView that runs automatically when the Web Application is launched. Instead of showing the **Getting Started** page, the **startup reports** are displayed.

To add a startup report, navigate to it in the dialog's report tree and then either drag it to the box on the right, or click the

Add button at the bottom of the report tree. The system administrator can limit the number of startup reports each user may have.

Use the **Move Row Up**

and **Move Row Down** icons to change the order of the startup reports.

Use the **Delete**

icon to remove a startup report. This only stops the report from loading on startup, it does not remove the report from the application.

User Reports

A **user report** is a report that has certain customization placed on it by an individual user from within the **Report Viewer**. For example, a user might make certain filter value selections.

Any of your user reports will be shown in this list. User reports may be deleted by clicking on the **Delete**

icon on the corresponding report row. User reports are added from within the Report Viewer.

Help

Clicking on the **Contextual Help**

icon in the top-right corner of the window walks the user through specific portions of the application. This context-sensitive help menu is indexed and completely searchable, granting the user easy access to all information.

Help for Running Reports

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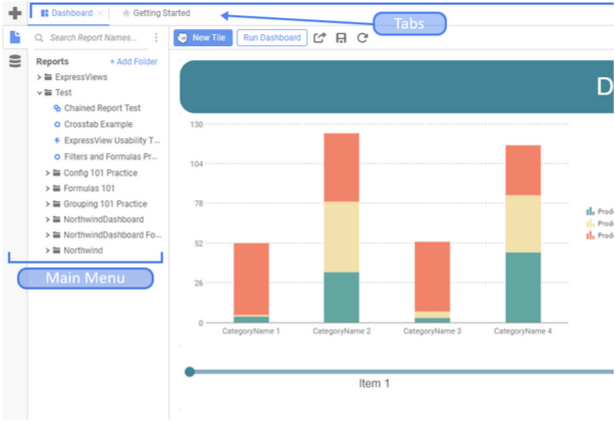
Google Maps

Show Generated SQL

Read more about [Unained Reports](#).

Navigating the Application

This application consists of two sections. On the left is the Main Menu and on the right are Tabs. The Main Menu displays the available reports, folders, and buttons. Tabs car windows, or help pages.



Main Menu

Through the Main Menu, you can:

- Create new reports
- Search for reports
- Read report descriptions
- Run Reports
- Export reports to other types (Excel, PDF, RTF, and CSV)
- Duplicate reports to save time setting up similar reports
- Edit reports
- Schedule reports to be emailed or archived
- Manage folders and report storage

The main menu, depending on system configuration, has three or four mode icons along the left-side. They are:

-  [Create New Report](#)

The Context-Sensitive-Help system in the application

To learn more about getting started, continue with Report Types.

Keyboard Shortcuts

This article lists all the available keyboard shortcuts in the Web Application User Interface and describes their behavior in their applicable contexts.

Where a plus sign + appears between two keys, it means hold down the key before it and press the key after it. For example, Ctrl+V means hold down the Control key and then press the V key. Release both keys after pressing V.

IMPORTANT

The key mappings are the same for PC and Mac keyboards. Use the Mac Control key when directed.

Global

- Ctrl+Down Arrow or Ctrl+Right Arrow → Next tab
- Ctrl+Up Arrow or Ctrl+Left Arrow → Previous tab
- Ctrl+Shift+V → Show application version number
- Ctrl+Shift+X → Create debug package (only if debugging is enabled in system configuration)

Report / Data Tree

- [→ Toggle last open tree pane
- Up Arrow → Previous item
- Down Arrow → Next item
- Delete → Delete selected report
- Enter → Edit selected report
- / → Search for a report. The cursor will move to the Search field on top of the Report Tree.

New Report Menu

- Up Arrow → Previous item
- Down Arrow → Next item
- Enter → Select item
- Esc → Close menu

Advanced Report Designer

- Arrows → Select cells
- Ctrl+S → Save report

- **F2** â€” put focus (move the cursor to) the Formula Bar
- **Delete** â€” Delete cell contents
- **Ctrl+C** â€” Copy cell contents
- **Ctrl+X** â€” Cut cell contents
- **Ctrl+V** â€” Paste cell contents
- **Ctrl+Click** â€” Select multiple cells, rows, or columns
- **Shift+Click** â€” Select a range of cells, rows, or columns
- **Ctrl+Z** â€” Undo
- **Ctrl+Y** â€” Redo
- **Ctrl+B** â€” Bold cell text
- **Ctrl+I** â€” Italicize cell text
- **Ctrl+U** â€” Underline cell text
- **Tab** â€” Select next cell
- **Shift+Tab** â€” Select previous cell
- **Enter** â€” Open cell text editor / close cell text editor and apply changes
- **Esc** â€” Close cell text editor without applying changes / close wizard or modal window

Report Filters Dialog

These shortcuts apply to the Report Filters dialog in the Advanced Report Designer.

- **Ctrl+[** â€” Add an opening parenthesis before the selected filter
- **Ctrl+]** â€” Add a closing parenthesis before the selected filter
- **Ctrl+Shift+[** â€” Remove an opening parenthesis before the selected filter
- **Ctrl+Shift+]** â€” Remove a closing parenthesis before the selected filter

Report Joins Menu (Complex)

- **Ctrl+.** â€” Add parentheses around last clicked condition
- **Ctrl+,** â€” Remove parentheses from around last clicked condition

Formula Editor

- **Up Arrow** â€” Select previous item in search list
- **Down Arrow** â€” Select next item in search list
- **Right Arrow** â€” Select next argument in formula
- **Left Arrow** â€” Select previous argument in formula

Color Picker Menu

- **Enter** â€” Apply selected color and close picker
- **Esc** â€” Close picker without applying color

ExpressView

- **Page Up** â€” Scroll up
- **Page Down** â€” Scroll down
- **Ctrl+Home** â€” Start of report
- **Ctrl+End** â€” End of report
- **Ctrl+Arrows** â€” Scroll the report
- **N** â€” Next page
- **P** â€” Previous page
- **S** â€” Toggle sorts pane
- **F** â€” Toggle filters pane
- **O** â€” Toggle formatting pane
- **E** â€” Toggle settings pane
- **V** â€” Toggle visualizations menu
- **C** â€” Toggle selected cell menu
- **Shift+V** â€” Show/hide visualization
- **Ctrl+R** â€” Refresh data
- **Ctrl+S** â€” Save ExpressView
- **Ctrl+F** â€” Show search report menu

ExpressView Search

- **Enter** â€” Find next result
- **Shift+Enter** â€” Find previous result
- **Esc** â€” Close menu

Dashboard Designer

- **E** â€” Open/close options menu *pre-v2019.2*, opens the Save menu in *v2019.2*
- **Ctrl+S** â€” Save
- **Esc** â€” Deselect all tiles
- **Arrow keys** â€” Moves the selected tiles
- **Delete** â€” Delete the selected tiles
- **Ctrl+A** â€” Select all tiles
- **Ctrl+C** â€” Copy selected tiles
- **Ctrl+V** â€” Paste copied tiles
- **F** â€” Toggle filters menu
- **O** â€” Toggle formatting menu

- Ctrl+Y “Redo”
- Ctrl+Z “Undo”

Dashboard Viewer

- F “Open/close the Filters pane”
- P “Open/close the Parameters pane”

Report Types

There are five different report types available in the reporting application. Four are standalone types, and two are composite types which combine reports together. By default **ExpressView**, **Advanced Report**, and **Dashboard** are enabled in the interface. The system administrator can enable and disable other types of reports.

Dashboard

Dashboards combine one or more reports onto a canvas, providing a way to create a personalized arrangement and display of related reports.



Dashboard Viewer

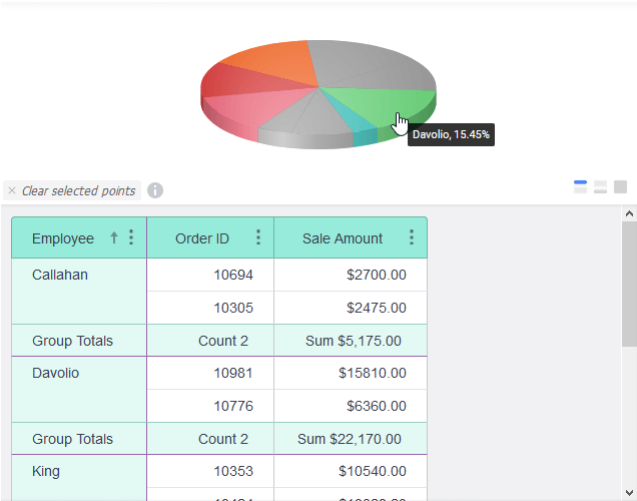
All standalone report types can be added to a Dashboard, and visualizations can be created directly on the canvas without needing to make a separate report. Dashboards can also have text, borders, images, interactive filters, and embedded web pages.

Dashboards run in the browser, can have interactivity such as dynamic filtering and drilldowns, and can refresh on a timed interval.

Visit the Dashboards documentation.

ExpressView

ExpressView is a tool to quickly get insight into vertically expanding data records and groups. An ExpressView can optionally include a visualization.



ExpressView with pie chart visualization in v2021.1+

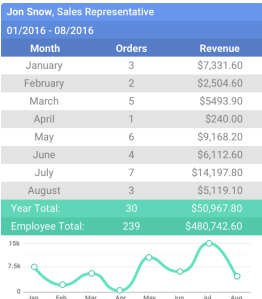
Built with an intuitive drag-and-drop interface, ExpressView is intended to be a way to get started quickly viewing data as possible. ExpressViews can be converted to Advanced Reports in order to gain the additional capabilities of that format.

ExpressViews can be scheduled, added to Chained Reports and Dashboards, embedded into web pages, and exported to multiple formats.

Visit the ExpressView Documentation.

Advanced Report

Advanced Reports are the flagship report type of the application.



Advanced Report

The most powerful reporting tools are available with **Advanced Reports**, including geographic maps; CrossTabs; repeating groups; complex join, filter, and sort logic; drilldowns to linked child reports, and more. Advanced Reports are made using an spreadsheet-like cell-grid interface. The **Advanced Report Designer** allows users to build reports without requiring knowledge of SQL or the underlying data model. Advanced Reports can be executed to a browser-based **Report Viewer** interface, which allows for interactivity, additional changes to be made without re-running the report, and for saving user-specific customization.

Advanced Reports can be scheduled, added to Chained Reports and Dashboards, embedded into web pages, used to populate document templates, and exported to multiple formats.

Visit the [Advanced Reports documentation](#).

CrossTab Report

CrossTab Reports are a special type of Advanced Report.

Category	Product	Year	2015	2016	Total
Drinks	Glengoolie		47	255	304
			\$705.40	\$4,590.00	\$5,295.40
	Soma		103	46	149
			\$1,402.28	\$2,620.00	\$4,111.28
	Butterbeer		105	179	284
			\$1,260.00	\$2,685.00	\$3,945.00
Drinks Total			255	480	735
			\$3,448.68	\$6,965.00	\$10,413.68
Produce	Varren Skewers		81	44	125
			\$1,952.00	\$1,952.00	\$3,904.00
	Lembas Bread		151	147	298
			\$402.00	\$267.50	\$669.50
	Ivalice Eggs		149	145	294
			\$2,956.80	\$3,117.00	\$6,073.80
Produce Total			381	336	717
			\$5,208.80	\$5,437.00	\$10,645.80
Total			636	816	1452
			\$8,657.48	\$12,402.00	\$21,059.48

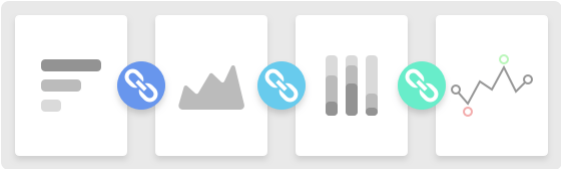
CrossTab Report

Also known as pivot tables, CrossTab Reports display and summarize data in a way that expands dynamically both vertically and horizontally.

Visit the [CrossTab Reports documentation](#).

Chained Report

Chained Reports combine multiple reports into a single multi-page document.



This can simplify running and distributing a group of related reports at once. They also support collating reports along a common sort field, to create a super-grouping of common report data.

Chained Reports can be scheduled and exported to multiple formats.

Visit the [Chained Reports documentation](#).

Building Your First Report

Choose the application version in use from the **Viewing content for** dropdown to see content relevant to that version.

There are two report types well suited for building your first report: **ExpressView** and **Advanced Reports**.

ExpressView is a tool to quickly get insight into vertically expanding data records and groups. An ExpressView can optionally include a visualization.

Advanced Reports are the flagship report type of the application. Advanced Reports are made using an spreadsheet-like cell-grid interface. The most powerful reporting tools are available with Advanced Reports, including geographic maps; CrossTabs; repeating groups; complex join, filter, and sort logic; drilldowns to linked child reports, and more.

Review Report Types to learn more.

The examples below utilize the Northwind sample data set.

Creating an ExpressView

This section will walk-through creating an ExpressView report listing the unit prices of products organized into categories. A column chart comparing the average price on a per-category basis is also included. The report looks like this:



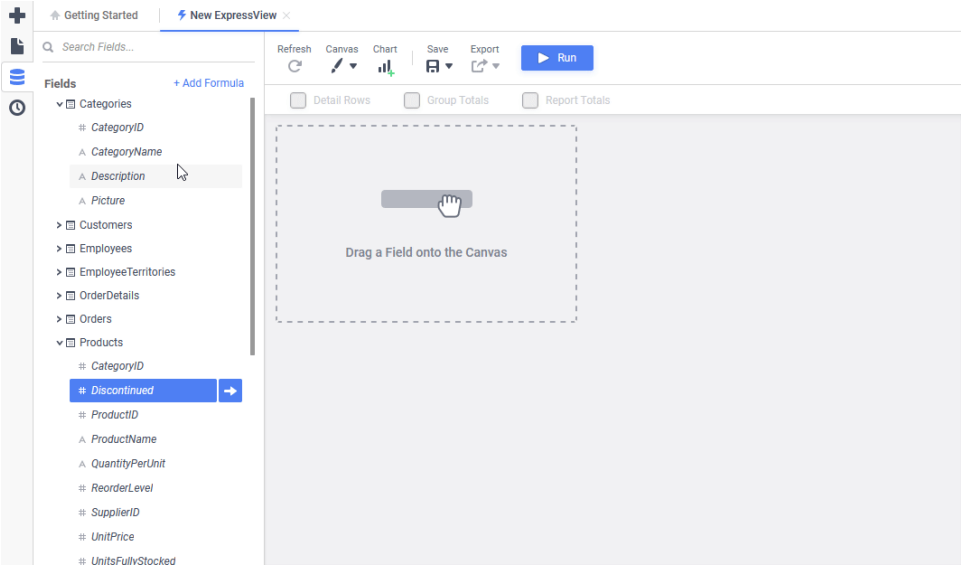
1. On the main menu in the top-left corner, click the **Create New Report**  icon.



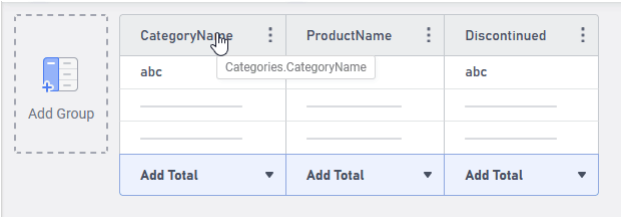
2. Click **ExpressView** to start the ExpressView Designer.

3. Add the necessary data fields to the canvas, by dragging them from the  **Data Fields Pane** on the left side of the screen and dropping them into desired position on the canvas:

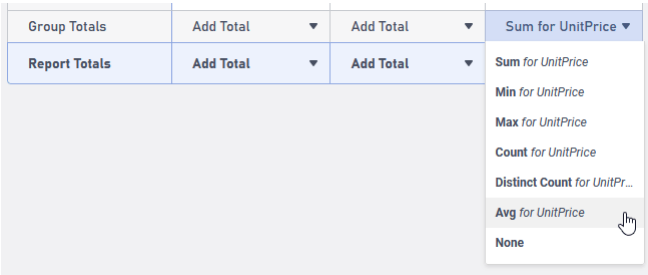
- Categories.CategoryName
- Products.ProductName
- Products.Discontinued
- Products.UnitPrice



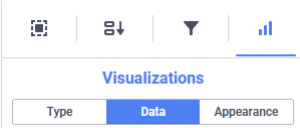
4. To organize the report by the product category, set Categories.CategoryName as a **Group**. Click-and-drag on the CategoryName header and drop it to the **Add Group** drop zone.



5. To calculate the average unit price for each category, on the **Group Totals** line, click on the *Sum for UnitPrice* dropdown and change to *Avg for UnitPrice*.

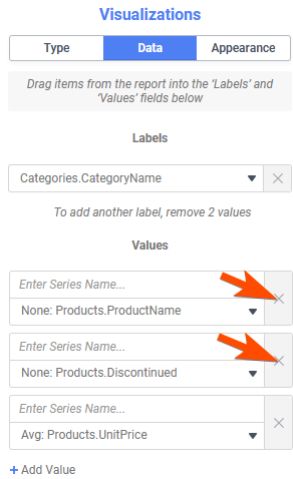


6. Add a chart to the report, by clicking the **Chart** icon on the toolbar. Then, in the Properties Pane on the right, choose the

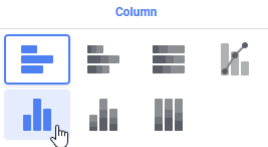


Visualizations tab, and then **Data**.

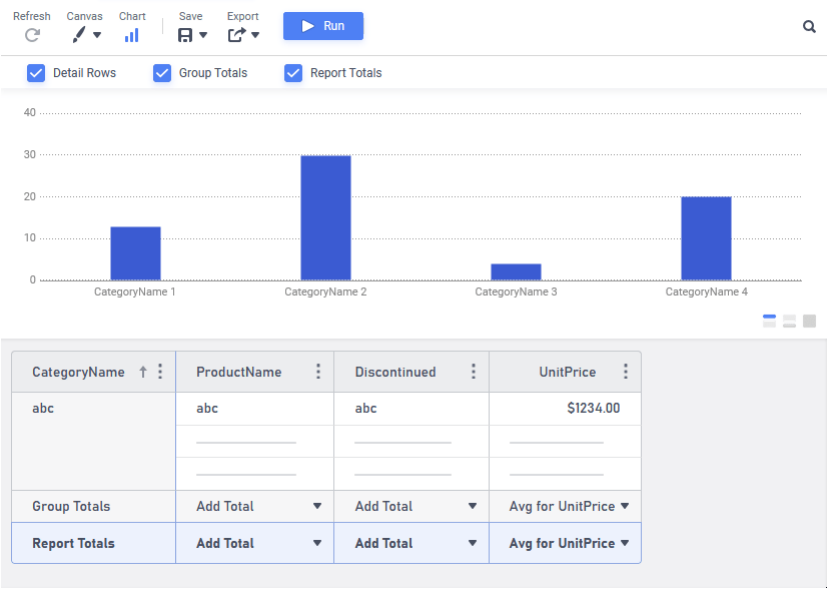
7. Since columns that are not totaled don't appear in charts, remove the **Values** for `Products.ProductName` and `Products.Discontinued` by clicking the **X** icon in each element. The chart will appear.



8. Switch to the **Type** tab, then click the **Column** icon to change the chart to a column chart.



At this point, the ExpressView very closely matches the same report at the beginning of this article. It should look something like the figure below.



Continue on to apply formatting such as color schemes, fonts and column names:

9. To style the groups and detail fields, click the **Canvas** icon in the toolbar.
 1. Choose a color **Theme** from the dropdown. The *Office Park* theme is used in the example report. The color theme will immediately change on the canvas.
 2. Choose a **Font** from the dropdown. *Bookman Old Style* is used in the example report.
10. Click the **Canvas** icon again to close the menu.

CategoryNa... ↑ ↓	ProductName ⋮	Discontinued ⋮	UnitPrice ⋮
abc	abc	abc	\$1234.00
Group Totals	Add Total ▼	Add Total ▼	Avg for UnitPrice ▼
Report Totals	Add Total ▼	Add Total ▼	Avg for UnitPrice ▼

11. In the Properties Pane on the right, choose the **Visualizations** tab, then **Appearance**, then **Chart Titles**.
12. Enter a **Main Chart Title**, and choose a font.

Visualizations

Type

Data

Appearance

▼ Chart Titles

Main Chart Title

Title

Average Unit Prices

Position

Top Center

Bookman Old Style

A

18

+ Add Subtitle

13. In the **Labels** section, choose a font to match the others. Optionally, add an **X-Axis Title** and **Y-Axis Title**.

Labels

X-Axis Title

Y-Axis Title

Bookman Old Style

A

11

14. Change to the **Chart Colors** section, then choose a color theme from the dropdown. The example report uses the *Sandstone* theme.

► Chart Titles

▼ Chart Colors

Theme

Linear Range

Custom

Sandstone

☐ Use 3D Style

15. Change to the **Chart Data** section, scroll down to **Number Format**. This section formats how the values in the chart axes appear. Since they are average dollar values, set these controls as follows:

Enter 2 for **Decimal Places**

Check the **Use Currency Symbol** checkbox

Number Format

Decimal Places

2

.

☐ Use 1000 Separator

,

☒ Use Currency Symbol

\$

☐ Append Percent Sign (%)

16. Each column can be given a custom name, font style and alignment. Click on a column header (e.g. `CategoryName`) and then in the **Selected Section** tab of the Properties Pane, enter a **Display Name**, **Horizontal Align** choice, **Font Style** and **Underline** as desired. Repeat for the `ProductName`, `Discontinued` and `UnitPrice` columns.

NOTE

The **Horizontal Align** property will apply to the column header and the data in the column. The **Display Name**, **Font Style** and **Underline** only apply to the column header.

Selected Section

Display Name

Unit Price

Horizontal Align

Font Style

Underline

Bold

AaAaAa

17. The data in the columns, and the totals can also be styled. Click on the white area of the Unit Price column between the header and the total. In the Selection Section tab of the Properties Pane, choose a **Data Format** (*Number* should already be selected). Repeat this step for the **Group Totals**, which will also apply the settings to the **Report Totals** line.

18. Save the report by clicking the **Save** icon  on the toolbar. Enter a **Name**, an optional **Description** and select a folder to save it to. The *My Reports* folder is a good choice for a first report.

19. Click **Run** on the toolbar to switch to Live Data mode and see the new ExpressView in all its glory. Congratulations!

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Additional Resources

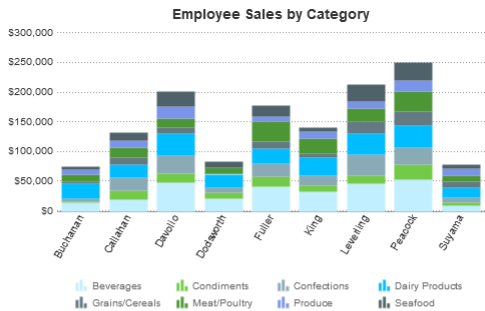
- ExpressView Documentation

Creating an Advanced Report

TIP

A quick way of getting an Advanced Report up and running is to start with an ExpressView, then export that ExpressView as an Advanced Report. Editing can then resume in the Advanced Report Designer.

This section will walk-through creating an Advanced Report from scratch with the **Advanced Report Designer**. The sample report lists the amount of revenue generated by each salesperson in a company, including the amount of revenue of each product category in a collapsible section. A multi-series column chart appears at the beginning of the report. The sample report looks like this:



▶ Steven Buchanan	Revenue
▶ Laura Callahan	Revenue
▼ Nancy Davolio	Revenue
Beverages	\$48,832.00
Condiments	\$14,033.85
Confections	\$30,343.54
Dairy Products	\$38,012.80
Grains/Cereals	\$9,173.95
Meat/Poultry	\$16,346.07
Produce	\$20,454.45
Seafood	\$24,947.05
▶ Anne Dodsworth	Revenue
▶ Andrew Fuller	Revenue
▶ Robert King	Revenue
▶ Janet Leverling	Revenue
▶ Margaret Peacock	Revenue
▶ Michael Suyama	Revenue

To jump through the steps of this tutorial, click one of the following links or start from step 1 below.

- Setup the Report’s Layout (steps 1‐8)
- Add Data and Content to the Report (steps 9‐12)
- Apply Formatting to the Cells and Data (steps 13‐16)
- Add the Chart (steps 17‐20)

1. On the main menu in the top-left corner, click the **Create New Report**  icon.



2. Click **Advanced Report** to start the Advanced Report Designer.
3. The **Add Data Objects** dialog appears. These data objects are needed for this report:
- Categories
 - Products
 - Employees
 - Orders
 - OrderDetails

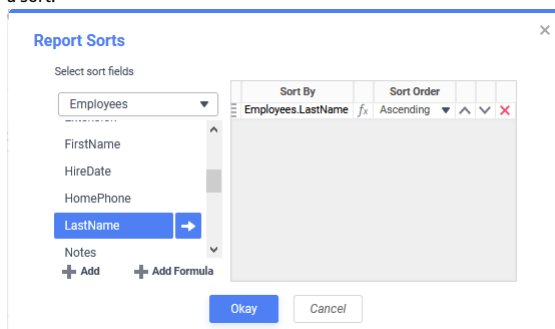
Not all of these data objects appear on the report, but they provide a join path between the objects that do.

Suppress Duplicates	Data Object Name	
☐	Categories	✗
☐	Employees	✗
☐	OrderDetails	✗
☐	Orders	✗
☐	Products	✗

Click **Okay**.

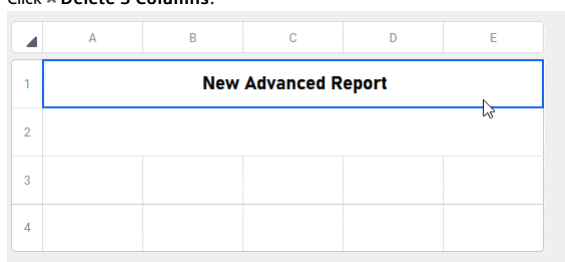
4. The report will group and aggregate (summarize) data by the employee name, and by the product category name. **Sorts** are required to create groups. To create sorts:

1. Click the **Sorts**  icon on the toolbar to open the Report Sorts dialog.
2. From the dropdown on the left, choose **Employees**, then double click the **LastName** field. This will add **Employees.LastName** as a sort.



3. Repeat step 2 to add **Categories.CategoryName** as a second sort.
4. Click **Okay** to close the Report Sorts dialog.
5. This report will show two columns: one with the employee's name and category names, the other with the actual revenue values. The other columns can be removed from the grid

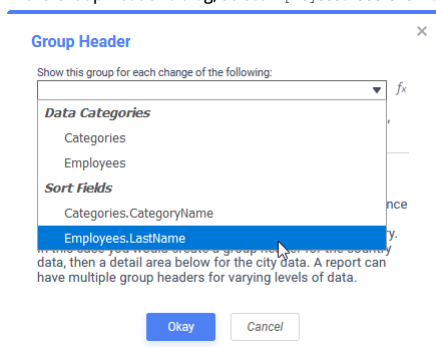
1. Hold the **Ctrl** key on the keyboard and click the column headers for columns E, D and C.
2. Click the **Column Menu**  icon to open the Column Menu.
3. Click **Delete 3 Columns**.



6. The Page Header section is also not needed for this example report. Click the **Section Menu**  icon on the Page Header, then click **Delete Section**. The design grid should now look like this:

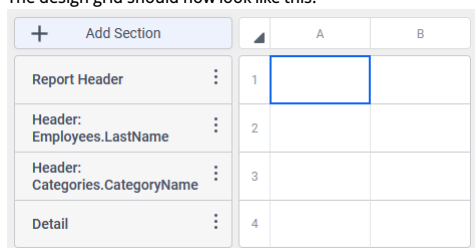


7. The chart will reside in the Report Header section. To add it:
 1. Click the **+ Add Section** button
 2. Click **Report Header**.
8. Add the Group Header sections for the Employee Name and Category Name:
 1. Click the **+ Add Section** button
 2. Click **Group Header**.
 3. In the Group Header dialog, select **Employees.LastName** from the dropdown list.



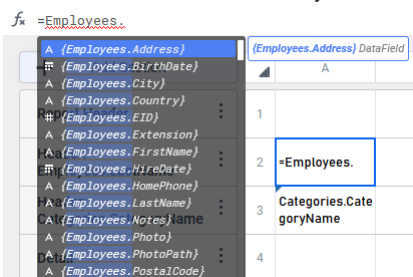
4. Click **Okay** to close the Group Header dialog.
5. Repeat steps 1&2 for **Categories.CategoryName**.

The design grid should now look like this:



9. Add the data to the cells on the design grid:
 1. Add **Categories.CategoryName** directly from the Data Objects Pane by dragging it to cell A3 on the grid.
 2. Type the word **Revenue** into cell B2.
10. Since the employee's first and last names are contained in two different fields, a **formula** can be used to **concatenate** or join the fields together. Here is how:
 1. Select cell A2 by clicking it.
 2. Place the cursor into the **Formula Bar** just below the toolbar.

- Type an equals sign =.
- Begin typing `Employees`. A tooltip will appear with all of the fields that contain the word `Employees` as guidance. Use the mouse or arrow keys to highlight `Employees.FirstName` then press Enter. The entire data field name will be added to the formula bar. Notice it is enclosed in { curly braces }. Data fields must always be enclosed in curly braces in formulas.



- Type &. This is called the **concatenation character** and tells the system to join two things together.
- Type " ". This will add a space between the first and last names.
- Type another &.
- Type `Employees` again, this time highlighting `Employees.LastName`, then press Enter. The complete formula should look like this:

```
=({Employees.FirstName} & " " & {Employees.LastName})
```

- Use another **formula** to calculate the revenue for each category:

- Select cell B3 by clicking it.
- Place the cursor into the **Formula Bar** just below the toolbar.
- Enter the formula exactly as it appears below:

```
=AggSum({OrderDetails.UnitPrice}*{OrderDetails.Quantity})
```

This formula uses an **aggregate function** to calculate sum of the revenues of all sales, by multiplying the quantity of each product sold by its unit price, then adding them all together. The breaking down of revenues into product categories, and for each employee happens automatically since the aggregate function is contained in the group sections created earlier. The design grid should now look something like this:

+	Add Section		A	B
Report Header	:	1		
Header: Employees.LastName	:	2	=({Employees.FirstName} & " " & {Employees.LastName})	Revenue
Header: Categories.CategoryName	:	3	Categories.CategoryName	=AggSum({OrderDetails.UnitPrice}*{OrderDetails.Quantity})
Detail	:	4		

- Now is a good time to save the report. Click the Save icon on the toolbar. Enter a **Name**, an optional **Description** and select a folder to save it to. The *My Reports* folder is a good choice for a first report.

- Apply the color formatting to the cells to match the example report.

- Select cell A2, then click the **Background Color** icon on the toolbar. Select a medium gray color. Click the **Bold** **B** icon to increase the font's weight.
- Repeat step 1 for cell B2, choosing a medium green color. Click the **Horizontal Alignment** icon, then choose **Center**.
- Select cell A3, apply a light blue background color. Select cell B3 and apply a light green background color. Set cell B3 for a center alignment as well.
- Select both columns A and B, then place the cursor between the columns and drag to resize both of them.

+	Add Section		A	B
Report Header	:	1		
Header: Employees.LastName	:	2	=({Employees.FirstName} & " " & {Employees.LastName})	Revenue
Header: Categories.CategoryName	:	3	Categories.CategoryName	=AggSum({OrderDetails.UnitPrice}*{OrderDetails.Quantity})

- To make the categories list collapsible, click the header for row number 2 to open the Row Menu. Click **Collapse Rows**.
- Delete the Detail section from the report, it won't be needed.

- The design grid should now look like this:

+	Add Section		A	B
Report Header	:	1		
Header: Employees.LastName	:	2	=({Employees.FirstName} & " " & {Employees.LastName})	Revenue
Header: Categories.CategoryName	:	3	Categories.CategoryName	=AggSum({OrderDetails.UnitPrice}*{OrderDetails.Quantity})

Click **Run** on the toolbar to execute the report to see the progress so far. In the Report Viewer, the report should look like this:

▶	Steven Buchanan	Revenue
▶	Laura Callahan	Revenue
▼	Nancy Davolio	Revenue
	Beverages	48832
	Condiments	14033.85
	Confections	30343.54
	Dairy Products	38012.8
	Grains/Cereals	9173.95
	Meat/Poultry	16344.07
	Produce	20454.45
	Seafood	24947.05
▼	Anne Dodsworth	Revenue
	Beverages	20513.6
	Condiments	11106.9
	Confections	8782.94
	Dairy Products	22017.9
	Grains/Cereals	1305.5
	Meat/Poultry	9920.34
	Produce	404.25
	Seafood	8912.55
▶	Andrew Fuller	Revenue
▶	Robert King	Revenue
▶	Janet Leverling	Revenue
▶	Margaret Peacock	Revenue
▶	Michael Suyama	Revenue

Click on the **Open Rows** ▶ icons to open or close the collapsed rows to see the revenue figures.

15. Close the Report Viewer tab and return to the Report Designer.
16. Apply borders and advanced numeric formatting to the data. These changes don't appear on the Design Grid, but they affect how the data is presented in the Report Viewer and when exported to output files such as PDF or Excel.

1. Select cell A2, then click the **Format Cells**  icon. When the Format Cells dialog opens, switch to the Border tab.

2. Check the **Make Borders Uniform** checkbox. Click the **Color Chooser**  icon, then choose black.

3. Click **Okay** to close the dialog.

4. Select cell B2, then click the **Format Cells**  icon. Apply a top, right and bottom border with color black by setting the individual border settings.
- Format Cells

Number

Border

Conditional

Select color and width for each side of the cell. Check 'Make Borders Uniform' to apply color and width to all sides.

☐ Make Borders Uniform

#000000

1

0

#000000

1

#000000

1

Okay

Cancel
5. Repeat step 4 for:

■ cell A3 apply a left, bottom and right border

■ cell B3 apply a bottom and right border

6. With cell B3 still selected, and the Format Cells dialog still open, switch to the Number tab to apply advanced numeric formatting to the revenue values contained within it:
- Format Cells

Number

Border

Conditional

Category

General

Number

Date

Text

Decimal Places

2

Symbol

.

☐ Use 1000 Separator

☐ Use Currency Symbol

☐ Append Percent Sign (%)

☐ Blank When Zero

Okay

Cancel
1. Under **Category**, select **Number**.

2. Ensure **Decimal Places** is set to **2**.

3. Check the **Use 1000 Separator** and **Use Currency Symbol**.

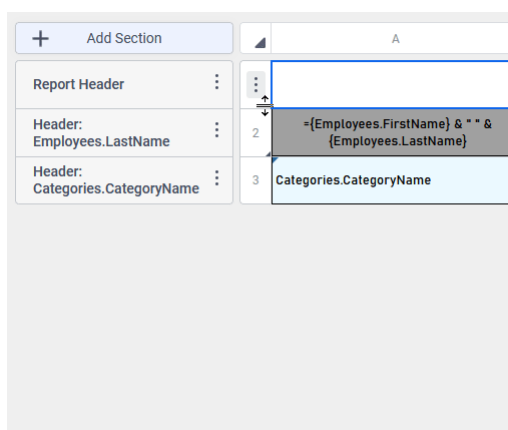
4. Click **Okay** to close the dialog.

17. Run the report again to observe the changes that the formatting options have made to the report output. When satisfied, close the Viewer tab and return to the Designer.

18. Hold the **Ctrl** key on the keyboard and click cells A1 and B1 to select both cells. Click the **Merge Cells**  icon on the toolbar to combine the cells together.

19. Place the cursor between the headers for rows 1 and 2, then drag the mouse down to increase row 1's height.

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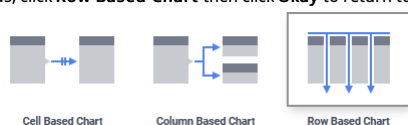
20. Select the new single cell on row 1, then add the chart:

1. Click the **Insert**  icon on the toolbar, then select **Chart** to start the Chart Wizard.
2. On the Type tab, select the *Stack Column* chart type. Then, click **Next** to advance to the Data tab.

– Bar and Column



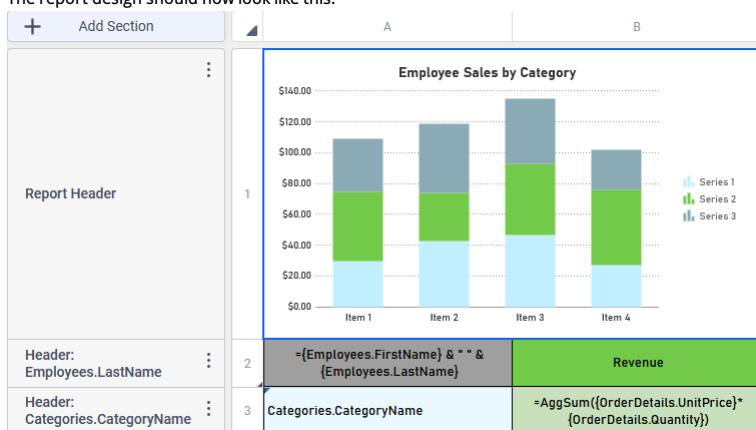
3. Click the **Data Layout...** button. Since all of the revenues that appear on the chart are in a single column but different rows, click **Row Based Chart** then click **Okay** to return to the Chart Wizard.



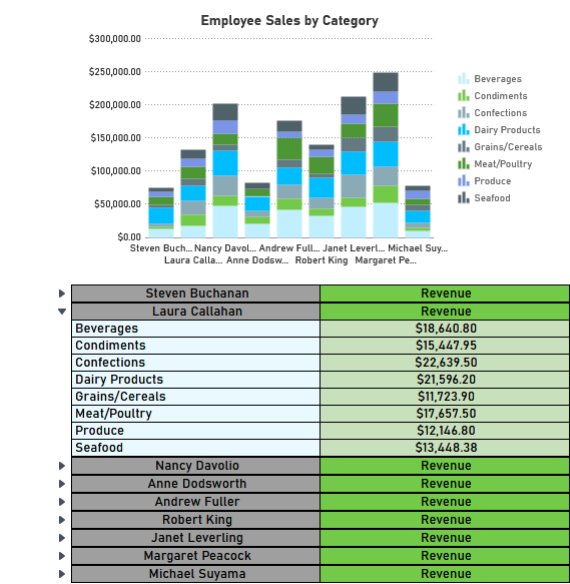
4. Under **Data for Chart**, make the following choices, then click **Next** to advance to the **Appearance** tab.
 - **Data Values** – choose the formula `=AggSum({OrderDetails.UnitPrice}*{OrderDetails.Quantity})`. This setting determines the size of the colored segments in each column.
 - **Data Labels** – choose the formula `=({Employees.FirstName}&" "&{Employees.LastName})`. This setting determines the labels that appear along the X-axis of the chart.
 - **Series Labels** – choose the cell value `Categories.CategoryName`. This setting determines the labeling of each of the Data Values.
5. Under **Colors**, choose *Blue Grey* as the **Theme**.
6. Under **Labels**, enter *Employee Sales by Category* for the **Chart Title**.
7. Click **Finish** to close the Chart Wizard.

21. Save the report with the chart.

22. The report design should now look like this:



Run the report to see the completed report design in the Report Viewer. Congratulations!



Additional Resources

- Advanced Reports: Sections
- Advanced Reports: Design Grid
- Advanced Reports: Sorts
- Charts

What are formulas?

Formulas allow you to do calculations, parse strings, insert images, and much more. Formulas are the composition of functions, parameters, Data Fields, and references to other cells.

Functions

A function takes zero or more inputs, called arguments, and returns a value based on some calculation or manipulation of those arguments. For example, a Year() function takes a date as an argument and returns only the year portion of the date. Use the Year() function on a report or on a chart to display or work with only the year portion of a date.

There are many categories of functions to choose from, and the system administrator has the ability to add their own Custom Functions to the system to fill a specific need. Functions can be combined together with other functions and with other operators. Nearly all formulas used in this application will use at least one function.

For a complete list of functions, including description, remarks and examples, refer to the List of Functions.

Parameters

Parameters are special variables that can be assigned when logging in to the application, or they can be prompted for when executing a report. There are also several built-in parameters.

To use a parameter in a formula, enter its name between @ signs. Parameters can be used as function arguments or alone in a cell following an = sign.

For a list of parameters and their descriptions, see the Formula Editor article. The system administrator has the ability to create additional parameters.

A special type of parameter called a **dropdown parameter** can be created by the system administrator. These parameters have two values: the **Value**, used by the server for processing and the **Display Value** that appears in cells and is used in formulas. These distinct values can be accessed with @ and @ respectively. For more information, consult with the system administrator.

Examples

@

@

@

NOTE

Parameters are case sensitive (pageNumber is not the same as pagenumber). Parameter names may not contain the at symbol (@).

Data Fields

To use a Data Field as part of a formula, enter its name between curly braces.

Example: {Orders.OrdersID}

Cell References

To reference another cell’s value, enter the column name with a capital letter and the row number between square brackets. A cell reference can be used in formulas or alone in a cell following an = sign.

NOTE

Cell references will update if rows or columns are added or deleted; however dragging a cell will not update cell references. This may cause errors in some formulas.

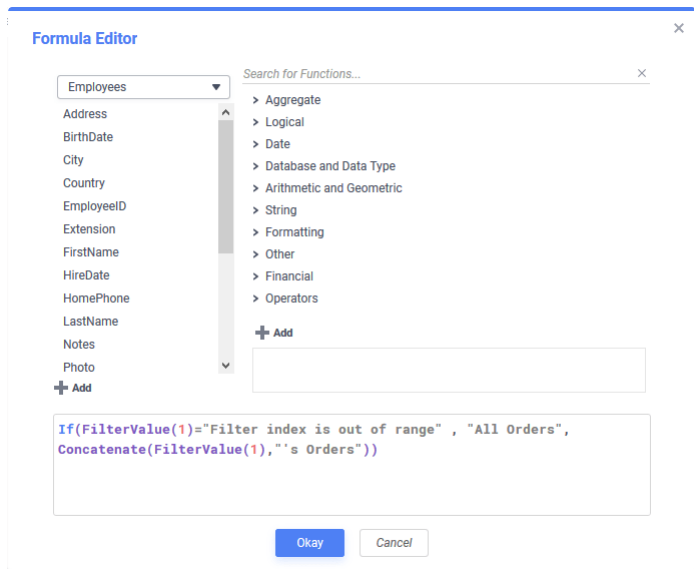
Example: [A2]

Adding Formulas to a Report

This section covers adding formulas to an Advanced Report. However, formulas may also be used on ExpressView and in Dashboards. Refer to the ExpressView: Formula Columns and Dashboard Designer articles for more information about using formulas in those Report Design environments.

Formula Editor

1. Click in the cell in which you want the formula to appear.
2. Click the **Formula Editor**  icon in the toolbar.
3. Create the desired formula by selecting the desired functions and clicking the button or by drag-and-dropping them into the Formula box.



4. Click **Okay**.

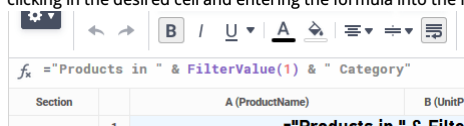
NOTE

When nesting functions, begin with the outermost function and add them moving inward.

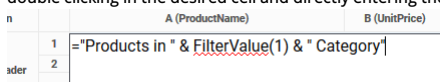
Example: =TRUNCATE (SQRT (162)) will first find the square root of 162, then remove the numbers after the decimal point returning only the whole number portion. Details of the TRUNCATE and SQRT functions can be found in their respective article sections.

Manual Entry

1. Navigate to the **Report Designer**.
2. Enter the formula into a cell by:
 - o clicking in the desired cell and entering the formula into the formula bar just below the toolbar, or



- o double clicking in the desired cell and directly entering the formula into the cell textbox

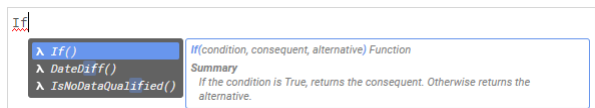


3. Press the **Enter** key on the keyboard to save the formula into the cell

Formula Editor

The **Formula Editor**'s features guide users through creating formulas.

Use the **Search** field to search through the functions by name. Or start typing in the **Formula** field to get a list of functions that match what's entered.



The Formula Editor suggests functions that match the entered text, in this case `//matches If(), DateDiff() and IsNoDataQualified()`.

TIP

Search for data fields, report cells references, and parameters in the same manner.

Using Functions

Formulas work by applying some calculations to a few values that you give them. A basic example of a formula is `1 + 2`. In this example, the formula comprises one **function**, the addition function (+), and two **arguments**, the addends `1` and `2`. When the report runs, the formula calculates and **returns** the sum, `3`.

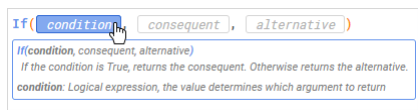
Not every function takes two arguments, so functions cannot always be written as `argument1 function argument2`. In most cases functions instead use the following format:

```
Function(argument1, argument2, ...)
```

The addition example could also be written as `Add(1, 2)`. This is the style that most formulas in the application use. Most functions are more abstract than simple arithmetic. Each function has a description which tells you exactly what it does and how to use it.

Arguments

An argument is a value that a function uses to do a calculation. Functions have different amounts and types of arguments. When a function is first entered into the Formula field, there are placeholder values for each required argument. Click on a placeholder to see the description of the argument.



Description of the condition argument of the If function

Some arguments are optional. Those are surrounded by brackets `[ ]`. Some arguments are a list of values. Those are followed by an ellipsis `...`.

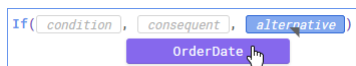


The `today` function takes an optional argument. The `and` function takes a list of arguments.

TIP

Some functions take no arguments. These are formatted with empty parentheses: `Function()`

You need to supply values for all of the function's required arguments. Type a value into the argument space, or drag a data field or function over the placeholder.



Dragging a data field to an argument

Formulas are used in several areas besides the report design: custom sorts and groups, drilldowns, conditional formatting for cells and charts, and custom crosstab fields, to name a few. In every area where you can use a formula you can click on the **Formula Editor** 

icon to open the **Formula Editor** window. These areas may require a specific type of data to be returned from the formula. Some built-in functions, such as aggregates, may be unavailable. Consult the relevant topic for the specifics.

About Sections

Formulas which reference data fields or cells, with the exception of aggregate functions, should be in the same report section as the reference data. Detail sections repeat for every data field, group sections repeat for every group, and page sections repeat for every page. Since most formulas expect only one reference value, and not repeated values, referencing a repeated field or cell from outside of its section can return irregular data. Formulas need to repeat alongside their reference values. Aggregate functions are the exception since they are designed to evaluate once for a group of data. For more information, see Sections.

Manual Formula Entry

You have the option of typing in your functions, data fields, parameters, and cell references manually. Use the following formatting guidelines.

Text

Surround text with double or single quotation marks:

```
"Hello, World!"
'I am on fire'
```

If you want to use a quotation mark in the text, then surround the text with the opposite mark:

```
"You're on fire"
'He says "like" too often'
```

Do not use quotation marks around numbers.

Data Fields

```
{DataCategory.DataField}
```

where `DataCategory` is the name of the Data Object and `DataField` is the name of the data field.

Cell References

To use the value from another cell in a formula, use the following format:

```
[C#]
```

where `C` is the letter of the cell column, and `#` represents the number of the cell row.

For example, `[B5]` refers to cell B5.

CAUTION

Rearranging cells can cause cell references to break.

Parameters

Parameters return special values depending on some condition. The built-in parameters are:

- `@[email protected]` – the current page number of the report
- `@[email protected]` – the name of the report
- `@[email protected]` – the name and path to the report

There may be additional parameters available, contact the system administrator for more information.

A special type of parameter called a **dropdown parameter** can be created by the system administrator. These parameters have two values: the **Value**, used by the server for processing and the **Display Value** that appears in cells and is used in formulas. These distinct values can be accessed with `@[email protected]` and `@[email protected]` respectively. For more information, consult with the system administrator.

Syntax Checking

If there are any syntactical errors in the function, the **Formula Editor** underlines the relevant section in red, and shows a brief description of the problem. Any errors must be corrected before running the report.

```
"Hello " {Employees.FirstName}
```

Syntax Error: Operator expected, not found

This formula will not work without a concatenation operator "&"

Aggregate Functions

Aggregate Functions calculate values based on two factors: the input cell, which is usually but not always a data field, and the report section that the function is located, relative to the input. The location of the function determines which, and how many cell values will be sent to the input. For example, an *AggCount()* function in a Group Footer will count the values in the group, but that same function in a Report Footer will count the values for the entire report. Aggregate Functions can also be used in Group Headers.

NOTE

Aggregate Functions cannot be nested, used in conditional formulas, in the static sections of a report or **ExpressView** formula columns.

Aggregating One-to-Many Relationships

Aggregate Functions have an optional argument that indicates how to count aggregates for one-to-many relationships named `recordLevel`. This argument indicates whether aggregation should occur at the **record level** or **entity level**. Pass *True()* to force aggregation to occur for every record, regardless of whether or not the record represents a unique instance of the entity that is

being aggregated. This is called record level aggregation.

By default aggregation occurs only for every unique instance of the entity being aggregated, not for repeat values that occur from a one-to-many data relationship.

In application *v2019.2* by default aggregation occurs for all values in a one-to-many data relationship. To aggregate only for each unique instance, *False()* must be passed to force aggregation on the entity level. This default behavior can be changed by a system administrator.

For example, in the two reports below, the **Category Name** column is being aggregated with the `AggCount()` function. The top figure aggregates on the entity level (`recordLevel` argument is *False*), and the bottom figure aggregates on the record level (`recordLevel` argument is *True*). Since the Category Name does not change, when aggregating by entity level, the count is 1. When aggregating on the record level, all records are considered for the aggregation and the count is 11.

Category Name	Product Name	Unit Price
Beverages	Chai	\$18.00
Beverages	Chang	\$19.00
Beverages	Sasquatch Ale	\$14.00
Beverages	Steeleye Stout	\$18.00
Beverages	Côte de Blaye	\$263.50
Beverages	Chartreuse verte	\$18.00
Beverages	Ippoh Coffee	\$46.00
Beverages	Laughing Lumberjack Lager	\$14.00
Beverages	Outback Lager	\$15.00
Beverages	Rhönbräu Klosterbier	\$7.75
Beverages	Lakkalikööri	\$18.00
Category count: 1	Product count: 11	\$41.02

Aggregating CategoryName on entity level (recordLevel is False)

Category Name	Product Name	Unit Price
Beverages	Chai	\$18.00
Beverages	Chang	\$19.00
Beverages	Sasquatch Ale	\$14.00
Beverages	Steeleye Stout	\$18.00
Beverages	Côte de Blaye	\$263.50
Beverages	Chartreuse verte	\$18.00
Beverages	Ippoh Coffee	\$46.00
Beverages	Laughing Lumberjack Lager	\$14.00
Beverages	Outback Lager	\$15.00
Beverages	Rhönbräu Klosterbier	\$7.75
Beverages	Lakkalikööri	\$18.00
Category count: 11	Product count: 11	\$41.02

Aggregating CategoryName on record level (recordLevel is True)

Most users can choose to ignore this option by simply omitting the argument.

To count at the Entity level, the application checks for changes in the Unique Key Fields of the object on the *one*-side of the join. Therefore, it is important to sort the report by the *one*- side's unique key fields, otherwise the result is undefined and may be nonsensical.

In application *v2019.2*, an administrator can add their own aggregate functions to the application, called a **Custom Aggregate Function**. Consult with your administrator for more details about what functions are available when building reports.

NOTE

The application will not include `null` values when aggregating in-memory. If the system administrator has enabled aggregation in the data source, the data source will determine how `null` values are handled during aggregation.

AggAvg

Description	Returns the average of the values in a group.
Remark	Accepts data fields or cell references. <i>Optional</i> second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i> Due to a limitation in Google BigQuery Data Sources, calculating the aggregate average on a floating point column may cause non-deterministic results.
Example	<code>AggAvg ({OrderDetail.Quantity})</code> returns the average quantity of sales orders.

AggCount

Description	Returns the number of unique entities in a Data Object.
Remark	The AggCount() function uses the Data Object, not the Data Field. For example, the function <code>AggCount ({Officer.Salary})</code> counts the number of Officers. You could replace <i>Officer.Salary</i> with any other field in the Officer Data Category and the function would still count the number of officers. When passing a cell reference, the function will count the rows in the group section, not the rows in the data object. See the example below. <i>Optional</i> second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
	Consider this sample report that displays all of the products in each category. Cell B3's formula <code>=AggCount ({Categories.CategoryName})</code> will count the number of times a product has an

associated category name (in this example, that is all of the products). However, cell C3's formula =AggCount ({A1}) will count the number of categories in the header section.

	A	B	C
Header: Categories.CategoryName	1	<u>Categories.CategoryName</u>	
Detail	2	Products.ProductName	Products.UnitPrice
Footer: Categories.CategoryName	3	=AggCount({Categories.CategoryName})	=AggCount({A1})
	4		

Description	Returns the number of unique values in a group.
Remark	Accepts data fields or cell references. <i>Optional</i>/second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i> <i>Optional</i>/third argument indicates whether to count <code>null</code> as a distinct value. - Count: <i>True</i> (default) - Ignore: <i>False</i>
Example	<pre>AggDistinctCount ({OrderDetail.Quantity})</pre> returns the number distinct quantities in an order.

Description	Returns the maximum value in a group.
Remark	Accepts data fields or cell references. <i>Optional</i> second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Example	<code>AggMax ({OrderDetail.Discount})</code> returns the largest discount.

Description	Returns the minimum value in a group.
Remark	Accepts data fields or cell references. <i>Optional</i> second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Example	<code>AggMin ({OrderDetail.Discount})</code> returns the smallest discount.

Description	Returns the sum of the values in a group.
Remark	Accepts data fields or cell references. <i>Optional</i> second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i> Due to a limitation in Google BigQuery Data Sources, calculating the aggregate sum on a floating point column may cause non-deterministic results.
	<code>AggSum ({OrderDetail.Quantity})</code>

Example	returns the total quantity of units ordered.
---------	--

RunningSum

Description	Returns a running total of the input cell.
Remark	The cell you want to sum. <i>Optional</i>/second argument of a Data Field or Category. The running sum will reset to 0 whenever there is a new value for this Data Field or Category. <i>Optional</i>/third argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Examples	- RunningSum({Employees.Salary}) returns running total of all the employeeâ€™s salary. - RunningSum({Employees.Salary}, {Employees.Region}) returns a running total of employeeâ€™s salary for each region. - RunningSum({Employees.Salary}, {Company}) returns a running total of employeeâ€™s salary for each Company.

AggMedian v2017.2+

Description	Returns the median, or the middle value, of a data set.
Remark	Accepts data fields or cell references. <i>Optional</i>/second argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Example	AggMedian({OrderDetail.Quantity}) returns the median order quantity.

AggMode v2017.2+

Description	Returns the mode, or the value that appears most often, of a data set.
Remark	Accepts data fields or cell references. <i>Optional</i>/second argument indicates whether to count: - Records: <i>True</i> (default) - Entites: <i>False</i>
Example	AggMode({OrderDetail.Quantity}) returns the mode of order quantity.

AggStandardDeviation v2017.2+

Description	Returns the standard deviation (SD) of a data set. SD is used to quantify the spread of the values in a data set. A lower SD indicates that values are close to the mean, and a higher SD indicates that values are more spread.
Remark	Accepts data fields or cell references. Takes one, two, or three arguments: The cell to get the standard deviation <i>Optional</i>/second argument indicates whether to calculate: - Sample-based standard deviation: "String" - Population-based standard deviation: "Population" <i>Optional</i>/third argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Example	AggStandardDeviation({OrderDetail.Quantity}) returns the standard deviation of order quantities.

AggVariance v2017.2+

Description	Returns the variance of a data set. Variance is used to quantify the spread of the values in a data set, and is equal to the square of the standard deviation. Variance weighs outliers more heavily than standard deviation.
	Accepts data fields or cell references. Takes one, two, or three inputs: The cell to get the variance Optional second argument indicates whether to calculate:

Remark	- Sample-based standard deviation: "String" - Population-based standard deviation: "Population" <i>Optional</i> third argument indicates whether to count: - Records: <i>True</i> (default) - Entities: <i>False</i>
Example	<code>AggVariance({OrderDetail.Quantity})</code> returns the variance of order quantities

Financial Functions

Common methods for monetary calculations such as interest and depreciation.

Db

Description	Returns the depreciation of an asset for a specified period using the <i>fixed-declining balance</i> method. Cost is the initial cost of the asset. Salvage is the value at the end of the depreciation (sometimes called the <i>salvage value</i> of the asset). Life is the <i>number of periods</i> over which the asset is being depreciated (sometimes called the <i>useful life</i> of the asset). Period is the <i>period</i> for which you want to calculate the depreciation. Period must use the same units as life. Month is the number of months in the first year. If month is omitted, it is assumed to be 12.
Remark	The <i>fixed-declining balance</i> method computes depreciation at a fixed rate. Db uses the following formulas to calculate depreciation for a period: (cost – total depreciation from prior periods) * rate where: rate = 1 – ((salvage / cost) ^ (1 / life)), rounded to three decimal places. Depreciation for the first and last periods is a special case. For the first period, Db uses this formula: cost * rate * month / 12. For the last period, Db uses this formula: ((cost – total depreciation from prior periods) * rate * (12 – month)) / 12.
Example	Data Assumptions: Initial cost=1,000,000 (A2); Salvage value=100,000 (A3); Lifetime in years=6 (A4). Ex. <code>Db([A2],[A3],[A4],1,7)</code> – Depreciation in first year, with only 7 months calculated (186,083.33). Ex. <code>Db([A2],[A3],[A4],2,7)</code> – Depreciation in second year (259,639.42). Ex. <code>Db([A2],[A3],[A4],3,7)</code> – Depreciation in third year (176,814.44). Ex. <code>Db([A2],[A3],[A4],4,7)</code> – Depreciation in fourth year (120,410.64). Ex. <code>Db([A2],[A3],[A4],5,7)</code> – Depreciation in fifth year (81,999.64). Ex. <code>Db([A2],[A3],[A4],6,7)</code> – Depreciation in sixth year (55,841.76). Ex. <code>Db([A2],[A3],[A4],7,7)</code> – Depreciation in seventh year, with only 5 months calculated (15,845.10).

Ddb

Description	Returns the depreciation of an asset for a specified period using the <i>double-declining balance</i> method or some other method you specify. Cost is the initial cost of the asset. Salvage is the value at the end of the depreciation (sometimes called the <i>salvage value</i> of the asset). Life is the number of periods over which the asset is being depreciated (sometimes called the <i>useful life</i> of the asset). Period is the period for which you want to calculate the depreciation. Period must use the same units as life. Factor is the rate at which the balance declines. If factor is omitted, it is assumed to be 2 (the <i>double-declining balance</i> method).
	Note: All <i>five</i> arguments must be positive numbers.
Remark	The <i>double-declining balance</i> method computes depreciation at an accelerated rate. Depreciation is highest in the first period and decreases in successive periods. Ddb uses the following formula to calculate depreciation for a period: ((cost-salvage) – total depreciation from prior periods) * (factor/life). Change factor if you do not want to use the <i>double-declining balance</i> method. Use the Vdb function if you want to switch to the <i>straight-line depreciation</i> method when depreciation is greater than the <i>declining balance</i> calculation.
Example	Data Assumptions: Initial cost=2400 (A2); Salvage value=300 (A3); Lifetime in years=10 (A4). Ex. <code>Ddb([A2],[A3],[A4]*365,1)</code> – First day's depreciation. Ex. <code>Ddb([A2],[A3],[A4]*12,1,2)</code> – First month's depreciation (40.00). Ex. <code>Ddb([A2],[A3],[A4],1,2)</code> – First year's depreciation (480.00). Ex. <code>Ddb([A2],[A3],[A4],10)</code> – Tenth year's depreciation. Note: The results are rounded to two decimal places.

Fv

Description	Returns the future value of an investment based on periodic, constant payments and a constant interest rate.
Remark	For a more complete description of the arguments in Fv and for more information on annuity functions, see Pv (Above). Rate is the interest rate per period. Nper is the total number of payment periods in an annuity. Pmt is the payment made each period; it cannot change over the life of the annuity. Typically, Pmt contains principal and interest but no other fees or taxes. If Pmt is omitted, you must include the Pv argument. Pv is the present value, or the lump-sum amount that a series of future payments is worth right now. If Pv is omitted, it is assumed to be 0 (zero), and you must include the Pmt argument. Type is the number 0 or 1 and indicates when payments are due. If type is omitted, then it is assumed to be 0. Make sure that you are consistent about the units you use for specifying Rate and Nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4*12 for Nper. If you make annual payments on the same loan, use 12% for Rate and 4 for Nper. For all the arguments, cash you pay out, such as deposits to savings, is represented by negative numbers; cash you receive, such as dividend checks, is represented by positive numbers.
	Data Assumptions: Annual interest rate=6% (A2); Number of payments=10 (A3); Amount of the payment=-200 (A4); Present value=-500 (A5); Payment is due at the beginning of the period=1 (A6)...(see

Example	above). Ex. Fv([A2]/12, [A3], [A4], [A5], [A6]) – returns future value of an investment with these terms (2,581.40).
----------------	---

IntRate

Description	Returns the interest rate for a fully invested security. Note: Dates should be entered by using the Date function, or as results of other formulas or functions. For example, use Date(2008,5,23) for the 23rd day of May, 2008. Problems can occur if dates are entered as text. Settlement is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer. Maturity is the security's maturity date. The maturity date is the date when the security expires. Investment is the amount invested in the security. Redemption is the amount to be received at maturity. Basis is the type of day count basis to use.
Remark	The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date. Settlement, maturity, and basis are truncated to integers. If settlement or maturity is not a valid date, IntRate returns the #VALUE! error value. If investment = 0 or if redemption = 0, IntRate returns the #NUM! error value. If basis < 0 or if basis > 4, IntRate returns the #NUM! error value. If settlement = maturity, IntRate returns the #NUM! error value.
Example	Data Assumptions: Settlement date=February 15, 2008 (A2); Maturity date=May 15, 2008 (A3); Investment=1,000,000 (A4); Redemption value=1,014,420 (A5); Actual/360 basis (see above)=2 (A6). Ex. IntRate([A2],[A3],[A4],[A5],[A6]) – returns discount rate, for the terms of the bond above (0.05768 or 5.77%).

Ipmt

Description	Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate. For a more complete description of the arguments in Ipmt and for more information about annuity functions, see Pv. Rate is the interest rate per period. Per is the period for which you want to find the interest and must be in the range 1 to Nper. Nper is the total number of payment periods in an annuity. Pv is the present value, or the lump-sum amount that a series of future payments is worth right now. Fv is the future value, or a cash balance you want to attain after the last payment is made. If Fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0). Type is the number 0 or 1 and indicates when payments are due. If type is omitted, it is assumed to be 0.
Remark	Make sure that you are consistent about the units you use for specifying Rate and Nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for Rate and 4*12 for Nper. If you make annual payments on the same loan, use 12% for Rate and 4 for Nper. For all the arguments, cash you pay out, such as deposits to savings, is represented by negative numbers; cash you receive, such as dividend checks, is represented by positive numbers.
Example	Data Assumptions: Annual interest=10% (A2); Period for which you want to find the interest=1 (A3); Years of loan=3 (A5); Present value of loan=8000 (A6). Ex. Ipmt([A2]/12, [A3]*3, [A4], [A5]) – Interest due in the first month for a loan with the terms above (-22.41). Note: The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

Nper

Description	Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate. For a more complete description of the arguments in Nper and for more information about annuity functions, see Pv (above). Rate is the interest rate per period. Pmt is the payment made each period; it cannot change over the life of the annuity. Typically, Pmt contains principal and interest but no other fees or taxes. Pv is the present value, or the lump-sum amount that a series of future payments is worth right now. Fv is the future value, or a cash balance you want to attain after the last payment is made. If Fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0). Type is the number 0 or 1 and indicates when payments are due.
Remark	Set Type equal to 0 (or omitted) if payments are due at the end of the period. Set Type equal to 1 if payments are due at the beginning of the period.
Example	Data Assumptions: Annual interest rate=12% (A2); Payment made each period=-100 (A3); Present Value=-1000 (A4); Future Value=10000 (A5); Payment is due at the beginning of the period=1 (A6). Ex. Nper([A2]/12, [A3], [A4], [A5], 1) – Periods for the investment with the above terms (60). Ex. Nper([A2]/12, [A3], [A4], [A5]) – Periods for the investment with the above terms, except payments are made at the beginning of the period (60). Ex. Nper([A2]/12, [A3], [A4]) – Periods for the investment with the above terms, except with a future value of 0 (-9.578).

Npv

Description	Calculates the net present value of an investment by using a discount rate and a series of future payments (negative values) and income (positive values). Rate is the rate of discount over the length of one period. Value1, value2, ... are 1 to 29 arguments representing the payments and income. Value1, value2, ... must be equally spaced in time and occur at the end of each period. Npv uses the order of value1, value2, ... to interpret the order of cash flows. Be sure to enter your payment and income values in the correct sequence. Arguments that are numbers, empty cells, logical values, or text
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	representations of numbers are counted; arguments that are error values or text that cannot be translated into numbers are ignored. If an argument is an array or reference, then only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored.
Remark	The Npv investment begins one period before the date of the value1 cash flow and ends with the last cash flow in the list. The Npv calculation is based on future cash flows. If your first cash flow occurs at the beginning of the first period, the first value must be added to the Npv result, not included in the values arguments. For more information, see the example below. Npv is similar to the Pv function (present value). The primary difference between Pv and Npv is that Pv allows cash flows to begin either at the end or at the beginning of the period. Unlike the variable Npv cash flow values, Pv cash flows must be constant throughout the investment. For information about annuities and financial functions, see Pv. Npv is also related to the Irr function (internal rate of return). Irr is the rate for which Npv equals zero: Npv(Irr(...), ...) = 0 .
Example	Data Assumptions: Annual discount rate=10% (A2); Initial cost of investment one year from today=-10,000 (A3); Return from first year=3,000 (A5); Return from second year=4,200 (A6). Ex. Npv([A2], [A3], [A4], [A5], [A6]) – Net present value of this investment (1,188.44) ...In the preceding example, you include the initial \$10,000 cost as one of the values, because the payment occurs at the end of the first period.

Pmt

Description	Calculates the payment for a loan based on constant payments and a constant interest rate. For a more complete description of the arguments in PMT, see the PV function. Rate is the interest rate for the loan. Nper is the total number of payments for the loan. Pv is the present value, or the total amount that a series of future payments is worth now; also known as the principal. Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0. Type is the number 0 (zero) or 1 and indicates when payments are due.
Remark	The payment returned by PMT includes principal and interest but no taxes, reserve payments, or fees sometimes associated with loans. Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 12 percent, use 12%/12 for rate and 4*12 for nper. If you make annual payments on the same loan, use 12 percent for rate and 4 for nper.
Example	Data Assumptions: Annual interest rate=8% (A2); Number of months of payments=10 (A3); Amount of loan=10000 (A4). Ex. Pmt([A2]/12, [A3], [A4]) – Monthly payment for a loan with the above terms (-1,037.03). Ex. Pmt([A2]/12, [A3], [A4], 0, 1) – Monthly payment for a loan with the above terms, except payments are due at the beginning of the period (-1,030.16).

Ppmt

Description	Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate. For a more complete description of the arguments in PPMT, see PV (above). Rate is the interest rate per period. Per specifies the period and must be in the range 1 to nper. Nper is the total number of payment periods in an annuity. Pv is the present value—the total amount that a series of future payments is worth now. Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0. Type is the number 0 or 1 and indicates when payments are due.
Remark	Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.
Example	Data Assumptions: Annual interest rate=10% (A2); Number of years in the loan=2 (A3); Amount of loan=2000 (A4). Ex. Ppmt([A2]/12, 1, [A3]*12, [A4]) – Payment on principle for the first month of loan (-75.62). Note: The interest rate is divided by 12 to get a monthly rate. The number of years the money is paid out is multiplied by 12 to get the number of payments.

Pv

Description	Returns the present value of an investment. The present value is the total amount that a series of future payments is worth now. For example, when you borrow money, the loan amount is the present value to the lender. Rate is the interest rate per period. For example, if you obtain a car loan at a 10% annual interest rate and make monthly payments, your interest rate per month is 10%/12, or 0.83%. You would enter 10%/12, or 0.83%, or 0.0083, into the formula as the rate. Nper is the total number of payment periods in an annuity. For example, if you get a four-year car loan and make monthly payments, your loan has 4*12 (or 48) periods. You would enter 48 into the formula for nper. Pmt is the payment made each period and cannot change over the life of the annuity. Typically, pmt includes principal and interest, but no other fees or taxes. For example, the monthly payments on a \$10,000, four-year car loan at 12 percent are \$263.33. You would enter -263.33 into the formula as the pmt. If pmt is omitted, you must include the fv argument. Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, then it is assumed to be 0 (the future value of a loan, for example, is 0). For example, if you want to save \$50,000 to pay for a special project in 18 years, then \$50,000 is the future value. You could then make a conservative guess at an interest rate and determine how much you must save each month. If fv is omitted, then you must include the pmt argument. Type is the number 0 or 1 and indicates when payments are due.
Remark	Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper. In annuity functions, cash you pay out, such as a deposit to savings, is represented by a negative number; cash you receive, such as a dividend check, is represented by a positive number. For example, a \$1,000 deposit to the bank would be represented by the argument -1000 if you are the depositor and by the

	argument 1000 if you are the bank.
Example	Data Assumptions: Money paid out of an insurance annuity at the end of every month=500 (A2); 8% is the interest rate earned on the money paid out (A3); 20 is the number of years the money will be paid out (A4). Ex. Pv([A3]/12, 12*[A4], [A2], , 0) – <i>Present value of an annuity with the stated terms (-59,777.15).</i> The result is negative because it represents money that you would pay in an outgoing cash flow. If you are asked to pay (\$60,000) for the annuity, you would determine this would not be a good investment because the present value of the annuity (59,777.15) is less than what you are asked to pay. Note: The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

Rate

Description	Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value. For a complete description of the arguments nper, pmt, pv, fv, and type, see PV. Nper is the total number of payment periods in an annuity. Pmt is the payment made each period and cannot change over the life of the annuity. Typically, pmt includes principal and interest but no other fees or taxes. If pmt is omitted, you must include the fv argument. Pv is the present value—the total amount that a series of future payments is worth now. Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0). Type is the number 0 or 1 and indicates when payments are due.
Remark	Guess is your <i>guess</i> for what the rate will be. If you omit guess, it is assumed to be 10 percent. If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1. Make sure that you are consistent about the units you use for specifying guess and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for guess and 4*12 for nper. If you make annual payments on the same loan, use 12% for guess and 4 for nper.
Example	Data Assumptions: Years of the loan=4 (A2); Monthly payment=–200 (A3); Amount of the loan=8000 (A4). Ex. Rate([A2]*12, [A3], [A4]) – Monthly rate of the loan with the stated terms (1%). Note: The number of years of the loan is multiplied by 12 to get the number of months.

Sln

Description	Returns the straight-line depreciation of an asset for one period.
Remark	Cost is the initial cost of the asset. Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset). Life is the number of periods over which the asset is depreciated (sometimes called the useful life of the asset).
Example	Data Assumptions: Cost=30,000 (A2); Salvage value=7,500 (A3); Years of useful life=10 (A4). Ex. Sln([A2], [A3], [A4]) – The depreciation allowance for each year (2,250).

Syd

Description	Returns the sum-of-years' digits depreciation of an asset for a specified period.
Remark	Cost is the initial cost of the asset. Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset). Life is the number of periods over which the asset is depreciated (sometimes called the useful life of the asset). Per is the period and must use the same units as life.
Example	Data Assumptions: initial cost=30,000 (A2); Salvage value=7,500 (A3); Lifespan in years=10 (A4). Ex. Syd([A2], [A3], [A4], 1) – Yearly depreciation allowance for the first year (4,090.91). Ex. Syd([A2], [A3], [A4], 10) – Yearly depreciation allowance for the tenth year (409.09).

Date Functions

Date functions can be used to do calculations and formatting on date and time values.

[v2019.2.35](#) [v2020.1.18](#) [v2021.1.6](#) For all of the functions below except for DateCustomFormat() and Time(), passing Null(), DbNull() or any value that resolves to Null() or DbNull(), including null in a database field will return Null(). For example, calling DateAdd("m", 3, Null()) returns Null().

Date

Description	Creates a date value from three numeric values.
Remark	This function should be used to represent a date to other functions instead of representing a date as text.
Example	Date (2012,7,4) – returns the date July 4th, 2012.

DateAdd

Description	Returns the sum of a date and a quantity of time.
	DateAdd takes three input arguments: 1. A string representing the interval you want to add. The interval can be "yyyy" (year), "y" (days), "d"

Remark	(days, "w" (weeks), "m" (months), "h" (hours), "n" (minutes), "s" (seconds), "ww" (weeks), or "q" (quarters). 2. A real number representing how much time you want to add to the date. 3. A date value.
Example	<code>DateAdd('h',1,Now())</code> â€œ returns the date and time 1 hour from now. <code>DateAdd('h',-1,Now())</code> â€œ returns the date and time 1 hour ago.

DateCustomFormat

Description	Modifies a date value to be output in a specified format.
Remark	Defaults to MM/dd/yy format if no alternative format is specified. Cells that use this function must be formatted as <i>Text</i> .
Example	<code>DateCustomFormat(Date(2018,2,24),"MM-dd-yy")</code> â€œ returns the string "02-24-18".

DateDiff

Description	Returns the amount of time between two dates as an integer.
Remark	DateDiff takes three input arguments: 1. A string representing the interval you want to subtract by. The interval can be "yyyy" (year), "d" (days), "w" (weeks), "m" (months), "h" (hours), "n" (minutes), "s" (seconds), "ww" (weeks), or "q" (quarters). 2. A date value that will be subtracted from the base value. 3. A base date value.
Example	<code>DateDiff('yyyy',Date(1787,9,17),Now())</code> â€œ returns the number of years since the signing of the United Statesâ€™ Constitution <code>DateDiff('h',14:00,14:45)</code> â€œ returns 0 (zero), the number of complete hours elapsed during this 45 minute period.

DateValue

Description	Converts a date represented as a string (in a .NET DateTime format) to a DateTime for further processing by the application. For example, use this function when comparing two dates.
Remark	- If the year portion of the argument is omitted, DateValue uses the current year on the server for the year. - If the day portion of the argument is omitted, DateValue uses 1 for the day. - If the time portion of the argument is omitted, DateValue uses midnight (00:00:00) for the time. - If the argument is null, returns null (as notedf above)
Example	<code>DateValue("30-jun-2011")</code> â€œ returns a DateTime object 6/30/2011 00:00:00. <code>DateValue("August 8, 2021 1:13 AM")</code> â€œ returns a DateTime object 8/8/2021 01:13:00 <code>DateValue({Orders.OrderDate}) > DateValue(Today())</code> â€œ compares the order date to today.

Day

Description	Returns the day portion of a date as a whole number.
Remark	Values returned by the YEAR, MONTH and DAY functions will be <i>Gregorian</i> Calendar values regardless of the display format for the supplied date value.
Example	<code>Day({Appointment.Date})</code> â€œ returns the day of the appointment.

DayOfWeekName v2021.1+

Description	Returns the name of the weekday of a date (e.g. Monday, Tuesday, Wednesday, ... Sunday)
Remark	Values returned are referenced from the language file.
Example	<code>DayOfWeekName(Date(2019,10,1))</code> â€œ returns <i>Tuesdays</i> since October 1, 2019 occured on a Tuesday.

DayOfWeekNumber v2021.1+

Description	Returns the number of the weekday of a date, where 1 = Sunday, 2 = Monday, 3 = Tuesday ... 7 = Saturday
Example	<code>DayOfWeekName(Date(2019,10,1))</code> â€œ returns <i>3</i> since October 1, 2019 occured on a Tuesday.

Days360

Description	Returns the number of days between two dates based on a 360-day year.
	Often used in accounting applications. Days360 takes three input arguments:

Remark	1. The first date value. 2. The second date value. 3. Optional: True/False indicating to use European or American method of computation. If not included the American method is used.
Example	<code>Days360({Appointment.Date}, Today())</code> – returns the number of days between today and the appointment date.

GlobalDateFormat

Description	Returns a String value whose format is based on the session format.
Remark	Only accepts data objects, parameters, and cell references as input.
Example	<code>GlobalDateFormat({Appointment.Date}) &€”</code> returns the date of the appointment based on the session format.

GlobalDateTimeFormat

Description	Returns a String value whose format is based on the session format.
Remark	Only accepts data objects as input.
Example	<code>GlobalDateTimeFormat({Appointment.Date}) &€”</code> returns the date and time of the appointment based on the session format.

Hour

Description	Returns the hour of a time value ranging from 0 (12:00 AM) to 23 (11:00 PM).
Remark	Times may be entered as text strings within quotation marks or as a DateTime value.
Example	<code>Hour("2:50:05 PM") &€”</code> returns 14.

Minute

Description	Returns the Minute of a time value ranging from 0 to 59.
Remark	Times may be entered as text strings within quotation marks or a date time value.
Example	<code>Minute("2:50:05 PM") &€”</code> returns 50.

Month

Description	Returns the month portion of a date as a whole number, ranging from 1 (January) to 12 (December).
Remark	Values returned by the YEAR, MONTH and DAY functions will be <i>Gregorian</i> Calendar values regardless of the display format for the supplied date value.
Example	<code>Month({Appointment.Date}) &€”</code> returns the month of the appointment.

MonthName v2017.2+

Description	Returns the name of the month for a given date.
Remark	Accepts a full date or date formatted string, or simply an integer representing the month. The month name is returned in the current language.
Examples	<code>MonthName(2) &€”</code> returns “February” <code>MonthName("02/24/1991") &€”</code> returns “February”

Now

NOTE

In *pre-v2021.2.0*, this function returns the current time on the server. In *v2021.2.0+*, this function returns the current time based on the end user’s Culture Settings in the session.

Description	Returns today&€”s date and time (in local server time).
Remark	If embedding in other functions use <code>Now(&€”false&€”)</code> .
Example	<code>Now()</code> &€” returns the current date and time. <code>Now('false')</code> &€” returns the current date and time formatted mm/dd/yyyy hh:mm:ss

QuarterName v2017.2+

Description	Returns the fiscal quarter for a given date, as text from Q1 to Q4.

Remark	Administrators can customize this function for different localities.
Example	<code>Quarter("02/24/1991")</code> â€ returns "Q1"

QuarterNumber v2017.2+

Description	Returns the fiscal quarter for a given date, as a number from 1 to 4.
Remark	Administrators can customize this function for different localities.
Example	<code>Quarter("02/24/1991")</code> â€ returns 1

Second

Description	Returns the seconds of a time value ranging from 0 to 59.
Remark	When a time omits seconds, 0 (zero) is assumed. Times may be entered as text strings within quotation marks or a date time value.
Example	<code>Second("2:50:05 PM")</code> â€ returns 5.

Time

Description	Returns the number of ticks in a period of hours, minutes and seconds.
Remark	This function should be used to represent a time to other functions instead of representing a time as text. Time takes three input arguments: - Hours - Minutes - Seconds
Example	<code>Time(14,50,5)</code> â€ returns 534050000000.

TimeFormat1

Description	Returns the time component of a DateTime nput as a time object.
Remark	This function should be used to represent a time to other functions instead of representing a time as text. NOTE The return value of this function should be formatted as text. Cells formatted as General or Date may contain an erroneous placeholder date.
Example	<code>TimeFormat1({Appointment.Date})</code> â€ returns the time component of the appointment date in the format â€~hh:mm ttâ€.

TimeValue

Description	Convert a time represented in text (<i>i.e.</i> , â€œHH-mm-ssâ€) into time values that can be passed to other functions.
Remark	Acceptable formats include "5:55 PM" and "17:55". A time separator is mandatory ("17:00" is acceptable, "1700" is not). If AM/PM is not present AM is assumed. When specifying AM or PM, do not use periods ("A.M." or "P.M." will return an error). NOTE The return value of this function should be formatted as text. Cells formatted as General or Date may contain an erroneous placeholder date.
Example	<code>TimeValue(Time(14,50,5))</code> â€ returns the time object 14:50:05.

Today

NOTE

In *pre-v2021.2.0*, this function returns the current date on the server. In *v2021.2.0+*, this function returns the current date based on the end user's Culture Settings in the session.

Description	Returns todayâ€™s date with no time component.
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Remark	If embedding in other functions use <code>Today(â€˜falseâ€™)</code> .
	See the <i>Now()</i> function to get today's date with its time component.
Examples	<code>Today()</code> â€” returns the current date. <code>Today('false')</code> â€” returns the current date formatted as mm/dd/yyyy.

WeekOfYear v2021.1+

Description	Returns the ordered number of the week in the year that a date occurs on, from 1 to 53.
Example	WeekOfYear(Date(2021,05,8)) â€” returns 19, since May 8, 2021 occurs on the 19th week of the year. WeekOfYear("5/8/2021") â€” returns 19, since May 8, 2021 occurs on the 19th week of the year.

Year

Description	Returns the year portion of a date as a whole number, ranging from 1 to 9999.
Example	<code>Year(Today())</code> â€” returns 2011.

Arithmetic and Geometric Functions

Basic mathematical functions, as well as number field manipulation like truncation and rounding.

Abs

Description	Returns the absolute value of a number.
Remark	
Example	Abs(-23.1) â€” returns 23.1.

Acos

Description	Returns the arccosine, or inverse cosine, of a number.
Remark	The input must be from -1 to 1. The returned angle is given in radians in the range 0 (zero) to pi. If you want to convert the result from radians to degrees, then multiply it by 180/Pi() or use the Degrees() function.
Example	Acos(-.231) â€” returns 1.80390168255052.

Acosh

Description	Returns the inverse hyperbolic cosine of the given number.
Remarks	The input must be a real number greater than or equal to 1.
Example	Acosh(10) â€” returns 2.993223.

Asin

Description	Returns the arcsine of the given number in radians, in the range -Pi/2 to Pi/2.
Remarks	The input is the sine of the angle you want and must be in the range from -1 to 1.
Example	Asin(-0.5) â€” returns 0.5236.

Asinh

Description	Returns the inverse hyperbolic sine of a number.
Remarks	The input can be any real number.
Example	Ex. Asinh(-2.5) â€” returns -1.64723.

Atan

Description	Returns the arctangent, inverse tangent of a number.
Remarks	The input can be any real number. Atan returns an angle given in radians in the range -Pi/2 to Pi/2.
Example	Atan(1) â€” returns 0.785398 (pi/4).

Atan2

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Description	Returns the angle from the x-axis to a line containing the origin (0, 0) and a point with coordinates (x,y).
Remarks	The input requires two values, the x and y coordinates. NOTE If both x and y = 0, Atan2() returns the error #Div/0!. A negative result represents a clockwise angle.
Example	Atan2(1, 1) â€™ returns 0.785398 (pi/4).

Atanh

Description	Returns the inverse hyperbolic tangent of a number.
Remarks	The input must be from -1 to 1.
Example	Atanh(.76159416) â€™ returns 1 (approximately).

Ceiling

Description	Returns the number rounded up away from zero to the nearest multiple of significance, or the error #VALUE! if the argument is not a number.
Remarks	The input requires two values, the number to be rounded and the multiple of significance. Regardless of the sign of number, a value is rounded up when adjusted away from zero.
Example	Ceiling(4.42,.05) â€™ returns 4.45.

Cos

Description	Returns the <i>cosine</i> , of an angle in radians.
Remarks	The returned angle is given in radians in the range 0 (zero) to pi. If you want to convert the result from radians to degrees, then multiply it by 180/Pi() or use the Degrees() function.
Example	Cos(1.047) â€™ returns 0.500171.

Cosh

Description	Returns the hyperbolic cosine of a number.
Example	Cos(4) â€™ returns 27.30823.

Even

Description	Returns a number rounded up to the nearest even integer, or the error message #VALUE! if the argument is not a number.
Remarks	Regardless of the sign of number, a value is rounded away from zero.
Example	Even(1.5) â€™ returns 2.

Exp

Description	Returns <i>e</i> raised to the power of the input.
Remarks	Exp is the inverse of Ln, the natural logarithm.
Example	Exp(1) â€™ returns 2.718282 (the approximate value of <i>e</i>).

Fixed

Description	Returns the first argument rounded to the number of decimal places specified in the second argument.
Remarks	Takes three arguments: 1. The number you want to round. 2. The number of digits to the right of the decimal to include. 3. (Optional) TRUE/FALSE whether to omit commas. The default is FALSE (includes commas as normal).
Example	Fixed(1234.5678, 2) â€™ returns 1,234.56.

Floor

Description	Rounds the number down, toward zero, to the nearest multiple of significance.
	The input requires two values, the number to be rounded, and the multiple of significance.

Remarks	Regardless of the sign of number, a value is down toward zero. NOTE. If the argument is non-numeric, then Floor returns the error #VALUE!
Example	Floor(2.6, .5) â€™ returns 2.5.

GlobalNumericFormat

Description	Returns a numeric string value whose format is based on the session format.
Remarks	Only accepts numeric values as input. If Null(), DbNull() or a data field that is null is passed as the argument, the function returns Null().
Example	GlobalNumericFormat({Region.Population}) - returns the value based on the session format.

Int

Description	Rounds a number down to the nearest integer.
Remarks	The input must be a real number.
Example	Int(2.6) â€™ returns 2.

Ln

Description	Returns the natural logarithm of a number.
Remarks	Ln() is the inverse of the Exp() function.
Example	Ln(86) â€™ returns 4.454347.

Log

Description	Returns the logarithm of a number to the base you specify.
Remarks	The first input is the number and the second is the base (if omitted base 10 used).
Example	Log(100) â€™ returns 2.

Log10

Description	Returns the base 10 logarithm of a number.
Remarks	
Example	Log10(86) â€™ returns 1.934498451.

Mod

Description	Returns the remainder after first argument is divided by the second argument.
Remarks	The second argument must not be 0.
Example	Mod(27,5) â€™ returns 2.

Odd

Description	Returns a number rounded up to the nearest odd integer.
Remarks	The input must be a real number. Odd always rounds away from zero.
Example	Odd(1.5) â€™ returns 3.

Pi

Description	Returns the number 3.14159265358979, the mathematical constant pi, accurate to 15 digits.
Remarks	
Example	Ex. Pi() â€™ returns 3.14159265358979.

Power

Description	Returns the result of the first argument raised to the second argument.
Remarks	The ^ operator may be used instead of this function.
Example	Power(5,2) â€™ returns 25.

Product

Description	Returns the product of the arguments.
Remarks	The * operator may be used in place of this function. Arguments must be numbers, cell references or text representations of numbers.
Example	Product(5,2) â€™ returns 10. Also 5 * 2 – returns 10.

Quotient

Description	Returns the integer portion of a division.
Remarks	The / operator may be used in place of this function. This function discards the remainder of the division.
Example	Quotient(5,2) â€™ returns 2.

Rand

Description	Returns an evenly-distributed random number between 0 and 1 (inclusive).
Remarks	To generate a random real number between a and b, use: RAND() *(b-a)+a.
Example	Rand() â€™ returns a random number between 0 and 1.

Round

Description	Returns a rounded number.
Remarks	Takes one or two input: 1. The number to round. 2. The number of decimal places desired.
Example	Round(5.236, 2) â€™ returns 5.24

Sin

Description	Returns the sine of the given angle.
Remarks	The returned angle is given in radians in the range 0 (zero) to pi. If you want to convert the result from radians to degrees, then multiply it by 180/Pi() or use the Degrees() function.
Example	Sin(1.047) â€™ returns .0865926611287823.

Sinh

Description	Returns the <i>hyperbolic sine</i> of a number.
Remarks	
Example	Sinh(4) â€™ returns 27.1899171971278.

Sqrt

Description	Returns the positive square root of the argument.
Remarks	If the input is negative Sqrt returns the error #NUM!.
Example	Sqrt(25) â€™ returns 5.

Tan

Description	Returns the tangent of the given angle.
Remarks	The returned angle is given in radians in the range 0 (zero) to pi. If you want to convert the result from <i>radians</i> to <i>degrees</i> , then <i>multiply it by 180/Pi()</i> or use the DEGREES function.
Example	Tan(.785) â€™ returns .99920.

Tanh

Description	Returns the hyperbolic tangent of a number.
Remarks	
Example	Tanh(-2) â€™ returns .96403.

Truncate

Description	Truncates a number to an integer by removing the fractional part of the number.
Remarks	INT and TRUNC are different only when using negative numbers: TRUNC (-4.3) returns -4, but

	INT (-4.3) returns -5 because -5 is the lower number.
Example	Truncate(9.9) â€” returns 9.

Formatting Functions

Apply font styling changes (bold, italic, underline) to cell contents.

Bold

Description	Applies bold font weight to the input.
Example	= <code>"The second half of " & bold("this sentence is bold.")</code> The second half of this sentence is bold .

Italic

Description	Applies <i>italic</i> formatting to the input.
Example	= <code>"The second half of " & italic("this sentence is italic.")</code> The second half of <i>this sentence is italic</i> .

Underline

Description	Applies a single underline to the input.
Example	= <code>"The second half of " & underline("this sentence is underlined.")</code> The second half of this sentence is underlined.

String Functions

String functions are commonly used for interpreting and manipulating text fields.

Concatenate

Description	Joins several text strings into one text string.
Remark	The “&” operator can be used instead of <code>Concatenate()</code> to join strings
Example	<code>Concatenate("This ", "is ", "one ", "string!")</code> â€” returns This is one string! <code>"This " & "is " & "another " & "string!"</code> – returns This is another string!

JSONExtract v2021.2+

The JSONExtract function is documented in its own article.

Left

Description	Returns the first character(s) of a text string.
Remark	The first argument is the string you want to display. The second argument is number of characters you want.
Example	Ex. <code>Left(â€œexampleâ€œ, 2)</code> â€” returns ex.

Len

Description	Returns the number of characters in a text string.
Example	Ex. <code>Len(â€œexampleâ€œ)</code> â€” returns 7.

Lower

Description	Converts all uppercase letters in a text string to lowercase.
Example	Ex. <code>Lower(â€œEXAMPLEâ€œ)</code> â€” returns example.

Mid

Description	Returns a specific number of characters from a text string starting where you specify.
Remark	Mid takes three input arguments: 1. The text string.2. The place you want to start.3. The number of characters you want to display.
Example	Ex. <code>Mid(â€œexampleâ€œ, 2, 3)</code> â€” returns xam.

NewLine

Description	Begins a new line of text.
Remark	NewLine takes no arguments.

Example	Ex. NewLine()
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Replace

Description	Replaces part of a text string.
Remark	Replace takes four input arguments: 1. The text string to partially replaced. 2. The place you want to start replacing. 3. The number of characters to replace. 4. The string you want to substitute.
Example	Ex. Replace("example", 2, 3, "**") â€™ returns e*ple.

Right

Description	Returns the last characters in a text string.
Remark	The first argument is the string you want to display. The second argument is number of characters you want.
Example	Ex. Right("example", 2) â€™ returns le.

Trim

Description	Removes all spaces from text except for single spaces between words.
Example	Ex. Trim("ThisÂ Â Â sentenceÂ Â Â hasÂ Â weirdÂ Â Â spacing.") â€™ returns This sentence has weird spacing.

Upper

Description	Converts text to uppercase.
Example	Ex. Upper("example") â€™ returns EXAMPLE.

Value

Description	Converts a text string that represents a number to a number.
Example	Ex. Value("\$1,000") â€™ returns 1000.

JSONExtract Function

Description	Pick out one or more portions of a JSON input string as a single value, an array of values, a JSON object, or list of items, via a standard JSONPath expression.
Remark	Takes two arguments: • <i>JSONtoParse</i>: The input JSON to parse and return the value(s) from • <i>JSONPath</i>: A JSONPath expression that describes what value(s) to return from JSONtoParse By default, JSONExtract is done in-memory unless the system administrator explicitly sets a hidden system configuration flag to translate JSONExtract to SQL for processing in the Data Source. JSONPath is a standardized format for accessing elements of a JSON structure.
Examples	JSONtoParse = { "products": [{ "name": "C��te de Blaye", "price": 263.50 }, { "name": "Ipoh Coffee", "price": 46.0 }, { "name": "Veggie-spread", "price" : 43.9 }, { "name": "Northwoods Cranberry Sauce", "price": 40 }] } JSONExtract(JSONtoParse, "\$..price") returns <i>[263.5,46.0,43.9,40]</i> JSONExtract(JSONtoParse, "\$..products[3].name") returns <i>["Northwoods Cranberry Sauce"]</i> JSONtoParse = {"color": "green", "code": "123"} JSONExtract(JSONtoParse, "\$.color") returns <i>green</i> JSONExtract(JSONtoParse, "\$.code") returns <i>123</i>

JSONExtract in the Data Source

By default, the application will extract JSON in-memory. The system administrator can enable JSON extraction in the database, for those Data Sources that support it, by changing a system configuration setting. Each Data Source implements this function differently, so care should be taken when enabling this feature.

Table A below lists the supported JSONPath expressions for in-memory processing and processing in the supported Data Source types.

Table A â€™ Supported JSONPath Expressions in Data Sources				
JSONPath Feature	In-Memory	MySQL	Oracle	SQL Server 2016+
\$	Yes	Yes	No	No
\$.prop	Yes	Yes	Yes	Yes

\$.prop[0]	Yes	Yes	Yes	Yes
\$.1,2]	Yes	No	No	No
\$.recursive	Yes	No	No	No
\$.prop.*	Yes	Yes	No	No
\$.*	Yes	Yes	No	No
\$.3:5]	Yes	No	No	No
\$.6:]	Yes	No	No	No
\$.[:3]	Yes	No	No	No
\$.[-2:]	Yes	No	No	No
\$.{?(@.prop == val)}	No	No	No	No
\$.{?(@.prop != val)}	No	No	No	No
\$.{?(@.prop > val)}	No	No	No	No
\$.{?(@.prop < val)}	No	No	No	No
\$.{?(@.prop >= val)}	No	No	No	No
\$.{?(@.prop <= val)}	No	No	No	No
\$.{?(@.prop =~ val)}	No	No	No	No
\$.{?( =~ val)}	No	No	No	No
\$.{?(@.prop == val && @.prop == val)}	No	No	No	No
\$.{?(@.prop == val @.prop == val)}	No	No	No	No
\$.{?(@.prop in ['1', '2', '3'])}	No	No	No	No
\$.{?(@.prop nin ['1', '2', '3'])}	No	No	No	No

Notes and Exceptions

- IBM DB2 “ testing has shown this data source does not support JSONExtract although its documentation says that it does
- PostgreSQL “ no support for JSONPath syntax, so JSONExtract can only be done in-memory
- Oracle “ if the JSONPath expression selects a JSON object from within the main JSON object, the return value will be null

Logical Functions

Logical functions can be used to handle conditional information.

And

Description	Returns TRUE if all its arguments are TRUE ; returns FALSE if any argument is FALSE .
Remark	The arguments must evaluate to TRUE or FALSE . NOTE: The And function can take more than two arguments as input.
Example	Ex. AND(2+2=4, 4+0=4, 2+3=6) “ returns FALSE .False:

False

Description	Returns the logical value FALSE .
Remark	You can also type the word FALSE directly onto the worksheet or into a formula; it is interpreted as the logical value FALSE .
Example	

If

Description	Takes three arguments as input. Returns the second argument if the first evaluates to TRUE . Otherwise returns the third argument.
Remark	The first input must evaluate to TRUE or FALSE .
Example	Ex. if({OrderDetail.Price}= 0,“FREE”,{OrderDetail.Price}) – returns FREE if the price is 0, otherwise it returns the price.

Not

Description	Reverses the value of its argument.
Remark	Argument should evaluate to TRUE or FALSE .
Example	Ex. Not(FALSE) – returns TRUE .

Or

Description	Returns TRUE if any argument is TRUE .
Remark	The arguments must evaluate to logical values such as TRUE or FALSE . NOTE: The AND function can take more than two arguments as input.
Example	Ex. OR(2+2=4, 4+0=8, 2+3=6) – returns TRUE .

Switch

Description	This function should be used instead of placing if() functions inside of if() functions. Takes any even number of inputs arguments.
Remark	The 1 st argument will be the test value to compare to. The 2 nd argument will be returned if none of the comparisons return true. The 3 rd , 5 th , 7 th arguments will be compared to the 1 st argument. When the first match occurs the following argument will be returned. For example if argument 3 matches argument 1 then the 4 th argument will be returned.
Example	Ex. Switch({Categories.CategoryName},â€œNOT FOUNDâ€œ, â€œBeveragesâ€œ, â€œDrink up!â€œ, â€œCondimentsâ€œ, â€œEnhanceâ€œ, â€œConfectionsâ€œ, â€œSweet Toothâ€œ) â€œ returns a string based on the Category Name.

True

Description	Returns the logical value TRUE .
Remark	You can also type the word TRUE directly onto the worksheet or into a formula; it is interpreted as the logical value TRUE .
Example	

Database and Data Type Functions

Used for determining the type of information contained in a cell. Helpful for error and sanity checks.

DataRowCount

Description	Returns the number of rows retrieved from the data source when executing the report.
Example	Suppose report is run to retrieve basic information on 10 employees DataRowCount() should return 10.

DBNull

Description	Represents a DBNull “value”. Used most often in comparisons instead of an empty string to indicate a missing or nonexistent data value returned from a data object. DBNull applies when a result set is returned from the data object, but it doesn't contain anything. If the data object is unable to return anything at all, Null() will be returned instead.
Example	1. Use Conditional Formatting to suppress a row in a report if the data set returned is null. CellValue() = DBNull() 2. A column in a table has no data in at all, and therefore is considered not to exist.

IsEven

Description	Checks if a value is an even number. Returns <i>True</i> if the number is even (evenly divisible by 2), or <i>False</i> if it is odd.
Example	IsEven(4) â€œ returns <i>True</i>

IsLogical

Description	Checks if a value is TRUE or FALSE.
Example	IsLogical([A1]) â€œ returns <i>True</i> if the cell [A1] contains TRUE/FALSE, <i>False</i> otherwise.

IsNonText

Description	Checks if a value is not text.
Remark	Non Text values include dates, numbers, images and blank cells.
Example	IsNonText([A1]) â€œ returns TRUE if the cell [A1] contains non text, FALSE otherwise.

IsNoDataQualified

Description	Returns True if no data qualified for the report execution. Otherwise it returns false.
Example	Suppose report is run to retrieve basic information on 10 employees IsNoDataQualified() returns false.

IsNull

Description	Returns True if the argument is NULL or DBNull. Otherwise returns False.
-------------	--

IsNumber

Description	Checks if a value is a number. Returns <i>True</i> if the value is a number, or <i>False</i> if it is not.
Remark	Does not convert text to numbers. Ex IsNumber(â€œ19â€œ) returns <i>False</i> .
Example	IsNumber([A1]) â€œ returns TRUE if the cell [A1] contains a number, FALSE otherwise.

IsOdd

Description	Checks if a value is odd. Returns <i>True</i> if the number is odd (not evenly divisible by 2), or <i>False</i> if it is even.
Remark	Returns #NUM if the value is not numeric.
Example	IsOdd([A1]) â€œ returns <i>True</i> if the cell [A1] contains an odd number, <i>False</i> otherwise.

IsText

Description	Checks if a value is text.
Example	IsText([A1]) â€œ returns <i>True</i> if the cell [A1] contains text, <i>False</i> otherwise.

Null

Description	Represents a <i>null</i> (or <i>Nothing</i> in Visual Basic.NET) "value". Used most often in comparisons instead of an empty string to indicate a nonexistent reference. Null() applies when a result a data object cannot return anything, and so it returns nothing at all. If the data object is able to return something (i.e. the SQL is executed, but the resulting data set is empty) use DBNull() instead.
-------------	--

Type

Description	Returns the type of value.
Remark	Returns 1 if the value is a number, 2 if it is text.
Example	Type(â€œJohn Smithâ€œ) â€œ returns 2.

Other Functions

CellValue

Description	Returns the value of the current cell.
Remark	Used in Conditional Formatting .
Example	Suppose a cell of a report displays the price of products. Ex. CellValue() > 150 returns <i>True</i> if the price of the product is greater than 150.

FilterValue

Description	Returns the current value of a filter as a string for display purposes.
Remark	Takes three arguments: 1. The index, starting with 1 of the filter. 2. <i>Optional</i>: The sub-index, starting with 1 for filters that contain multiple values (e.g. filters with an Is Between, Is Not Between, Is One Of or Is Not One Of operator). If omitted, filters with multiple values will return a comma-separated list of values. 3. <i>Optional</i>: a boolean to determine if the value should be formatted following the user's culture settings. This is used for numbers and dates. NOTE The optional third argument is not recommended for use in computational formulas. For more information about best practices, review the Filter Value and General Format Best Practices article.

Example	Suppose the filter summary is <code>Order.Detail.UnitPrice > '3.6'</code> and <code>Products.ProductName</code> is one of ('Boston Crab Meat', 'Tofu'). FilterValue(1) returns 3.6 FilterValue(2) returns Boston Crab Meat, Tofu FilterValue(2,2) returns Tofu
----------------	--

Hyperlink

Description	Create a hyperlink to an external website. Available for all report types except for CrossTab Reports. The link will open in a new window/browser tab.
Remark	Takes two arguments: 1. The URL of the website. 2. <i>(Optional)</i> the text to display in the cell. If the second argument is omitted, the URL will display. NOTE If PDF exports open in a tab within this application, then clicking the hyperlink may direct a user to leave the application. NOTE Hyperlink() must be the outermost function in a cell. It may not be used inside conditional functions (i.e. <i>If</i> or <i>Switch</i>) or nested in other functions.
Example	Hyperlink("www.fakeWebSite.com", "click here") returns a hyperlink that displays the text "click here". Clicking this text will open http://www.fakeWebSite.com .

LoadImage

Description	Load a server side image based on the input path into the cell.
Remark	Can be used to load an image dynamically in place of Report Designer's Insert menu. The path to the image must be in quotation marks, or may be a data object field. The entire path of the image is not required if the administrator has set a value for Admin Console > General > Other Settings > 'LoadImage' Cell Function Parameter Prefix. NOTE LoadImage() must be the outermost function in a cell. It may not be used inside conditional functions (i.e. <i>If</i> or <i>Switch</i>) or nested in other functions.
Example	Ex. LoadImage("C:/StarryNight.jpg") Ex. LoadImage("https://mywebsite.com/logo.png") Ex. LoadImage({Employees.Photo})

StripHTMLTags

Description	Removes any HTML tags from the input string.
Remark	The input must be a string in between quotation marks.
Example	Ex. StripHtmlTags("<h1>This is heading 1</h1>") – returns This is heading 1 .

ExcelFormula

Description	Passes an Excel formula to an Excel report.
Remark	The input must be a string in between quotation marks. Must be the outermost function in a formula.
Example	Ex. ExcelFormula("SUM(A1:A100)") will pass the formula SUM(A1:A100) to Excel, which will evaluate the formula when the spreadsheet is opened.

PageNumber V2017.2

Description	Returns the current page number for HTML, PDF, and RTF Advanced or Express Reports.
Remark	Equivalent to the @ parameter. Support for use in Chained Reports added in <i>v2017.3.8</i>.
Example	Ex. PageNumber()

ExportType V2017.2

Description	Returns the format the report is being exported as.
Remark	This is useful for conditionally suppressing report sections depending on the export type.
Example	ExportType()

ExpressView: Introduction (v2021.1+)

Â

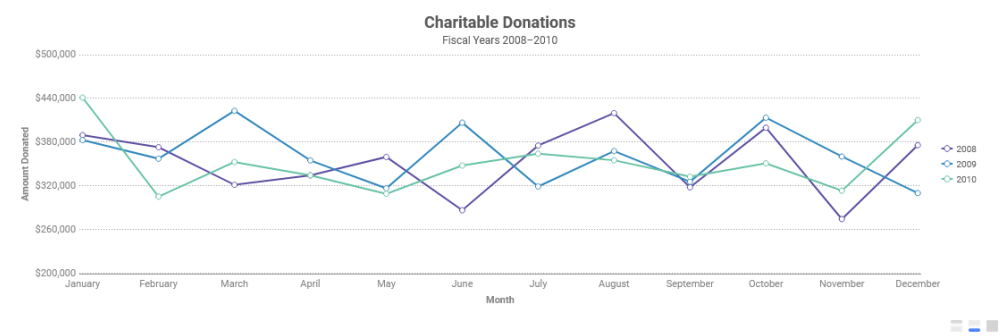
ExpressView is a report building tool that combines grouping, sorting, filtering, and summarizing data with a drag-and-drop interface. A chart can be added with a single click, and the entire report can be exported as PDF, RTF, CSV, or an Excel workbook.

Category	Mfg Code	Model #	Product Name	Inquiries
Baffles and Grilles	21	6A496	Wall Speaker Baffle, Wood Grain Finish	4
		110-3822	Digital Clock 2" Speaker Assembly	3
		110-3822A	Digital Clock 2" Speaker Assembly	3
	Group Totals	Distinct Count 3		Sum 10
	26	6A625A	Round Speaker Baffle, Steel, White	1
	Group Totals	Distinct Count 1		Sum 1
	39	677-67	Speaker Support Bridge	1
	Group Totals	Distinct Count 1		Sum 1
Group Totals		Distinct Count 5		Sum 12
Batteries	22	136-F3	Battery, 6V 1.2 Ah	2
	Group Totals	Distinct Count 1		Sum 2
	23	24ZBDCELL-2	D-Cell Alkaline Battery Kit	4
	Group Totals	Distinct Count 1		Sum 4
Group Totals		Distinct Count 2		Sum 6
Preamplifiers	21	1A881	Remote Microphone Preamplifier	12
		RTC350P	AM/FM Tuner/Cassette Player (rack mount)	6
		2A37	Dual Input Module: Low Impedance Mic or Line Level Aux (RCA)	5
		2A38	Dual Input Module: Dual Mic Preamps (Screw Terminal)	5
		2A32	Dual Input Module: Dual Mic Preamps and Auxiliary Input	3
		2A40	Dual Input Module: Stereo Summing Auxiliary (RCA)	3
		2A96A	Modular Mixer/Preamplifier	3
		3A242A	1/3 Octave Graphic Equalizer	3
		110-1976A	Pink Noise Generator Card	2
		2A33	Dual Input Module: Dual High Impedance Mic Preamps and Auxiliary/Phono	2
		2A82A	Compressor/Noise Gate	2
		Report Totals		Distinct Count 27

Product Category	Product Name	Discontinued	Unit Price
Beverages	Côte de Blaye	False	\$263.50
	Ipoh Coffee	False	\$46.00
	Chang	False	\$19.00
	Chai	False	\$18.00
	Chartreuse verte	False	\$18.00
	Steeleye Stout	False	\$18.00
	Lakkalikööri	False	\$18.00
	Outback Lager	False	\$15.00
	Laughing Lumberjack Lager	False	\$14.00
	Sasquatch Ale	False	\$14.00
	Rhönbräu Klosterbier	False	\$7.75
	Guaraná Fantástica	True	\$4.50
Group Totals	Distinct Count 12		Avg \$37.98
Condiments	Vegie-spread	False	\$43.90
	Northwoods Cranberry Sauce	False	\$40.00
	Sirop d'érable	False	\$28.50
	Grandma's Boysenberry Spread	False	\$25.00
	Chef Anton's Cajun Seasoning	False	\$22.00
	Slurpee	False	\$21.00
Report Totals	Distinct Count 77		Avg \$28.87

Category	Mfg Code	Model #	Product Name	Views
Covers & Chassis	21	211-1525	Cover, 8-Key Clear	6
		115-6961	Mounting Bracket/Plate for 110-2250A	1
	Group Totals	Distinct Count 2		Sum 7
Group Totals		Distinct Count 2		Sum 7
Knobs	21	440-264	Knob, Silver and Black with Pointer	13
	Group Totals	Distinct Count 1		Sum 13
	25	440-61	Knob, black	
	Group Totals	Distinct Count 1		Sum 0
	40	440-418	Knob, large	2
		440-417	Knob, small	
	Group Totals	Distinct Count 2		Sum 2
Group Totals		Distinct Count 4		Sum 15
Switches	25	680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	
	Group Totals	Distinct Count 2		Sum 3
	44	680-655	Switch, Power	5
Group Totals		Distinct Count 1		Sum 5
Group Totals		Distinct Count 3		Sum 8
Transformers	21	710-4258	Transformer, Power 27Vdc .25A	1
		710-4227	Transformer, Power	
		710-4321	Transformer, Power	
	Group Totals	Distinct Count 3		Sum 1
Group Totals		Distinct Count 3		Sum 1
Report Totals		Distinct Count 12		Sum 31

Year	Month	Campaign Name	Count for Countries	Sum for Amount
2008	March	Telethon 1	12	\$38,351.00
		US Expo	11	\$35,383.00
	Group Totals		Count 106	Sum \$321,450.00
	April	Asian Expo	19	\$59,415.00
		Europe Expo	11	\$22,358.00
		Fashion Show	11	\$30,733.00
		Gala	11	\$24,636.00
		Mail Campaign 1	6	\$10,904.00
		Mail Campaign 2	14	\$48,759.00
		Phone Bank 1	10	\$24,976.00
Report Totals			Count 4003	Sum \$12,782,340.00



ExpressViews are created in the **ExpressView Designer**. Depending on system configuration, ExpressView can display data live as they are edited.

NOTE

This section applies to ExpressView in v2021.1+ of the application. For previous versions, refer to ExpressView (pre-v2021.1)

Layout

ExpressViews are simple reports that contain **Detail Fields** and **Groups**. Consider a report that shows products organized into categories. The product name would be a **Detail Field** and the category would be a **Group**.

Product Name
Chai
Chef Anton's Gumbo Mix
Mishi Kobe Niku
Maxilaku
Manjimup Dried Apples
Outback Lager
Longlife Tofu

A single detail field on
Products.ProductName

Groups, up to 7, nest inside of each other and establish a “for each” hierarchy. Building on the above product example, by adding the product category as a **Group** the ExpressView now looks like this:

Product Category	Product Name
Beverages	Chai
	Outback Lager
Condiments	Chef Anton's Gumbo Mix
Confections	Maxilaku
Meat/Poultry	Mishi Kobe Niku
Produce	Manjimup Dried Apples
	Longlife Tofu

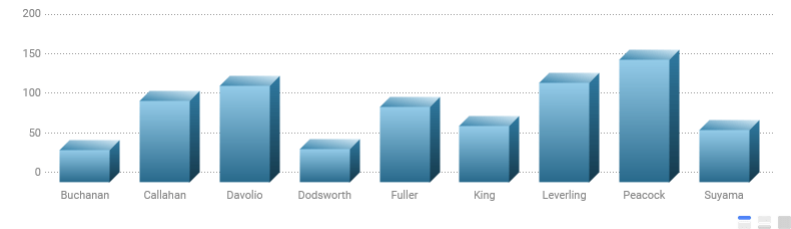
Products organized into their respective
Categories by adding a group on
Categories.CategoryName

Each **Group** is capable of displaying a summary for each of its component detail rows, called a **Group Total**. An overall **Report Total** is also available. Depending on the type of data in the detail rows, available aggregate functions will change but in general they are: *Sum, Min, Max, Count, Distinct Count, Average* or *None*.

Product Category	Product Name	Unit Price
Beverages	Outback Lager	\$15.00
	Chai	\$18.00
Group Totals	Count 2	Avg \$16.50
Condiments	Chef Anton's Gumbo Mix	\$21.35
Group Totals	Count 1	Avg \$21.35
Confections	Maxilaku	\$20.00
Group Totals	Count 1	Avg \$20.00
Meat/Poultry	Mishi Kobe Niku	\$97.00
Group Totals	Count 1	Avg \$97.00
Produce	Longlife Tofu	\$10.00
	Manjimup Dried Apples	\$53.00
Group Totals	Count 2	Avg \$31.50
Report Totals	Count 7	Avg \$33.48

Summarizing Group and Report data by aggregating group and
report totals

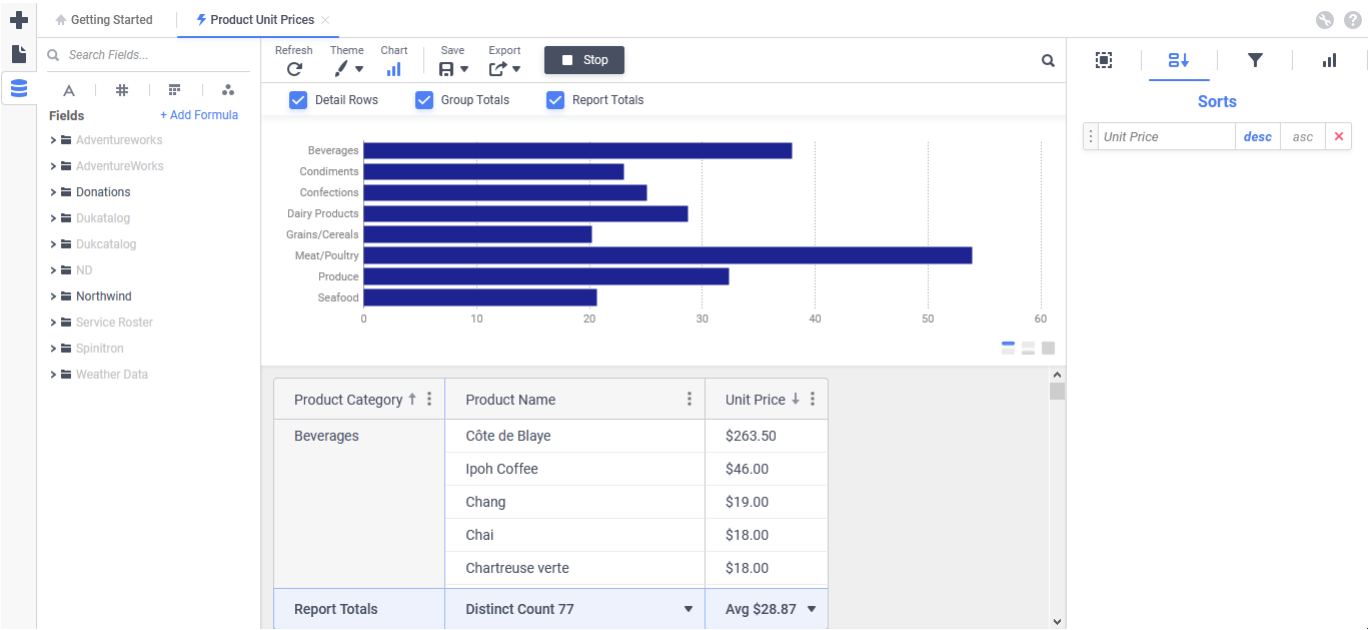
A visualization can be added to an ExpressView with only a few additional clicks of the mouse.



A Column chart showing the number of sales each salesperson made

Anatomy of the ExpressView Designer

The **ExpressView Designer** consists of four main components: the Canvas, the Toolbar, the Properties Pane and the Data Objects Pane.



The ExpressView Designer in Live Data (Run) mode, including a Bar chart visualization

Canvas

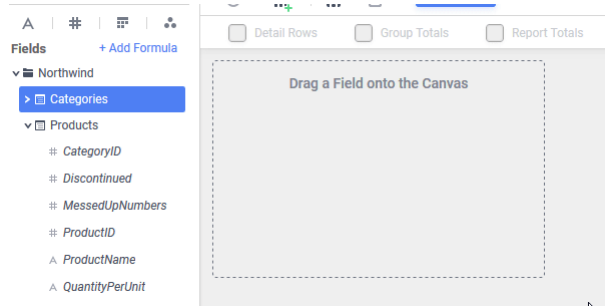
The **Canvas** is the central component of the ExpressView Designer. The canvas is interactive, meaning data fields can be drag-and-dropped right onto it from the **Data Objects Pane** and arranged as desired. Visualizations may be displayed at the top, bottom or fill the canvas.

Depending on system configuration, it may be possible to work with the data in the objects on the report interactively. Click **Run** on the toolbar to enable **Live Data** mode. In this mode, as fields are added to the ExpressView canvas, they will display data immediately from the data source. When Live Data mode is enabled, this button becomes **Stop**. Click **Stop** to turn off live data mode and work “offline” with placeholder data. For very large and complex ExpressViews, keeping Live Data mode off while editing will be much faster.

NOTE

When in **Live Data** mode, data is only refreshed when an action is taken in the ExpressView Designer to do so (i.e. clicking **Refresh** on the toolbar or making a change to the report design or properties). It is not necessarily a “real-time” automatically updated data display.

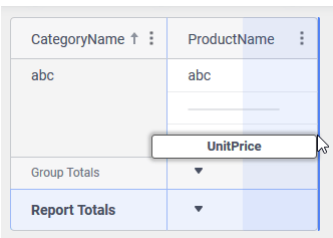
Drop zones on the canvas prompt with available actions. For example, when creating a new ExpressView, “Drag a field on the canvas” will appear. Once at least one column is on the canvas, an “Add Group” drop zone will appear.



Demonstrating drop zones by dragging ProductName as a Detail Field and CategoryName as a Group from the Data Objects Pane to the Canvas

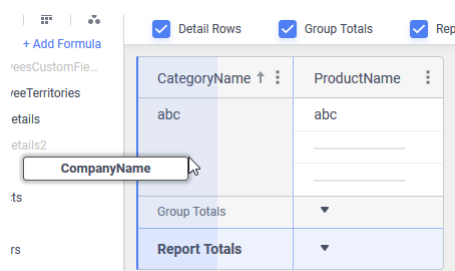
Once at least one Detail Field and one Group are added to the canvas, the drop zone prompts will disappear but the drop zones remain active.

The columns themselves also have drop zones. Additional detail fields and groups may be added to the canvas by dragging data fields from the Data Objects pane to the desired position. The drop zones on the columns highlight in blue to show where the new column will be added.



Adding UnitPrice as a detail row by dragging

it to the right-hand drop zone on the
ProductName detail column



Adding CompanyName as a group by dragging it to the left-hand drop zone on the CategoryName group column

The new column will be of the same type as the column where the data field was dropped. That is, if a new field is dropped on a detail field, a new detail field column will be created. If the new data field is dropped on a group column, the new data field will become a group.

Columns may be re-ordered by dragging them around the canvas and dropping them in the desired destination.

Instead of adding a pre-defined data field, **formulas** may be added as columns. Click the **+ Add Formula** link at the top of the Data Objects Pane to add a new formula column. More information about **formula columns** can be found in the ExpressView: Formula Columns article.

Options for grouping, filtering and sorting both detail rows and groups can be found on the **Column Menu**. This menu is accessed by either right-clicking on the column or by clicking on the **Column Menu** icon in the column's header.

Depending on where the column type (either group or detail field) there will be different options available. In general, they are:

- **◀ Move Left/Promote Group** – this item will be **Move Left** for detail fields and **Promote Group** for groups. Click this option to move this column one position to the left, or promote the group up one level to the left. For more information about grouping, review the ExpressView: Grouping article. This item is disabled if the column is the leftmost column of its type. That is, if this is a detail column and the next column to the left is a group, this item will be unavailable.
- **▶ Move Right/Demote Group** – this item will be **Move Right** for detail fields and **Demote Group** for groups. Click this option to move this column one position to the right, or demote the group down one level to the right. For more information about grouping, review the ExpressView: Grouping article. This item is disabled if the column is the rightmost column of its type.
- **≡ Group By This/Ungroup** – this item will be **Group By This** for detail fields and **Ungroup** for Groups. Click this option to convert a detail field into a Group, or to convert a Group to a detail field. For more information about grouping, review the ExpressView: Grouping article.
- **✕ Remove Field** – click this option to immediately remove this column.
- **▼ Filter By This** – click this option to add a new **Standard Filter** using the field or formula in this column. For more information about filtering, review the ExpressView: Filtering article.
- **↑ Sort Ascending** – click this option to add a new **Ascending Sort** using the field or formula in this column, or change the direction of an existing sort to *Ascending*. Sorts are applied in the order they are added to the report. For more information about sorting, review the ExpressView: Sorting article.
- **↓ Sort Descending** – click this option to add a new **Descending Sort** using the field or formula in this column, or change the direction of an existing sort to *Descending*. Sorts are applied in the order they are added to the report. For more information about filtering, review the ExpressView: Sorting article.
- **1 Change to Primary Sort** – click this option to change the sort on this detail field to be the first one. This option is only available if this column is a detail field, there is more than one sort defined, and this column is not already the first sort. For more information about sorting, review the ExpressView: Sorting article.
- **✕ Remove Sort** – click this option to remove the sort on this detail field. For more information about sorting, review the ExpressView: Sorting article.
- **fx Quick Functions** – click this option to add a **Quick Function** to this column. A Quick Function can quickly manipulate the data in the column. For example, choose *Month Name* to pick out only the name of the month from a column with a date in it. This option is only available if at least one Quick Function has been configured in the system for the data type in the column (e.g. *date*, *numeric*, *string*). For more information, review the Quick Functions section of the ExpressView: Formula Columns article.
- **fx Convert to Formula/Edit Formula** – click this option to either convert from a standard column to a **Formula Column**, or to edit the formula on an existing formula column. For more information, review the ExpressView: Formula Columns article.

Styling the Canvas

Color Theme

A **theme** can be applied that will change the colors of the elements on the canvas such as the totals, column headers, data rows, borders and divider lines. Themes will also apply in certain situations when the ExpressView is exported.

Product Category	Product Name	Unit Price
Beverages	Côte de Blaye	\$263.50
	Ipoh Coffee	\$46.00
	Chang	\$19.00
	Chai	\$18.00
Group Totals	Distinct Count 4	Avg \$86.63
Condiments	Veggie-spread	\$43.90
	Northwoods Cranberry Sauce	\$40.00
	Sirop d'érable	\$28.50
	Grandma's Boysenberry Spread	\$25.00
Group Totals	Distinct Count 4	Avg \$34.35
Confections	Sir Rodney's Marmalade	\$81.00
	Tarte au sucre	\$49.30
	Schoggi Schokolade	\$43.90
Report Totals	Distinct Count 32	Avg \$48.58

A simple ExpressView with the Lava Splash theme applied

To apply a theme to an ExpressView:

- 1. Click the **Canvas** icon in the toolbar to open the **Report Styling** dialog.
- 2. Choose a theme name from the **Theme** dropdown. A preview of the colors will appear in the **Preview** and the colors on the canvas will change.
- 3. Close the Report Styling dialog by clicking anywhere on the canvas.

Font

To change the font of the entire report:

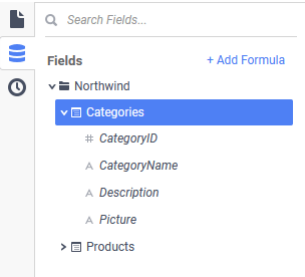
- 1. Click the **Canvas** icon in the toolbar to open the **Report Styling** dialog.
- 2. Choose a font from the **Font** dropdown.
- 3. Close the Report Styling dialog by clicking anywhere on the canvas.

Text Styling

Individual sections of the ExpressView can have styling options (e.g. bold, italic, underline, alignment, data formatting) applied to them. Use the Selected Section tab of the Properties Pane to set those options for each desired element.

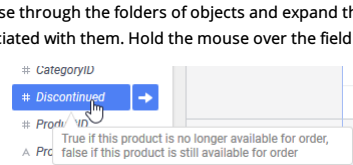
Data Objects Pane

The **Data Objects Pane** contains the available **data objects** that may be added to the ExpressView **canvas**. Data objects are arranged into folders. Those objects are further expanded into **fields**. A field is a parcel of data from a data object, such as the name of a Product or an Employee ID number.



Use the **Search Fields** area to search for fields by name.

Browse through the folders of objects and expand the objects to see the fields available. Some fields may have a description associated with them. Hold the mouse over the field name to see the description.

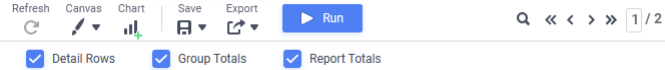


A field with a description that appears as a tooltip

Fields are added to the ExpressView with the methods described in the Canvas section.

Toolbar

The top of the **ExpressView Designer** contains tools for building and manipulating the report.



- The ExpressView Designer toolbar
- Refresh** – click to refresh the data displayed when in **Live Data** mode. Disabled when Live Data is turned off. More information about data modes is above in the Canvas section.
 - Canvas** – set ExpressView styling options such as a color theme and a font. For more information, review Styling the Canvas above.
 - Chart** – for more information about charts in ExpressView, review the ExpressView: Visualizations article
 - Add Visualization** – click to add a visualization to the ExpressView, or show an existing visualization if it is hidden
 - Visualization Active** – indicates a visualization is part of this ExpressView and is visible
 - Hide Visualization** – click to hide the visualization. Hiding the visualization does not delete it.
 - Save** – save the ExpressView. On the first click for new ExpressViews, this will open a dialog to enter a name, description and folder to save to. Subsequent clicks will save changes to the same location. Click the **Save Dropdown** icon to change the report’s name, description or folder.
 - Export** – click to export the ExpressView to one of the supported file formats or save it as an **Advanced Report**. Choose from *Excel*, *PDF*, *RTF* or *CSV*. Depending on system and report configuration, not all file types may be available.
 - Hover over **Advanced Report** to convert the ExpressView to an Advanced Report. Enter a new name, choose a folder and click the **Create Advanced Report** button. Review the Exporting to an Advanced Report section of the ExpressView: Exporting article for more information.
 - Click **Export Options** to open the **Export Options** menu. Review the Export Options section of the ExpressView: Exporting article for an explanation of these settings.
 - Run/Stop** – click **Run** to start **Live Data** mode and view data from the data objects on the report. When Live Data mode is enabled, this button becomes **Stop**. Click **Stop** to turn off live data mode and work “offline” with placeholder data. For very large and complex ExpressViews, keeping Live Data mode off while editing will be much faster, as each modification to the report design will not re-query the data source.
 - Showing x Results** – the report was generated with a partial data set and may contain incorrect calculations and aggregates. Click the link to load more data:
 - Load *number* more Records** – get the next *number* of data rows and add them to the existing report
 - Load All Data** – get the remainder of the data set
 - Report Search icon** – click to open a panel to search for content in the report.

Search report...

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v

x

Matches for the search query will be highlighted on the report wherever it appears.

- Search report... field** – enter the search query into this textbox
- Previous** – move to the previous match of the search query
- Next** – move to the next match of the search query
- Close** – close the search panel and clear highlighting of the matches
- Go to First Page** – navigate to the beginning of the report
- Previous Page** – go back one page to the previous one
- Next Page** – go forward one page to the next one
- Go to Last Page** – navigate to the end of the report
- Page Number Entry** – navigate to a specific page number
- Detail Rows** – check to include all of the component records on the report. Unchecking this option can vastly increase processing speed especially when only interested in group or report-level aggregates. *Checked* by default.
- Group Totals** – check to include aggregate summaries for each group column on the report. *Checked* by default if at least one group column exists.
- Report Totals** – check to include overall aggregate summaries for each column on the report at the end. *Checked* by default.

Properties Pane

The **Properties Pane** on the right side of the Designer is broken down into four tabs:

- Selected Section**
- Sorts**
- Filters**
- Visualizations**

The active tab is indicated by an underlined and highlighted icon.

The Filters tab is active

To collapse the Properties Pane and expand the canvas, click the active tab icon. Clicking on any icon will re-open the pane.

Selected Section

The **Selected Section** tab is used to define the characteristics of the column and the formatting of its data.

The **Display Name** field is used to apply a custom name to the column in lieu of the default field name.

UnitsOnOrder		On Order
123.0		123.0
Sum for UnitsOnO...	–	Sum for On ...

The `Products.UnitsOnOrder` detail column without a **Display Name** (top) and with “*On Order*” as a custom **Display Name**

(bottom)

Use the **Horizontal Align** buttons to set the alignment of values as they appear in group columns and detail columns. Choose from *Left*, *Centered*, *Right* or *Justified*.

Choose a **Font Style** from the dropdown. Choose from: *Normal* (no font styling applied), *Bold*, *Italic* or *Bold Italic*. The Font Style applies only to the column header.

Use the **Underline** buttons to set underlining on the values. Choose from *none*, *single* or *double* underline. The Underline applies only to the column header.

The **Data Format** section has settings for manipulating the display of data in the column.

Choose a **Format Type** from the dropdown. Depending on the type selected, additional settings will appear

- *General* the application will attempt to format the data based on information in the system configuration for this column.
- *Number* explicitly sets the data to be a number with the following settings available:
 - **Decimal Places** when checked, will force a specified number of decimal places to be displayed. The symbol inserted between the whole and fractional part of the number can also be specified.
 - **Use 1000 Separator** when checked, will separate thousands places with the specified symbol
 - **Use Currency Symbol** when checked, will display the specified currency symbol in front of the value (e.g. \$3.14)
 - **Append Percent Sign (%)** when checked, will display a percent sign (%) after the value (e.g. 3.14%)
 - **Blank When Zero** when checked, if the value is zero, the cell will be blank instead of displaying zeroes
 - **Show Negative Symbol** when checked, if the value is negative, will display the negative symbol in front of the value (e.g. -25)
 - **Show Parenthesis** when checked, if the value is negative, will wrap the value in parenthesis (e.g. (25))
 - **Color** when checked, if the value is negative, will change the value to a specified color. Click the **Color Selector** icon to choose the color.
- *Date* explicitly sets the data to be a date, time or both, with the following settings available:
 - **Date/Time Format** choose a date format code from the dropdown. The Number Tab section of the Advanced Reports: Cell Formatting article contains a description of each of the codes.
- *Text* no additional formatting is applied, it will appear exactly as returned from the data source

Sorts

The **Sorts** tab is used to edit or remove existing sorts for detail rows. For more information, review the ExpressView: Sorting article.

Filters

The **Filters** tab is used to add, edit or remove filters. For more information, review the ExpressView: Filtering article.

Visualizations

The **Visualizations** tab is used to configure charts. For more information, review the ExpressView: Visualizations article.

Keyboard Shortcuts

There are several useful keyboard shortcuts available in the **ExpressView Designer**. They are listed in the Keyboard Shortcuts article.

Further Reading

Continue to the other articles in the ExpressView documentation:

- ExpressView: Grouping
- ExpressView: Aggregating/Summarizing Data
- ExpressView: Sorting
- ExpressView: Filtering
- ExpressView: Formula Columns
- ExpressView: Visualizations
- ExpressView: Exporting

ExpressView: Grouping (v2021.1+)

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Data may be organized in up to seven hierarchical groups. In addition to dragging-and-dropping fields to the canvas as described in the ExpressView: Introduction article, groups can be manipulated with the column menu.

Groups nest inside of each other and establish a “for each” hierarchy. In the example below, *for each* product category, all of the products will be listed.

ProductName	CategoryName
Northwoods Cranberry Sauce	Condiments
Original Frankfurter grüne Soße	Condiments
Maxilaku	Confections
Wimmers gute Semmelknödel	Grains/Cereals
Alice Mutton	Meat/Poultry
Uncle Bob's Organic Dried Pears	Produce
Boston Crab Meat	Seafood

Product Category	Product Name
Beverages	Chai
	Outback Lager
Condiments	Chef Anton's Gumbo Mix
Confections	Maxilaku
Meat/Poultry	Mishi Kobe Niku
Produce	Manjimup Dried Apples
	Longlife Tofu

ExpressView with two detail fields (left) and after adding `CategoryName` as a group (right). Note the two products grouped under the Beverages and Produce categories.

Groups may be nested or layered together. In the example below, to see all of the model numbers *for each* manufacturer *for each* product category, two groups are needed: one on the category and one on the manufacturer. Since each manufacturer may have products in many categories, manufacturer should be the left-most or least-specific group. The product category will be nested inside of the manufacturer group so that *for each* manufacturer, all of the applicable categories and products in those categories are listed.

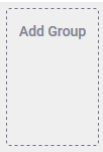
Manufacturer	Product Category	Model #	SKU	Views
abc	abc	abc	123	123
				Max for Views

Manufacturer	Product Category	Model #	SKU	Views
123	abc	abc	123	123
	Group Totals	Distinct Count for Model #		Max for ...
	Group Totals	Distinct Count for Model #		Max for ...
Group Totals		Distinct Count for Model #		Max for ...
Report Totals		Distinct Count for Model #		Max for V...

An ExpressView with all columns as data fields (top) then with three data fields and two nested groups (bottom)

Adding Groups

To create the first group on an ExpressView, drag a field from the Data Objects pane to the “Add Group” drop zone on the canvas.



To change a detail field to a group, either drag-and-drop the detail field column to a Group drop zone (i.e. the **Add Group** zone or one of the drop zones on an existing Group column) or use the **Column Menu**:

1. Open the **Column Menu** by either clicking on the **Column Menu** icon or right-clicking on the column.

2. Click **Group By This**. The column will be added as the right-most (most-specific) group.
- Adding a Group will automatically add an *Ascending Sort* on that column. See the ExpressView: Sorting (v2021.1+) article for more information.

Changing Group Order

As the order of Groups is changed, they will be promoted (less specific) as they move left or be demoted (more specific) as they move right.

Groups may be re-ordered by simply dragging-and-dropping them from one Group drop zone to another, or by using the **Column Menu**:

1. Open the **Column Menu** by either clicking on the **Column Menu** icon or right-clicking on the column.

2. Click **Promote Group** to promote a group to the left or **Demote Group** to demote a group to the right.

NOTE

Dragging a group to a drop zone on a detail field column will ungroup the column and change it back to a detail field.

Removing Groups

To ungroup a column, either:

- drag-and drop it off of the canvas,
- drag-and-drop it over a detail field column's drop zone (to change the group to a detail field),
- or use the **Column Menu**:
 1. Open the **Column Menu** by either clicking on the **Column Menu** icon or right-clicking on the column.
 2. Do one of the following:
 - Click **Ungroup**. The column will be converted to the left-most detail field column on the report.
 - Click **Remove Field** to remove the column entirely.

ExpressView: Aggregating/Summarizing Data (v2021.1+)

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Aggregating leverages the power of ExpressView groups to compile summaries of data. Aggregates may be optionally added for each group and for the entire report.

Pre-defined **aggregate functions** determine how the summary is calculated. The available functions will vary with the data type in the column, but in general they are:

- *Sum* "display the additive total of this column"
- *Min* "display the smallest or earliest value in this column"
- *Max* "display the largest or latest value in this column"
- *Count* "display the number of rows in this column. For example in the data set {1, 2, 3, 3, 4, 4} the count is 6."
- *Distinct Count* "display the number of unique rows in this column. For example in the data set {1, 2, 3, 3, 4, 4} the distinct count is 4."
- *Avg* "display the average of this column"
- *None* "do not show an aggregate for this column"

Category	Mfg Code	Model #	Name	Views
Master Clocks	21	438-860	Master Time & Program Clock Solid-State Relay Kit	9
		9A1660A	Synchronous Clock Adapter	7
		110-3836A	Digital Clock Sync Module	2
		438-500	Programmed Master Clock PROM	1
		438-501	Programmed Master Clock PROM	1
	Group Totals	Distinct Count 5		Sum 20
	22	24A700	Master Time & Program Clock	5
		24A715	Master Time & Program Clock	1
		24A715M	Master Time & Program Clock with Modem	1
	Group Totals	Distinct Count 3		Sum 7
	23	24ZBMC100	Wireless Master Clock with NTP/GPS	4
		GE-MC-020	Wireless Clock GPS Kit	2
		24ZBMCGPS	Wireless Clock GPS Kit	1
		GE-MC-030	GPS Antenna Extension Cable	1
		24ZBMCGPSEXT	GPS Antenna Extension Cable	
	Group Totals	Distinct Count 5		Sum 8
Group Totals		Distinct Count 13		Sum 35
Report Totals		Distinct Count 13		Sum 35

Distinct Count aggregate function on the **Model #** column and **Sum** aggregate function on the **Views** column is computed for each group (Manufacturer and Category) as well as an overall report total

To show only the aggregates, uncheck the **Detail Rows** checkbox in the toolbar.

Category	Mfg Code	Model #	Name	Views
Master Clocks	21			
	Group Totals	Distinct Count 5		Sum 20
	22			
	Group Totals	Distinct Count 3		Sum 7
	23			
	Group Totals	Distinct Count 5		Sum 8
Group Totals		Distinct Count 13		Sum 35
Report Totals		Distinct Count 13		Sum 35

The same ExpressView as above, without Detail Rows

Adding Aggregates

Either **Group Totals** or **Report Totals** (or both) must be checked in the toolbar. Unchecking one or the other hides the respective

total from view.

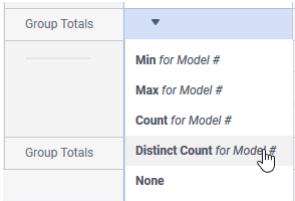
As numeric fields are added to the ExpressView, the *Sum* aggregate function will be automatically applied.

NOTE

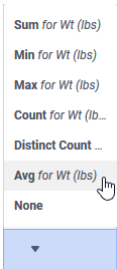
Checking **Group Totals** enables aggregating for all groups.

To aggregate data:

1. Click the **Choose Aggregate** ▾ icon in the desired group footer or report footer.
2. Click an available aggregate function.



Selecting the Distinct Count aggregate function for the Model # group column



Selecting the Average aggregate function for the Wt (lbs) detail field as a report total

Changing Aggregates

1. Click the **Choose Aggregate** ▾ icon in the desired group footer or report footer.
2. Click an available aggregate function.

Removing Aggregates

To stop aggregating on a single column:

1. Click the **Choose Aggregate** ▾ icon in the desired group footer or report footer.
2. Click *None*.

To stop aggregating for a section type:

1. In the toolbar, uncheck the respective **Group Totals** or **Report Totals** checkbox.

ExpressView: Sorting (v2021.1+)

Â

Data can be ordered by applying **sorts** to the columns. Adding a group will automatically add a sort on the column. Detail fields may optionally be sorted.

Data can be sorted either in *Ascending* or *Descending* order. *Ascending* sorts start from the smallest or earliest value and end at the largest or latest value. *Descending* order is the oppositeâ€”starting from the largest value and ending at the smallest.

Sorting is indicated by a sort direction icon in the column header. Sorts on Detail Fields are also displayed on the Sorts tab of the Properties Pane, and can be modified from there as well.

- ↑ â€” this column is sorted in *Ascending* order
- ↓ â€” this column is sorted in *Descending* order

Category ↓ ⌵	Manufacturer ↓ ⌵	Model # ↑ ⌴	name ⋮
abc	123	abc	abc

Descending sorts on the two **Category** and **Manufacturer** Group columns and an *Ascending* sort on the **Model #** detail field column. The **name** column is not sorted.

Sorts

⋮

model

desc

asc

✕

The **Sorts** tab of the **Properties Pane** for the above ExpressView shows only the *Ascending* sort on `model`.

There may be several sorts on detail fields in an ExpressView. When there is more than one sort on ExpressView detail fields, a sort priority is formed. Consider the figure below, with two sorted detail fields: `City` and `Country`.

LastName ⋮	Address ⋮	City ↑ ⌴	Country ↑ ⌴
abc	abc	abc	abc

One sort must be the **primary sort** and the others will follow in priority order. Use the Sorts tab of the Properties Pane to view and modify the priority of detail field sorts.

Sorts

⋮

Employees.Country

desc

asc

✕

⋮

Employees.City

desc

asc

✕

`Employees.Country` is the **primary sort**, and `Employees.City` is the second priority sort. All records will first be sorted in *Ascending* order by country name, and then each city within each country will be sorted in *Ascending* order.

Sort priority for groups is determined by the grouping order. Review the Grouping article for more information.

Adding Sorts

Groups are automatically sorted in *Ascending* order when they are added. If a detail field has a *descending* sort when it is converted to a group, the sort direction will be changed to *Ascending*.

To add a sort on a **Detail Field**:

1. Open the **Column Menu** by either clicking on the **Column Menu** ⋮ icon or right-clicking on the column.

2. Click **↑ Sort Ascending** to sort this column in *Ascending* order or **↓ Sort Descending** to sort this column in *Descending* order

As sorts are added to detail fields, they will be added to the bottom of the sort priority list.

Modifying Sorts

Sort order may be changed with the Column Menu for both groups and detail fields. Sort order and priority may be changed with the Properties Pane for detail fields.

To change sort direction for groups:

1. Open the **Column Menu** by either clicking on the **Column Menu** ⋮ icon or right-clicking on the column.

2. Click **↑ Sort Ascending** to sort this column in *Ascending* order or **↓ Sort Descending** to sort this column in *Descending* order.

To change sort order for detail fields, either:

1. Open the **Column Menu** by either clicking on the **Column Menu** ⋮ icon or right-clicking on the column.

2. Click **↑ Sort Ascending** to sort this column in *Ascending* order or **↓ Sort Descending** to sort this column in *Descending* order.

or

1. Open the Properties Pane to the **Sorts** tab.

2. Click either *desc* to sort this column in *Descending* order or *asc* to sort it in *Ascending* order. The currently selected direction is highlighted.

To change sort priority for detail fields, either:

1. Open the **Column Menu** by either clicking on the **Column Menu** ⋮ icon or right-clicking on the column.

2. Click **⇄ Change to Primary Sort** to change this column's sort to be the primary one.

or

1. Open the Properties Pane to the **Sorts** tab.

2. Click and drag the **Move Grid Row** ⌵ icon to move the sort to the desired position

Sorts

Employees.Country	desc	asc	×
Employees.City	desc	asc	×

Removing Sorts

Groups must be sorted. To stop sorting on a group column, ungroup it.

To remove a sort on a detail field, either:

1. Open the **Column Menu** by either clicking on the **Column Menu** icon or right-clicking on the column.
2. Click **Remove Sort**.

or

1. Open the Properties Pane to the **Sorts** tab.
2. Click the **Delete** icon in the row of the sort to remove.

ExpressView: Filtering (v2021.1)

To show only data that matches certain criteria, **filters** can be added. Filters can also improve performance by only including relevant information. There are two kinds of filters that may be applied to an ExpressView: **Standard** and **Top/Bottom**.

Standard filters pair down data included in the report based on certain conditions. For example, "include only products in the Beverages category". **Top/Bottom** filters can be used to restrict data included to only the top or bottom values. For example, "include only the top performing salesperson's sales", or "include only the two worst performing products". A Top/Bottom filter can work in conjunction with standard filters or on its own.

Standard Filters

Standard Filters are comprised of three parts: the **filter field**, the **operator** and the **values**. To help design standard filters, consider a phrase that spells out what to include. For example: "Include only the products whose unit price is more than \$10" or "Do not include any employee who was hired after 5/1/2008".

The **filter field** is the data field that contains the data that will be filtered. In the above examples, the filter field would be the product ID number or employee hire date.

The **operator** sets the filtering action. The Standard Filters section of the Advanced Report: Filters article lists all of the available filter operators and how they work. In the above examples, the operators would be *Greater Than* for the products unit price and *Less Than* for the employee hire date.

The **values** are the criteria that the filter field must meet when compared by the operator. In the above examples, the values would be *\$10* and *5/1/2008*. Some operators allow there to be more than one value.

Filter Conjunctions

Standard Filters can be combined to form complex filtering phrases. Taking the previous example a bit further, a filter can be setup to show "only the orders of products whose unit price is more than \$10 AND were placed by any employee who was hired after 5/1/2008". Note the emphasis on the word AND. To build a report that shows this kind of data, the original two filters are conjoined so that only orders that meet both criteria will apply.

Another way of combining filters is with an OR conjunction. For example, "show only the products whose Category is Beverages OR whose Category is Condiments".

Filter conjunctions can also be combined together. Consider this complex filter phrase that uses four individual standard filters to return only service tickets that required a Return Material Authorization due to lightning or surge damage: "Include only the service tickets where the description contains 'RMA' OR the title contains 'RMA' AND the description contains 'Lightning' OR the description contains 'Surge'".

Adding a Standard Filter

Use the 

Filters tab of the Properties Pane to add standard filters.

Filters

Standard	Top/Bottom
----------	------------

Meet **all** of the following conditions:

drag and drop fields here

and meet **any** of the following conditions:

drag and drop fields here

There are two drop zones for dragging-and-dropping fields to the tab. The **Meet all of the following conditions** zone is for adding filters that will AND together; the **and meet any of the following conditions** zone is for adding filters that will OR together. If there are filters in both of the drop zones, the two drop zones are ANDed together. For example, the filter phrase for the figure below is "Show all of the work orders in the Service Department AND opened after 9/25/2019 AND the category is Door Entry OR Telephones". This ExpressView would list only service tickets for problems related to door entry or telephones that were opened after September 25, 2019.

Standard

Top/Bottom

Meet **all** of the following conditions:

▼ Work Order Departments.Name is S...

×

Equal To

Service

▼ Work Order Tickets.Open Date is gr...

×

Greater Than

09/25/2019

fx

and meet **any** of the following conditions:

▼ Work Order Categories.cname is Do...

×

Equal To

Door Entry

▼ Work Order Categories.cname is Te...

×

Equal To

Telephones

Complex conjoined standard filter example

Standard filters may be added on data field available, including formulas.

1. Adding a filter requires first adding the **filter field**, by either:
- Dragging-and-dropping the filter field from the Data Objects Pane or from the canvas to the desired drop zone

○ Using the Column Menu:

1. Open the **Column Menu** by either clicking on the **Column Menu** icon or right-clicking on the column.

2. Click **Filter By This**. A new standard AND (meet all of the following conditions) filter will be added.
- TIP
- To use a formula as a filter field:
1. Add a new formula column.

2. Add the column as a filter as described above.

3. Optionally remove the column from the report if desired. The filter will remain.
2. Select the **operator** from the dropdown list. The default operator is *Equal To*.

3. Directly enter or select the **values** to match the criteria in the filter. If the system administrator has enabled it, either:

○ click the **Choose Filter Value** icon to show a list of potential filter values, or

○ click the **Choose Date** icon to choose a date (for date type data fields only), or

○ click the **Filter Function** icon to choose an available filter function. Filter functions are configured by the system administrator to extend filter value functionality from a static value to a dynamic value such as “The first day of next month” or “Friday of next week”.
- Examples
- When implementing the example filter phrases in this section, the Filters tab of the Properties Pane will look as follows:
- Standard

Top/Bottom

Meet **all** of the following conditions:

▼ Products.UnitPrice is greater than 10

×

Greater Than

10

fx

and meet **any** of the following conditions:

drag and drop fields here
- Show the products whose unit price is more than \$10
- Standard

Top/Bottom

Meet **all** of the following conditions:

▼ Employees.HireDate is less than 05...

×

Less Than

05/01/2008

fx

and meet **any** of the following conditions:

drag and drop fields here
- Do not include any employee who was hired after 5/1/2008
- 58 of 229

Standard

Top/Bottom

Meet **all** of the following conditions:

▼ Employees.HireDate is less than 05...

×

Less Than

05/01/2008

fx

▼ Products.UnitPrice is greater than 10

×

Greater Than

10

fx

and meet **any** of the following conditions:

drag and drop fields here

Show the products whose unit price is more than \$10 AND include only employees whose hire date is before 5/1/2008

Standard

Top/Bottom

Meet **all** of the following conditions:

drag and drop fields here

and meet **any** of the following conditions:

▼ Categories.CategoryName is Bever...

×

Equal To

Beverages

▼ Categories.CategoryName is Condi...

×

Equal To

Condiments

Show only the products whose category is Beverages or Condiments

Changing Standard Filters

Use the⌵

Filters tab of the Properties Pane to change standard filters.

The operator and values can be changed after the filter has been created. To change the filter field, remove the filter and add a new one.

Removing Standard Filters

Use the⌵

Filters tab of the Properties Pane to remove standard filters.

Click the Delete⌵

icon in the top-right corner of the filter element. The filter will be instantly removed.

Top/Bottom Filters

Top/Bottom Filters, also known as **Top N Filters** can be used to filter the report to show the top or bottom values or aggregated summary of a field. For example: “Show only the best performing 2 salespeople in each region” or “Show the 5 smallest times to complete the manufacture of each model”. Top/Bottom filters can also be used to **sort by aggregate** and create a ranked list. For example, to list the Top 40 songs played on a radio station.

NOTE

Top/Bottom filtering is always done in memory. Therefore, they should be combined with **standard filters** when possible to improve performance for very large datasets.

1. Check the **Limit the report to the top/bottom values** checkbox.
2. From the **Top/Bottom** dropdown select either *Top* to show the largest or latest values or *Bottom* to show the smallest or earliest values.
3. Enter an integer into the **#** field to specify the desired number of values (e.g. enter 2 to see the top 2 or bottom 2 values).
4. Choose what to compare.
 - *Values* – display the top N data values
 - *(aggregate function)* – if there are groups on the ExpressView, choose one of the available aggregate functions, to display the top N of the aggregate. The available functions will differ based on the columns on the report.
5. Select the data field or group field to filter from the **Of...** dropdown.

To optionally filter the top/bottom values of each group on the report, called a **For Each Group**:

CAUTION

Adding a **For Each** group will run the sort N times, where N is the number of Top or Bottom values to include in step 3 above. This may drastically negatively performance for large data sets.

- Click the **+ Add Group** button.
- Select one of the groups to group by from the dropdown list.

To remove a **For Each Group** click the **Delete Dropdown**  icon.

ExpressView: Formula Columns (v2021.1+)

ExpressViews are an easy way to display and visualize data. Custom **formula columns** extend the pre-defined data.

NOTE

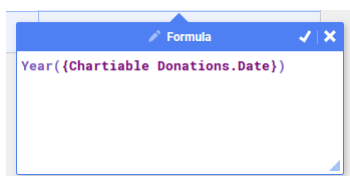
This section applies to ExpressView in v2021.1+ of the application. For previous versions, refer to ExpressView (pre-v2021.1)

In addition to using the data fields that are available in the Data Objects Pane, formulas may be added as custom **formula columns**. Formulas may contain **data objects**, **parameters** and **functions**.

Just like standard columns, a formula column may be either a detail field or group, and may be included in visualizations, formatted, sorted and filtered.

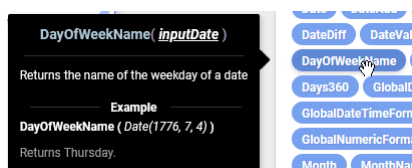
To add a formula column to an ExpressView:

- In the Data Objects Pane, click the **+ Add Formula** link at the top. A new column will be added to the report and the **Formula Builder** will appear.



Formula Builder with a formula that returns the year portion of a date detail field.

- The **Selected Section** tab of the **Properties Pane** will open with the available functions that may be used to build a formula.
 - Either **Search** for a function, or expand the function categories to browse the available functions:
 - Arithmetic* – basic mathematical functions, as well as number field manipulation like truncation and rounding.
 - Database* – used for determining the type of information contained in a cell. Helpful for error and sanity checks.
 - Date* – can be used to do calculations and formatting on date and time values.
 - Financial* – common methods for monetary calculations such as interest and depreciation.
 - Formatting* – applies bold, underline, or italic formatting to the input.
 - Logical* – can be used to handle conditional information.
 - Other* – miscellaneous functions
 - String* – commonly used for interpreting and manipulating text fields.
 - Parameters* – a listing of the available system parameters that may be used in the formula
 - Hover the mouse over a function name to see a description of it and how to use it.



- Either drag-and-drop the function name, or double-click the function name to add it to the Formula Builder.
- Click the **Apply Changes**  icon to apply the formula to the column, or **Discard Changes**  to cancel.

The formula column is now added to the ExpressView, and can be manipulated just as any other column on the report.

Formula Components

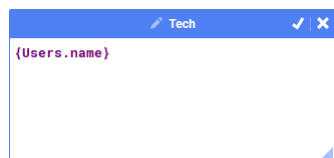
Formulas may contain any combination of **data objects**, **parameters** and **functions**.

Data Objects

To add a field to the formula, either:

- drag it from the Data Objects Pane to the Formula Builder
- double-click the field name in the Data Objects Pane while the Formula Builder is open
- type its name into the Formula Builder

Data objects must always be enclosed in curly braces. For example, {Orders.OrderId}

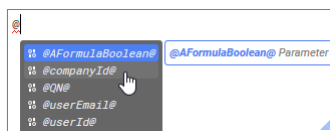


Formula Builder with a single data object in it

Parameters

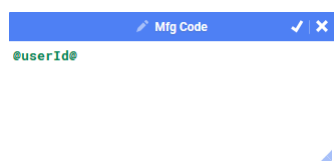
Parameters are system-wide variables that may be referenced in formulas. To add a parameter to a formula:

1. Type @ into the Formula Builder, and a list of available parameters will appear.



2. Either double-click the parameter in the list, or use the arrow keys to highlight the desired parameter and then press Enter on the keyboard.

Parameters are case-sensitive and must always be enclosed by @ symbols. For example, @



Formula Builder with a single parameter in it

A special type of parameter called a **dropdown parameter** can be created by the system administrator. These parameters have two values: the **Value**, used by the server for processing and the **Display Value** that appears in cells and is used in formulas. These distinct values can be accessed with @ and @ respectively. For more information, consult with the system administrator.

Functions

Functions are mechanisms built-in to the application that take an input and return an output. For example, there is a square root function that given an input number will return the square root of the number. For example, `Sqrt(4)` returns 2.

Many functions can be used together in a formula.

A list of all available functions and operators along with descriptions and examples of how to use them can be found in the [List of Functions](#) article.

Some examples of functions in formulas:

```
{Employees.LastName} & ", " & {Employees.FirstName}
```

Concatenate employee's last name and first name in a single column, using two fields

```
Year({Orders.OrderDate})
```

Get only the year portion of an order date, from the `Orders.OrderDate` field

```
If(@[email protected] = "Admin", {Manufacturers.name}, {Manufacturers.manufacturer_id})
```

Using a combination of parameters, functions and data objects to display the name of a manufacturer in a column to the administrator, or an obfuscated ID number to all other users

Quick Functions

Quick Functions are pre-defined calculations or operators that transform the fields in either detail fields or group columns. For example, the *Month Name* quick function applied to a date column will transform the column to only the name of the month of that date. Quick Functions can be used in lieu of building a full formula column, work in conjunction with a formula, or work on a standard detail field or group column by themselves.

There are several built-in **Quick Functions**, and the system administrator has the ability to add or remove functions from the list:

- *Day of Month* – Gets the day of the month from a date, as a one or two digit number
- *Day of Week* – Gets the name of the weekday of a date
- *Week of Year* – Gets the ordered number of the week in the year that a date occurs on, from 1 to 53
- *Month Name* – Returns the name of the month
- *Year, Month Name* – Returns the year and month name of a date. For example, 2020 – September
- *Quarter* – Returns the fiscal quarter of a date in the typical Q1, ..., Q4 style
- *Year, Quarter* – Returns the year and quarter name of a date. For example, 2020 – Q3
- *Year* – Gets the year component of a date, as a four digit number
- *None* – remove the Quick Function from the column and return it to a standard detail field or group column

With a Quick Function on a column, it may be sorted, filtered, aggregated and included in a chart just as any other column type.

Behind the scenes, a Quick Function works like a pre-set formula column. Quick functions have a **display formula** and a **sort formula**. The **display formula** is applied to the data as it is displayed in the ExpressView Designer, in exported files and it is the value that is compared when filters are applied to a column. The **sort formula** is activated when a sort is applied to a column. This allows a column to be sorted on a different quantity than the display formula. For example, the *Day of Week* quick function will display names of weekdays, but will sort the column in chronological order instead of alphabetical order (i.e. *Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday*).

	A	B	C
1	Orders for Each Country		
2	Destination	Day of Week	Order Date
3			Count
4	Argentina		16
5		Tuesday	02/17/2015
6		Wednesday	04/29/2015
7		Wednesday	01/13/2016
8		Wednesday	03/30/2016
9		Wednesday	04/13/2016
10		Thursday	04/28/2016
11		Thursday	02/11/2016

An ExpressView with one group column, one detail column on the OrderDate field, and a detail field with the Day of Week quick function applied to OrderDate as it appears in exported Excel file

When an ExpressView is exported to an Advanced Report, the quick functions will be broken down into their component **display** and **sort formulas**. The **display formula** will appear on the report, and if an applicable sort had been added to the ExpressView, the **sort formula** will be added to the end of the Advanced Reports sort list.

+	Add Section	A (Destination)	B (Day of Week)	C (Order Date)
		1	Orders for Each Country	
		2	Destination	Order Date
		3		Count
	Header: Orders.ShipCountry	4	Orders.ShipCountry	=aggcount({Orders. OrderDate})
	Detail	5	=DayOfWeekName({ Orders.OrderDate})	Orders.OrderDate
	Report Footer	6	Report Totals	=aggcount({Order s.OrderDate})

The DayOfWeekName Display Function appears in column B of the Advanced Report Designer

Report Sorts			
Select sort fields			
Orders			
CustomerID			
Sort By		Sort Order	
Orders.ShipCountry		fx Ascending	⌵ ⌶ ⌷ ⌸
=DayOfWeekNumber(Orders.OrderDate)		fx Descending	⌵ ⌶ ⌷ ⌸

The DayOfWeekNumber Sort Function is added to the end of the Advanced Report's Sorts list

Using a Quick Function

1. Open the **Column Menu** by either clicking on the **Column Menu**  icon or right-clicking on the column.

2. Point to  **Quick Functions**.

NOTE

The **Quick Functions** menu item will only be available if there are quick functions configured in the system for the data type in the chosen column. For example, there must be Quick Functions that work on date columns if the chosen column contains a date.

3. Click the name of the desired Quick Function to add to the column.

The name of the Quick Function will appear in the column header.

Day of Month: OrderDate	↑ ⋮
123	
Group Totals	
Report Totals	

The Day of Month Quick Function has been applied to this Group column on Orders.OrderDate

When a Quick Function is applied to a formula column, the quick function will apply to the data after the formula. For example, the formula `DateAdd("d", 3, {Orders.OrderDate})` combined with the **Day of Month** Quick Function will display the name of the day of the week three days later than the `OrderDate`. If the order was placed on *Tuesday*, the column will display *Friday*.

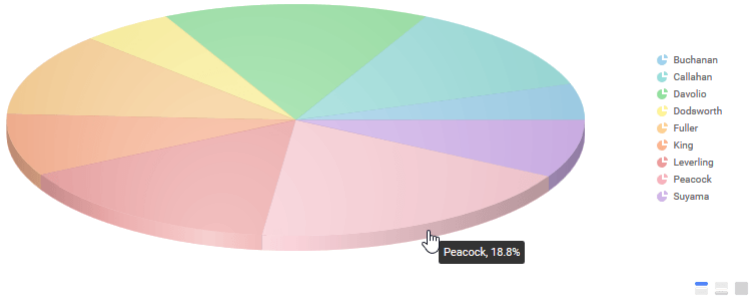
Removing a Quick Function

Follow the steps in Using a Quick Function above. At step 3, choose *None*.

Quick Functions will also be removed from a formula column if the formula is changed in a way that the formula returns a different data type than the data type the Quick Function applies to. For example, if a formula that returns a date is changed to one that returns a string, the Quick Function will be removed from the column.

ExpressView: Visualizations (v2021.1+)

Visualizations, also known as **charts** or **graphs** allow data to be showcased in a visual format. They allow data to be scanned quickly for patterns and trends. Charts can be easily made and customized in ExpressViews, in as little as one click.



A 3D Pie Chart visualization with pastel custom coloring showing the percentage of sales made by each salesperson, with a tooltip showing the exact percentage for Margaret Peacock

NOTE

This section applies to ExpressView in v2021.1+ of the application. For previous versions, refer to ExpressView (pre-v2021.1)

Table of Contents

Use the links below to skip to the applicable section of this article.

- 1. Adding a Visualization
 - 1. Type
 - 2. Data
 - 1. Labels
 - 2. Values
 - 3. Appearance
 - 1. Chart Titles
 - 2. Chart Colors
 - 3. Chart Data
- 2. Interactive Editing
 - 1. Drilling Down
 - 2. Editing a Chart Directly
- 3. Suggested Reading

Adding a Visualization

To add a chart to an ExpressView:

- 1. Click the **Add Visualization** icon in the toolbar. A bar chart is added and populated with the data from the ExpressView automatically.
- 2. On the **Visualizations** tab of the Properties Pane, select the type of chart you want to use. The chart immediately swaps to that type. Choose from *Bar and Column*, *Pie and Other Single-Series*, *Line and Area* or *Miscellaneous*. Review the Type section below for more information about each type.

There are three small icons in the lower-right corner of the visualization that determine where on the canvas the chart will appear. Choose from:

- the chart will appear on the top of the canvas; report data will be on the bottom
- the chart will appear on the bottom of the canvas; report data will be on the top
- the chart will fill the canvas; report data will be hidden

Use the

Visualizations tab of the Properties Pane to customize the visualization:

Type

Choose one of the available chart types to display. Charts are organized into four general categories. Click each type name for additional information.

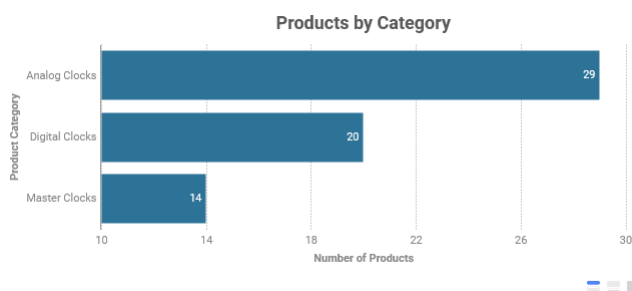
- Bar and Column
- Pie and Other Single-Series
- Line and Area

- Miscellaneous
 - Scatter/Zoom Scatter
 - KPI

Data

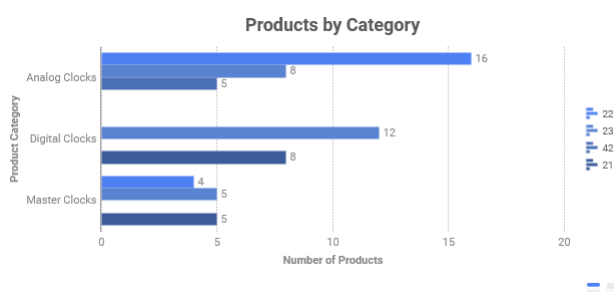
Labels

The **Labels** field is a group of data values, for each iteration of the group represented as a series on the chart. For example, using the Product Category group field as the label field represents each category as a series.



A **Bar** chart with one label field on the product category, showing the number of products in each category

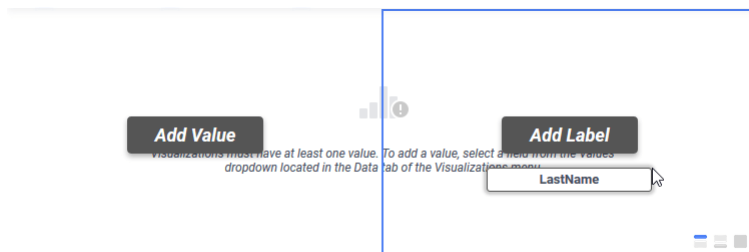
Several chart types allow more than one label field. This is useful for nested groups, which represent common series measured across several groups. For example, to compare the number of products in each category manufactured by a particular manufacturer, a nested manufacturer field can be added as a second label.



A **Bar** chart with two label fields: one on the product category, and the other on the manufacturer's code number showing the number of products in each category made by each manufacturer

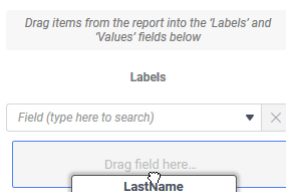
To add a chart label, either:

- Drag a data field from the Data Objects Pane onto the chart and release on the **Add Label** drop zone.



Adding `LastName` as a label by dragging it to the drop zone on the chart

- In the **Visualizations** tab, click the **Data** tab. Either:
 - Drag a data field to the **Labels** drop zone.
 - Click **+ Add Label**, then select a field from the **Field** list.

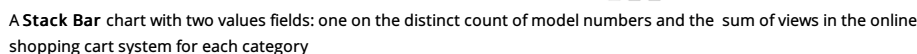


Adding `LastName` as a label by dragging it to the drop zone in the Properties Pane

Values

The **Values** fields are the data values to plot on the chart for each iteration of each labels group. For example, the products per category.

Several chart types allow for multiple values fields. This is useful if there are common series to be measured across several groupings, and the values fields are in the same data row. For example, the number of products per category and the number of views of those products on the online shopping site.



- Drag a data field onto the chart and release on the **Add Value** drop zone.



- Values**

Enter Series Name...	✕
Field (type here to search) ▼	

Drag field here

OrderID

Appearance

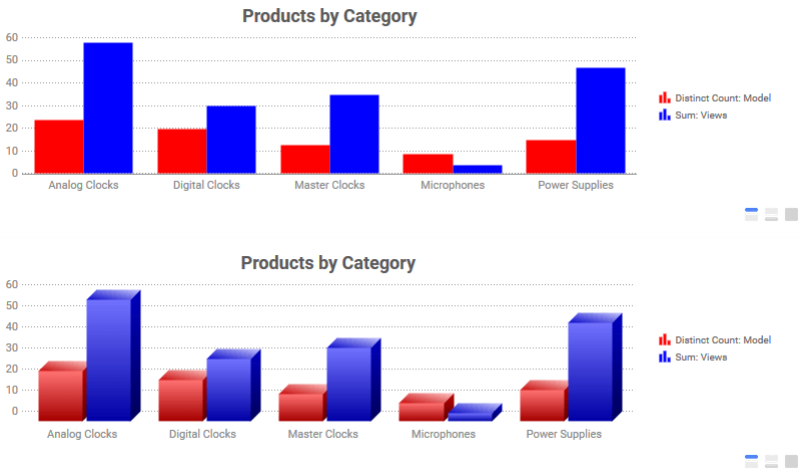
Chart Titles

Add a main title and subtitle, as well as X-Axis and Y-Axis labels in this section. Each title may have a unique font, color and size.

Chart Colors

Select a palette to color the chart elements with. Choose from:

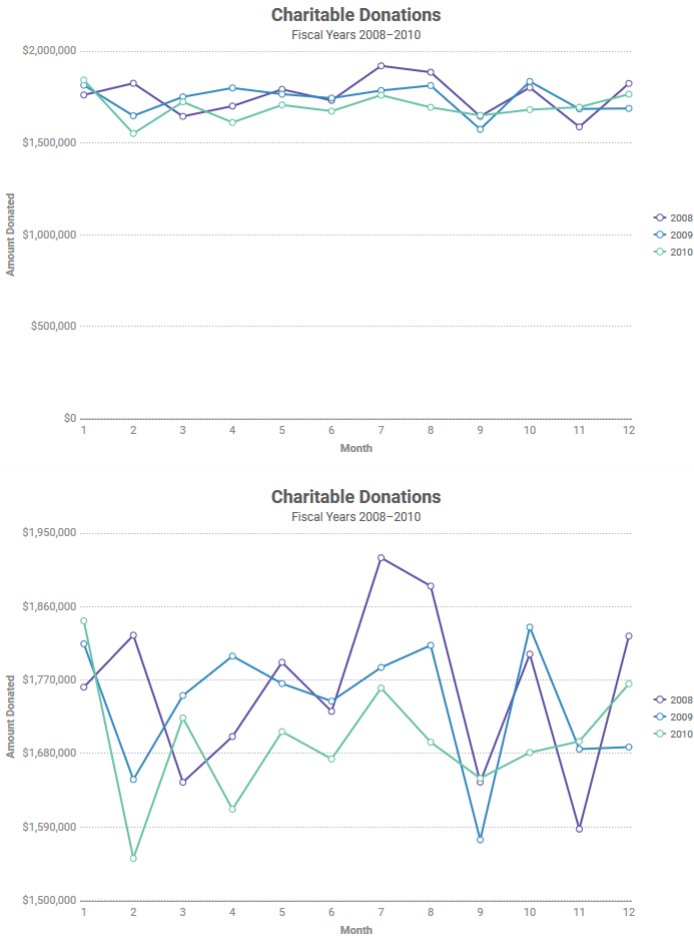
- Check the **Use 3D Style** checkbox to enable a three-dimensional effect on the chart elements.



A multi-value **Column** chart with **Use 3D Style** *unchecked*(top) and *checked*(bottom)

Chart Data

Use the **Data Axis Min Value** and **Data Axis Max Value** fields to set the minimum and maximum values for the axes. All values in the chart must be above the **Data Axis Min Value** and less than **Data Axis Max Value** otherwise this setting will be ignored. These settings can help make a chart easier to read. For example:



The same line chart without (top) and with (bottom) min and max values set

Use the **Exclude Values Less Than** and **Exclude Values Greater Than** settings to exclude values outside of the set range from appearing on the chart.

Use the **Sort By** dropdown to apply a secondary sort to the chart that will affect the order *Values* are added to the visualization. Choose from *Ascending* or *Descending* order by selecting from the dropdown. The options available will differ by chart type, but in general they are:

- *Report Order* – data points are added to the chart in the order they appear on the report
- *Data Labels* – data points are sorted by their *Labels*
- *Data Values* – data points are sorted by the *Values*

Point Labels will display the exact values of each point on the chart. Different chart types will have different options available, but in general they are:

- *Series Values* or *Point Value* – display the value of the *values* or *point*
- *Percent of Series Values* or *Percent of Point Value* – displays the percentage of the whole represented by this *value* or *point*
- *Data Labels* or *Point Label* – display the names of the *Labels* represented by each segment of the chart

- *Data Labels with Data Values* or *Point Label with Point Values*  combine the behavior of both *Data Labels* and *Series Values* modes to place both pieces of information in the label

For some charts, the **Point Labels** may be positioned with the **Label Position** setting. Choose from:

- *Auto*: allow the application to select the best orientation for you based on available space
- *Slant*: rotate the labels 45-degrees along the axis
- *Wrap*: texts wraps to a new line
- *Stagger*: values are staggered along two lines so they don't overlap
- *Rotate*: rotate the labels 90-degrees along the axis
- *None*: do not apply any change to labels, they may overlap

To include a **Legend** on the chart, click either *Right* or *Bottom*. Choose *None* to remove the legend.

The **Number Format** settings determine how numbers appear on the axes and in the **Point Labels** (if applicable):

- **Decimal Places**  will force a specified number of decimal places to be displayed. The symbol inserted between the whole and fractional part of the number can also be specified.
- **Use 1000 Separator**  when checked, will separate thousands places with the specified symbol
- **Use Currency Symbol**  when checked, will display the specified currency symbol in front of the value (e.g. \$3.14)
- **Append Percent Sign (%)**  when checked, will display a percent sign (%) after the value (e.g. 3.14%)

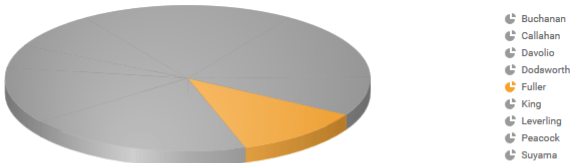
Interactive Editing

Drilling Down

When **Live Data (Run)** is enabled, click on a chart series to drilldown the data to that series.

NOTE

Because some of the data is hidden in this mode, totals and other calculations may not be accurate.

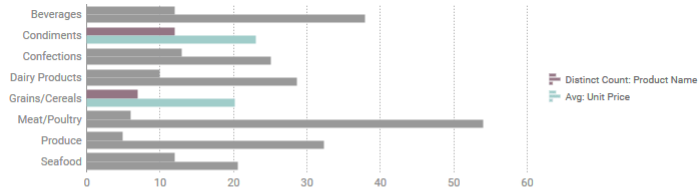


× Clear selected points ⓘ

LastName ↑ ⋮	OrderID ⋮
Fuller	10595
	10588
	10583
	10620
	10615

Clicking the **Fuller** series highlights only that series in the chart, and shows only those records that comprise that section of the chart

Several series may be drilled at the same time.



× Clear selected points ⓘ

Product Category ↑ ⋮	Product Name ⋮	Unit Price ↑ ⋮
Condiments	Northwoods Cranberry Sauce	\$40.00
	Vegie-spread	\$43.90
Group Totals	Distinct Count 12 ▾	Avg \$23.06 ▾
Grains/Cereals	Filo Mix	\$7.00
	Tunnbröd	\$9.00

Drilling into both the **Condiments** and **Grains/Cereals** categories highlights them on the chart and shows their applicable records

Click ×

Clear selected points to remove the drilldown and return to the original report design.

Editing a Chart Directly

Right-click on a chart to open the interactive menu.

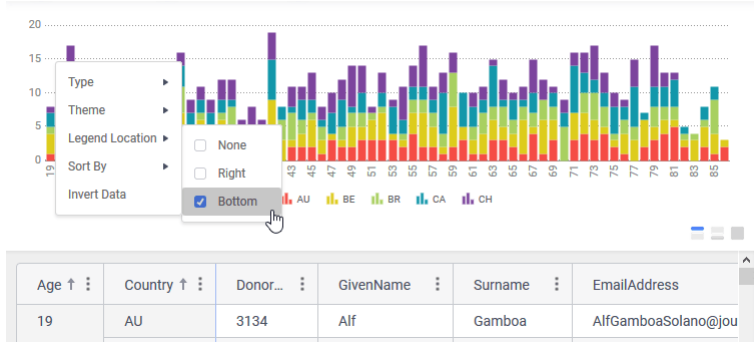


Chart interactive menu

Choose from:

- **Type** – change the chart from one type to another as in the Type section of the Properties Pane. Only charts of the same series type may be selected. That is, if the chart is a multi-series type of chart only other mutli-series charts may be selected.
- **Theme** – change the color palette of the chart as in the Chart Colors section of the Properties Pane
- **Legend Location** – change the location of the legend
- **Sort By** – change the sort order on the chart as in the Chart Data section of the Properties Pane
- **Invert Data** – swap the data fields on the X and Y axes

Suggested Reading

Additional resources may prove helpful when working with ExpressView and ExpressView Visualizations:

- Charts

ExpressView: Exporting (v2021.1+)

Â

ExpressViews are an easy way to display and visualize data. **Exporting** an ExpressView allows the contents of the report to be saved externally as either a *PDF, Excel, RTF* or *CSV* file. The system administrator may restrict the available file types, so all may not be available in all environments.

ExpressView may also be exported into an Advanced Report, where it may be further edited with the Advanced Report Designer.

For all export types except CSV, data as it is arranged in the ExpressView Designer and a visualization (if applicable) will be in the output file. Since CSV is a text-only format, visualizations cannot be exported in that format.

Formatting options set in the **Canvas** menu and the styling options (e.g. bold, italic, underline, horizontal alignment) will apply to PDF, RTF and Excel exports (only if **Keep Cell Styling in Excel** is *checked* in the Export Options menu)

Exporting to a File

There are several ways to export an ExpressView:

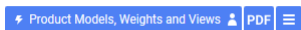
- From the **Report Tree**
 - Default Action
 - Report Options (right-click) Menu
- From the ExpressView Designer's **Export** menu
- From the **Scheduler Service**

Report Tree

There are two ways to export an ExpressView directly from the Report Tree without first opening the ExpressView in the Designer.

If the ExpressView's **Report Tree Shortcut** setting is set to *Export Report*:

1. Click the default export type in the Report Tree.



Click **PDF** to export this ExpressView as a PDF directly from the Report Tree

Or, open the Report Options menu by either clicking the **Menu** icon or right-clicking on the ExpressView item in the list. Choose from one of the available actions:

- Export As
- Schedule Report
- Email Report

For more information, review the Right-Clicking on Reports section of the Navigating the Application article.

Designer Export Menu

1. Click the **Export**  icon in the ExpressView Designer toolbar.

2. Choose an available export type.

Scheduler Service

When an ExpressView is executed on a schedule by the **Scheduler Service**, the resulting output will be an exported file. See the Scheduling an ExpressView section below for more information.

Scheduling an ExpressView

NOTE

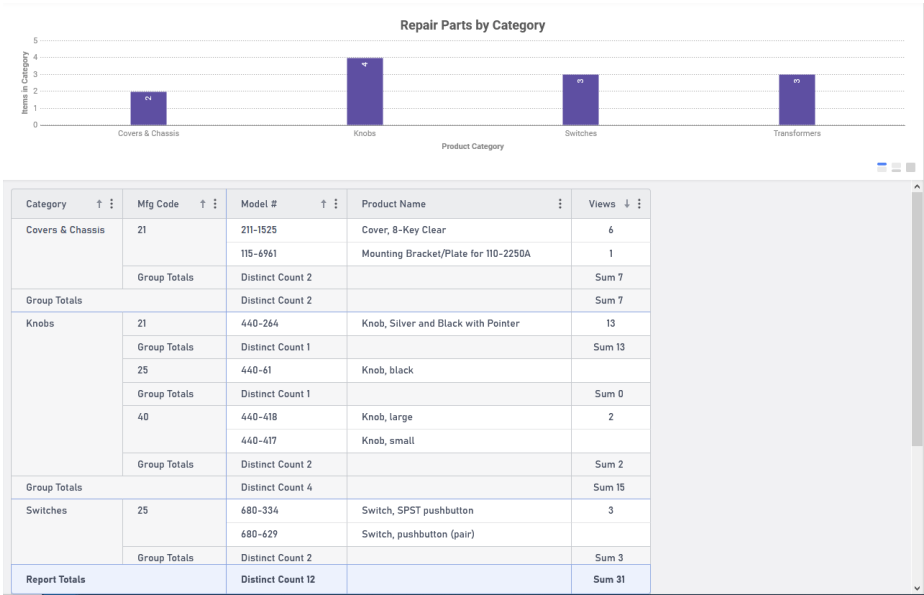
The **Scheduler Service** is an optional feature. Contact your system administrator for assistance.

An ExpressView can be scheduled to execute on a schedule. When executed by the **Scheduler Service**, the ExpressView will be exported as one its available export file types.

Review the Scheduling Reports article to learn how to schedule a report.

Examples

Consider the below ExpressView with two groups, several detail fields and a simple visualization.



Files can be exported in a format that either resembles the report layout, or in a format that may be easily imported into another system. Reports exported as PDF and RTF always resemble the report layout. Excel and CSV exports have options to change the data export mode. These options are discussed further in the Other Options section of this article.

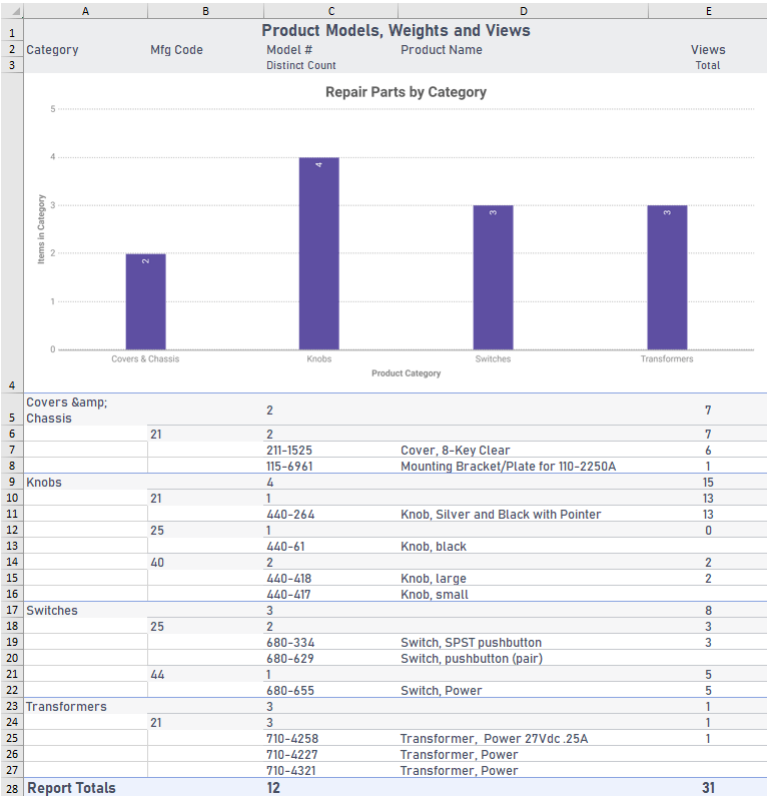
Report Layout

Product Models, Weights and Views				
Category	Mfg Code	Model # Distinct Count	Product Name	Views Total
Repair Parts by Category				
Covers & Chassis		2		7
	21	2		7
		211-1525	Cover, 8-Key Clear	6
		115-6961	Mounting Bracket/Plate for 110-2250A	1
Knobs		4		15
	21	1		13
		440-264	Knob, Silver and Black with Pointer	13
	25	1		0
		440-61	Knob, black	0
	40	2		2
Switches		440-418	Knob, large	2
		440-417	Knob, small	2
		3		8
	25	2		3
		680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	3
Transformers	44	1		5
		680-655	Switch, Power	5
		3		1
	21	3		1
		710-4258	Transformer, Power 27Vdc .25A	1
		710-4227	Transformer, Power	1
		710-4321	Transformer, Power	1
Report Totals		12		31

Report exported as a PDF file

Product Models, Weights and Views				
Category	Mfg Code	Model # Distinct Count	Product Name	Views Total
Repair Parts by Category				
Covers & Chassis		2		7
	21	2		7
		211-1525	Cover, 8-Key Clear	6
		115-6961	Mounting Bracket/Plate for 110-2250A	1
Knobs		4		15
	21	1		13
		440-264	Knob, Silver and Black with Pointer	13
	25	1		0
		440-61	Knob, black	0
	40	2		2
Switches		440-418	Knob, large	2
		440-417	Knob, small	2
		3		8
	25	2		3
		680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	3
Transformers	44	1		5
		680-655	Switch, Power	5
		3		1
	21	3		1
		710-4258	Transformer, Power 27Vdc .25A	1
		710-4227	Transformer, Power	1
		710-4321	Transformer, Power	1
Report Totals		12		31

Report exported as an RTF file



Report exported as an Excel file with **Keep Cell Styling in Excel** *enabled* and **Flatten Groups in Excel and CSV** *disabled*

CSV files support text only, so visualizations cannot be rendered in them.

```
"Product Models, Weights and Views","","","",""
"Category","Mfg Code","Model #","Product Name","Views"
","","","Distinct Count","","Total"
","","","",""
"Covers & Chassis","","2"," ", "7"
","","21","2"," ", "7"
","","","211-1525","Cover, 8-Key Clear","6"
","","","115-6961","Mounting Bracket/Plate for 110-2250A","1"
"Knobs","","4"," ", "15"
","","21","1"," ", "13"
","","","440-264","Knob, Silver and Black with Pointer","13"
","","25","1"," ", "0"
","","","440-61","Knob, black",""
","","40","2"," ", "2"
","","","440-418","Knob, large","2"
","","","440-417","Knob, small",""
"Switches","","3"," ", "8"
","","25","2"," ", "3"
","","","680-334","Switch, SPST pushbutton","3"
","","","680-629","Switch, pushbutton (pair)",""
","","44","1"," ", "5"
","","","680-655","Switch, Power","5"
"Transformers","","3"," ", "1"
","","21","3"," ", "1"
","","","710-4258","Transformer, Power 27Vdc .25A","1"
","","","710-4227","Transformer, Power",""
","","","710-4321","Transformer, Power",""
"Report Totals","","12"," ", "31"
```

Report exported as an CSV file with **Flatten Groups in Excel and CSV** *disabled*

For Easy Import

When groups are **flattened** in Excel and CSV exports, groups become columns that repeat for each row of data. This is helpful when importing the data into another system that requires, for example, the name of the product category to accompany the rest of the product's information on each line of the file. Groups are flattened by a setting in the Export Options section, more information is below.

CAUTION

When groups are flattened, group and report totals will be removed from the report output.

	A	B	C	D	E
1	Product Models, Weights and Views				
2	Category	Mfg Code	Model #	Product Name	Views
3	To render a chart, please uncheck "Flatten Groups in Excel and CSV" under "Export Settings" in the Settings menu				
4	Covers & Chassis	21	211-1525	Cover, 8-Key Clear	6
5	Covers & Chassis	21	115-6961	Mounting Bracket/Plate for 110-2250A	1
6	Knobs	21	440-264	Knob, Silver and Black with Pointer	13
7	Knobs	25	440-61	Knob, black	
8	Knobs	40	440-418	Knob, large	2
9	Knobs	40	440-417	Knob, small	
10	Switches	25	680-334	Switch, SPST pushbutton	3
11	Switches	25	680-629	Switch, pushbutton (pair)	
12	Switches	44	680-655	Switch, Power	5
13	Transformers	21	710-4258	Transformer, Power 27Vdc .25A	1
14	Transformers	21	710-4227	Transformer, Power	
15	Transformers	21	710-4321	Transformer, Power	
16					

Report exported as an Excel file with **Flatten Groups in Excel and CSV** *enabled*

CSV files support text only, so visualizations cannot be rendered in them.

```
"Product Models, Weights and Views","","","",""
"Category","Mfg Code","Model #","Product Name","Views"
"To render a chart, please uncheck ""Flatten Groups in Excel and CSV"" under ""Export Settings"" in the Settings menu","","","",""
"Covers & Chassis","21","211-1525","Cover, 8-Key Clear","6"
"Covers & Chassis","21","115-6961","Mounting Bracket/Plate for 110-2250A","1"
"Knobs","21","440-264","Knob, Silver and Black with Pointer","13"
"Knobs","25","440-61","Knob, black",""
"Knobs","40","440-418","Knob, large","2"
"Knobs","40","440-417","Knob, small",""
"Switches","25","680-334","Switch, SPST pushbutton","3"
"Switches","25","680-629","Switch, pushbutton (pair)",""
"Switches","44","680-655","Switch, Power","5"
"Transformers","21","710-4258","Transformer, Power 27Vdc .25A","1"
"Transformers","21","710-4227","Transformer, Power",""
"Transformers","21","710-4321","Transformer, Power",""
```

Report exported as an CSV file with **Flatten Groups in Excel and CSV** *enabled*

Export Options

When building an ExpressView that will be exported, the **Export Options** should be considered to set certain characteristics of the exported output.

To change the export settings, from the 

Export menu on the toolbar, hover over **Export Options**.

Export Options

Export Types

Allow

☒ Excel ☒ PDF ☒ RTF ☒ CSV

Report Tree Shortcut

Run Report

Default Export Type

Default

Page and Style

Page Size

Letter

Orientation

Portrait

☒ Fit Content to Page Width

☒ Flatten Groups in Excel and CSV

☒ Keep Cell Styling in Excel

Other

Include Setup Info

No

No Data Qualified Mode

Show Message

Save and Close

ExpressView Export Options dialog

The export settings are arranged in three groups: **export types**, **page and style** and **other**.

Export Types

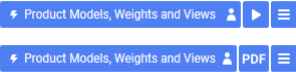
The **Export Types** section determines how exporting is accessed through the application.

- **Types Allowed** – uncheck any file types that the report should not be exported to. The default is for all file types to be checked.

NOTE

The system administrator can restrict the availability of certain export file types, so all four types may not be available.

- **Report Tree Shortcut** – choose the action that is available when selecting the report in the **Report Tree**. Choose *Default* to use the behavior set by the system administrator, *Run Report* to execute the report in the ExpressView Designer or *Export Report* to export the report in the **Default Export Type**. The default setting is *Default*.



Report Tree item for an ExpressView with **Report Tree Shortcut** set to *Run Report* (top) and *Export Report* (bottom)

- **Default Export Type** – choose the export file type that will be used by default when exporting directly from the **Report Tree** or when scheduling the report's execution with the Schedule Wizard. Choose *Default* to use the file format set by the system administrator, or explicitly choose a file format. The default setting is *Default*.

Page and Style

The **Page and Style** section determines the size of the pages in Excel, PDF and RTF exports.

- **Page Size** – choose the page/paper size. Choices are common named US and ISO paper sizes (e.g. *Letter*, *Legal*, *Tabloid*, *A4*, etc...) The default value is *Letter*.
- **Orientation** – choose either *Portrait* or *Landscape* page orientation. The default is *Portrait*.
- **Fit Content to Page Width** – check this box to stretch the contents to the available width of the page. The default value is *checked*.

Product Models, Weights and Views				
Category	Mfg Code	Model # Distinct Count	Product Name	Views Total
Covers & Chassis	21	2		7
		2		7
		211-1525	Cover, 8-Key Clear	6
		115-4961	Mounting Bracket/Plate for 110-2250A	1
Knobs	21	4		15
		1		13
	25	440-264	Knob, Silver and Black with Pointer	13
		1		0
	40	440-61	Knob, black	2
		2		2
Switches	25	440-418	Knob, large	8
		440-417	Knob, small	3
	44	680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	3
Transformers	21	680-655	Switch, Power	5
		1		1
		710-4258	Transformer, Power 27Vdc 25A	1
		710-4227	Transformer, Power	1
		710-4321	Transformer, Power	1
Report Totals		12		31

Product Models, Weights and Views				
Category	Mfg Code	Model # Distinct Count	Product Name	Views Total
Covers & Chassis	21	2		7
		2		7
		211-1525	Cover, 8-Key Clear	6
		115-4961	Mounting Bracket/Plate for 110-2250A	1
Knobs	21	4		15
		1		13
	25	440-264	Knob, Silver and Black with Pointer	13
		1		0
	40	440-61	Knob, black	2
		2		2
Switches	25	440-418	Knob, large	8
		440-417	Knob, small	3
	44	680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	3
Transformers	21	680-655	Switch, Power	5
		1		1
		710-4258	Transformer, Power 27Vdc 25A	1
		710-4227	Transformer, Power	1
		710-4321	Transformer, Power	1
Report Totals		12		31

An ExpressView on a wide paper size with **Fit Content to Page Width** unchecked (top) and checked (bottom)

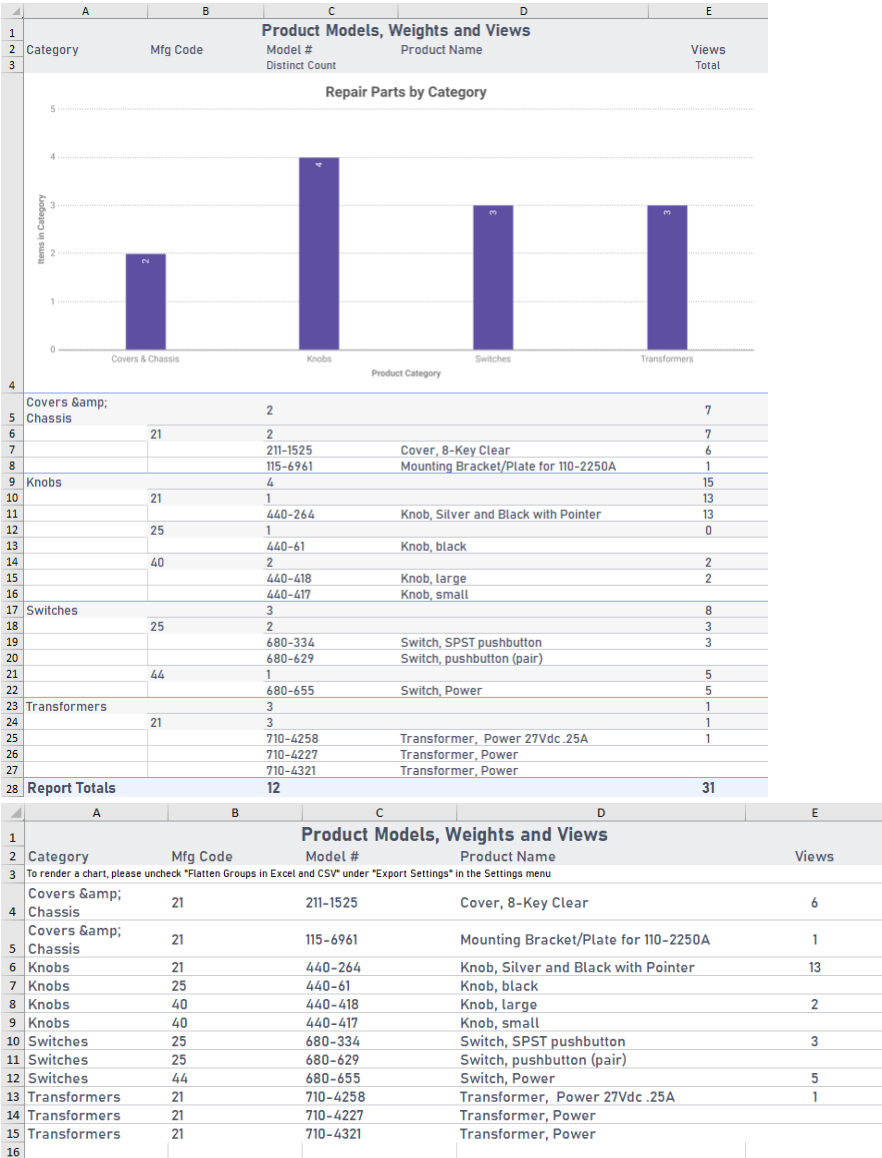
NOTE

This setting only controls whether or not the content will expand to fit a page that is wider than the data. Exported data will always compress to fit in the available page width if the page is smaller than the data.

- **Flatten Groups in Excel and CSV** – choose how to handle the inclusion of group headers in the exported data for Excel and CSV file outputs. When *checked*, the groups are “flattened”. Groups become columns that repeat for each row of data. When *unchecked*, the groups remain in their hierarchical positions, and only appear when they change. The default value is *checked*.

CAUTION

When groups are flattened, group and report totals will be removed from the report output.



An ExpressView exported to Excel with **Flatten Groups in Excel and CSV unchecked** (top) and **checked** (bottom)

CAUTION

Enabling **Flatten Groups in Excel and CSV** on an ExpressView that doesn't have **Detail Rows** visible (unchecked on the toolbar) will result in an empty output file.

- **Keep Cell Styling in Excel** – choose to either retain or remove styling such as font, and background color when exporting to Excel. The default value is *checked*.

Product Models, Weights and Views				
Category	Mfg Code	Model #	Product Name	Views
		Distinct Count		Total
Covers & Chassis		2		7
	21	2		7
		211-1525	Cover, 8-Key Clear	6
		115-6961	Mounting Bracket/Plate for 110-2250A	1
Knobs		4		15
	21	1		13
		440-264	Knob, Silver and Black with Pointer	13
	25	1		0
		440-61	Knob, black	
	40	2		2
		440-418	Knob, large	2
		440-417	Knob, small	
Switches		3		8
	25	2		3
		680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	
	44	1		5
		680-655	Switch, Power	5
Transformers		3		1
	21	3		1
		710-4258	Transformer, Power 27Vdc .25A	1
		710-4227	Transformer, Power	
		710-4321	Transformer, Power	
Report Totals		12		31

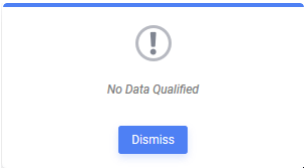
Product Models, Weights and Views				
Category	Mfg Code	Model #	Product Name	Views
		Distinct Count		Total
Covers & Chassis		2		7
	21	2		7
		211-1525	Cover, 8-Key Clear	6
		115-6961	Mounting Bracket/Plate for 110-2250A	1
Knobs		4		15
	21	1		13
		440-264	Knob, Silver and Black with Pointer	13
	25	1		0
		440-61	Knob, black	
	40	2		2
		440-418	Knob, large	2
		440-417	Knob, small	
Switches		3		8
	25	2		3
		680-334	Switch, SPST pushbutton	3
		680-629	Switch, pushbutton (pair)	
	44	1		5
		680-655	Switch, Power	5
Transformers		3		1
	21	3		1
		710-4258	Transformer, Power 27Vdc .25A	1
		710-4227	Transformer, Power	
		710-4321	Transformer, Power	
Report Totals		12		31

An ExpressView exported to Excel with **Keep Cell Styling in Excel** *checked*(top) and *unchecked*(bottom)

Other

The **Other Options** determine additional content and behavior in the output.

- **Include Setup Info** – choose to include information about sorts, filters and data objects that are included in the report.
Choose from:
 - *No* – additional setup information is not included in the output file
 - *Top* – additional setup information is included at the beginning of the output, before the report content
 - *Bottom* – additional setup information is included at the end of the output, after the report content
- **‘No Data Qualified’ Mode** – choose what action should be taken if there is no data that qualifies to be included in the output (e.g. a filter excludes all possible rows). The default value is *Show Message*. Choose from:
 - *Show Message* – display a message in a dialog box that no data is qualified for the report. Stop execution and do not return any file.

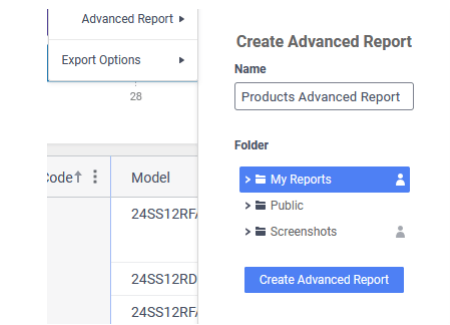


- *Show Report* – continue with report execution and return a file with the report headers and footers but without any data.

Category	Mfg Code	Model Distinct Count	Name	Wt (lbs) Avg	Views Total
Report Totals		0		0.0	0

Exporting to an Advanced Report

To export an ExpressView to an **Advanced Report**:



1. Click the **Export** menu on the toolbar. Hover over **Advanced Report**.
2. Provide a report name in the **Name** field for the Advanced Report.

NOTE

Even though the new report will be of a different type, it must have a unique report name.

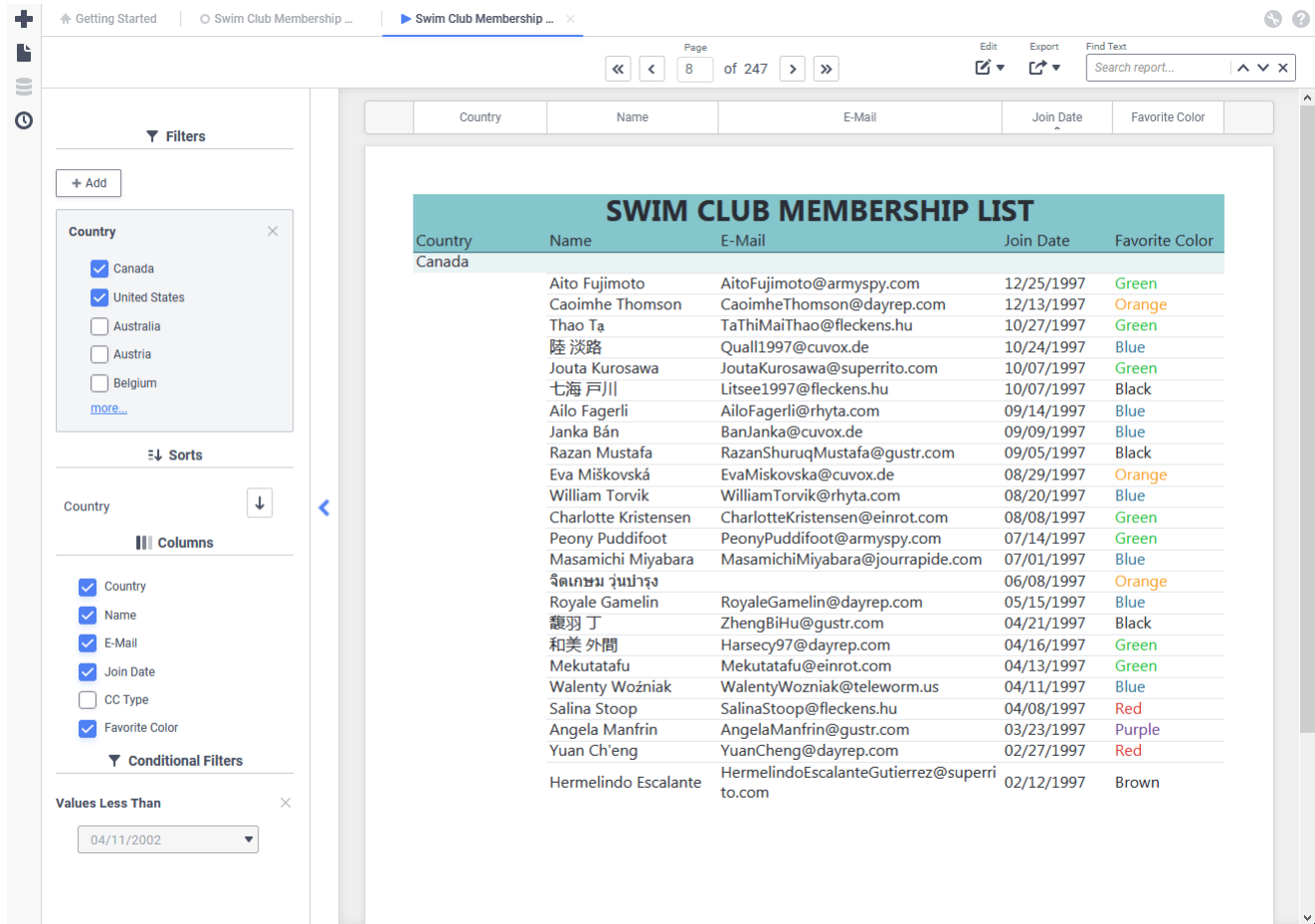
3. Select a **Folder** to save it to in the report tree browser.
4. Click **Create Advanced Report**.

The **Advanced Report Designer** will open with the newly created report for immediate editing.

Report Viewer

This document covers several versions of the application. Use the **Viewing content for** dropdown to see only the content relevant to a specific application version.

Executing an Advanced Report or CrossTab Report presents the data output in a paged, interactive format called the **Report Viewer**. Paging through, searching, filtering, sorting, conditional formatting chart and map interactivity are all available in the Report Viewer. Changes made to the report can be saved to the original report, a new report or a customized “user report”. Basic report viewing is also supported on mobile devices.



The interactive Report Viewer (v2021.1+)

To run a report in the Report Viewer either:

- From the Report Designer, click on the toolbar. Depending on system configuration, this will also save the report.
- From the Report Tree, select the report then either:
 - click the **Run** icon (if available), or

- click the **Menu**  icon or right-click and then ► **Run Report**.

The Report Viewer opens in a new tab, indicated by the viewer ►

icon. Making any changes in the Report Designer requires running it again in a new Report Viewer tab.

Prompting Filters and Parameters

Some reports may contain filters or parameters that prompt for a value to be provided when the report is run. In this case, a dialog will appear asking for a value to be displayed.

Apply Parameters

Name	Value
Compute interest for entire year	True
Amount of down payment	15029.12
Choose a date	01/01/2050
Destination e-mail address	peter@example.com

Run Report

Cancel Run

Prompting parameter dialog

1. For each parameter or filter, enter a value into the **Value** field by either:
 - entering the value directly into the text field
 - choose a value from the dropdown list, if available.
 - click the **Formula Function**  icon to select a value based on a formula function, if available.
 - click the **Date Selector**  icon to choose a date, if the parameter expects a date value
2. Click **Run Report** to execute the report with the provided values, or **Cancel Run** to cancel the report's execution.

For filters, the report builder has the option of choosing what fields and controls are available in the prompt. The full filter dialog may appear, or a simplified version with or without the ability to change the filter operator may appear.

Apply Filters

Field	Operator	Value
Products.UnitPrice	Greater Than Or Equal To	31.23
Product Category	Is One Of	Produce Beverages Confections

Run Report

Cancel Run

Simple prompting filter dialog without operator. This is considered “without operator” because the operator cannot be changed in this dialog.

If the filter has an *Is One Of* operator, values may be selected from the top dropdown in the **Value** column. A value may be manually entered and then added by clicking on the **Add Value**  icon.

Anatomy of the Report Viewer

The Report Viewer is divided into three sections: the toolbar, the interactive dock and the canvas.

Toolbar

Use the toolbar for paging or searching through the report's contents, saving changes made to the report in the Viewer and exporting the report to a downloadable file such as PDF, Excel, RTF or CSV. The system administrator can enable or disable certain features, including the entire toolbar, so not all options shown below may be available.

TIP

Select the correct version number from the **Viewing content for** dropdown in this article to show only the relevant options.

Page

1 of 41

Showing 2000 Results

Edit

Export

Find Text

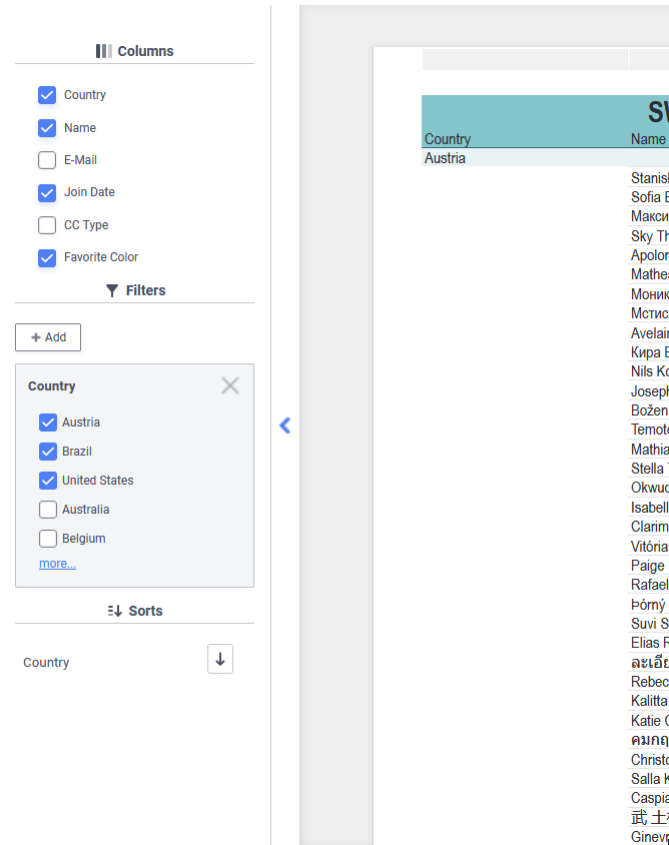
Search report...

Report Viewer toolbar (v2021.1+)

- « **First Page** » skip to the first page of the report
- < **Previous Page** » turn back one page
- > **Next Page** » advance one page
- » **First Page** » skip to the last page of the report
- **Showing x Results** (v2021.1+) » the report was generated with a partial data set and may contain incorrect calculations and aggregates. Click the link to load more data:
 - **Load x more Records** » get the next x of data rows and add them to the existing report
 - **Load All Data** » get the remainder of the data set
-  **Edit** (v2021.1+) » save or clear any changes to the report made with the features described in the Interacting With Reports and Customizing Report Output – Creating User Reports sections below.
 - Save Changes...
 - **to This Report** » save any changes made back to this report
 - **as New Report** » save any changes made to the report as a new report with a new name and folder
 - **as User Report** » save any changes made to the report as a user report
 - Clear Changes
 - **Styling Only** » clear only styling changes made with the conditional formatting/filtering popup to the report
 - **Column Only** » unhide all hidden columns, reset custom column widths and remove any active column sorts
 - **Delete User Report** » delete the user report if one exists
 - **Clear All** » clear changes made with the conditional formatting/filtering popup dialog, unhide any hidden columns, reset custom column widths, remove active column sorts
-  **Export** (v2021.1+) » export the report as a downloadable file such as PDF, Excel, RTF or CSV. Not all file types may be available depending on report and system configuration.
- **Find Text** (v2021.1+) » search the report data for text entered into this field. Text that matches the search will be highlighted. Use the **Search Up** ^ and **Search Down** v icons to move between results that match the search text. Click the **Clear** x icon to remove the search from the report.

Interactive Dock

The **interactive dock** optionally contains filters, sorts and column view controls. The dock can appear on the left or right side of the Report Viewer by default. It can also be disabled on a per-report or per-system basis.



The Interactive Dock is displayed on the left side of the window in this figure

The dock contains different modules based on the system and report settings: columns, filters, sorts and conditional filters.

Click the **Open Dock** > (v2021.1+) icon to open the dock to manage the modules and their settings. Click the same icon to hide the dock.

Filters

Interactive filters added to the report will appear in this section. They are added in the Report Designer for exclusive use in the Report Viewer. Changes made to the filters can be saved as a user report.

Some filters may appear as soon as the dock is opened, others can be added as needed with the **Add** button (v2021.1+).

Filters

+ Add

Country

☒ Canada

☒ United States

☐ Australia

☐ Austria

☐ Belgium

[more...](#)

Birth Year

19902002

Filters module (v2021.1+) with two filters: a multiple choice filter for Country, and a range slider for Birth Year

To remove an interactive filter, click the **Remove Filter**  (v2021.1+) icon.

 Sorts

The **sorts** on the report optionally are exposed in this module, available to be switched from *ascending* or *descending* order.

To change the direction of a sort, click the corresponding **Sort Ascending** 

or **Sort Descending**  icon.

Sorts

Categories.CategoryName



Products.ProductName



Sorts module (v2021.1+) with two sorts: a descending sort on `Categories.CategoryName` and an ascending sort on `Products.ProductName`

 Columns

Selectively hide or unhide columns from an Advanced Report’s output by checking or unchecking the corresponding checkboxes. The visibility of columns can be saved as a user report.

NOTE

This module is unavailable if a CrossTab appears on the report.

Columns

☒ Country

☒ Name

☐ E-Mail

☒ Join Date

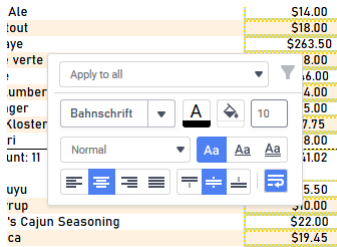
☐ CC Type

☒ Favorite Color

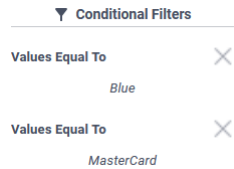
The E-Mail and CC Type columns are hidden from the report but Country, Name, Join Date and Favorite Color are visible

 Conditional Filters

Conditional Filters are those added to the Report Viewer with the conditional formatting/filtering popup dialog. Conditional filters can be saved to a user report.



Conditional formatting/filtering popup dialog

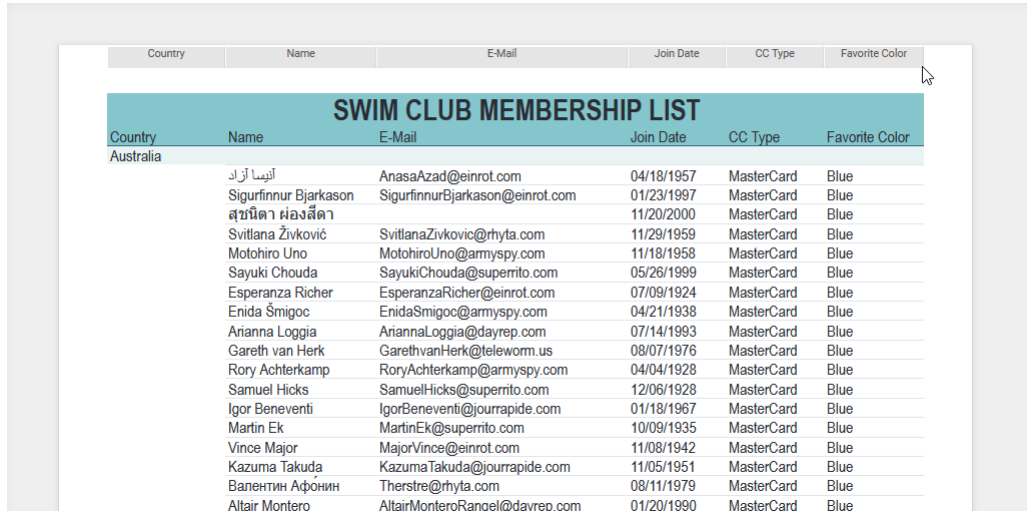


Conditional Filters module (v2021.1+) with two filters: one enforcing the color choice to be blue, the other credit card type to be MasterCard

To remove a conditional filter, click the **Remove Filter** (v2021.1+) icon. The module will disappear once all conditional filters have been removed from the report.

Canvas

The canvas is the main viewpoint for the data presented in the report. The canvas consists of the **column headers** which appear as boxes above the report layout, and the report layout/data itself.



Mouse hovering over the column headers/control boxes at the top of the report canvas *pre-v2021.1*

See Managing Data Columns below for information about interacting with the column headers. See Interacting With Reports for information about interacting with the data, charts and maps that appear on the report's layout.

Interacting With Reports

There are a number of ways to interact with reports in the **Report Viewer**. Available options depend on how the report was designed and the type of content in it.

TIP

If the report has **Linked Action Events**, there may be more interactive features than aren't listed in this article. Consult with the system administrator or the user who designed the report for more information.

Drilling Into Data

Some reports allow **drilling down** into cells or charts to see additional data related to the field selected. If a cell or chart has a linked report (a.k.a. drilldown), click on one of the values to see the related data.

Linked Reports are actually other reports that can be interacted with or even export to a file. Linked Reports may even have drilldowns of their own!

Orders per Customer

Alfreds Futterkiste

ORDERID	Quantity	UnitPrice	Revenue
10143	38	\$25.20	\$362.00
10143	20	\$43.90	\$878.00
10702	21	\$14.00	\$165.00
10835	17	\$34.00	\$425.50
10952	18	\$35.30	\$245.60
11011	60	\$17.38	\$480.00



Clicking on an Order ID drills down into the line items included on that order with a linked report. Note the mouse cursor changes to a hand versus an arrow indicating that the order ID is clickable.

Expanding Collapsed Rows

Some reports have collapsed rows that can be seen by expanding them. Collapsed rows are indicated by the **Open Rows** icon. Click on the icon to expand the row. Click the icon again to collapse it. Right-click the icon to open a menu to do the following:

- **Expand / Collapse** – expand or collapse the outer group
- **Expand / Collapse Group** – expand or collapse the group and any inner groups
- **Expand / Collapse All** – expand or collapse all outer and inner groups on the report

Antonio Moreno Taquería

Eastern Connection

ORDERID	QUANTITY	UNIT PRICE
10364	35.00	\$23.00
10400	86.00	\$43.13
10532	39.00	\$21.45
10726	30.00	\$21.50
10987	86.00	\$36.93
11024	113.00	\$19.07
11047	55.00	\$19.68
11056	125.00	\$29.33

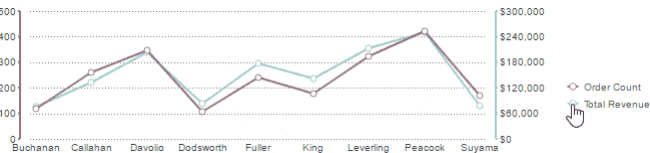
Familia Arquibaldo

Expanding a data row

Visualization Features

Visualizations have a number of interactive features depending on the type of chart. For example, line charts and bar charts allow hiding series, axes can be turned on or off for multi-axis charts and the slices of pie charts can be pulled out and rotated . Charts can also show some additional information in a tooltip when hovered over. Heatmaps may optionally display up to 5 additional data series in a tooltip when hovering over a cell.

See Styling Charts below for additional information about changing a chart's style in the viewer.



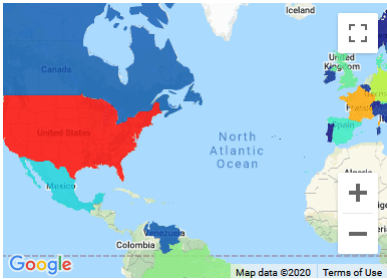
Toggling a chart series on or off



Rotating a pie chart and pulling out its segments by clicking on them

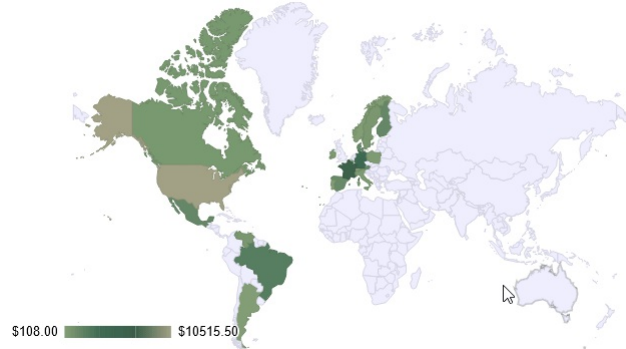
Drilling Into Maps

Google Maps are fully interactive geographic visualizations. Review the Interacting with Google Maps Visualizations section of the Google Maps article for full details.



Drilling down from country, to state, county and street address level by double-clicking on the Google Map

On a GeoChart, click on a highlighted region to drill down into the region. Click **[Back]** to return to the previous view. Learn more in the Interacting with GeoChart Visualizations section of the GeoCharts article.



Drilling down from world view to the United States, then selecting Washington state, then viewing the map detail for the cities Seattle and Kirkland on a GeoChart

Customizing Report Output – Creating User Reports

The Report Viewer allows for changes to the style, formatting and data presented on the report. These changes can be saved to the original report, to a new copy of the report, or as a *user report*. Review Toolbar above for details how to save report changes.

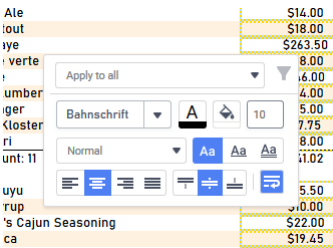
A **user report** is a customized version of a report that is specific to a specific end user. User report changes are saved separately from the report design, and will only show when that user runs the report themselves. These can be useful for making changes to read-only reports. More information about user reports can be found in the User Preferences and Context Sensitive Help article.

NOTE ABOUT COOKIES

User reports may be stored locally in the web browser. Clearing the browser cache will remove any user report customization. Contact the system administrator for additional information.

Styling Data

Right-click a cell to open the **conditional formatting/filtering popup**. Use this dialog to set custom formatting based on the data meeting certain criteria.



Right-clicking a cell to change its styling

For group cells with dynamic data from fields or formulas, use the **Conditional Filter** list (default value is *Apply to all*) to apply styling to only the data that meet a certain condition. For each of the following options, styling applies to the cells of the same type in the group that meet the specified condition:

TIP

Select a condition before changing the styling.

- *Apply to all* – apply universally to all of the cells in this column
- *Apply to equal values* – All cells with the same value as the clicked cell
- *Apply to unequal values* – All cells with different values than the clicked cell
- *Apply to greater values* – All cells with values greater than the clicked cell (larger number, later date, or alphabetically)

- subsequent)
- *Apply to greater than or equal values* – All cells with values greater than or equal to the clicked cell
- *Apply to lesser values* – All cells with values less than the clicked cell (smaller number, earlier date, or alphabetically preceding)
- *Apply to less than or equal values* – All cells with values less than or equal to the clicked cell

The styling options available are:

-  Font
-  Font Size
-  Text Color
-  Background color
-  Text decoration
-  Horizontal and  Vertical Alignment
-  Wrap Text

Styling applies to all cells of the same type in the column; affected cells are outlined by a goldenrod border.

Conditional Filters

Clicking the 

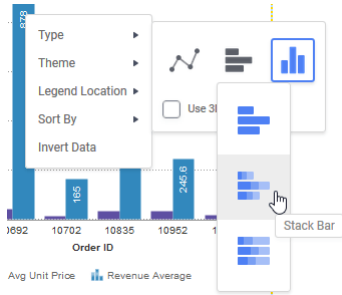
Conditionally Filter icon will add a new conditional interactive filter to the report and open the Interactive Dock (if not already open), filtering the detail rows by the criteria selected in the dropdown. This icon is only active for choices other than *Apply to All*. See Interactive Dock and Conditional Filters above.

Styling Charts

NOTE

The Chart Options menu is supported for all chart types except heatmaps.

Right-click a chart (or click the **Chart Options**  icon on mobile) to open the **Chart Options** menu. Using this menu you can swap to a different Type of chart, change the color Theme, change the location of the Legend, and change the Sort order of the data series. These settings can be saved as a user report.



Changing a column chart to a stacked bar chart with Chart Options menu

- **Type** – change the chart from one type to another as in the Type tab of the Chart Wizard. Only charts of the same series type may be selected. That is, if the chart is a multi-series type of chart only other mutli-series charts may be selected.
- **Theme** – change the color palette of the chart as in the Colors section of the Chart Wizard's Appearance tab.
- **Legend Location** – change the location of the legend
- **Sort By** – change the sort order on the chart as in the Other Options section of the Chart Wizard's Data tab.
- **Invert Data** – swap the data fields on the X and Y axes

Managing Data Columns

Each column on the report has a light gray column header/control box. These headers can be optionally turned on or off from the Report Designer. Changes made here can be saved as a user report.

Change the width of the columns by clicking and dragging the line between column headers left or right.



Resizing a column

To hide a column, either:

- right-click the column header, then click  **Hide Column** from the menu
- use the Interactive Dock's Columns module to uncheck the column (not available for CrossTabs)



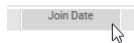
Right clicking a column to hide it

To unhide a column, either:

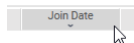
- right-click the column header, then click either < Æ Unhide Column to Left or > Æ Unhide Column to Right from the menu
- use the Interactive Dock's Columns module to check the column (not available for CrossTabs)

Some columns may have an additional **column sort** that is either active when the report is executed, or can be made active by clicking on the column header. Column sorts are applied after the sorts defined in the Report Designer's Sorts dialog. If there are multiple columns with column sorts defined, only one may be active at any given time.

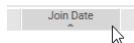
Clicking the column header will cycle through the available options: no column sort, ascending column sort, descending column sort.



Column header
(pre-v2021.1 on top, v2021.1+ on bottom) with no column sort applied



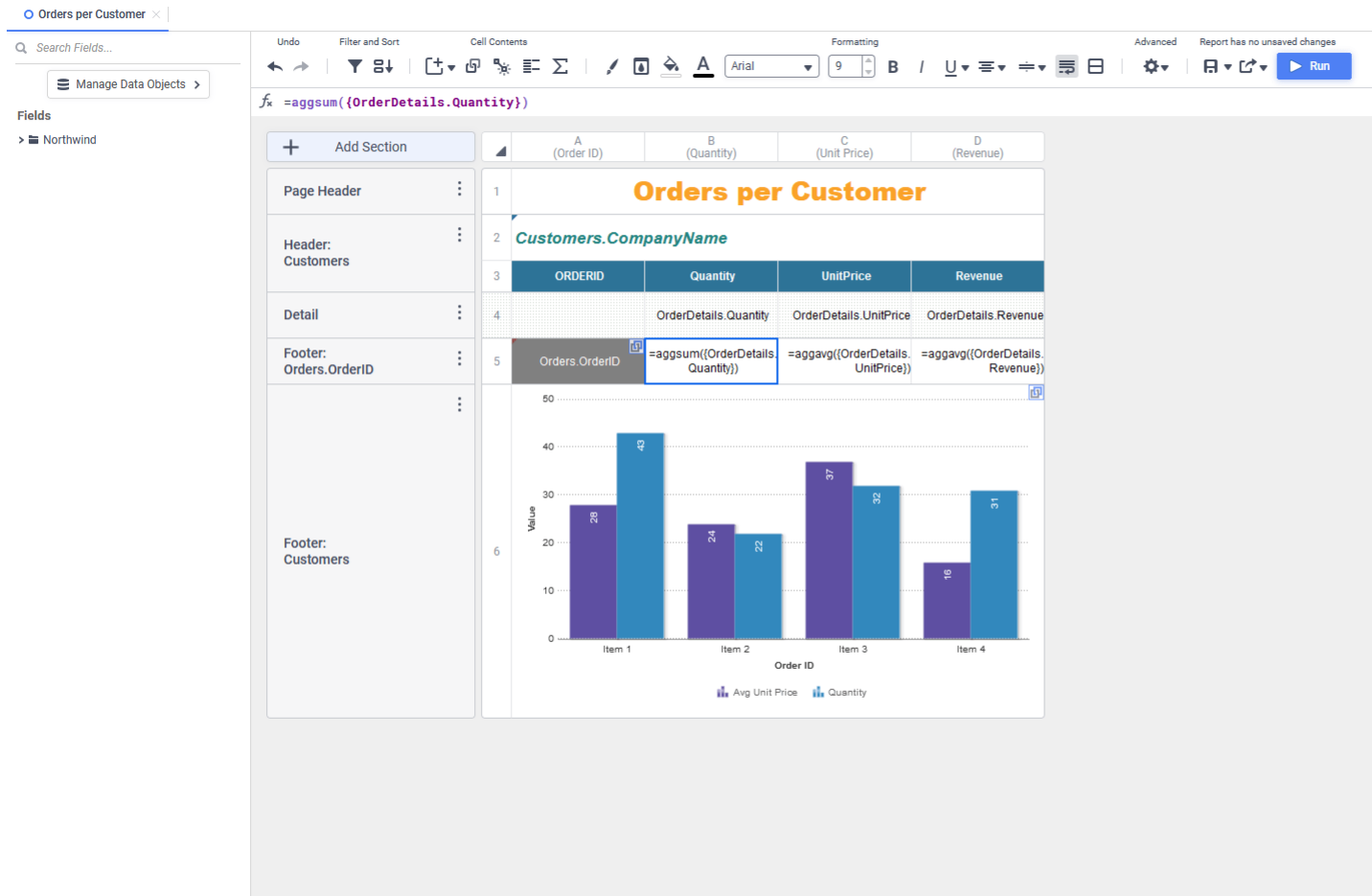
Column header
(pre-v2021.1 on top, v2021.1+ on bottom) with an ascending column sort applied



Column header
(pre-v2021.1 on top, v2021.1+ on bottom) with a descending column sort applied

Report Designer (v2021.1+)

Æ The **Report Designer** is the main editor for **Advanced** and Æ **CrossTab Reports**. A full suite of reporting and design tools with a spreadsheet-like interface is available.



The Advanced Report Designer

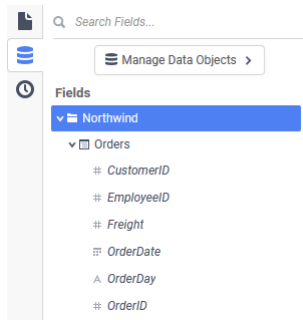
Reports may be sorted, grouped and filtered on data from several sources. The flexibility of the Designer allows for simple reports as well as very complex reports with many calculations, graphics, charts, maps and interactivity to be created. Advanced Reports can link to other reports for drilling further down into background data. Files (also known as templates) may be uploaded to the Designer to dynamically fill form fields or automatically include data in documents.

The Advanced Designer is comprised of several different parts: the Data Objects Pane, the Toolbar, the Formula Bar and the Design Grid.

Data Objects Pane

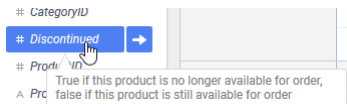
The **Data Objects Pane** on the left side of the Designer contains the available **data objects** that may be added to the report's design grid. Data objects are arranged into folders. Those objects are further expanded into **fields**. A field is a parcel of data from a data object, such as the name of a Product or an Employee ID number.

Data Objects Tree



Use the Search Fields area to search for fields by name.

Browse through the folders of objects and expand the objects to see the fields available. Some fields may have a description associated with them. Hold the mouse over the field name to see the description.



A field with a description that appears as a tooltip

More information can be found in the [Advanced Reports: Data Objects](#) article.

Toolbar

The toolbar contains the buttons and menus used to modify the report. Modifications can include aesthetic formatting, inserting formulas and images, linking reports, and much more.



The v2021.1+ Report Designer toolbar, with mouse pointer hovering the Format Cells icon

The system administrator has the ability to hide or show specific menu options and toolbar items. Some items may not be available.

- **Undo** – most actions on a report can be undone by clicking this icon or pressing **Ctrl + Z** on the keyboard.

NOTE

Changing filters, sorts, joins, data objects and other items from the menus are not undo-able.

- **Redo** – undone actions can be redone by clicking this icon or pressing **Ctrl + Y** on the keyboard.
- **Filter** – open the **Report Filters** dialog to create, modify or remove **Filters**, which limit the data on the report based on criteria. Full details on filtering can be found in the [Filters](#) article.
- **Sorts** – open the **Report Sorts** dialog to create, modify or remove **Sorts**, which order data on the report. Sorts are also required for utilizing **Groups**, a type of section. Full details on sorting and grouping can be found in the respective [Sorts](#) and [Sections](#) articles.
- **Insert** – insert an item into the selected cell. Choose from:
 - **Chart** – add a graphical visualization (e.g. a bar chart, line graph, pie chart). See the [Charts](#) article.
 - **Gauge** – add a gauge visualization (e.g. a thermometer or angular dial gauge). See the [Gauges](#) article.
 - **GeoChart** – add a basic geographical map visualization. See the [GeoCharts](#) article.
 - **Google Maps** – add a fully interactive geographical map visualization. See the [Google Maps](#) article.
 - **CrossTab** – add a dynamically expanding pivot table. See the [CrossTab Reports](#) article.
 - **Image** – add an image file to the cell
 - **Formula** – add a formula to the cell using the [Formula Editor](#). See the [Formulas](#) section.
- **Linked Report** – link this cell dynamically to another report, to drill into background data. See the [Linked Reports \(Drilldowns\)](#) article.
- **Linked Action Event** – link an **Action Event** to this cell. Action Events are custom bits of functionality created by the system administrator that respond to certain actions such as clicking on icons or parts of a chart. This is an advanced feature, contact the system administrator for assistance.
- **Suppress Duplicates** (*pre-v2021.1.1*) / **Hide Repeated Values** (*v2021.1.1+*) – enable this feature to hide duplicated values from appearing after one another in a report. See the [Dealing with Duplicate Values](#) article.
- **AutoSum** – to quickly get a total on a data field, place the field in a Report or Group Footer section then click this icon. Do not use **AutoSum** on a cell with an aggregate formula such as *aggSum*.

CAUTION

Aggregating some Data Sources and data types, such as floating point columns in Google BigQuery sources, may cause non-deterministic results due to limitations in the Data Source.

- **Advanced** – access additional option dialogs to control advanced features of the report
 - **Report Viewer Options** – open the **Report Viewer Options** dialog to control display options, interactive filters and sorts
 - **General Options** – open the **Report Options** dialog to control execution, exporting, filter window and page display options
 - **Custom Options** – open the **Custom Options** dialog for setting the value of extensibility options. This is an advanced feature, contact your system administrator for assistance with it.
 - **Joins** – open the **Joins** dialog to define how the data objects on the report relate to one another. See [Joins](#) for more information.
 - **Show SQL** – view the generated SQL query which retrieves the data used on the report. See [Show Generated SQL](#).
 - **Templates** – setup document templates and forms. See [Templates](#).
 - **Execution Caching** – allows the data from a report execution to be cached so that reports can be viewed more quickly and with less stress to the data source
 - **Events** – link a **Server Event** to the report. Server Events are custom bits of functionality created by the system administrator that occur when certain application triggers occur such as when the report is loaded, saved or during the execution cycle. See the [Events](#) section of the [Advanced Options](#) article.
 - **Parameters** – define reusable system variables, called Parameters, on the report. See [Report-Level Parameters](#).
- **Save Report** – save the report to the system. On the first click, or by clicking the dropdown arrow icon, provide a name, optional description, optional filter description (if enabled) and folder to save the report to.
- **Export Report** – save the report as a downloadable *PDF*, *Excel*, *RTF* or *CSV* file.
- **Run** – execute the report in the application's **Report Viewer**.
- **Execution Caching** – the data displayed on this report comes from a cache that is periodically updated. Click the **Cache Invalid** icon to manually update the cache. When the **Cache Valid** icon is displayed, the cache is valid. A report

- may only be run when the cache is valid.
-  **Format Paintbrush** – select a cell to copy the formatting from, click this icon and then click another cell to copy the formatting to
 -  **Format Cells** – open the **Format Cells** dialog to change data formatting, borders and conditional formatting settings. See Cell Formatting.
 -  **Background Color** – select a cell, then click this icon to change the cell's background color with the color chooser.
 -  **Foreground Color** – select a cell, then click this icon to change the cell's foreground/text color with the color chooser.
 -  **Font and Font Size** – select a cell, then click the dropdown to choose a different font. Use the up and down arrows to change the size of the font, or enter a number directly.
 -  **B Bold** – select a cell, then click this icon to change the font weight to **Bold**. Click again to remove bold weight.
 -  **Italic** – select a cell, then click this icon to change the font style to *Italic*. Click again to remove italic styling.
 -  **U Underline** – select a cell, then click this icon to change the font style to change the font style to Underlined. Click again to remove underline styling. Click the dropdown arrow icon to choose the underline type, either *Single* or *Double*.
 -  **Horizontal Alignment** – select a cell, then click this icon to change the horizontal alignment of the content of the cell. Choose from:
 -  *Left*
 -  *Center*
 -  *Right*
 -  *Justified*
 -  **Vertical Alignment** – select a cell, then click this icon to change the vertical alignment of the content of the cell. Choose from:
 -  *Top*
 -  *Middle*
 -  *Bottom*

Formula Bar

```
fx =AggMin(DateDiff(@AvgAgeUnit@, {Orders.OrderDate},{Orders.ShippedDate}))
```

A formula may be added to cells by directly entering them into this formula bar. Click the **Formula Editor**  icon in the bar to open the Formula Editor for assistance building the formula. Just as when entering formulas directly into cell content, formulae should be prefixed with an equals sign.

Examples

```
=({Orders.OrderDate})

=AggCount ({Products.ProductName})

=[A5]
```

Additional Resources

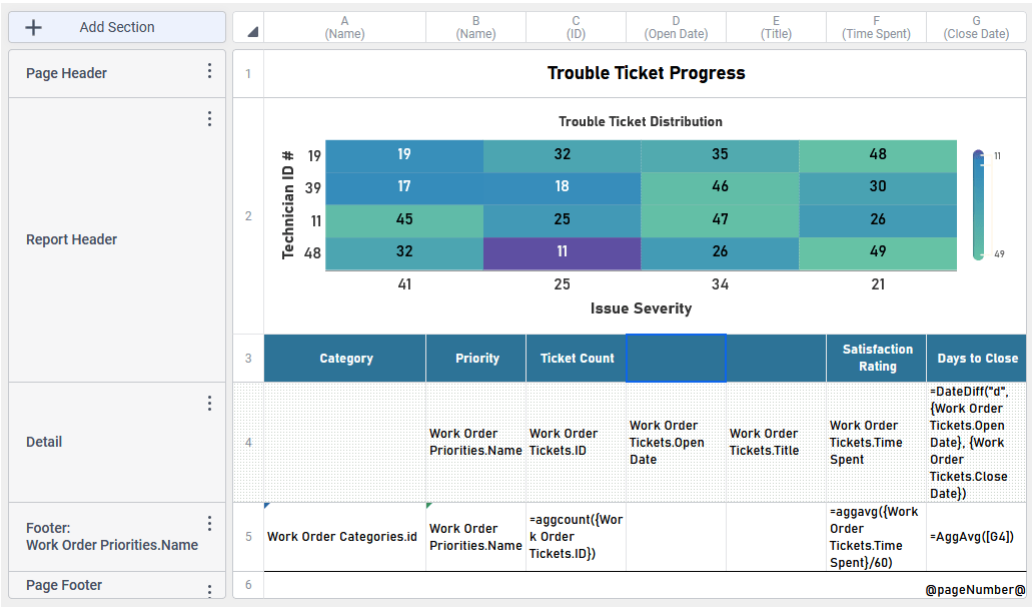
For more information about formulas, review these articles:

- What are formulas?
- Formula Basics
- Formula Editor

Design Grid

The Report Designer works in a spreadsheet-like interface with content residing in **cells** arranged into **rows** and **columns**. Cells may contain plain text, data from data objects, formulas, images, charts, maps and gauges.

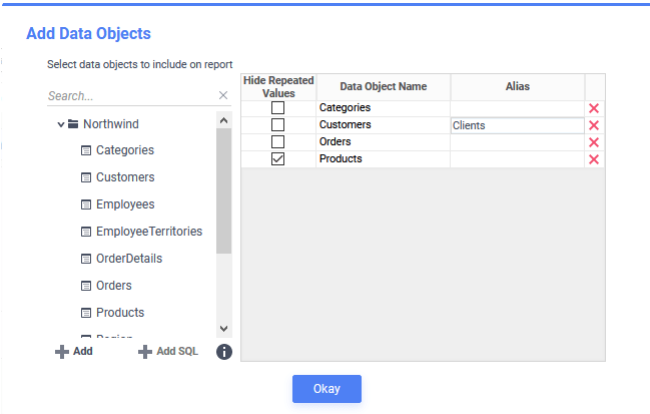
The Design Grid can be broken down into **sections** that dictate more finite control of how and where content appears on the finished report. Available section types include **Page Header**, **Report Header**, **Group Header**, **Detail**, **Repeating Groups**, **Group Footer**, **Report Footer** and **Page Footer**.



Advanced Reports: Data Objects (v2021.1+)

A **data object** is a container for reportable information from a source of data. For example, a payroll report may include an *Employees* data object with census data such as names, addresses and hire dates as well as a *Time* data object with clock-in and clock-out times for each employee's shift start and end.

When creating a new Advanced Report, data objects will be added to the report with the **Add Data Objects** dialog, which will appears when launched for the first time.



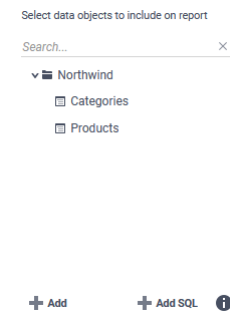
Data Objects Dialog

The **Data Objects Dialog** consists of two main parts:

- the available data objects tree on the left side
- the selected data objects panel on the right side

Available Data Objects Tree

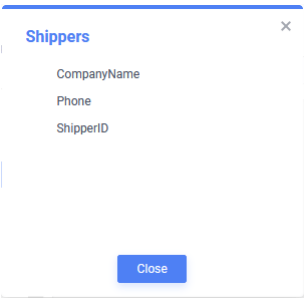
The data objects tree on the left side of the dialog shows all of the available data objects that can be added to a report. A **Search...** field at the top of the tree allows searching for data objects by name.



There are two data objects in the Northwind folder of this data objects tree: Categories and Products

If the system administrator has enabled it, custom SQL statements may be added as a data object in lieu of selecting one of the existing objects. For more information, refer to the Custom SQL Objects section of this article.

Selecting a Data Object from the list and clicking on the **View Data Object Details** ⓘ icon will display the names of the **fields** that are available in that object.



CompanyName, Phone and ShipperID are fields available in the Shippers data object

Selected Data Objects Panel

The selected data objects panel on the right side of the dialog is where the added data objects appear and is divided into three or four columns depending on system configuration.

Hide Repeated Values	Data Object Name	Alias	
☐	Categories		✗
☐	Customers	Clients	✗
☐	Orders		✗
☒	Products		✗

Three data objects have been added to this report: Categories, Products and Orders

- **Suppress Duplicates** (*pre-v2021.1.1*)/**Hide Repeated Values** (*v2021.1.1+*) ⓘ check this checkbox to hide repeating values on the report. For more information, review the Dealing with Duplicate Values article.
- **Data Object Name** ⓘ the name of the data object as it appears in the available data objects tree and the system configuration
- **Alias** ⓘ this column is only available if the system administrator has enabled it. When this column is present data objects can be added more than once. This allows, for example, joining the fields on the duplicate data object to other objects, or to itself in ways other than what the system administrator has defined. For more information, refer to the Advanced Reports: Joins article. Each data object must be referenced by a unique alias. The alias can also be used to provide a different name for the data object.
- **✗ icons** ⓘ click the **Delete** ✗ icon on the corresponding row to remove the data object from the report.

Add, Edit or Delete Data Objects to/from a Report

The instructions below assume that the Add Data Objects dialog is already open on screen.

- To **add** a data object to a report, first choose the data object from the available data objects tree and then either:
 - click the arrow icon to the right of the object's name
 - click the **➕ Add** button at the bottom of the tree
 - double-click on the data object's name
 - drag-and-drop the data object from the tree to the selected data objects panel
 - click the **➕ Add SQL** button to add a custom SQL object to the report. There may not be any other data objects in the selected data objects panel for this button to have an effect. For more information, refer to the Custom SQL Objects

section of this article.

- Click the **Custom SQL Object**  icon in the Data Object Name column to **edit** it. Only **Custom SQL Objects** can be edited from the Add Data Objects dialog.
- Click the **Delete**  icon on the corresponding row to **delete** a data object. This removes the data object from the report, but not from the system configuration.

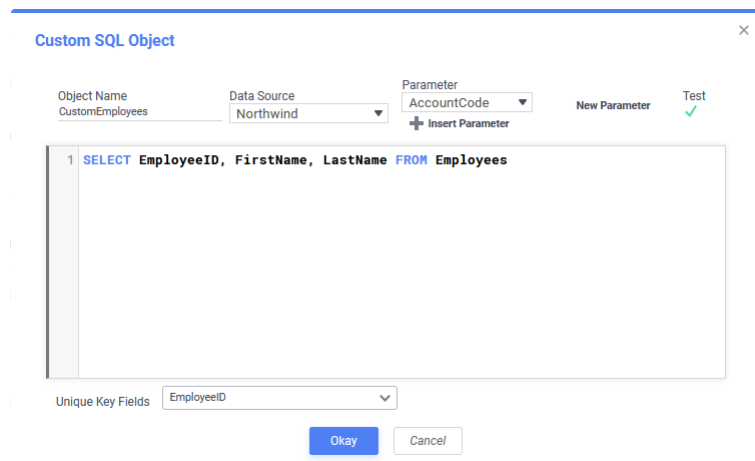
Custom SQL Objects

This is an advanced feature, and the system administrator must enable it for it to be available.

CAUTION

If a **Custom SQL Object** is added as a data object to a report, it may be the *only* data object on that report.

Custom SQL Objects may only be added to new report, not an existing report.



Custom SQL Object dialog in v2021.1.15+

Writing Custom SQL Objects requires underlying knowledge of the data source architecture and its relevant SQL language.

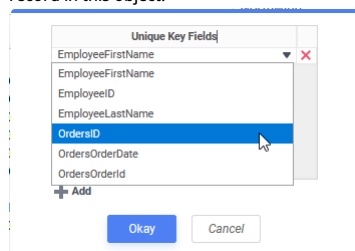
To add a **Custom SQL Object** to a report:

1. Click the **+ Add SQL** button in the Add Data Objects dialog to open the **Custom SQL Object** dialog.
2. Provide a unique **Object Name** for the new data object. It cannot match any existing data object in the system configuration nor contain any of the following characters, including spaces: [] { } . , @
3. Choose the **Data Source** that this Custom SQL Object will retrieve data from. Not all data sources in the system may support Custom SQL objects.
4. In the large **code window** (shown with a line number 1 in the figure above), enter the full SQL statement. This statement will be inserted as a subquery when it is sent to the data source for processing.

CAUTION

ORDER BY clauses and **Common Table Expressions** are not supported in subqueries. To sort a report with a Custom SQL Data Object, use the **Sorts** dialog in the Report Designer.

5. System variables called **parameters**, that change based on certain environmental situations (e.g. who is running the report) may optionally be added to the SQL statement by selecting the name from the dropdown and clicking the **+ Insert Parameter** button. To add a new report-level parameter to the report, and the system administrator has enabled it, first click the **New Parameter** button to open the Report Parameters dialog (v2021.1.15+)
6. Click the **Test**  icon to check the SQL statement for validity.
7. Click the **Unique Key Fields** list to select unique keys for the custom SQL object. Select the columns that uniquely identify a record in this object.



1. Click the **+ Add** button to add a unique key field to the list.
2. Select the name of the field from the dropdown, or click the **Delete**  icon to remove it.
3. Once all unique key fields are defined, click **Okay**.
8. Click **Okay** to close the Custom SQL Object dialog and save the object to the Add Data Objects dialog.

To edit a Custom SQL Object:

1. Click the **Manage Data Objects** button in the Data Objects Pane to open the Add Data Object dialog.
2. Click the **Custom SQL Object**  icon in the Data Object Name column to open the Custom SQL Object dialog.
3. Follow the instructions in the add a **Custom SQL Object** section above to edit the object.

Example

The following Custom SQL Object could be used to generate the basic report shown below with order IDs and dates of each order placed by each salesperson in the company in a certain month.

```
SELECT
    dbo.[Orders].[OrderID] AS c0,
    dbo.[Orders].[OrderDate] AS c1,
    dbo.[Employees].[FirstName] AS c2,
    dbo.[Employees].[LastName] AS c3,
    dbo.[Employees].[EmployeeID] AS c4,
    dbo.[Orders].[EmployeeID] AS c5
FROM dbo.[Employees]
INNER JOIN dbo.[Orders] ON (
    dbo.[Employees].[EmployeeID] = dbo.[Orders].[EmployeeID]
)
WHERE
    Month(dbo.[Orders].[OrderDate]) = 7
```

Employee Sales

Steven Buchanan	
10607	07/22/2015
10248	07/04/2014
10254	07/11/2014
10269	07/31/2014
Laura Callahan	
10589	07/04/2015
10596	07/11/2015
10602	07/17/2015
10603	07/18/2015
10610	07/25/2015
10614	07/29/2015
10262	07/22/2014
10268	07/30/2014
Nancy Davolio	
10587	07/02/2015
10591	07/07/2015
10598	07/14/2015
10604	07/18/2015
10605	07/21/2015
10612	07/28/2015
10616	07/31/2015
10258	07/17/2014

Output of the report

Advanced Reports: Sections (v2021.1+)

Â

The **sections** of an **Advanced Report** define its appearance and pattern. Specifically, sections determine how frequently cell contents are repeated.

The appearance of a report is based on data that is not necessarily known at the time it is made. Reports are usually not fixed designsâ€”the data, and the relationships it describes, are dynamic. Knowing which sections are suitable for different types of content is crucial for designing the best possible report.

Types of Sections

There are two general types of sections: **Static** and **Dynamic**. The difference is in the repetition of their cells.

The cells in a **static section** do not repeat according to the report data. Static sections are best used for information that is not related to data rows. For example, defining column headers that describe the type of data in each field, or a page number at the bottom of each page.

The cells in a **dynamic section** repeat according to the data that is returned to the report. Dynamic sections are suitable for showing content related to that data. For example, cells in a **Detail** section repeat for every composite data row in the report.

Static Sections

Report Headers, **Page Headers**, **Page Footers** and **Report Footers** are categorized as *static* because they do not repeat according to the data in the report; although they may repeat by other means. These sections are best used for report metadata. They can also be useful for boilerplate elements, such as logos, copyright notices, titles or disclaimers.

A typical report may have a **report header** with the title of the report, a **page header** with labels for each column, a **page footer** that uses the `PageNumber()` function or `@[email protected]` parameter to number the pages, and a **report footer** with summary information.

Page Header & Page Footer

The rows in the **Page Header** section appear at the top of every page of a report, and the rows in the **Page Footer** section appears at the bottom of every page of a report. Typically, the Page Header section is used to designate column headers for a report, and the Page Footer section isÂ used to display the page number and/or confidentiality notices for a report.

Page Headers and Page Footers are not intended to perform calculations or display data fields. For this reason, a Page Header populated with a data field will only return the first line of dataÂ in that field; a Page Footer will return only the last line of data.

Page breaks are usually caused when the data in dynamic sections overflows the length of the page, determined by the **Page Size** and **Orientation** settings in the report's **General Options**. Manual page breaks may also be added.

</

A report with a **Page Header** section in the Report Designer

Company Orders Alfreds Futterkiste Click an order ID for additional information about that order. 10643 10702 10492 10808 10962 11011 11079 Antonio Moreno Taqueria Click an order ID for additional information about that order. 10366 10866 10477 10682 10607 10636 10673 B's Beverages Click an order ID for additional information about that order. 10678 10636 10639 10471 10484 10699 11023 10289 10943 10947 Chop-suey Chinese Click an order ID for additional information about that order. 10264 11041 10370 11029 10966 10731 10746 10619 Great Lakes Food Market Click an order ID for additional information about that order. 10628 10816 10416 10617	Company Orders 10481 10656 10669 10936 11041 11006 11040 Island Trading Click an order ID for additional information about that order. 10316 10318 10321 10933 10674 10621 10829 10749 10798 10473 Save-a-lot Markets Click an order ID for additional information about that order. 10393 10398 10440 10462 10810 10846 10767 10847 10748 10700 10711 10713 10714 10722 10427 10603 10407 10612 10487 10678 10816 10941 10882 10894 10983 10984 11002 11030 11031 10324	Company 11044 Seven Seas Imports Click an order ID for additional information about that order. 10369 10377 10306 10866 10800 10804 10523 10647 10472
--	--	--

The “Company Orders” page header appears on top of each of the three pages in the report output

TIP

Excel and CSV export types have no pages. Page sections function the same as Report sections for these export types.

Even though page sections repeat, they are not considered dynamic sections because their repetition does not directly depend on the data. Thus they are not suitable for displaying data fields. Since there is no way of knowing ahead of time which data will appear on which page, these sections are not suitable for summarizing data with **aggregates** or visualizations.

A report may only have one page header and one page footer section, but each section may consist of multiple rows.

Report Header & Report Footer

Report Header and **Report Footer** sections appear once each, at the start and end of the report, respectively. Use these sections for introductory and concluding information. The **report footer** is ideal for summarizing all of the report data with aggregate formulas and visualizations.

NOTE

Report Headers appear below Page Headers.

A report with both a Report Header and a Report Footer section in the Report Designer

The "Product Pricing Information" Report Header and the Combination Chart in the Report Footer appear only once, at the start and end of the report, respectively.

Dynamic Sections

The key for knowing how to use dynamic sections is knowing how the data will repeat in relation to the rest of the report.

The rows in the **Detail** section repeat for each data row retrieved from the Data Object, and is the main section of most reports.

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Add Section	A	B	C	D	E
Page Header	1	Categories and Products			
Detail	2	Products.ProductID	Products.ProductName	Products.UnitPrice	

A simple report design with a Detail section containing Product ID, Name and Unit Price data fields

Categories and Products		
7	Uncle Bob's Organic Dried Pears	€30.00
14	Tofu	€23.25
29	Rössle Sauerkraut	€45.60
31	Hannay's Dried Apples	€53.00
74	Longlife Tofu	€10.00
10	Ikura	€31.00
13	Konbu	€4.00
18	Carnarvon Tigers	€42.85
30	Nord-Ost Matjeshering	€25.89
36	Infärgd Sill	€19.00
37	Gravad lax	€23.00
40	Boston Crab Meat	€18.40
41	Jack's New England Clam Chowder	€9.45
46	Rogede sild	€9.80
48	Spegesild	€12.00
66	Escargots de Bourgogne	€13.25
73	Röd Kaviar	€16.00
1	Chai	€18.00
2	Chang	€19.00
24	Guaraná Fantástica	€4.50
34	Sasquatch Ale	€14.00
36	Stoutley Stout	€18.00
38	Côte de Blaye	€263.50
39	Chartreuse verte	€18.00
43	Ippoh Coffee	€46.00
67	Laughing Lumberjack Lager	€14.00
70	Outback Lager	€16.00
78	Rhônebräu Klosterbier	€7.75
79	Lakkaikööri	€18.00
3	Aniseed Syrup	€10.00
4	Chef Anton's Cajun Seasoning	€22.00
6	Chef Anton's Gumbo Mix	€21.55
6	Grandma's Boysenberry Spread	€25.00
8	Northwoods Cranberry Sauce	€40.00
16	Genen Shouyu	€16.50
44	Gula Malacca	€19.45
41	Sirup d'érable	€26.50
63	Veggie-spread	€43.90
65	Louisiana Fiery Hot Pepper Sauce	€21.05
66	Louisiana Hot Spiced Okra	€17.00
77	Original Frankfurter grüne Soße	€13.00
16	Pavlova	€17.45
19	Teatime Chocolate Biscuits	€9.20
20	Sir Rodney's Marmalade	€18.00
21	Sir Rodney's Scones	€10.00
26	NuNuCa Nuß-Nougat-Creme	€14.00
26	Gumbär Gummibärchen	€31.23
27	Schoggi Schokolade	€43.90
47	Zaanse koeken	€9.80
48	Chocolade	€12.75
49	Maxilaku	€20.00
60	Valkoinen suklaa	€16.25
62	Tarte au sucre	€49.30
68	Scottish Longbreads	€12.80
9	Wishi Kobe Niku	€97.00

Categories and Products		
17	Alice Mutton	€39.00
29	Thüringer Rostbratwurst	€123.79
53	Perth Pasties	€32.80
64	Tourtière	€7.45
66	Pâté chinois	€24.00
11	Queso Cabrales	€21.00
12	Queso Manchego La Pastora	€38.00
31	Gorgonzola Telino	€12.50
32	Mascarpone Fagioli	€32.00
33	Gelöst	€2.50
69	Faclette Courdavault	€65.00
60	Camembert Pierrot	€34.00
69	Gudbrandsdalsost	€36.00
71	Flotemysost	€21.60
72	Mezzanotte di Giovanni	€34.80
22	Gustaf's Knäckebröd	€21.00
23	Tunnbröd	€9.00
42	Singaporean Hokkien Fried Mee	€14.00
82	Pilo Milk	€7.00
86	Gnocchi di nonna Alice	€38.00
87	Ravioli Angelo	€19.80
64	Wimmers gute Semmelknödel	€33.25

The Detail section expands to include all of the Product rows that match each Category so that the ID, Name and Unit Price of each product is displayed in the report

The number of rows that are displayed can be limited by using filters, duplicate suppression/hide repeating values and advanced join logic.

A report may only have one detail section, but it may consist of multiple rows. To have more than one detail section, use Repeating Groups.

Group Header & Group Footer

Groups are the primary way in which data is assembled into related categories that each share a unique attribute. Detail rows are arranged into the groups they belong to. The common attribute is defined by a sort.

The rows in a Group Header section will appear above the Detail section for each unique value of the sorted Data Field, or a formula. Typically, Group Header sections are used to display data as labels.

The rows in a Group Footer section will appear below the Detail section for each unique value of the sorted Data Field. Typically, Group Footer sections are used to calculate subtotals.

Add Section	A	B	C	D	E
Page Header	1	Categories and Products			
Header: Categories.CategoryName	2	Categories.CategoryName			
	3	ID	Product Name	Unit Price	
Detail	4	Products.ProductID	Products.ProductName	Products.UnitPrice	

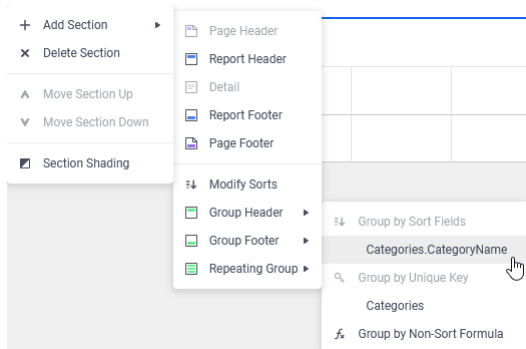
Adding a Group Header section to the previous example will group each product by it's category.

Categories and Products		
Produce		
ID	Product Name	Unit Price
7	Uncle Bob's Organic Dried Pears	\$30.00
14	Tofu	\$22.25
28	Rössle Sauerkraut	\$48.40
61	Manjimup Dried Apples	\$55.00
74	Longlife Tofu	\$10.00
103	Ikura	\$30.00
135	Konbu	\$44.00
163	Carnarvon Tigers	\$62.80
195	Nord-Ost Majesticering	\$25.99
234	Inlagd Sill	\$19.00
37	Gravid Ixax	\$72.00
40	Boston Crab Meat	\$18.40
41	Jack's New England Clam Chowder	\$7.45
45	Rogede sild	\$9.80
46	Spegeild	\$12.00
88	Escargots de Bourgogne	\$12.75
73	Röd Kaviar	\$12.00
Beverages		
ID	Product Name	Unit Price
1	Chai	\$19.00
2	Chana	\$19.00
24	Guaraná Fantástica	\$48.00
34	Sasquatch Ale	\$14.00
38	Steeleye Stout	\$14.00
39	Cille de blays	\$24.50
39	Chartreuse verte	\$18.00
45	Ippoh coffee	\$44.00
67	Laughing Lumberjack Lager	\$14.00
70	Outback Lager	\$14.00
76	Röhnbräu Klosterbräu	\$7.75
76	Lakkalikööri	\$18.00
Condiments		
ID	Product Name	Unit Price
3	Aniseed Syrup	\$10.00
4	Chef Anton's Cajun Seasoning	\$22.00
6	Chef Anton's Gumbo Mix	\$21.58
8	Grandma's Berryberry Spread	\$25.00
8	Northwoods Cranberry Sauce	\$40.00
16	Genen Shoyu	\$19.80
44	Gula Melacca	\$18.40
41	Sirap d'érable	\$24.50
63	Veggie-spread	\$43.00
65	Louisiana Fiery Hot Pepper Sauce	\$21.00
68	Louisiana Hot Spiced Oil	\$17.00
77	Original Frankfurt grüne Sote	\$12.00
Confections		
ID	Product Name	Unit Price
16	Pavlova	\$17.48
19	Teatime Chocolate Biscuits	\$9.20
21	Sir Rodney's Marmalade	\$31.00
21	Sir Rodney's Scones	\$9.00

Products are now organized into groups based on their Category.

For each sort, the group can change on either on either the **Data Object/Unique Key** or the **Sort Field**.

- When grouping on a Data Object, the group breaks at each new instance of the data object's unique key.
- When grouping on a Sort Field, the group breaks at each new value of that field.



Â Adding a Group Header section on a sort field v2021.2+

The screenshot shows the 'Group Header' dialog box. The 'Show this group for each change of the following:' section has 'Data Categories' selected. The 'Sort Fields' section has 'Categories.CategoryName' selected. The 'OKay' button is highlighted.

For example, instead of grouping by each *Product*, you may want to instead group by *product quantity*, so that products that are low or out of stock are grouped together. First, add a **sort** on the *Products.Quantity* field, then **group** by that field.

There may be multiple group sections, to add additional levels of stratification to the report. Each **group** requires a corresponding sort.

TIP

The order of the sorts has an effect on the way the data is arranged. Data is sorted by the first field, then any ambiguities are sorted by the second field, then any remaining ambiguities are sorted by the third, and so on. In general, order group headers by their associated sorts, and group footers in inverse order.

Repeating Groups

Repeating Groups are a way to organize and display data that contain multiple one-to-many relationships. Each repeating group has data from “many” category, grouped by the “one” category. The following diagrams demonstrate how this works.

Two Data Objects, X and Y, with a one-to-many relationship from X to Y, will display like so in a **Detail** section:

One 1-to-Many	
x	y
	y
	y
x	y
	y
	y
	y
x	y
	y

Each X has 1 or more Y.
Category X has duplicates suppressed/repeating values hidden
“this is similar to grouping on X.

If there is a third category, Z, with a one-to-many relationship from X to Z, there is not necessarily a relationship between Y and Z. So there may be blank rows with only Y or only Z.

Two 1-to-Many		
x	y	z
	y	z
		z
		z
	y	
x	y	z
	y	z
		z
		z
	y	
x	y	z
	y	z
	y	z
		z
	y	

Each X has 1 or more Y, and 1 or more Z

There are two potential solutions. If there is a relationship between Y and Z, **Advanced Joins** can impose additional constraints so that only the rows with both Y and Z are shown. For more information, see **Joins**.

On the other hand, there may be no relationship between Y and Z, only between X and Y, X and Z. Or there may be a relationship, but it does not matter for this data set. Repeating groups can ignore that relationship and simply organize the data by X instead.

To do so, create two repeating groups for X, and put Y in the first, and Z in the second:

Repeating Group	
x	y
	y
	y
	z
	z
	z
	z
x	y
	y
	z
	z
	z
	z
x	y
	y
	y
	y
	z
	z

Each X repeats twice: once for Y, once for Z

Each **repeating group** section has its own **group header**, **detail**, and **group footer** sections. These follow the same principles as their main counterparts.

+	Add Section	A	B	C	D
Report Header	...	1	PRODUCT PROFILE		
Header: Products	...	2	Products.ProductName		
	...	3	CATEGORY:	Categories.CategoryName	+LoadImage({Categories.Picture})
Repeat group for each: Products	...	4	=Upper(Concatenate("SUPPLIERS OF OF ", (Products.ProductName)))		
Header: Products	...	5	Company	Contact Name	Phone Number
Detail	...	6	Suppliers.CompanyName	Suppliers.ContactName	Suppliers.Phone
Repeat group for each: Products	...	7	=Upper(Concatenate("ORDERS OF ", (Products.ProductName)))		
Header: Products	...	8	Number of Orders	Order Date	Average Freight
Footer: Products	...	9	+ADDCOUNT({Orders})		+aggravg({Orders})
Detail	...	10	Orders.OrderID	Orders.OrderDate	Orders.Freight

A report with two Repeating Groups that will display all of the Suppliers for each product, and the Orders for each product.

PRODUCT PROFILE

Sasquatch Ale

CATEGORY: Beverages

SUPPLIERS OF OF SASQUATCH ALE

Company	Contact Name	Phone Number
Bigfoot Breweries	Cheryl Saylor	(503) 555-9931

ORDERS OF SASQUATCH ALE

Number of Orders	Order Date	Average Freight
10287	08/22/2014	€12.76
10315	09/26/2014	€41.76
10358	11/20/2014	€19.44
10367	11/28/2014	€13.95
10386	12/18/2014	€13.99
10438	02/04/2015	€8.24
10483	03/24/2015	€15.28
10548	05/26/2015	€1.43
10573	06/19/2015	€84.84
10688	10/01/2015	€299.09
10700	10/10/2015	€65.10
10757	11/27/2015	€8.19
10805	12/30/2015	€237.34
10890	02/16/2016	€32.76
10927	03/10/2016	€31.51
10990	04/01/2016	€117.61
11008	04/08/2016	€79.46
11063	04/30/2016	€81.73
11066	05/01/2016	€44.72
19		€63.63

Rogede sild

CATEGORY: Seafood

SUPPLIERS OF OF ROGEDE SILD

Company	Contact Name	Phone Number
Lyngbyild	Niels Petersen	43844108

ORDERS OF ROGEDE SILD

Number of Orders	Order Date	Average Freight
10388	12/19/2014	€34.86
10465	03/05/2015	€145.04
10502	04/10/2015	€69.32
10549	05/27/2015	€171.24
10638	08/20/2015	€158.44
10713	10/22/2015	€167.05
10740	11/13/2015	€81.88

Rogede sild

CATEGORY: Seafood

10750	11/21/2015	€79.30
10753	11/25/2015	€7.70
10776	12/15/2015	€381.53
10847	01/22/2016	€487.57
10896	02/19/2016	€32.45
10954	03/17/2016	€27.91
11013	04/09/2016	€32.99

Maxilaku

CATEGORY: Confections

SUPPLIERS OF OF MAXILAKU

Company	Contact Name	Phone Number
Karkki Oy	Anne Heikkonen	(953) 10956

ORDERS OF MAXILAKU

Number of Orders	Order Date	Average Freight
10253	07/10/2014	€58.17
10290	08/27/2014	€79.70
10304	09/12/2014	€63.79
10360	11/22/2014	€131.70
10400	01/01/2015	€83.93
10404	01/03/2015	€155.97
10456	02/25/2015	€8.12
10481	03/20/2015	€64.33
10499	04/08/2015	€102.02
10539	05/16/2015	€12.36
10603	07/18/2015	€48.77
10612	07/28/2015	€544.08
10804	12/30/2015	€27.33
10868	02/04/2016	€191.27
10875	02/04/2016	€32.37
10882	02/11/2016	€23.10
10910	02/26/2016	€38.11
10942	03/11/2016	€17.95
10967	03/23/2016	€62.22
11019	04/13/2016	€5.17
11039	04/21/2016	€65.00
21		€86.36

The output of the above report: three products with their suppliers and orders listed with two Repeating Group Sections

Create, Modify, Delete Sections

- To **add** a new section either:
 - click the **+ Add Section** button
 - click a **Section Menu** icon then hover over **+ Add Section**
 - right-click anywhere on a **Section Header** and hover over **+ Add Section**

Page Header	
Report Header	
Detail	
Report Footer	
Page Footer	
Add Sort	
Group Header	▶
Group Footer	▶
Repeating Group	▶

The **Add Section** menu will open with static sections on top and dynamic sections on the bottom. Click a section type to add to the design grid. If adding a Group Header, Group Footer or Repeating Group a minimum of one Sort must be defined for the report. In v2021.2+, click **Add Sort/Modify Sorts** to open the Sorts dialog.

- To **change the sort** that a group header, group footer or repeating group breaks on, either:
 - click the **Section Menu** icon on the section to be changed, then click **Modify Section / Edit Group**.
 - right-click anywhere on the **Section Header** of the section to be changed, then click **Modify Section / Edit Group**
- To **re-arrange the order** of group headers, group footers or repeating groups, either:

The order of the sorts as they appear in the Sorts dialog have an effect on the way the data is arranged. Moving the sections up and down will only change where in the report that data appears, not change its grouping/sorting order.

Click the **Section Menu**  icon on the section to be changed, then click  **Move Section Up** or  **Move Section Down**

Right-click anywhere on the **Section Header** of the section to be changed, then click  **Move Section Up** or  **Move Section Down**

Delete an existing section, either:

Click the **Section Menu**  icon on the section to be removed, then click  **Delete Section**

Right-click anywhere on the **Section Header** of the section to be removed, then click  **Delete Section**

If the detail section of any given group spans multiple pages, it may be desirable to have the **Group Headers** repeated at the start of the next page.

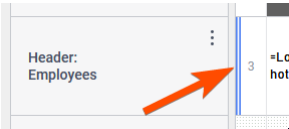
A report with a Group Header that includes an employee's photo, name and sales goal visualization with a list of all of their orders

The same report with the Group Header reprinted at the top of each page as the Detail section flows to the following page. The employee information appears at the top of each page their order information appears

1. Open the **Row Menu** by either:
 - clicking the **Row Menu**  icon on the row to be repeated
 - right-clicking anywhere on the **row number** of the row to be repeated

2. Check the **Repeat Row** checkbox.
3. Repeat steps 1â€”2 for any additional row that should repeat.

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For additional information about the Row Menu, review the Rows Section of the Advanced Reports: Design Grid article.

Section Shading

Section shading creates alternating background colors for repeating elements in a section. Alternating colors applies to Detail and Group sections; for other sections, only one color can be used.

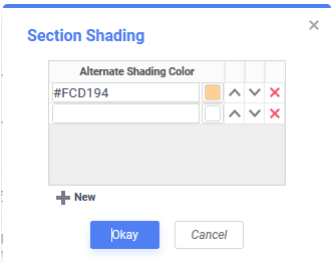
Section shading is overridden by the cell background color and by conditional formatting, if applied. Review the Advanced Reports: Cell Formatting article for more information.

Employee Information				
ID #	First Name	Last Name	Phone #	Hire Date
1	Nancy	Davolio	(206) 555-9857	12/08/1964
2	Andrew	Fuller	(206) 555-9482	02/19/1968
3	Janet	Leverling	(206) 555-3412	08/30/1979
4	Margaret	Peacock	(206) 555-8122	09/19/1953
5	Steven	Buchanan	(71) 555-4848	03/04/1971
6	Michael	Suyama	(71) 555-7773	07/02/1979
7	Robert	King	(71) 555-5598	05/29/1976
8	Laura	Callahan	(206) 555-1189	01/09/1974
9	Anne	Dodsworth	(71) 555-4444	01/27/1982

A basic report with no section shading applied

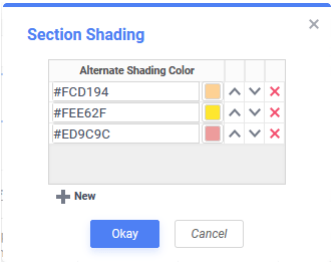
Employee Information				
ID #	First Name	Last Name	Phone #	Hire Date
1	Nancy	Davolio	(206) 555-9857	12/08/1964
2	Andrew	Fuller	(206) 555-9482	02/19/1968
3	Janet	Leverling	(206) 555-3412	08/30/1979
4	Margaret	Peacock	(206) 555-8122	09/19/1953
5	Steven	Buchanan	(71) 555-4848	03/04/1971
6	Michael	Suyama	(71) 555-7773	07/02/1979
7	Robert	King	(71) 555-5598	05/29/1976
8	Laura	Callahan	(206) 555-1189	01/09/1974
9	Anne	Dodsworth	(71) 555-4444	01/27/1982

The same report with orange and white alternating section shading colors applied to the Detail section



The Section Shading dialog for the above report

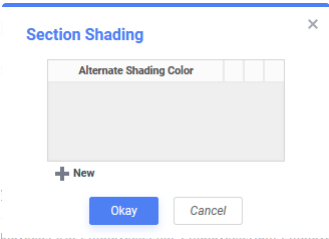
Employee Information				
ID #	First Name	Last Name	Phone #	Hire Date
1	Nancy	Davolio	(206) 555-9857	12/08/1964
2	Andrew	Fuller	(206) 555-9482	02/19/1968
3	Janet	Leverling	(206) 555-3412	08/30/1979
4	Margaret	Peacock	(206) 555-8122	09/19/1953
5	Steven	Buchanan	(71) 555-4848	03/04/1971
6	Michael	Suyama	(71) 555-7773	07/02/1979
7	Robert	King	(71) 555-5598	05/29/1976
8	Laura	Callahan	(206) 555-1189	01/09/1974
9	Anne	Dodsworth	(71) 555-4444	01/27/1982



The same report with orange, yellow and pink alternating shading colors applied to the Detail section, and its corresponding Section Shading dialog

To add section shading:

- 1. Open the Section Menu by either:
 - clicking the **Section Menu**  icon on the section to be changed
 - right-click anywhere on the **Section Header** of the section to be changed
- 2. Click  **Section Shading** to open the **Section Shading** dialog.



3. Click **+ New** to add a new shading color. Any number of colors may be added.
4. Click the **Color Chooser**  icon, or enter a hexadecimal HTML color code to select a shading color.
5. Use the up **Move Item Up**  and **Move Item Down**  icons to rearrange the order of the colors.
6. Click the **Delete**  icon to remove a shading color.
7. Click **Okay** to close the dialog and apply the color settings.

When Section Shading is applied to a section, a small indicator with the shading colors will be shown above the **Section Menu** .

icon. For example:



Advanced Reports: Design Grid (v2021.1+)

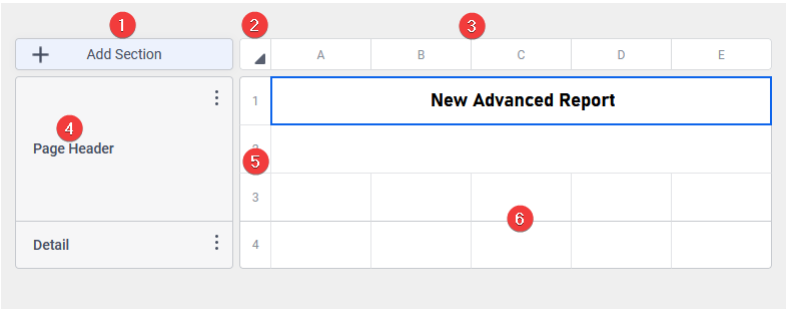
Â

The **Design Grid** is main interaction point of the Advanced Report Designer. Use the Design Grid to:

- Define the *layout* of the report by adding, altering and deleting rows, columns, and sections to it.
- Define the *content* of the report by entering data fields, text, labels, formulas, images, charts, CrossTabs and maps to it.

Anatomy of the Design Grid

The Design Grid has six principal components:



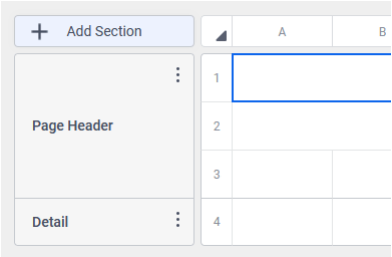
The anatomy of the Advanced Report Designer Design Grid

1. **+ Add Section** button – click this button to add a new section to the grid
2. **▲ Select All Cells** button – click this button to select all of the cells in the grid
3. **Column Headers** – labelled alphabetically beginning with *A* from left to right. Click the header to open a menu for working with columns. These headers are referenced only in the Designer, and do not appear on the report output.
4. **Section Header** – displays the name and type of the section. Click the header to open a menu for working with sections. These headers are referenced only in the Designer, and do not appear on the report output.
5. **Row Header** – labelled numerically beginning with *1* from top to bottom. Click the header to open a menu for working with rows. These headers are referenced only in the Designer, and do not appear on the report output.
6. **Cells** – contain the report's contents

Sections

The **sections** of an **Advanced Report** define its appearance and pattern. Specifically, sections determine how frequently cell contents are repeated. For example, a report may have a *Page Header*, a *Report Footer* and *Detail* section to display data.

To resize the **Section Headers**, hover the mouse on the right edge of the Section Header. The cursor will change to the **resizing cursor**. Click and drag the mouse in the desired direction, to either expand or shrink the header.



Learn more about working with sections in the [Advanced Reports: Sections](#) article.

Columns

Columns expand horizontally across the report. Typically, each parcel of information to be included in the report is included in its own column. Columns may also be used for padding cells or creating hierarchical indentations in the report's layout. There is no practical limit to the number of columns a single report may have.

	A	B	C	D	E
Page Header	Employee Information				
	ID #	First Name	Last Name	Phone #	Hire Date
Detail	Employees.EID	Employees.First Name	Employees.Last Name	Employees.HomePhone	Employees.Hire Date

A very simple report design with five columns, labeled A–E, one for each identifiable employee property to include in the report.

	A	B	C	D	E	F
Page Header	Product List					
	organized by Product Category					
Header: Categories.CategoryName	Categories.CategoryName					
Header: Products.Discontinued	Status	Product Code	Product Name		Unit Price	
Detail	Products.Discontinued	Products.ProductID	Products.ProductName		Products.UnitPrice	

Slightly more complex report design, note columns A and B don't contain content in the Detail section, instead they create padding for the Detail information and establish a hierarchy of the group headers over the Detail

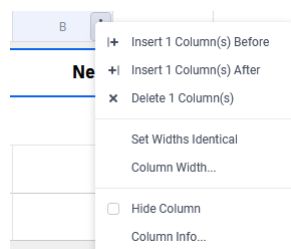
Working with Columns

- **Selecting Columns**
 - To select a continuous group of columns, hold the **Shift** key and then click the starting and ending columns.
 - To select non-continuous groups of columns, hold the **Ctrl** key (**Command** key on Mac) then click the desired columns.
- **Resizing Columns**
 - A column can be resized by dragging its right edge horizontally, just as Section Headers can be.
 - Use the **Column Width...** or **Set Widths Identical** options on the **Column Menu** described below



- Hover the mouse over the column header to see its current size

Once one or more columns are selected, hover the mouse over a column header, then click the **Column Menu** icon, or right-click on a column header to open the **Column Menu**.



The Design Grid Column Menu

- **Insert x Column(s) Before** – insert the selected number of columns before (to the left of) this column (e.g. if three columns are selected, this menu item is Insert 3 Column(s) Before)
- **Insert x Column(s) After** – insert the selected number of columns after (to the right of) this column (e.g. if three columns are selected, this menu item is Insert 3 Column(s) After)
- **Delete x Column(s)** – delete the selected columns
- **Set Widths Identical** – set the widths of the selected columns to the width of the column that was selected last
- **Column Width...** – open the Column Width dialog, where an absolute value, in pixels may be set for the column's width
- **Hide Column** – when checked, the selected columns (and their contents) will be hidden from the report output. Hidden columns can be unhidden in the Report Viewer.
- **Column Sort** – if the Interactive Column Sorts feature has been enabled on this column, hover over this item to select the default sorting direction. This menu item only appears if the Interactive Column Sorts feature is on, and only has an effect in the Report Viewer.
 - **None** – this column will not be sorted when the report is first executed
 - **Ascending** – this column will be sorted in Ascending (smallest/earliest to largest/latest) order
 - **Descending** – this column will be sorted in Descending (largest/latest to smallest/earliest) order
- **Column Info...** – open the **Column Information** dialog, to set properties of the column that are used for the Report Viewer's interactive functions. Review Advanced Reports Report Viewer for more information.
 - **Label** – provide a label or title for the column that will be used in the Report Viewer
 - **Sort** – enable the Interactive Column Sorts feature, described below.

Interactive Column Sorts

While viewing reports in the Report Viewer, a user can click the bar at the top of the report to **sort on a column**. Only those columns that have an **Interactive Column Sort** defined can be sorted in the Report Viewer interactively like this.

	Product Code	Product Name	Unit Price	
--	--------------	--------------	------------	--

A report with three columns in the Report Viewer, with a Column Sort activated on the Unit Price column. Both Product Code and Product Name do not have an interactive column sort.

NOTE

Interactive Column Sorts are applied after the sorts defined in the Report Designer's Sorts dialog.

To add an **Interactive Column Sort**:

1. Hover the mouse over a column header, then click the **Column Menu** icon, or right-click on a column header to open the **Column Menu**.
2. Select **Column Info...** from the menu.

Column Information

Label:

Sort:

None

fx

OkayCancel

3. Provide a **Label** for the column as it will appear in the Report Viewer.
4. From the **Sort** dropdown select the Data Field to be used for sorting, or provide a formula by clicking the **Formula Editor** icon.
5. Click **Okay**.
6. Hover the mouse over a column header, then click the **Column Menu** icon, or right-click on a column header to open the **Column Menu** again.
7. Hover over **Column Sort** and choose a default sorting direction.

+ Insert Columns Before

+ Insert Columns After

× Delete Columns

Set Widths Identical

Column Width...

☐ Hide Column

Column Sort

☒ None

☐ Ascending

☐ Descending

Column Info...

Rows

Rows expand vertically through the report. Rows may also be used for padding cells or creating spacing in the report's layout. There is no practical limit to the number of rows a single report may have.

When the report is executed, it will automatically add rows to include all of the data necessary. For example, to display a report with many products, it is not necessary to have a row for each product configured in the Report Designer. A single row in a Detail section will automatically expand to include all of the products at run time.

+ Add Section		A	B	C	D	E
Page Header	1	Categories and Products				
Detail	2	Products.ProductID	Products.ProductName		Products.UnitPrice	

A basic report design that includes only a single row in the Detail section that will expand to include all of the Products when executed

Categories and Products		
7	Uncle Bob's Organic Dried Pears	€30.00
14	Tofu	€24.26
28	Rössle Sauerkraut	€46.40
81	Manjimp Dried Apples	€63.00
74	Longlife Tofu	€10.00
10	Kura	€30.00
13	Konbu	€6.00
18	Carnarvon Tigers	€62.60
30	Nord-Ost Matjeshering	€26.89
36	Inlagd Sill	€19.00
37	Gravad lax	€26.00
40	Boston Crab Meat	€16.40
41	Jack's New England Clam Chowder	€9.45
46	Rogede sild	€9.60
46	Spegesild	€12.00
68	Escargots de Bourgogne	€18.26
72	Röd kaviar	€16.00
1	Chai	€18.00
2	Chang	€19.00
24	Souriana Fantastica	€4.60
34	Sasquatch Ale	€14.00
36	Steeleye Stout	€18.00
38	Côte de Blaye	€26.60
39	Charreusse verrie	€18.00
43	IpoH Coffee	€46.00
67	Laughing Lumberjack Lager	€14.00
70	Outback Lager	€16.00
76	Rhönbrau Klosterbier	€7.76
76	Lakkalikööri	€18.00
3	Aniseed Syrup	€10.00
4	Chef Anton's Cajun Seasoning	€22.00
6	Chef Anton's Gumbo Mix	€21.36
6	Grandma's Boysenberry Spread	€26.00
8	Northwoods Cranberry Sauce	€46.00
16	Garden of Eatin'	€16.60
44	Gula Malacca	€19.46
61	Sirop d'érable	€26.60
62	Veggie-spread	€46.96
66	Louisiana Fiery Hot Pepper Sauce	€21.06
66	Louisiana Hot Spiced Okra	€17.00
77	Original Frankfurter grüne Soße	€10.00
14	Pavlova	€17.46
19	Teatime Chocolate Biscuits	€9.20
20	Sir Rodney's Marmalade	€61.00
21	Sir Rodney's Scones	€10.00
26	NuNuCa Nut-Neugat-Creme	€14.00
26	Gumbär Gummibärchen	€31.23
27	Schoggi Schokolade	€43.90
47	Zaansse koeken	€9.60
48	Chocolade	€12.76
49	Maxilaku	€20.00
60	Valkoinen suklaa	€16.26
62	Tarte au sucre	€46.30
68	Scottish Longbreads	€12.60
9	Mishi Kobe Niku	€97.00

Categories and Products		
17	Alice Mutton	€39.00
29	Thüringer Rostbratwurst	€121.19
63	Perth Pasties	€32.80
64	Tourtière	€7.46
86	Pâté chinois	€24.00
11	Queso Cabrales	€21.00
12	Queso Manchego La Pastora	€38.00
31	Gorgonzola Telino	€12.60
32	Mascarpone Fabioli	€32.00
33	Gelost	€2.60
69	Raclette Courdavault	€66.00
60	Camembert Pierreot	€34.00
69	Suðrlandsdillapost	€56.00
71	Flotemysost	€21.60
72	Mozzarella di Giovanni	€34.80
22	Gustaf's Knackebrod	€21.00
23	Tunabrid	€9.00
42	Singaporean Hokkien Fried Mee	€14.00
62	Filo Mki	€7.00
66	Gnocchi di nonna Alice	€16.00
67	Ravioli Angelo	€19.60
64	Wimmers gute Semmelknödel	€33.26

When the report is run, all of the products appear as the Detail section automatically adds the rows it needs to include them

Working with Rows

- Selecting Rows
 - To select a continuous group of rows, hold the **Shift** key and then click the starting and ending rows.
 - To select non-continuous groups of rows, hold the **Ctrl** key (**Command** key on Mac) then click the desired rows.
- Resizing Rows
 - A row can be resized by dragging its bottom edge vertically.
 - Use the **Set Auto Height** or **Row Height...** options on the **Row Menu** described below
 - Hover the mouse over the row header

Once one or more rows are selected, hover the mouse over a row header, then click the **Row Menu** ⋮

icon, or right-click on a row header to open the **Row Menu**.

⋮

✚

Insert 1 Row(s) Before

±

Insert 1 Row(s) After

✕

Delete 1 Row(s)

Set Auto Height

Row Height...

☐

Suppress Rows

☐

Collapse Rows

☐

Repeat Row

☐

Page Break

- **✚ Insert x Row(s) Before** â€” insert the selected number of rows before (above) this row (e.g. if three rows are selected, this menu item is Insert 3 Row(s) Before)
- **± Insert x Row(s) After** â€” insert the selected number of after after (below) this row (e.g. if three rows are selected, this menu item is Insert 3 Row(s) After)
- **✕ Delete x Row(s)** â€” delete the selected rows
- **Set Auto Height** â€” when row height is set automatically, each row will change its height based on the content contained within it. Click this item to quickly set the row height to automatic mode.
- **Row Height...** â€” open the Row Height dialog, where an absolute value, in pixels may be set for the row's height or check the **Auto Height** checkbox to enable automatic row height
- **Suppress Rows** â€” when checked, the selected rows (and their contents) will be hidden from the report output. Suppressed Rows have a faint dot pattern to indicate it won't be included in report output.

+ Add Section				
Report Header				
Header: Employees.LastName		1	EMPLOYEE ORDERS	
Detail		3	=Concatenate({Employees.FirstName},"",Employees.LastName))	=AggCount([A4])
Footer: Employees.LastName		4	Orders.OrderID	
		5	=DataRowCount()	=Type([A4])

- The slight dotted pattern on Row 4 indicates that it is suppressed from report output
- **Collapse Rows** â€” only available for rows in **Group Header** sections. When checked, the groups will hide their content by default in the Report Viewer. A small **Open Rows** ► icon will appear next to the Group Header, indicating the group can be expanded to show more information. To learn more, see Collapsed Rows below.
 - **Repeat Row** â€” only available for rows in **Group Header** sections. When checked, this row will repeat at the top of each page, if the Detail section in the group continues from one page to another. See Reprinting Group Headers in the Advanced Reports: Sections article for more information.
 - **Page Break** â€” when checked, a new page will be created before this row.

Auto Row Height

By default, all rows will have their height set automatically. This means that the rows height will conform to the data that is contained in the row.

Categories and Descriptions	
Compact Communications System	Reliable, Cost-effective Facility Communications
MACS II	MACS II is a true multi-link, multi-channel, open voice institutional communications system for schools, prisons, or any other facility requiring a full-featured, reliable means of communications between central and remote locations. MACS II offers the features and functions required for institutional facilities, including telephone (CO/PABX) interface and several networking options.
Modular System 1200	The Modular System 1200 features easy push button communication with computer speed and accuracy. Microprocessor controlled, the Modular System 1200 provides 2-way internal telephone communication, public address capability, paging or aural monitoring of specified areas.
STARSchedule	StarSchedule is a flexible PC-based networked scheduling application that allows schools, factories or facilities to alert staff of timed events.The application is fully compatible with the Dukane StarCall and MCS350 communications systems as the master clock and event scheduling program.

Each row is a different height, adapted to the length of the Description field on that row

Categories and Descriptions	
Compact Communications System	Reliable, Cost-effective Facility Communications
MACS II	MACS II is a true multi-link, multi-channel, open voice institutional communications system for schools, prisons, or any other facility requiring a
Modular System 1200	The Modular System 1200 features easy push button communication with computer speed and accuracy. Microprocessor controlled, the Modular
STARSchedule	StarSchedule is a flexible PC-based networked scheduling application that allows schools, factories or facilities to alert staff of timed

The same report, with a fixed row height of 50 pixels. Notice the first row has extra space and the other rows have truncated the category description

Collapsed Rows

A **Group Section** can be set to display as collapsed by default in the Report Viewer. This causes the contents of the section to be hidden and individually expandable for each break in the group section. When the report is exported to PDF, Excel, CSV or RTF all of the groups will be expanded so all report content is visible. Only one row in the Group Header section can be set to collapse, but multiple groups may be set to collapse.

Orders
► Order #: 10248
► Order #: 10249
► Order #: 10250
► Order #: 10251
► Order #: 10252
► Order #: 10253
► Order #: 10254
► Order #: 10255
► Order #: 10256
► Order #: 10257
► Order #: 10258
► Order #: 10259
► Order #: 10260

A report with Collapse Rows enabled in the Report Viewer, with all of the groups collapsed

In the Report Viewer, left-click on the **Open Rows** ► icon to expand (open) or collapse (close) the group.

Orders			
▶ Order #: 10248			
▶ Order #: 10249			
▶ Order #: 10250			
▼ Order #: 10251			
Product Name	Unit Price	Quantity	Revenue
Gustaf's Knäckebröd	\$16.80	6	\$100.80
Louisiana Fiery Hot Pepper Sauce	\$16.80	20	\$336.00
Ravioli Angelo	\$15.60	15	\$234.00
Number of Products on Order:		3	Total Revenue: \$670.80
▼ Order #: 10252			
Product Name	Unit Price	Quantity	Revenue
Camembert Pierrot	\$27.20	40	\$1,088.00
Celcost	\$2.00	25	\$50.00
Sir Rodney's Marmalade	\$64.80	40	\$2,592.00
Number of Products on Order:		3	Total Revenue: \$3,730.00
▶ Order #: 10253			
▶ Order #: 10254			
▶ Order #: 10255			
▶ Order #: 10256			
▶ Order #: 10257			
▶ Order #: 10258			
▶ Order #: 10259			
▶ Order #: 10260			

The groups for Order #10251 and Order #10252 are expanded whilst the others remain collapsed in the Report Viewer

Alternatively, right-click on the **Open Rows** ▶

icon to open a menu with display options:

- **Expand** â€” open the selected top-level group. This is the same behavior as left-clicking the **Open Rows** ▶ icon on a collapsed/closed group
- **Collapse** â€” close the selected top-level group. This is the same behavior as left-clicking the **Open Rows** ▶ icon on a expanded/open group. The state of the sub-groups is preserved.
- **Expand Group** â€” open the selected top-level group and all sub-groups within that group.
- **Collapse Group** â€” close the selected top-level group and all sub-groups within that group.
- **Expand All** â€” open every group and sub-group on the page.
- **Collapse All** â€” close every group and sub-group on the page.

Properties of a Collapsed Row

- Collapsed Rows always start as collapsed in the Report Viewer.

NOTE

Collapsed/expanded states of rows won't be saved to User Reports.

- Page Breaks below a collapsed row are ignored. Expanding a collapsed group does not alter the report's pagination.
- The contents of a collapsed group are searchable, but will not be visible until the containing group is expanded.

See **Interacting with the Report Viewer** for more information on the Report Viewer.

Row Header Indicators

When rows are collapsed, repeated or a page break is added, small indicators will appear with the row header.

Table A â€” Row Indicators		
Feature	Description of Indicator	Example
Collapsed Row	Small black arrow pointing down right	
Repeat Row	Two blue lines on the left	
Page Break	Dashed lines on the top of the row header	

The indicators may appear together if more than one feature is set on that row.



A collapsed, repeating row that causes a new page each time it appears in the

report

Cells

Cells are the containers for all the information in a report. Cells may contain data fields, formulas, text, images, charts, maps, links to other reports and/or links to special code snippets called Action Events.

The cells (and their contents) are the only elements on the Design Grid that actually appear in the final report output.

- To select cells, either click or use the keyboard arrow keys.
 - To select a continuous group of cells, hold the **Shift** key and then click the starting and ending cells or click and drag the center of one cell to another.

NOTE

Holding **Shift** while using the keyboard arrow keys will move the selected cell in the opposite direction, not select multiple cells. Use the mouse to select multiple cells.

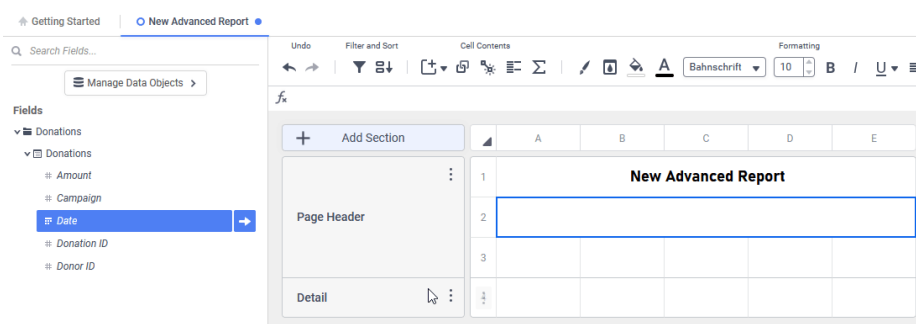
- To select non-continuous groups of cells, hold the **Ctrl** key (**Command** key on Mac) then click the desired cells.
- To enter text into a cell either:

TIP

When entering a formula, start with an equals sign. For example:

```
=aggsum({OrderDetails.Quantity})
```

- click the cell and begin typing, the cell contents appears in the formula bar just below the toolbar
- double-click the cell, and a text field will appear on the cell
- To add data fields from Data Objects to a cell, either
 - Drag the field from the Data Objects Pane and drop it on the cell



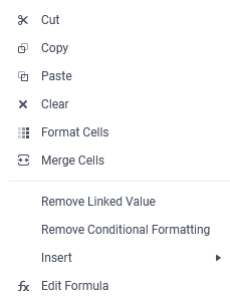
- Select a cell and begin entering a formula with the data field's name in curly braces. For example, =
{Categories.CategoryName}
- To insert charts, gauges, maps, images or CrossTabs into a cell, select it then either:
 - click the **Insert**  icon in the toolbar to select the item to add
 - right-click on the cell to open the cell context menu, described below
- Move contents from the selected cell to another by placing the mouse on the cell border. The cursor will change to a hand icon. Then drag to the destination cell. Or, use the **Cut** and **Paste** keyboard shortcuts or the Cell Context Menu.

8	Product ID	Product Name	Unit Price	Units In Stock
9	Products.ProductID			
10		Products.ProductName	Products.UnitsInStock	

- Copy contents from the selected cell to another by placing the mouse on the cell border. The cursor will change to a hand icon. Hold down the **Ctrl** key then drag to the destination cell. Or, use the **Copy** and **Paste** keyboard shortcuts or the Cell Context Menu.
- Adjacent cells can be merged and split using the **Split/Merge Cells**  icon on the toolbar or the **Merge Cells** cell context menu item. Cells in different rows may also be merged together. Only those cells that have been merged can be split.

Cell Context Menu

Right-clicking on a selected cell will open a **Cell Context Menu** with several cell options. Some of the options will only be available in certain situations.



Cell Context menu

- ✂ **Cut** – copy the contents of this cell so that it may be pasted into another one, and clear the cell's contents
- 📄 **Copy** – copy the contents of this cell so that it may be pasted into another one, without clearing the cell's contents
- 📄 **Paste** – place the contents of a previously cut or copied cell into this one
- ✖ **Clear** – delete all of the cell's contents
- 🔧 **Format Cells** – open the **Cell Format** dialog to customize how data values will display, add custom borders, and apply conditional formatting
- 🔗 **Merge Cells** or **Split Cells** – merge a group of selected cells together, or split a group of already merged cells up
- Remove Linked Value** – available only if this cell is linked to another report. Click this option to remove the linked report from this cell. See Advanced Reports: Linked Reports (Drilldowns).
- Remove Conditional Formatting** – available only if conditional formatting has been applied to this cell. Click this option remove the conditional formatting properties that have been applied to it.
- Insert** – like the **Insert**  icon on the toolbar, insert a new item such as a chart, gauge, map, image, CrossTab or formula. Only those items that may be added into this cell based on its section are available.
- fx Edit Formula** – available only if there is a formula in this cell. Click this option to open the Formula Editor dialog.
- 📊 Edit** – available only if there is a chart in this cell. Hover over this item, then select from one of the following options:
 - Type** – change the chart from one type to another as in the Type tab of the chart wizard. Only charts of the same series type may be selected. That is, if the chart is a multi-series type of chart only other mutli-series charts may be selected.
 - Theme** – change the color palette of the chart as in the Appearance tab of the chart wizard
 - Legend Location** – change the location of the legend
 - Wizard...** – open the Chart Wizard dialog
- 📈 Edit Gauge** – available only if there is a gauge in this cell. Click this option to open the Gauge Wizard.
- 📊 Edit CrossTab** – available only if there is a CrossTab in this cell. Click this option to open the CrossTab Data Designer dialog.
- 📍 Edit Google Map** – available only if there is a Google Map in this cell. Click this option to open the Google Map Wizard.
- 📍 Edit Map** – available only if there is a GeoChart in this cell. Click this option to open the GeoChart Map Wizard.

Cells containing fields from Data Objects will have a small color-coded triangle appear in the top-left corner. Cells containing data fields from the same data object will have the same color.

4			=AggSum({zProducts.viewed})
5	Manufacturers.name	Product Categories.name	=AggSum({zProducts.viewed})
6	Product.product_id	Product.name	zProducts.viewed

Each cell with a field from a different Data Object has a different indicator color. Note that two cells on Row 6 with fields from the Product Data Object have the same color.

Indicators

Certain indicators will appear in the cell if features have been enabled on them.

Table B – Cell Indicators		
Feature	Description of Indicator	Example
Conditional Formatting	Uppercase letter A in top right corner of the cell	
Linked Report	Chain links in the top right corner of the cell	
Data Field in a Cell	Small colored triangle in top left corner of the cell	 Proc

Advanced Reports: Sorts

Sorting is the process of ordering data in a certain sequence. For each available data category, you can choose which data field should be used to sort the rows. Fields can be sorted in *ascending* or *descending* order. The way in which rows are sorted depends on the type of value in the field:

- Numeric**
Ascending →

Lower values↗ ↘ ↘ ↘ ↘ Higher values↖ ← Descending
- Date**
Ascending →

Past↗ ↘ ↘ ↘ ↘ Future ← Descending

Text

Ascending ➡

AÃÄÅÄÄÄZ⬅ Descending

Employee Name	Department	Employee Name	Department
Steven Buchanan	Client Services	Steven Buchanan	Client Services
Laura Callahan	Human Resources	Anne Dodsworth	Client Services
Nancy Davolio	Development	Janet Leverling	Client Services
Anne Dodsworth	Client Services	Nancy Davolio	Development
Andrew Fuller	Executive	Robert King	Development
Robert King	Development	Andrew Fuller	Executive
Janet Leverling	Client Services	Michael Suyama	Executive
Margaret Peacock	Support	Laura Callahan	Human Resources
Michael Suyama	Executive	Margaret Peacock	Support

Sorting a category by Department

A report can have multiple sorts. This can be useful when you want your highest precedence sort to affect a data field where the values for multiple rows may be the same.

For example, imagine a large company with many employees. There could be multiple people with the last name Buchanan. With only a sort on *LastName*, you do not know how all the people with the last name Buchanan will be ordered amongst themselves. If this matters, then you can add a second sort on, say, the *FirstName* field, so that people with the same last names will be ordered by their first names.

Relationship Between Sorts and Groups

Sorts are a prerequisite for making **Groups**. Sorting puts data in order so that data rows which share common values for the sort field are next to each other. This is essentially what grouping does as well. **Grouping** simply takes those common values, pulls them out of the rows, and makes **Sections** for each group of rows which share that value. Sorts tell the report how you want your data to be grouped.

Employee Name	Department	Department	Employee Name
Steven Buchanan	Client Services	Client Services	Steven Buchanan
Anne Dodsworth	Client Services	Client Services	Anne Dodsworth
Janet Leverling	Client Services	Client Services	Janet Leverling
Nancy Davolio	Development	Development	Nancy Davolio
Robert King	Development	Development	Robert King
Andrew Fuller	Executive	Executive	Andrew Fuller
Michael Suyama	Executive	Executive	Michael Suyama
Laura Callahan	Human Resources	Human Resources	Laura Callahan
Margaret Peacock	Support	Support	Margaret Peacock

Grouping a category by the Department sort

TIP

Set the sort precedence so that nested groups are in order of their grouping level. The outermost group should have the highest precedence, with the next levels following in order. If the precedence is set incorrectly, it could result in inconsistent data groups.

Add, Edit, Delete Sorts

1. Click the  **Sorts** icon in the toolbar to open the **Report Sorts** dialog.

Report Sorts

Select sort fields

Product Categories

category_id

description

language_id

meta_description

meta_keywords

name

+

Add

+

Add Formula

Sort By

	Sort Order			
Manufacturers.name	f _x Ascending	▲	▼	✖
Product Categories.name	f _x Ascending	▼	▲	✖
Product.name	f _x Ascending	▼	▲	✖

Okay

Cancel

The Report Sorts dialog for a report that will first sort by the manufacturer's name, then by the Product Category name then finally by the Product's name

2. Add data fields to sort by first selecting a Data Object from the dropdown, and then either:
- clicking the arrow icon to the right of the data field's name

clicking the **+** **Add** button at the bottom of the data field's tree

double-clicking on the field's name

drag-and-dropping the data object from the tree to the Sort By panel

- clicking the **+** **Add Formula** button to add a formula sort to the report. For more information, refer to the Formula Sorts section of this article.
- 3. Click the **Formula Editor**  icon to change this sort to a **Formula Sort**.
- 4. Set the **Sort Order** to either *Ascending* or *Descending* with the dropdown.
- 5. If necessary, change the precedence of the sorts by either:
 - clicking the **Move Item Up**  or **Move Item Down**  icons
 - click and drag the **Grip**  icon to move the sort to the desired location
- 6. Repeat steps 2â€”5 for any additional sorts to be added
- 7. To delete a sort from the panel, click the **Delete**  icon at the end of the row.

Formula Sorts

NOTE

This feature is recommended for advanced users.

It is also possible to sort by formula instead of a plain data field, to gain finer control over group sections.

If there is no single data field as a unique key to indicate the end of one group and the start of another (called a break), a sort formula with concatenation of two fields may be used instead. For example, *EmployeeId* plus *TerritoryId* fields:

```
=({EmployeeTerritories.EmployeeId} & {EmployeeTerritories.TerritoryId})
```

Or if a plain data field would generate too many groups, sorting on a portion of a field may be helpful. For example, group on only the month and year component of a date field.

```
=Date(Year({Employees.HireDate}),Month({Employees.HireDate}),1)
```

To add a sort formula, click **+**

Add Formula, then use the **Formula Editor** to make a composite field to sort on.

Filters

Filters narrow the scope of reports by restricting the data by specified criteria.

For example, imagine a data object containing a row with every sale a company ever made. A filter can limit the report to only sales from the past month. This also has the benefit of speeding up report execution.

There are three types of filters available in the **Report Filters** dialog:

- **Standard**
- **Group Min/Max**
- **Top/Bottom**

This article covers **Standard Filters**, refer to the respective articles for **Group Min/Max** and **Top/Bottom** filters.

Standard filters limit data by only showing rows where the values for a field meet a certain condition.

Standard Filters are comprised of three parts: the **filter field**, the **operator** and the **values**. To help design standard filters, consider a phrase that spells out what to include. For example: “Include only the products whose unit price is more than \$10” or “Do not include any employee who was hired after 5/1/2008”.

The **filter field** is the data field that contains the data that will be filtered. In the above examples, the filter field would be the product ID number or employee hire date.

The **operator** sets the filtering action. The table in Step 3 below lists all of the available filter operators and how they work. In the above examples, the operators would be *Greater Than* for the products unit price and *Less Than* for the employee hire date.

The **values** are the criteria that the filter field must meet when compared by the operator. In the above examples, the values would be *\$10* and *5/1/2008*. Some operators allow there to be more than one value.

Adding Standard Filters

This section applies to Advanced Reports. To learn about adding filters to ExpressView or Dashboards, refer to the ExpressView: Managing Data and Dashboard Designer: Filters articles.

1. Click the **Filter**  icon to open the **Report Filters** dialog.
2. Add a data field to filter by, called the **Filter Field** by first selecting a Data Object from the dropdown, and then either:
 - clicking the arrow icon to the right of the data field’s name
 - clicking the **+** **Add** button at the bottom of the data field’s tree
 - double-clicking on the field’s name
 - drag-and-dropping the data object from the tree to the Filter By panel
 - clicking the **+** **Add Formula** button to add a formula filter to the report. For more information, refer to the Formula Filters section of this article.
3. For each data field, select an **operator** from the *Equal To* dropdown. When the report is run, the field value for each row is checked against the condition for that field. Only the rows where the field satisfies the condition will be included in the report.The following table describes the filter operators and their applicable data types:

Table A – Filter Operators

Operator	Type	Filter Values	Matching Values	Not-Matching Values
Equal To (=)	Any	July 4, 2016	July 4, 2016 July 4, 2016 12:00 AM	July 4 July 4, 2016 2:00 PM

Not Equal To (!=)	Any	July 4, 2015	July 4 July 4, 2016 2:00 PM	July 4, 2016 July 4, 2016 12:00 AM
Less Than (<)	Number, Date/Time	July 4, 2016	July 3, 2016	July 5, 2016
Less Than or Equal To (<=)	Number, Date/Time	July 4, 2016	July 3, 2016 July 4, 2016	July 5, 2016
Greater Than (>)	Number, Date/Time	July 4, 2016	July 5, 2016 July 4, 2016 5:00 PM	July 3, 2016
Greater Than or Equal To (>=)	Number, Date/Time	July 4, 2016	July 4, 2016 July 5, 2016 July 4, 2016 5:00 PM	July 3, 2016
Starts With	Text, Number	203	2035550224	8458081120
Not Starts With	Text, Number	203	8458081120	2035550224
Ends With	Text, Number	224	2035550224	7188044606
Does Not End With	Text, Number	224	7188044606	2035550224
Contains	Text, Number	555	2035550224	2038081120
Does Not Contain	Text, Number	555	2038081120	2035550224
Is Between	Any	1, 4	1, 1.5, 3, 4	0.999, 5
Is Not Between	Any	1, 4	0.999, 5	1, 1.5, 3, 4
Is One Of	Any	1, 2, 3, 4	1, 2, 3, 4	1.1, 9
Is Not One Of	Any	1, 2, 3, 4	1.1, 9	1, 2, 3, 4

NOTE

The *Is Between* operator is inclusive. Values should be in least to greatest order.

4. Enter a **filter value or values**, by either:

Equal To

AND With Next Filter

☐ Group With Next Filter

☐ Prompt For Value

- Entering them directly with the keyboard.
 - Select them from the list of existing values. Type into the filter field to search for data values to filter. Click the **Settings** icon to select whether to search for values that either **Start With** or **Contain** the typed text (v2017.3+).
 - Click the **Filter Function** icon to choose a pre-defined value based on a formula programmed by the system administrator. (For example, *First Day of Current Month* or *Friday of Last Week*).
5. *Optional:* If there are multiple filters, they may be logically grouped together. See **Grouping Filters Together** for more information.
6. *Optional:* If the user should be prompted to enter a filter value when the report is run, check the **Prompt For Value** checkbox. A **Title** for each filter object may be added. This title will be displayed in the prompt to the user when the report is executed. See Prompting for Values below.
7. If necessary, change the order of the filters by either:
- clicking the **Move Item Up** or **Move Item Down** icons
 - click and drag the **Grip** icon to move the filter to the desired location

Formula Filters v2018.2+

Formulas may be used in the filter field allowing for much more powerful filter statements.

Consider the following example using data objects from the sample Northwind data set, to compare the `OrderDate` against a single date.

```
{Orders.OrderDate} > 01/01/2015
```

Now, **Data Objects** may be used in a formula when doing a filter operation. For example, calculating the revenue of an order line item by multiplying `{OrderDetails.Quantity}` by `{OrderDetails.UnitPrice}` and then applying a filter to select only those line items whose revenue is greater than \$300.

```
{OrderDetails.Quantity}*{OrderDetails.UnitPrice} > 300
```

To add a Formula Filter in the Advanced Report Designer’s Filters dialog:

1. Click the **+ Add Formula** button in the lower left to open the **Formula Editor** dialog.

TIP

Refer to Formulas for details about creating and editing formulas and using the **Formula Editor**.

NOTE

Certain functions are available in the **Formula Editor** that are not compatible with the context of formula filters, such as *CellValue()*, *FilterValue()*, *Hyperlink*, *LoadImage()* and *PageNumber()*.

Prompting for Filter Values

If users should be able to select their own filter values when they run the report, set filters to **Prompt For Value**. In the **Report Options**, choose whether to let users change the operators and delete filters.

Apply Filters

Field	Operator	Value
Products.UnitPrice	Greater Than Or Equal To	31.23 f_x
Product Category	Is One Of	Produce Beverages Confections × × × +

Run Report

Cancel Run

Prompting Filter Window with two filters: a Greater Than or Equal To filter for the product unit price and an Is One Of filter for one or more product categories

When creating prompting filters in the **Report Filters** dialog, it is not necessary to select filter values (step 4). But if values are provided, those values become the defaults in the prompting window.

If there are no valid filter values for a particular filter, either due to there being no records in the filter field or an incomplete filter dependency, a *No values found matching the search criteria* message will appear when opening the dropdown in either the Simple with Operator and Simple without Operator prompting filter windows.

Filter Dependency

Using **Filter Dependency** is a graceful way of preventing users from seeing a **No Data Qualified** message by choosing incorrect filter values. Filter Dependency is an optional feature that must be enabled by the system administrator before it can be used in reports. When **Filter Dependency** is enabled and a report contains at least two **prompting filters**, values for subsequent filter dropdowns will be determined by values chosen for the preceding filters in the dialog.

Consider an example with three filters: **Category**, **Product** and **Supplier** that are grouped together with the AND clause. In this case, the report will select rows when all of the filter conditions are met. If **Category** is chosen to be *Meat/Poultry*, dropdowns for **Product** and **Supplier** will be filtered by Category so that only Products in the Meat/Poultry category and Suppliers selling Meat/Poultry products can be chosen. If a Product value is further selected, then the dropdown for Supplier would be filtered by both **Category** and **Product** such that only a Supplier selling that particular product could be selected. This “cascading” effect continues from top-to-bottom for as many filters there are on the report.

Report Filters

Select filter fields to include on report

Categories

CategoryID

CategoryName

Description

Picture

Filter By	Title			
Categories.CategoryName	Category	f _x	^	×
Products.ProductName	Product	f _x	^	×
Suppliers.CompanyName	Supplier	f _x	^	×

Equal To

AND With Next Filter

☐ Group With Next Filter

+

Add

SUMMARY

Category = 'Meat/Poultry' And Product = 'Alice Mutton' And

Alice Mutton

Mishi Kobe Niku

Pâté chinois

Perth Pasties

Thüringer Rostbratwurst

Tourtière

Okay

Cancel

Only Products in the Meat/Poultry Category can be selected as the Product filter depends on the Category value.

Filter dependency only works in a top-to-bottom flow. That is, choosing a Product Name will not cascade upwards to the Category filter, it will only cascade down to the Supplier filter. For interactive filters on a Dashboard, filter dependency is determined by the order the filter tiles are added to the canvas.

If there is no value selected for Category, then the Product and Supplier dropdowns will show no values in the example above. This is because the filter being generated is CategoryName = “null”, and so no data is returned. When this occurs in a Simple with Operator or Simple without Operator prompting filter window, a *No values found matching the search criteria* message will appear when opening the dropdown.

Product

Equal To

No values found matching search criteria

Supplier

Equal To

No values found matching the search criteria message will appear when opening a filter dropdown and there are no values to display

There are cases for data sets other than what our example uses where the subsequent filters will return data even if the preceding filter returns null. One such case is if there is an OR clause between two filters. For example, A OR B AND C. In this case, filter B is not dependent on the filter A, so selecting a value for filter A would not filter the dropdown for filter B. But C is still dependent on B in this case because of the AND in between them.

Report Filters

Select filter fields to include on report

Categories

CategoryID

CategoryName

Description

Picture

Filter By

Categories.CategoryName

Products.ProductName

Suppliers.CompanyName

Title

Category

Product

Supplier

fx

fx

fx

^

^

^

v

v

v

x

x

x

Equal To

AND With Next Filter

☐ Group With Next Filter

+

Add Formula

SUMMARY

Category = 'Beverages' Or Product = 'Boston Crab Meat' And S

Boston Crab Meat

Queso Manchego La Pastora

Raclette Courdavault

Ravioli Angelo

Rhönbräu Klosterbier

Röd Kaviar

Rogede sild

Rössle Sauerkraut

Sasquatch Ale

Schoggi Schokolade

Scottish Longbreads

All Products are available regardless of Category because the filter statement now includes the OR clause between Category and Product

Filter Dependency will follow logical grouping in the filter statement created either with the **Group With Next Filter** checkbox or by using the Nesting Filter Groups keyboard shortcuts.

IMPORTANT

Filter Dependencies only support one level of grouping and are not honored when the filters are included in the **Common Prompt** mode of a Chained Report.

Filter Logic and Grouping

Conjunctions

Standard Filters can be combined to form complex filtering phrases. Taking the examples from the beginning of this article a bit further, a filter can be setup to show “only the orders of products whose unit price is more than \$10 AND were placed by any employee who was hired after 5/1/2008”. Note the emphasis on the word AND. To build a report that shows this kind of data, the original two filters are conjoined so that only orders that meet both criteria will apply.

Another way of combining filters is with an OR conjunction. For example, “show only the products whose Category is Beverages OR whose Category is Condiments”.

Filter conjunctions can also be combined together. Consider this complex filter phrase that uses four individual standard filters to return only service tickets that required a Return Material Authorization due to lightning or surge damage: “Include only the service tickets where the description contains ‘RMA’ OR the title contains ‘RMA’ AND the description contains ‘Lightning’ OR the description contains ‘Surge’”.

SUMMARY

(Employees.HomePhone Starts With '203' Or Employees.HomePhone Starts With '(203')) And (Employees.City = 'Shelton' Or Employees.City = 'Waterbury')

Example of a combined filter statement

To specify that a data row needs to satisfy any one of several filters:

1. Click the **Filter** icon to open the **Report Filters** dialog.

2. Change the order of the filters so they are consecutive, by either:

◦ clicking the **Move Item Up** ^ or **Move Item Down** v icons

◦ click and drag the **Grip** icon to move the filter to the desired location

3. Select the first filter.

4. Change **AND With Next Filter** to **OR With Next Filter** in the dropdown.

Notice that in the **Summary** field, the *And* between this filter and the next has changed to *Or*.

5. Repeat steps 2-3 for every filter except the last.
- NOTE
- 112 of 229

The AND operator (**AND With Next Filter**) has higher precedence over the OR operator (**OR With Next Filter**). This means filters that are ANDed together will be evaluated first before those that are ORed together.

Examples

This filter will only show donations larger than \$5,000 that were made today from the Telethon fundraising campaign

```
Campaigns.Campaign Name = 'Telethon 1' And Donations.Date = 'Today' And Donations.Amount >= '5000'
```

This filter will show donations larger than \$5,000 and were made today or if the donor's birthday is today. Since this is less restrictive, more results are returned.

```
Donations.Date = 'Today' Or Donors.birthday = 'Today' And Donations.Amount > '5000'
```

Grouping

Filters may be grouped together, to specify that a data row can match either one group of filters, or another group of filters, to show on the report.

To specify that a data row needs to satisfy any one of several groups of filters:

1. Click the **Filter**  icon to open the **Report Filters** dialog.
2. Change the order of the filters so they are near their group mates, by either:
 - clicking the **Move Item Up**  or **Move Item Down**  icons
 - click and drag the **Grip**  icon to move the filter to the desired location
3. Select the first filter in the first group.
4. Check the **Group With Next Filter** checkbox.

Notice that in the **Summary** field, there are now parentheses around this filter and the next.
5. Repeat steps 2â€”4 for every filter except the last in the first group.
6. Select the last filter in the first group.
7. Change **AND With Next Filter** to **OR With Next Filter** in the dropdown.

Notice that in the **Summary** field, the *And* between this filter and the next has changed to *Or*.
8. Repeat steps 2â€”7 for every group of filters. Skip step 7 for the last filter in the last group.

Nesting Filter Groups

Filter groups can be nested arbitrarily. This allows for more detailed control over grouping. The **Summary** field shows the actual statement used to filter the data. You can make arbitrary groupings by inserting parentheses manually at locations in the statement. Use the following keyboard shortcuts:

IMPORTANT

Filter Dependencies only support one level of grouping.

- **Ctrl + [** to add an opening parenthesis before the selected filter
- **Ctrl +]** to add a closing parenthesis after the selected filter
- **Ctrl + Shift + [** to remove an opening parenthesis from before the selected filter
- **Ctrl + Shift +]** to remove a closing parenthesis from after the selected filter

Group Min/Max Filters

Group Min/Max Filters cause the report output to display detail containing either the highest/latest or lowest/earliest values in a field for either one group, multiple groups, or an entire data set.

This tool is especially useful if interested in viewing the highest or lowest values, such as the most recent hire date or highest revenue figure, in a given set. Group Min/Max filters are compatible with standard filters, and there is no limit to the number of group filters that can be defined.

To add a Group Min/Max Filter to a report:

1. Open the **Filters** dialog then, click the **Group Min/Max** tab. To open the dialog:
 - (v2021.1+) Click the **Filters**  icon on the toolbar
2. Add a data field to filter by, called the **Filter Field** by first selecting a Data Object from the dropdown, and then either:
 - clicking the arrow icon to the right of the data field's name
 - clicking the **+** **Add** button at the bottom of the data field's tree
 - double-clicking on the field's name
 - drag-and-dropping the data object from the tree to the Filter By panel
3. From the **Minimum** dropdown, choose either *Minimum* to see the smallest or earliest values, or *Maximum* to see the largest or latest values.
4. From the **For Each** dropdown, choose the data set to group the minimums or maximums by. Choose *Entire Data Set* to show the minimum or maximum of the entire data set, or a data object or sort field to show the minimum or maximum of a group. See details in the sections below
5. If necessary, change the order of the filters by either:
 - clicking the **Move Item Up**  or **Move Item Down**  icons
 - click and drag the **Grip**  icon to move the filter to the desired location

Like standard filters, multiple **Group Min/Max Filter Fields** may be added. Subsequent filter fields will further filter the report in the event of a tie.

Consider a report that lists the orders placed by customers grouped by the employee that took the order. The report design may look like this:

+ Add Section		A	B	C	D	E	F	G
Page Header	⋮	1	Group Min/Max Filters					
		2	In Stock	Product Code	Product Name	Quantity Ordered	Unit Price	
Header: Orders.EmployeeID	⋮	3	=Concatenate({Employees.FirstName}, " ", {Employees.LastName})					
Header: Orders.CustomerID	⋮	4	=Concatenate({Customers.CompanyName}, " (", {Customers.CustomerID}, ")")					
Detail	⋮	5	=If({Products.UnitsInStock}>0, "In Stock", "Out of Stock")	Products.ProductID	Products.ProductName	OrderDetails.Quantity	OrderDetails.UnitPrice	
		6						

Figure 1 – Report Designer layout of the example report used in this section

In the Report Viewer, this report looks like this:

Group Min/Max Filters				
In Stock	Product Code	Product Name	Quantity Ordered	Unit Price
Steven Buchanan				
Berglunds snabbköp (BERGS)				
In Stock	4	Chef Anton's Cajun Seasoning	12	\$22.00
In Stock	39	Chartreuse verte	20	\$18.00
In Stock	54	Tourtière	6	\$7.45
In Stock	2	Chang	21	\$19.00
In Stock	24	Guaraná Fantástica	6	\$4.50
In Stock	30	Nord-Ost Matjeshering	40	\$25.89
Blondesddsl père et fils (BLONP)				
In Stock	39	Chartreuse verte	60	\$14.40
In Stock	72	Mozzarella di Giovanni	20	\$27.80
Bon app' (BONAP)				
In Stock	16	Pavlova	15	\$17.45
Out of Stock	31	Gorgonzola Telino	3	\$12.50
In Stock	65	Louisiana Fiery Hot Pepper Sauce	10	\$21.05
Robert King				
Bon app' (BONAP)				
In Stock	46	Spegesild	21	\$12.00
In Stock	64	Wimmers gute Semmelknödel	20	\$33.25
Bottom-Dollar Markets (BOTTM)				
In Stock	68	Scottish Longbreads	42	\$12.50
B's Beverages (BSBEV)				
In Stock	3	Aniseed Syrup	30	\$8.00
In Stock	64	Wimmers gute Semmelknödel	9	\$26.60

Figure 2 – Report Viewer view of the above example report

This report will be used in each of the following examples

Entire Data Set

The most basic usage of a **Group Min/Max Filter** is to limit the whole report to a single record, representing either the minimum or maximum value for entire data set. To do this,Â at step 4 above choose *Entire Data Set*.
Setting a Group Maximum Filter on the example report's `OrderDetails.Quantity` field will reduce it to one record with the line item with the largest quantity of a single product out of all of the orders for all of the salespeople.

Report Filters

StandardTop/BottomGroup Min/Max

Select filter fields to include on report

Customers

Address

City

CompanyName

ContactName

+ Add

Filter By

OrderDetails.Quantity

Maximum

OrderDetails.Quantity

For Each

Entire Data Set

☐ Ignore other groupings on report

SUMMARY

Maximum OrderDetails.Quantity For Each EntireDataSet

Okay

Cancel

Figure 3 – The Report Filters dialog for the Entire Data Set Group Min/Max Filter

Group Min/Max Filters				
In Stock	Product Code	Product Name	Quantity Ordered	Unit Price
Steven Buchanan				
Blondesddsl père et fils (BLONP)				
In Stock	39	Chartreuse verte	60	\$14.40

Figure 4 – The resulting output after applying the Entire Data Set Group Min/Max Filter on the report from Figure 1

TIP

To see more than one maximum or minimum for a data set, use a Top/Bottom filter instead.

Min/Max for each Group

Another common usage for **Group Min/Max Filters** is to see the min or max value for each instance of a group.

To do this:

1. Add a sort on the field to do the min/max grouping on.Â Since sorts are implicit groups, adding a Group section is optional.

2. At step 4 above, choose the sort fieldÂ from the dropdown.

Report Filters

StandardTop/BottomGroup Min/Max

Select filter fields to include on report

Customers

Address

City

CompanyName

ContactName

+

Add

Filter By

OrderDetails.Quantity

Maximum

OrderDetails.Quantity

For Each

Orders.CustomerID

☐ Ignore other groupings on report

SUMMARY

Maximum OrderDetails.Quantity For Each Orders.CustomerID

Okay

Cancel

Figure 5 – Report Filters dialog when filtering with a group

Since the customers are grouped by employee, the resulting report output will show the product with the highest quantity ordered by each customer handled by each employee.

Group Min/Max Filters				
In Stock	Product Code	Product Name	Quantity Ordered	Unit Price
Steven Buchanan				
Berglunds snabbköp (BERGS)				
In Stock	30	Nord-Ost Matjeshering	40	\$25.89
Blondesddsl père et fils (BLONP)				
In Stock	39	Chartreuse verte	60	\$14.40
Bon app' (BONAP)				
In Stock	16	Pavlova	15	\$17.45
Robert King				
Bon app' (BONAP)				
In Stock	46	Spegesild	21	\$12.00
Bottom-Dollar Markets (BOTTM)				
In Stock	68	Scottish Longbreads	42	\$12.50
B's Beverages (BSBEV)				
In Stock	3	Aniseed Syrup	30	\$8.00

Figure 6 – Showing the products with the largest quantity on an order for each customer and each employee

To show the highest quantity ordered by each customer regardless of who placed the order, check the **Ignore other groupings on report** checkbox in the Report Filters dialog. In other words, show the largest product quantity ignoring the Employees group.

NOTE

If applying a Group Min/Max filter to an outer group, then checking the Ignore other groupings checkbox has no effect on the report output because the outermost group takes precedence anyway. If applying a Group Min/Max filter to an inner group, however, the button takes effect.

Report Filters

StandardTop/BottomGroup Min/Max

Select filter fields to include on report

Customers

Address

City

CompanyName

ContactName

+

Add

Filter By

OrderDetails.Quantity

Maximum

OrderDetails.Quantity

For Each

Orders.CustomerID

☒ Ignore other groupings on report

SUMMARY

Maximum OrderDetails.Quantity For Each Orders.CustomerID ignoring other groupings

Okay

Cancel

Figure 7 – Report Filters dialog when filtering with a group while ignoring other groups

Notice that Bon app' (BONAP) appears only once in Figure 8 in contrast with Figure 6. Due to the fact that BONAP's order of Spegesild from Robert King is greater than its order of Pavolova from Steven Buchanan, BONAP appears only once on the report. If BONAP had ordered the same quantity from both Buchanan and King, it would appear under both names, even with the **Ignore other groupings** checkbox checked.

Group Min/Max Filters				
In Stock	Product Code	Product Name	Quantity Ordered	Unit Price
Steven Buchanan				
Berglunds snabbköp (BERGS)				
In Stock	30	Nord-Ost Matjeshering	40	\$25.89
Blondesddsl père et fils (BLONP)				
In Stock	39	Chartreuse verte	60	\$14.40
Robert King				
Bon app' (BONAP)				
In Stock	46	Spegesild	21	\$12.00
Bottom-Dollar Markets (BOTTM)				
In Stock	68	Scottish Longbreads	42	\$12.50
B's Beverages (BSBEV)				
In Stock	3	Aniseed Syrup	30	\$8.00

Figure 8 – Showing the products with the largest quantity on an order for each customer regardless of the employee that placed it

Top/Bottom Filters

Top/Bottom filters, also known as **Top N filters** can be added to a report. **Top N filters** allow you to filter data to only the rows with the top or bottom values, for either data fields or data summaries, per group iteration.

Top/Bottom filters work after all other filters have been applied. If a **Standard** or **Group Min/Max** filter has narrowed down a data field, a Top/Bottom filter will work on the remaining values.

Report Filters

StandardTop/BottomGroup Min/Max

☒ Limit the report to the top/bottom values

Top/Bottom

Bottom

All

☐

#

2

Value

=aggsu((OrderDetails.Revenue))

Direction

Ascending

+ Add Group

Top/Bottom tab of the Filters dialog

To show only the top or bottom values, for either data fields or data summaries:

1. Open the **Filters** dialog then, click the **Top/Bottom** tab. To open the dialog:

o (v2021.1+) Click the **Filters** icon on the toolbar

2. Check the **Limit the report to the top/bottom values** checkbox.

3. From the **Top/Bottom** dropdown select either *Top* to show the largest or latest values or *Bottom* to show the smallest or earliest values.

4. Choose which values will be displayed, either:

o check the **All** checkbox to sort all of the section values by the Top N criteria

o enter an integer into the **#** textbox to specify the desired number of values (e.g. enter 2 to see the top 2 or bottom 2 values). This field is only available when **All** is unchecked.

5. Select the data field or group field to filter from the **Value** dropdown.

6. Choose the **Direction** that the results should be sorted:

o *Ascending* items will be sorted from least to greatest

o *Descending* items will be sorted from greatest to least

o *None* items will be sorted in the original report sort order

To optionally filter the top/bottom values of each sorted group on a report, called a **For Each Group**:

7. Click the **+ Add Group** button.

8. Select one of the sorted groups on the report to group by from the dropdown list. You may also type into the dropdown list to search for the name of a field.

9. Click **Okay**.

To remove a **For Each Group**, click the **Delete Dropdown** icon.

To remove a **Top N Filter**, uncheck the **Limit the report to the top/bottom values** checkbox.

Examples

Top 3 Performing Salespeople

A report showing the name and sales revenue for the top three performing salespeople in an organization may look like this:

Top 3 Performing Salespeople

Employee

Margaret Peacock

Janet Leverling

Nancy Davolio

Revenue

\$250,187.45

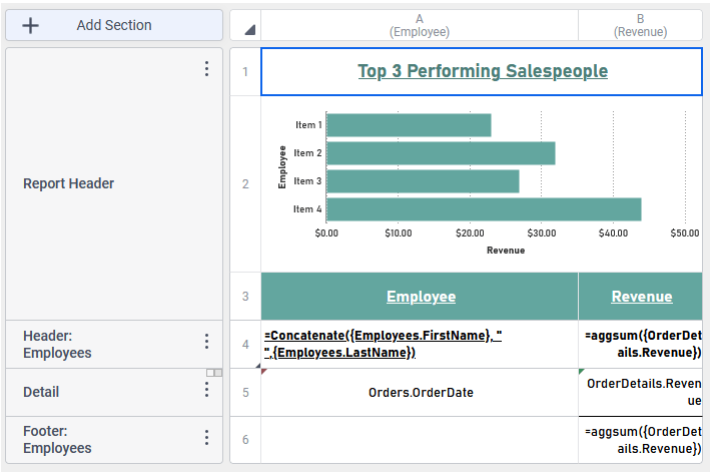
\$213,051.30

\$202,143.71

Employee	Revenue
Margaret Peacock	\$250,187.45
Janet Leverling	\$213,051.30
Nancy Davolio	\$202,143.71

In the **Report Designer**, the report contains the Employee Name and an aggregate of all of their order revenues summed together. The detail rows are collapsed so they are not initially visible in the **Report Viewer** until they are expanded.

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To filter all of the employees to show only those with the highest three revenues, a **Top N Filter** is applied with the following properties:

☒ Limit the report to the top/bottom values

Top/Bottom

All

#

Value

Direction

Top

☐

3

=aggsu([OrderDetails.Revenue])

Descending

[+ Add Group](#)

Top N Filter dialog for Top 3 Performing Salespeople report

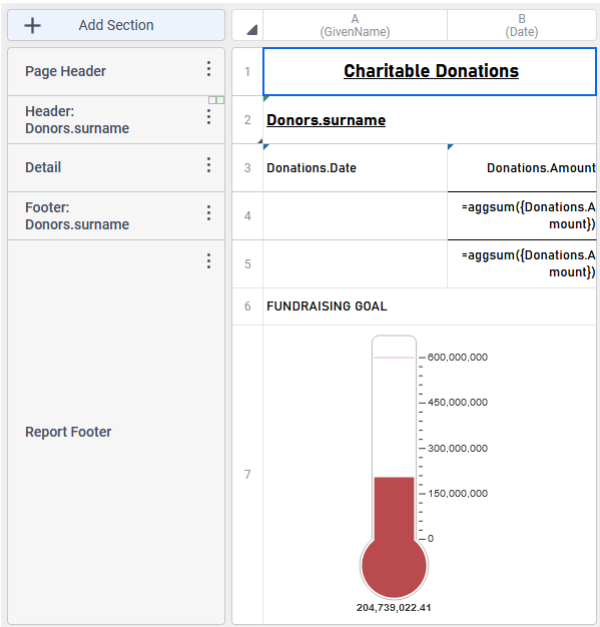
- **Top/Bottom** – set to *Top* to choose the largest values
- **All** – *unchecked*, enabling the **#** textbox
- **#** – set to *3* which will filter out all employees except for the top 3
- **Value** – set to the formula `=aggsu([OrderDetails.Revenue])` to set the criteria to the aggregate sum of each employee's orders
- **Direction** – set to *Descending* so that the largest value appears first and then in descending order from the *Top*.

Largest Donations per Donor

A report showing a fundraising goal may want to show the name of each donor, and the top two largest donations that each donor made to the cause may look like this:

▼ Aarsland		
08/02/2020		\$2,956.00
		\$2,956.00
▶ Aarsen		
▼ Aartsen		
05/24/2020		\$4,195.00
08/01/2020		\$4,084.00
		\$10,279.00
▼ Aarvik		
01/28/2020		\$4,134.00
08/29/2020		\$2,824.00
		\$6,958.00
▶ Aas		
▶ Aasbo		
▶ Aasebo		
▶ Aasen		
▶ Aaserud		
▶ Aasheim		
▼ Aass		
02/18/2020		\$5,950.00
07/09/2020		\$2,557.00
		\$8,507.00

The report is sorted by the donor's last name. Each donor may have made many contributions to the cause. In the **Report Designer**, the report looks like this:



If a **Top N Filter** is added, only the top donations will be shown. To show the top two donations *for each* donor, a **Top N Filter** with a **For Each** group is added with the following properties:

☒ Limit the report to the top/bottom values

Top/Bottom	All	#	Value	Direction
Top	☐	2	donations.Amount	Descending

For Each:

Top N Filter dialog for Charitable Donations report

- **Top/Bottom** " set to *Top* to choose the largest donation values
- **All** " unchecked, enabling the # textbox
- **#** " set to 2 which will filter out all donations except for the top 2
- **Value** " set to *donations.Amount* to set the filtering criteria to the amount of each donation
- **Direction** " set to *Descending* so that the largest value appears first and then in descending order from the *Top*.
- **For Each** " appears because the + **Add Group** button was clicked to add a **For Each** group. Set to *donors.Surname* to enable the Top N filter to be applied to each donor's name.

Sorting by Aggregates

Â

This document covers several versions of the application. Use the **Viewing content for** dropdown to see only the content relevant to a specific application version.

To sort groups by the summary, or **aggregate**, calculation of each group of an Advanced Report, use **Top/Bottom filters**.

Top/Bottom filters look for the highest or lowest values in a set, and then put those values in order. Any arbitrary cell in the report can be the Top/Bottom filter.

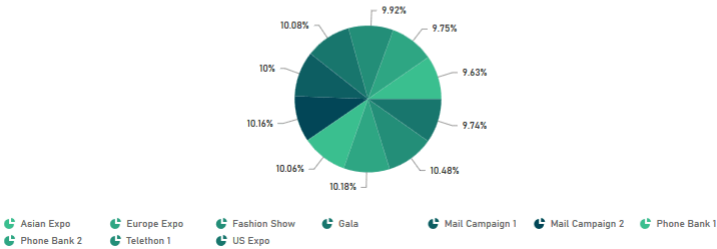
To sort by a summary calculation:

1. Ensure that your report has the appropriate aggregate formula in a group footer or header cell. The cell should return a numeric value in the report output, which you want to sort the groups by.
2. Open the **Filters** dialog then, click the **Top/Bottom** tab. To open the dialog:
 - o (v2021.1+) Click the **Filters** icon on the toolbar
3. Check the **Limit the report to the top/bottom values** check box.
4. From the **Top/Bottom** list:
 - o select **Bottom** to sort in ascending order, or
 - o select **Top** to sort in descending order.
5. Check the **All** checkbox to sort all of the section values by the Top N criteria.
6. From the **Value** list, select the group footer or header cell with the aggregate formula.
7. If there is a **For Each** group, click the **Delete** icon to remove it.

Keep in mind that this is not a *Sort* from the sort menu. It cannot make nested groups. This only affects the order in which a group of data is shown in the output. Because this is technically a *Filter*, this has precedence over the report sorts.

Fundraising Campaign Revenue Report

Asian Expo	\$3,279,244.00
Europe Expo	\$3,319,529.00
Fashion Show	\$3,377,278.00
Gala	\$3,430,796.00
Mail Campaign 1	\$3,403,068.00
Mail Campaign 2	\$3,457,952.00
Phone Bank 1	\$3,425,908.00
Phone Bank 2	\$3,463,929.00
Telethon 1	\$3,566,298.00
US Expo	\$3,316,327.00



An Advanced Report that aggregates the revenue raised from donations in a fundraising campaign

Standard

Top/Bottom

Group Min/Max

☒ Limit the report to the top/bottom values

Top/Bottom

All

#

Value

Direction

Top

☒

10

=aggsum((Charitable Donations.Amount))

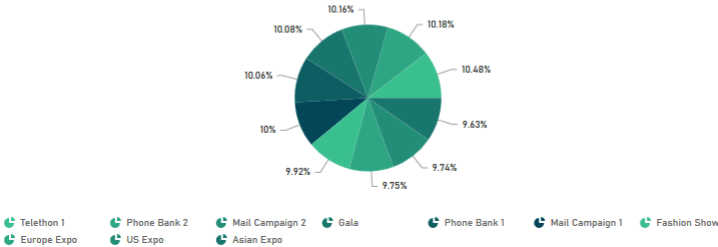
Descending

+ Add Group

The Filters dialog settings to sort by the aggregated revenue figure

Fundraising Campaign Revenue Report

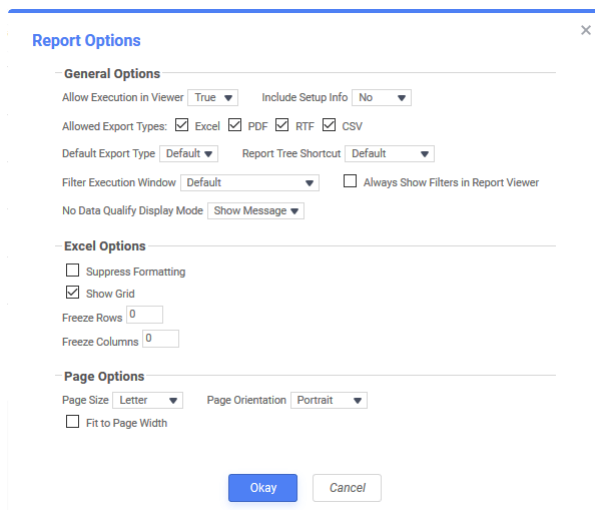
Telethon 1	\$3,566,298.00
Phone Bank 2	\$3,463,929.00
Mail Campaign 2	\$3,457,952.00
Gala	\$3,430,796.00
Phone Bank 1	\$3,425,908.00
Mail Campaign 1	\$3,403,068.00
Fashion Show	\$3,377,278.00
Europe Expo	\$3,319,529.00
US Expo	\$3,316,327.00
Asian Expo	\$3,279,244.00



The same report now sorted by the aggregated campaign donation amounts

Advanced Reports: Report Options

The following options are available in the General Options dialog:



Report Options [X]

General Options

Allow Execution in Viewer: ☒ True Include Setup Info: ☐ No

Allowed Export Types: ☒ Excel ☒ PDF ☒ RTF ☒ CSV

Default Export Type: Report Tree Shortcut:

Filter Execution Window: ☐ Always Show Filters in Report Viewer

No Data Qualify Display Mode:

Excel Options

☐ Suppress Formatting

☒ Show Grid

Freeze Rows:

Freeze Columns:

Page Options

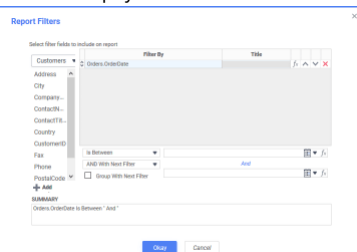
Page Size: Page Orientation:

☐ Fit to Page Width

Report Options dialog

General Options

- **Allow Execution in Viewer:** Allow or prevent the report from being run in the **Report Viewer**. If set to *False*, this report must be exported to be viewed.
- **Include Setup Info:** Select *Top* or *Bottom* to display the data categories, sorts, and filters at either the beginning (*Top*) or end (*Bottom*) of the report. Select *None* to not show this information on the report.
- **Allowed Export Types:** Enable or disable output types for the report.
- **Default Export Type:** Specify the default output type for the report. If *Default* the export type is determined by the system's configuration. This setting is used when exporting a report directly from the Report Tree, for example.
- **Report Tree Shortcut:** Specify whether the Run  button for the report in the report tree runs the report in the **Report Viewer** or exports it in the default export type.
- **Filter Execution Window:** Select which type of Filter menu displays when running the report with prompting filters:
 - *Default:* The type of filter window is determined by the system's configuration.
 - *Standard:* Display the standard filter window.



Report Filters [X]

Select filter fields to include on report

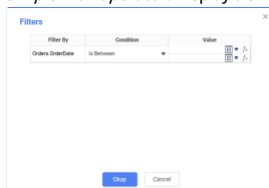
Customers ☒ Orders OrderDate

Address ☐ City ☐ Company ☐ ContactTitle ☐ Country ☐ CustomerID ☐ Fax ☐ Phone ☐ PostalCode ☐ Add

Filter By: Filter By:

Is Between And

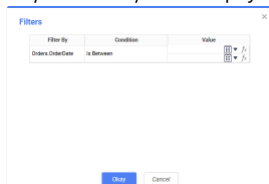
- *Simple with Operator:* Display a simplified filter window that only allows the filter operator and value to be changed.



Filters [X]

Filter By: Condition: Value:

- *Simple without Operator:* Display a simplified filter window that only allows the filter value to be changed.



Filters [X]

Filter By: Condition: Value:

- **Always Show Filters in Report Viewer:** Show the Filter menu and allow changes to be made to the filters every time the report is run, even if there are no **Prompting Filters** on the report.
- **No Data Qualify Display Mode:** Select what to display if no data qualifies for the report.
 - *Show Message:* Display the standard no data qualified message in a dialog box.
 - *Show Report:* Display the Page Header, Page Footer, Report Header, and Report Footer sections of the report. Any cells containing Data Fields will not be displayed.

Excel Options

- **Suppress Formatting:** Check the checkbox to only include the data in an Excel export, without the formatting.
- **Show Grid:** Check the checkbox to show grid lines between cells in an Excel export.
- **Freeze Rows:** Freeze the top number of rows when exporting to Excel, so that the rows stay anchored to the screen when scrolling through the report.
- **Freeze Columns:** Freeze the left number of columns when exporting to Excel, so that the columns stay anchored to the screen when scrolling through the report.

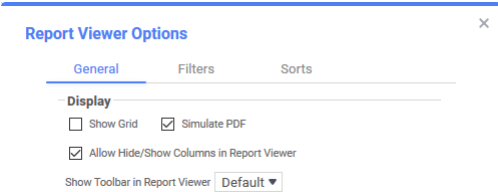
Page Options

- **Page Size** – choose the page/paper size. Choices are common named US and ISO paper sizes (e.g. *Letter*, *Legal*, *Tabloid*, *A4*, etc...) The default value is *Letter*.
- **Page Orientation** – choose either *Portrait* or *Landscape* page orientation. The default is *Portrait*.
- **Fit to Page Width** – check this box to stretch the contents to the available width of the page. The default value is *checked*.

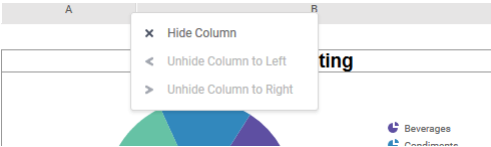
Report Viewer Options

The following options are available in the **Report Viewer Options** window:

General



- **Show Grid** – Check the checkbox to show grid-lines between cells, in addition to any cells borders that have been applied in the Report Viewer.
- **Simulate PDF** – Check the checkbox to have the report appear as if it were on a PDF page when viewed. When unchecked, the report still is paginated but does not have the formatting of a PDF exported report.
- **Allow Hide/Show Columns in Report Viewer** – check the checkbox if the ability to show or hide individual columns is available in the Report Viewer. If checked, headers will appear at the top of the page. When right-clicked, users will have the ability to hide or un-hide columns. If unchecked, the headers are not present and the columns may not be changed.



NOTE

If a CrossTab appears on the report, this setting will not have an effect.

- **Show Toolbar in Report Viewer** – Select whether to show or hide the interactive toolbar in the Report Viewer.



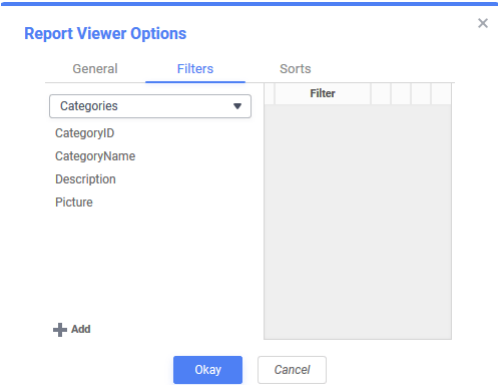
- *Default*: the toolbar will be displayed based on the system's configuration
- *Auto*: the toolbar will be hidden if the Report Footer appears on the first page. Otherwise, the toolbar will be shown.
- *Show*: always show the toolbar
- *Hide*: always hide the toolbar

- **Show Column Headers in Report Viewer (v2021.1+)** – uncheck this checkbox to hide the column headers in the Report Viewer.

Country	Name	E-Mail	Join Date	CC Type	Favorite Color
---------	------	--------	-----------	---------	----------------

- **Report Row Step Limit** – Override the default step size for incremental loading (with a smaller value). This option is only available if **Incremental Loading** is enabled in your environment.

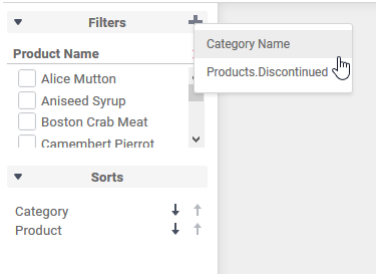
Filters



Filters tab of the Report Viewer options dialog

To allow users to select additional interactive filters in the Report Viewer, add data fields as filters. These filters are accessed by clicking on the **Open Dock**

(pre-v2021.1) or  (v2021.1+) icon on the side of the screen in the Report Viewer.

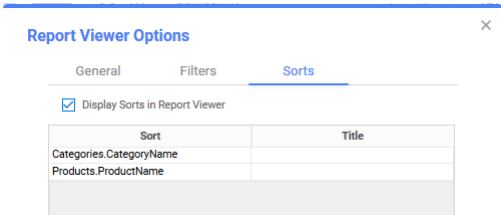


Interactive Features pane opened in the Report Viewer showing a Product Name filter, adding a Category filter and Sorts

For each filter you can select the following options:

- **Title:** Enter text to appear in place of the data field name.
- **Type:** Specify the type of ability the user has to choose filter values:
 - **Single Choice:** A dropdown menu with all possible filter values. Users can choose one value.
 - **Multiple Choice:** A check list with all possible filter values. Users can choose multiple values.
 - **Single Slider:** Users can choose one value by sliding a point along a scale.
 - **Range Slider:** Users can choose multiple values between two points on a scale.
- **Value Sort Direction:** Whether the filter values should display in *ascending* or *descending* order.
- **Filter Value Format:** Select how the filter values should display. The controls here work similar to the Cell Formatting controls.
- **Initially Display Filter on Panel:** Check the checkbox if the filter should appear automatically when the report is run. If unchecked, the user will need to add the filter each time the report is run.

Sorts



Sorts tab of Report Viewer options dialog showing two Category sorts

To allow users to change existing sorts from *ascending* or *descending* in the Report Viewer. These sorts are accessed by clicking on the  **Open Dock**

(pre-v2021.1) or  (v2021.1+) icon on the side of the screen in the **Report Viewer**.

- **Display Sorts in Report Viewer:** Select whether the user can see and modify sorts in the Report Viewer.
- **Title:** Enter a user-friendly name for the sorting category which will be displayed in the Report Viewer.

Advanced Options

NOTE

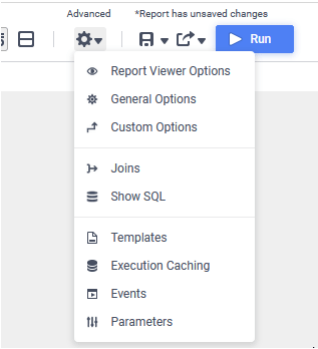
The system administrator can enable or restrict access to certain **Advanced Options**. Check with them for more information.

The following **Advanced Options** are available in the Report Designer, for both Advanced Reports and CrossTabs:

-  **Joins** – fine control over how the data objects on a report relate to each other.
-  **Events** – link a **Server Event** to the report. Server Events are custom bits of functionality created by the system administrator that occur when certain application triggers occur such as when the report is loaded, saved or during the execution cycle.
-  **Show SQL** – view the generated SQL query which retrieves the data used on the report
-  **Parameters** – define reusable system variables, called Parameters, on the report.

To access these advanced options:

- (v2021.1+) Click on the **Advanced**  menu on the toolbar, then choose one of the Advanced Options from the menu



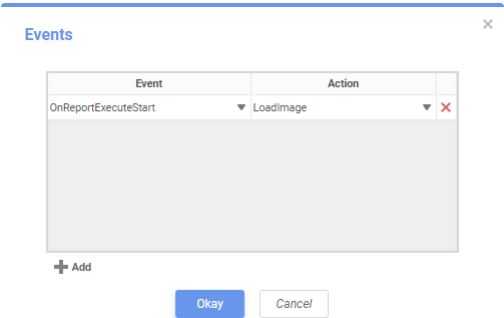
Joins

If a report has two or more data objects, then information will only appear if the objects match. Using the Joins dialog, however, you may specify information you want to display regardless of whether or not it only exists in one of the data objects.

To learn more about joining data objects, review the Advanced Reports: Joins article.

Events

Event handlers may be applied to the report by advanced users for additional functionality.



1. Click **+** **Add** to add a new event to the list.
2. Choose a server event trigger from the **Event** dropdown list. See Table A below for a list of server event names.
3. Choose a server event action from the **Action** dropdown list. The actions available here are determined by the custom code entered into the application by the system administrator.
4. Click **Okay** to save the server event to the report and close the dialog, or **Cancel** to close the dialog without saving.

An event can be removed from a report using the **Delete** **X**

icon.

Upon triggering the event “e.g., *OnReportExecuteStart* will be triggered at the start of the report’s execution” the associated action will take place.

Table A “ Server Event Descriptions

Server Event Name	Description
OnDataCombined	Called after all data is retrieved and combined from all data sources.
OnReportFailValidation	Called when a report fails validation while being loaded for editing or execution.
OnReportExecuteInit	Called after the report is loaded at the beginning of an execution, but before any processing has occurred.
OnReportExecuteStart	Called at beginning of report execution processing.
OnReportExecuteEnd	Called at end of report execution processing.
OnWebServiceExecuteEnd	Called after data is retrieved from a Web Service Method.
OnExecuteSqlStatementConstructed	Called after SQL statement due to report execution is constructed allowing any changes to be made.
OnFilterSqlStatementConstructed	Called after SQL statement due to filter dropdown is constructed allowing any changes to be made.
OnParameterSqlStatementConstructed	Called after SQL statement due to parameter dropdown is constructed allowing any changes to be made.
OnOkFiltersDialog	Called after Ok button in Filter execution dialog is clicked.
OnOkParametersDialog	Called after Ok button in Parameter execution dialog is clicked.
OnLoadReportParameters	Called when the report parameters are loaded but before any processing has occurred.
OnScheduledReportExecuteStart	Called at beginning of scheduled report execution.
OnScheduledReportComplete	Called upon completed execution of a scheduled report prior to further processing regardless of whether or not the report executed successfully

OnScheduledReportExecuteSuccess	Called upon successful execution of a scheduled report prior to further processing.
OnChartPreRender	Called just before rendering a chart.
OnConfigLoadStart	Called just after configuration file is loaded.
OnConfigLoadEnd	Called after configuration file is loaded, any changes are made, and host application container is redirected to the reporting application.
OnRenameFolderStart	Called just before renaming a report.
OnRenameFolderEnd	Called after a report is renamed.
OnDataFieldsRetrieved	Called after data fields are retrieved for a specific data object.
OnGetUserPreference	Called to retrieve a user preference.
OnSetUserPreference	Called to set a user preference.
OnReportSaveStart	Called before a report is saved.
OnAfterLoadReportsList	Called after reports built in this application have been loaded into the report tree object, for the purpose of allowing additional items to be loaded into the report tree.
OnExceptionThrown	Called when an application exception is thrown.
OnExportCsvCell	Called prior to exporting a CSV cell for the purpose of overriding the standard export results.
OnAfterReportExportSuccess	Called at the end of a successful report export.

Show Generated SQL v2019.1â€”v2021.1

Show SQL v2021.1+

This dialog displays the SQL statement that will be sent to the appropriate data sources in order to execute the report.

Northwind

```

1 SELECT
2     dbo.[Products].[ProductName] AS c0,
3     dbo.[Products].[UnitPrice] AS c1,
4     dbo.[Categories].[CategoryName] AS c2,
5     dbo.[Categories].[Description] AS c3,
6     dbo.[Products].[ProductID] AS c4,
7     dbo.[Categories].[CategoryID] AS c5,
8     dbo.[Products].[CategoryID] AS c6
9 FROM dbo.[Categories]
10 INNER JOIN dbo.[Products] ON (
11     dbo.[Categories].[CategoryID] = dbo.[Products].[CategoryID]
12 )
13 WHERE
14     dbo.[Categories].[CategoryName] IN ('Condiments', 'Confections')
15 ORDER BY
16     dbo.[Categories].[CategoryName] ASC

```

Close

The SQL statement shown in the **Execution SQL** window is the exact statement that will be sent to the databases. It is generated after applying sorts, filters, parameters, and other items that affect the constructed SQL.

Report-Level Parameters v2019.1.3+

Advanced users may also define their own report-level parameters. The **Parameters** window provides an interface for users to view existing non-hidden system-level parameters and create new parameters that are only present on the report.

Parameters

A parameter is a reusable variable. Parameters are used within calculations and filters, denoted by "@ParameterName@". They can be assigned a fixed value or prompt the user for a value on execution. Some parameters can only be edited by your administrator.

+ Add

Name	Type	Value	Prompt	Prompt Text
SalesQuota	decimal	75000	☒	Monthly sales quota
companyId	string		☐	
userEmail	string		☐	
userId	string		☐	

Okay Cancel

To create a new report-level parameter:

1. Click the **Add** button located in the top-right corner.
2. Define a unique **Name**. This value will act as the parameter's identifier within the report.
3. Specify a **Type** for the parameter, the following are available:
 - o String
 - o Date
 - o Integer
 - o Decimal
 - o Boolean
4. Enter a default or fixed **Value**. If left blank then the value will be interpreted as `null`.

5. Specify whether or not to **Prompt** the user for a value upon report execution.
6. Define the **Prompt Text**, the message that will appear when prompting the user for a value. A value for this field is required if the parameter is prompting.

Apply Parameters

Name

Value

Compute interest for entire year

True

Amount of down payment

15029.12

Choose a date

01/01/2050

Destination e-mail address

peter@example.com

Run Report

Cancel Run

Prompting parameter window

TIP

Report-level and system-level prompting parameters appear in the same prompting parameter window at run time.

Report-level parameters can be reused throughout the report in the same manner as non-hidden system-level parameters. They may be used as cell values or within filters, sorts, and calculations. To utilize a parameter within a cell or formula, surround its **Name** with '@' symbols (@*ParameterName*@).

For example, the following formula outputs *True* if an employee's revenue is greater than or equal to the value of the Sales Quota parameter and *False* if otherwise:

```
{OrderDetails.UnitPrice}*{OrderDetails.Quantity} >= @[email protected]
```

Using Report-Level Parameters in Dashboards and Chained Reports

Like system-level parameters, report-level parameters may be used and set to prompt for values in **Dashboards** and **Chained Reports** when the associated **Advanced Report** is added as an existing report.

MyParameter

Imported From param-test3, param-test4

Name

MyParameter

Value

Teleportation

Affected Tiles

ungroup

Additional Reports\param-test3

ungroup

Additional Reports\param-test4

On Execute

☐ Prompt for value

☒ Show on Output

☒ Set Default Value

Close

A report-level parameter defined on a Dashboard.

Within composite reports, however, these parameters can only take affect on the report-level and cannot be set to take affect on the **Dashboard**– or composite-level. This means that these parameters are only applicable on their associated **Advanced Reports** and cannot be modified to also apply to other reports or visualizations within a **Dashboard** or other composite report.

Internal Parameters

The following parameters are built into the application and can be used on any report. Their names are reserved and cannot be overridden.

Report Specific Parameters

The following parameters are utilized within reports to gather specific report information.

pageNumber

Description	Display the current page number for HTML, PDF, and RTF on Advanced, Express and Chained Reports.
Example	<code></code> Note: This parameter cannot be combined with other functions.

reportName

Description	Returns the name of the report.
Example	For a report named Transcripts in a folder named Student Documents would return “Transcripts”.

reportFullName

Description	Returns the name and file path of the report.
Example	For a report named Transcripts in a folder named Student Documents would return Student Documents/Transcripts.

User Specific Parameters

The following parameters are often used for user identification when loading user sessions rather than for reporting.

userId

Description	Returns the unique ID of the current user.
Example	

companyId

Description	Returns the unique ID of the company (or group) that the user belongs to.
Example	

userEmail

Description	Returns the email address of a specific user. Used to specify an email address for the “Reply To” email field of scheduled reports.
Example	

Installation Specific Parameters

The system administrator can create additional parameters for inclusion in reports. Contact the system administrator for details on these parameters and their use.

Advanced Reports: Templates

NOTE

Document Templates are an optional feature. Check with the system administrator for more information.

An Advanced Report can be used to dynamically fill out fields in forms and other documents. Placeholders in the document are dynamically linked to fields in the report. When executed, the form or document is merged with the report data.

Section		A
Detail	1	=(Employees.FirstName)&' '&(Employees.LastName)
	2	Employees.Address
	3	=(Employees.City)&' '&(Employees.PostalCode)

Report layout in the Advanced Report Designer

Nancy Davolio
507 - 20th Ave. E. Apt. 2A
Seattle, 98122
Andrew Fuller
908 W. Capital Way
Tacoma, 98401
Janel Leverling
722 Moss Bay Blvd.
Midland, 98003

Report data

Form W-9 (Rev. December 2011) Department of the Treasury Internal Revenue Service

Id

Name (as shown on your income tax return)
Nancy Davolio
Business name/disregarded entity name, if different from above
Check appropriate box for federal tax classification:
☐ Individual/sole proprietor
☐ Other (see instructions)
Address (number, street, and apt. or suite no.)
507 - 20th Ave. E. Apt. 2A
City, state, and ZIP code
Seattle, 98122

W9 template form with data
merged from report

This article covers the three stages of working with document templates:

1. Creating Template Documents
2. Linking Document Templates to a Report
3. Executing Template Reports

1. Creating Template Documents

The process for making templates differs between the three supported document types: PDF, Word (.doc, .docx and .rtf), and Excel; as do the available features.

CAUTION

Close the template file before running or saving a report that uses it.

PDF Templates

PDF templates support static fields and limited-repeating fields. PDFs are convenient for pre-existing and standardized forms, such as for government or business.

To create a PDF template:

1. Open the form in a PDF editor program, such as Adobe Acrobat or PDFescape.
2. Add form fields where you will insert report data. For fields where text may span multiple lines, select the multi-line property.
3. Give each form field a unique name following these guidelines:
 - o For *static fields*, which appear only once per template instance – use any name, with the exception of the format reserved for repeating fields.
 - o For *repeating fields*, which are mapped to consecutive values in a repeating cell or in a detail section – use the following naming format: `Name.0`, `Name.1`, ...
Where `Name` is shared by the repeating fields, and `0` maps to the first value, `1` maps to the next value, and so on.
 - o For *checkboxes* – use an `if()` function whose results are "X" for a checked box and " " (space) for an unchecked box. For example, `=if((Employees.Title) = 'Sales Representative', 'X', ' ')`.
4. Save the PDF. Then continue with the instructions in 2. Linking Document Templates to a Report.

Word Templates

Word templates support static fields, limited and unlimited-repeating fields, and conditional suppression.

TIP

Supported file types are .doc, .docx, and .rtf. Report templates exported as “RTF” will save to the original file type.

To create a Word template:

1. Open a document in Microsoft Word or a compatible document editor.
2. Add text where you want to insert report data.
3. Select the text, or in the case of repeating fields, a region of text, and insert a bookmark.

Employee Information

Personal Information

Full Name:

LastName

First Name

LastFirst

Address:

Address

City

Region

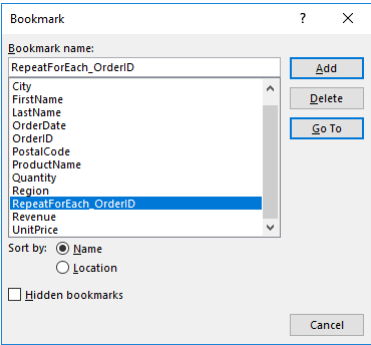
Postal Code

Street AddressCityStateZIP Code

Sales

OrderID	OrderDate	ProductName	Quantity	UnitPrice	Revenue
---------	-----------	-------------	----------	-----------	---------

4. Give each bookmark a unique name, as follows:
 - o For *static fields*, which appear only once per template instance – use any name, with the exception of the formats reserved for repeating and conditional fields.
 - o For *limited-repeating fields*, which are mapped to consecutive values in a repeating cell – use the following naming format: `FieldName_0`, `FieldName_1`, ... Where `Name` is shared by the repeating fields, and `0` maps to the first value, `1` maps to the next value, and so on.
 - o For *unlimited-repeating fields*, which are mapped to all the values in a repeating cell – use the following naming format: `RepeatForEach_FieldName` Where `FieldName` is a unique name. A `RepeatForEach` section in templating follows similar structure and purpose to grouping within reports. It is used to organize information under repeating groups within templates, arranging related information on the same page and separating groups with page breaks.



IMPORTANT

Bookmark formatting for unlimited-repeating fields must follow specific spacing requirements. The opening bookmark bracket should be placed one line before the repeating field section begins, and the closing bookmark bracket should be placed one line after the repeating field sections ends. Refer to the *Employee Information* example above for a visual reference. If this formatting is not followed, an “itemStart and itemEnd must be contained in one text body” error may be thrown.

- 5. *Optional* To conditionally show or hide text:
- 6. Select the text and add a bookmark with the following naming format: `KeepIF_FieldName` Where `FieldName` is a unique name.
- 7. In the report, map this field to a cell with a formula that returns 1 if the text should be shown, and 0 if the text should be hidden. For example, `=If({Products.ProductName} = "Chai", 1, 0)`
- 8. Save and close the file. Then continue with the instructions in 2. Linking Document Templates to a Report.

Microsoft Excel Templates

Excel templates work differently than other types. Templates are used to fill Excel columns with report data. This is useful for passing data to Excel charts, pivot tables, and macros.

To create an Excel template:

- 1. Open a workbook in Microsoft Excel or a compatible spreadsheet editor.
- 2. The first worksheet is used for dynamic report data. *Repeating cells* are mapped to columns in the worksheet. For each column where you will add report data, enter a unique name to the topmost cell in the column. All following cells must be empty. All other worksheets will remain unchanged by the report.

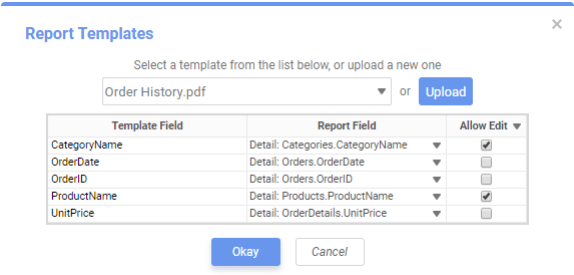
	A	B	C
1	Order ID	Quantity	Total
2			

Formatting an Excel file to be used as a template

- 3. Save the file. Then continue with the instructions in 2. Linking Document Templates to a Report.

2. Linking Document Templates to a Report

To use a report to fill out a template:



Editing of fields in exported PDF templates, v2018.2+

- 1. Enter field data in cells on the report. For repeating data:
 - Repeating cells mapped to static template fields make a new instance of the template for each repeat.
 - Repeating cells mapped to limited-repeating template fields make a new instance of the template each time the number of values exceeds the limit.
Note: This is often undesirable. Ensure that there are appropriate constraints on your data and enough fields to fit it all.
 - Repeating cells mapped to unlimited-repeating template fields never make a new instance of the template. Overflowing data is cut off.
- 2. *pre-v2021.1:* On the **Settings** menu, click **Template** to open the **Report Templates** dialog. Select an existing template or click the **Upload** button to upload a new one.
- 3. *v202.1+:* On the **Advanced** menu, click **Templates** to open the **Report Templates** dialog.
- 4. For each template field:
 - Select a report cell containing text or data. Images, visualizations, and other widgets are not supported.
 - Leave it blank. Any bookmarked text shows as-is in the output.
 - Select whether or not to allow editing of that field in the exported PDF file using the **Allow Edit** checkbox. **v2018.2+**
- 5. Click **OK**.

To remove a template from a report:

1. From the **Template** dialog, select the *blank* option from the template list.
2. Click **OK**.

3. Executing Template Reports

To generate the filled out forms or documents, simply **Export** the report in the same format as the template file (e.g. for a PDF template file, export the report as a PDF. For a Word template, export as RTF). Reports can be exported from the toolbar or from the main menu.

TIP

Template reports must be exported in the same file type as the template (i.e. a PDF template report must be exported as a PDF file). Review the General Section of the Report Options article for details on how to control report export types.

Referencing Data Exported to Excel Templates

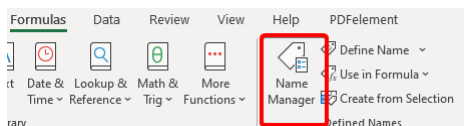
When using an Excel Template there are two ways for Charts or Pivot Tables to reference the populated report data:

- Named Ranges
- Row References

Named Ranges

Excel has a concept of a Named Range which can be used by Charts or Pivot Tables to refer to a range of cells. When building the template, name ranges by:

1. On Excel's ribbon, navigate to the **Formulas** tab and click the **Name Manager** icon.

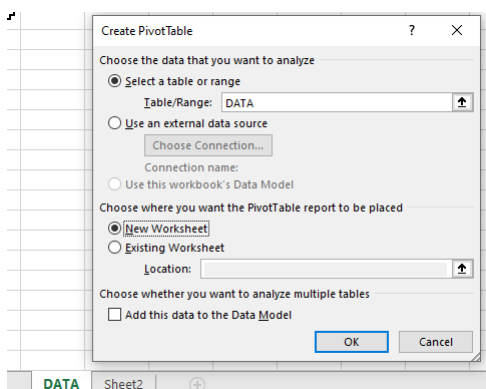


2. Click **New** to add a new named range.
 1. The **Name** must match the name of the first worksheet in the file.
 2. The **Scope** should be *Workbook* if the chart or PivotTable will reside on a different worksheet than the first one.
 3. *Optional*: add a comment
 4. In the **Refers to** field, select the upper left and upper right boundaries of the range. For example, to select all of the data from columns A&E", select those cells or enter `DATA!$A$1:$J$1`.

NOTE

When the report is exported, the range will automatically be expanded to include all of the rows.

3. When building the Excel chart or PivotTable, use the Named Range created in steps 1&2 as its data source.



Row References

Instead of using Named Ranges, each Chart or PivotTable can be set to reference the first two rows on the first worksheet. For example, a template with 5 columns would reference `=Sheet1!$A$1:$E$2`. When the report is exported, the range will automatically be expanded to include all of the rows.

Advanced Reports: Joins

CAUTION

The system administrator can enable or restrict access to certain **Advanced Options**, including **Joins**. Check with them for more information. The **Joins** dialog is recommended for advanced users only.

Joins describe how the **Data Objects** on a report are related to each other. When two objects are joined, a field in the first object is associated with a field in the second object. Wherever a value in the first object’s field matches a value in the second object’s field, that value’s rows from each object come together to form a composite row. The table produced by all the composite rows is the resulting data that appears on the report.

For example, take the following objects, *Orders* and *Products*. The *Orders.ProductId* field corresponds with the *Products.Id* field. When the objects are joined from *Orders.ProductId* to *Products.Id*, the rows are connected wherever those two fields have matching values.

Orders		Products	
Orders.Id	Orders.ProductId	Products.Id	Products.ProductName
16702	13	12	Blanton's Original
16703	13	13	Henry McKenna
16704	14	14	Russell's Reserve
16705	16	15	Hillrock Estate
16706	15	16	Buffalo Trace

Categories joined on Orders.ProductId >> Products.Id

The result of this join is the following composite rows. These objects have a *one-to-one* relationship, because each row in the “left” object joins at most one row in the “right” object.

Orders.Id	Orders.ProductId	Products.ProductName
16702	13	Henry McKenna
16703	13	Henry McKenna
16704	14	Russell's Reserve
16705	16	Buffalo Trace
16706	15	Hillrock Estate

Joined Data Objects. Products.Id is omitted.

TIP

Data Objects could be joined along more than one set of fields; composite rows are formed only when all sets have matching values.

For two data objects to be co-present on a report, there must be a join path between them. They are either directly joined, or there is a path through one or more intermediate data objects. You do not have to configure joins manually as they already exist in the environment. However, if you want to learn how to add or adjust joins on a per-report basis, the following sections explain the options that are available.

Join Types

The join that was previously described is the most common type of join, an **inner join**. When an inner join is applied, rows in either data object that have no matching row in the other are excluded from the resulting table. However, you may not want to exclude these rows. To do so, you can change the type of join to an **outer join**.

For example, the row in the *Products* object with *Products.Id* = 12 has no matching row in the *Orders* object. With an inner join, this row is excluded from the output. If you want to see the *Products* rows that have no matching *Orders* row, you can change the join type.

This changes the join between these data objects to a **left outer join**, because all rows from the *left* object are included. The following rows result:

Orders.Id	Orders.ProductId	Products.ProductName
		Blanton's Original
16702	13	Henry McKenna
16703	13	Henry McKenna
16704	14	Russell's Reserve
16705	16	Buffalo Trace
16706	15	Hillrock Estate

Joined data objects with all Products rows.
Products.Id is omitted.

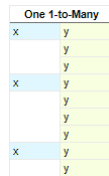
Similarly, selecting the *Orders data that does not have Products data* checkbox changes the join to a **right outer join**, which includes all rows from the *right* data object. Selecting both checkboxes includes all rows from both categories; this is a **full outer join**.

Relationship Types

There are two types of join relationships: **one-to-one** and **one-to-many**.

In the previous example, the relationship between the data objects is *one-to-one*, because each row in the left object joins at most one row in the right object. Some categories have a **one-to-many** relationship, where each row in the left object joins zero or more rows in the right object.

A one-to-many relationship from objects X to Y is represented in the following diagram:



Each X is
joined to one
or more Y

Reports with a single one-to-many join are well suited to grouping by the left data object. The data in these reports is generally well-formed and understandable.

However, when a report has multiple data objects with one-to-many joins, data can appear more disorganized and confusing. For example, the following diagram represents data from three objects: X, Y, and Z, where the relationships between X to Y and X to Z are both one-to-many:

Two 1-to-Many		
x	y	z
	y	z
	y	z
		z
	y	z
x		z
	y	z
		z
	y	z
x	y	
	y	z
	y	z
		z
	y	

Each X has 1 or more
Y, and 1 or more Z

Because Y and Z are not directly related to each other, there are many rows with only Y or only Z. This can cause the report to be significantly larger, and to be difficult to read and interpret. This occurs even with inner joins, the most restrictive type, because by default there is no logic that deals with the relationship between Y and Z.

Read on for different ways of improving the structure of a report with multiple one-to-many joins.

Cartesian Processing

You could fill the blank spaces with supplementary data by disabling **Special Cartesian Processing** from the **Joins** dialog. Blank cells are filled in with data that is repeated directly from the previous row. The following diagram demonstrates how this works:

Two 1-to-Many, No Cartesian		
x	y	z
	y	z
	y	z
	y	z
	y	z
x	y	z
	y	z
	y	z
	y	z
	y	z
x	y	z
	y	z
	y	z
	y	z
	y	z

Disabling Special
Cartesian Processing

The shaded cells represent data that has been repeated from the previous row. This can make the report more readable. However, this approach poses a problem: Blank cells indicate a lack of a relationship between two fields, so filling in these spaces with artificial data can obfuscate any relationship between Y and Z. This can decrease the accuracy of the report.

There are better ways to improve the readability of such a report without sacrificing accuracy:

- Use **repeating groups** to show the X to Y and X to Z relationships in entirely separate sections. This is suitable if any relationship between Y and Z is irrelevant or nonexistent. See **Sections** for more information.
- Hide some or all of the rows which do not have data for both Y and Z. This is suitable if you want to highlight an implicit or indirect relationship between Y and Z.

Modifying Joins on a Report

The **Joins** dialog shows all direct and implicit joins on the report. Direct joins can be added, modified, or removed from the report.

Joins

Select options below

Advanced Options

In addition to Cities data that has matching Avenues data, include:

☒ Cities data that does not have Avenues data

☒ Avenues data that does not have Cities data

In addition to Cities data that has matching Streets data, include:

☒ Cities data that does not have Streets data

☒ Streets data that does not have Cities data

In addition to selections above, for Cities data that has ANY of the following, it MUST have a:

☐ Avenues

☐ Streets

+

Add

From: Avenues

To: Streets

↺

Recreate

Enable Special Cartesian Processing | True

Okay

Cancel

Joins dialog for a report with two one-to-many joins, so the **Special Cartesian Processing** dropdown is visible.

Create a New Join

1. Select **From** and **To** categories.
2. Click **+**Add.

1. Click **+** **Add Condition** then select **From** (left column) and **To** (right column) fields.

TIP

If there are multiple conditions, only the rows that satisfy all the conditions are joined.

2. Click **Okay**
3. Click **Okay**

To restore the default joins, click the .

Recreate button, then click **Okay**.

Modify a Join

1. Click the **Edit**  icon next to the join to edit.
2. Add, remove, or modify conditions.
3. Click **Okay**.

To remove a join, click the **Delete** .

icon next to the join to delete, then click **Okay**.

Delete a Join

To remove conditions, click the **Delete** .

icon next to the condition to delete.

Advanced Joins

You may be able to specify join conditions that are more complex than column equality.

NOTE

Advanced Joins only apply to a single data source.

Type

Instead of joining between two columns, one or both sides of the join may instead be an arbitrary expression, constant, or SQL sub-query.

To change the expression type for one side of a join condition, select one of the following from the **Type** list:

- **Value:** One or more constant values separated by commas
- **Expression:** Formula or calculation
- **SubQuery:** SQL query

Then enter the value in the **Value** field.

Operator

As opposed to the default equality (=) operator, which joins fields from the left expression to matching fields from the right expression, a join condition can use one of several alternative operators instead. For example, the inequality (!=) operator joins fields on the left to non-matching fields on the right. To do so, select one of the alternative operators ;from the **Operator** list:

- **!=** not equal to
- **>** greater than
- **>=** greater than or equal to
- **<** less than
- **<=** less than or equal to equal
- **IN:** match one or more values, either specified or calculated from a subquery

Grouping

When a join has two or more conditions, you can specify how the conditions should be met as a group in order for the join to take effect.

To specify that either one of two conditions will satisfy part of the clause, select **OR** from the **Conjunction** list for the first condition of the two.

To add parentheses around two conditions, select the **Group** checkbox for the first condition of the two.

You can preview the full join clause in the **Summary** field.

Advanced Joins

The *v2017.2* release of Exago BI features several **Join Enhancements**, including the ability to join on inequalities, nested join expressions, and subqueries. Additionally, data objects can now be **cloned**, which allows for multiple different joins between objects, as well as the ability to join objects to themselves.

These enhancements allow developers to programmatically define complex joins “on-the-fly” in the application API, without needing to write SQL directly.

NOTE

To modify advanced joins in the Exago UI, see **Joins – Advanced Joins**. Advanced joins are not supported in the Admin Console. Advanced joins cannot be applied across multiple data sources.

Join Expressions

The left and right side of application joins now support complex expressions with the following logic:

Operators: *EQ(=), NE(<>), LT(<), GT(>), LE(<=), GE(>=), IN*

Conjunctions: *AND, OR*

Expression types: *Column, Constant, SubQuery, Expression*

NOTE

For a list of all constants, please see the **Constants and Enumerators** article.

Example

The **JoinColumn** and **KeyColumn** API objects have been extended with support for the additional logic. The following example demonstrates how to write a complex join statement in the API:

```
// INNER JOIN Products ON Categories.CategoryId > Products.CategoryId
// OR (Categories.CategoryId = Products.CategoryId
// AND Categories.CategoryId = Products.ProductId)

var join = new Join(api.PageInfo)
{
    EntityFromName = "Categories",
    EntityToName = "Products",
    Type = (int)JoinType.Inner,
};

join.JoinColumns.Add(new JoinColumn(
    new KeyColumn(join.EntityFromName, "CategoryId", JoinExpressionType.Column),
    JoinComparison.GT,
    new KeyColumn(join.EntityToName, "ProductId", JoinExpressionType.Column),
    JoinConjunction.OR,
    0 // nesting level - number of parens surrounding the expression
));

join.JoinColumns.Add(new JoinColumn(
    new KeyColumn(join.EntityFromName, "CategoryId", JoinExpressionType.Column),
    JoinComparison.EQ,
    new KeyColumn(join.EntityToName, "CategoryId", JoinExpressionType.Column),
    JoinConjunction.AND,
    1
));

join.JoinColumns.Add(new JoinColumn(
    new KeyColumn(join.EntityFromName, "CategoryId", JoinExpressionType.Column),
    JoinComparison.EQ,
    new KeyColumn(join.EntityToName, "ProductId", JoinExpressionType.Column),
    JoinConjunction.OR,
    1
));

// api.Joins.Add(join); // add at the application level
// report.Joins.Add(join); // or at the report level
```

Join XML Schema

The join XML schema has changed to support these enhancements. The <joincol> attribute is deprecated and replaced with <clause>:

```
<clause>
  <left_entity /> <!-- added in v2017.3 -->
  <left_side />
  <right_side />
  <conjunction />
  <comparison />
  <left_side_type />
  <right_side_type />
  <level />
</clause>
```

For details, see [Config File XML Reference – Joins](#).

Reports created in older versions will be automatically converted to the new schema when they are saved in the Advanced Report Designer. The Exago BI configuration file will not be converted automatically.

Example

```
<join>
  <affinity>Global</affinity>
  <entity_from_name>Categories</entity_from_name>
  <entity_to_name>Products</entity_to_name>
  <join_type>inner</join_type>
  <relation_type>IM</relation_type>
  <weight>0</weight>
  <clause>
    <left_side>CategoryID</left_side>
    <left_side_type>Column</left_side_type>
    <comparison>GT</comparison>
    <right_side>CategoryID</right_side>
    <right_side_type>Column</right_side_type>
    <conjunction>OR</conjunction>
    <level>0</level>
  </clause>
  <clause>
    <!-- <left_entity>New Left Entity Name would go here if needed -->
    <left_side>CategoryID</left_side>
    <left_side_type>Column</left_side_type>
    <comparison>EQ</comparison>
    <!-- <right_entity>New Right Entity Name would go here if needed -->
    <right_side>CategoryID</right_side>
    <right_side_type>Column</right_side_type>
    <conjunction>AND</conjunction>
    <level>1</level>
  </clause>
  <clause>
    <left_side>CategoryID</left_side>
    <left_side_type>Column</left_side_type>
    <comparison>EQ</comparison>
    <right_side>ProductID</right_side>
    <right_side_type>Column</right_side_type>
    <conjunction>AND</conjunction>
    <level>1</level>
  </clause>
</join>
```

Entity Cloning

Data Objects (also referred to as entities) can be cloned on a per-report basis, to allow objects to be joined in multiple ways.

The following example demonstrates how to add a cloned entity to a report:

Example

```
report.Entities.Add(api.Entities.GetEntityClone(
    "Categories",    // original entity
    "Category_Clone" // cloned entity name
));
```

The `clonedFrom` property indicates the original entity that a clone was created from.

Entity Report XML Schema

The entity report XML schema was updated to support an optional `<clone>` attribute, indicating that an entity is a clone of an existing one:

```
<entity>
  <entity_name>Categories_Clone</entity_name>
  <clone>Categories</clone>
</entity>
```

Cloned entities can be added to reports by editing the XML directly, if desired.

Configuration Settings

A hidden flag was added to the configuration file in support of entity cloning.

- <aliasallentities>

As entity **names** may no longer be unique, the entity **Id** property (which must always be unique) can be used as a table alias in any application generated SQL. This can be enabled by setting the <aliasallentities> attribute in the configuration file to *True*. The default value is *False*, meaning all entities will not be aliased with the ID property. Setting to *True* will enable the aliasing behavior.

Advanced Reports: CrossTabs

Use a **CrossTab**, or cross tabulation, for grouping and summarizing data fields that expands vertically and horizontally depending on the number of data groupings. CrossTabs are also known as *two-way tables*, *contingency tables*, or *pivot tables*.

Year	Month	Category	Meat/Poultry	Beverages	Confections	Seafood	Grains/Cereals	Condiments	Dairy Products	Produce	Total
2015	January		\$7,775.80	\$24,224.40	\$9,582.30	\$2,074.30	\$4,570.20	\$5,698.80	\$9,872.00	\$2,895.00	\$66,692.80
	February		\$8,442.90	\$3,090.40	\$7,413.50	\$2,283.80	\$5,043.40	\$6,618.40	\$5,616.00	\$2,698.80	\$41,207.20
	March		\$3,271.60	\$11,027.20	\$3,324.90	\$3,579.10	\$3,350.00	\$1,905.90	\$9,844.40	\$3,676.80	\$39,979.90
	April		\$4,846.24	\$7,377.50	\$11,714.65	\$4,518.30	\$6,555.60	\$5,903.00	\$6,447.00	\$6,137.10	\$55,699.39
	May		\$3,548.05	\$15,654.00	\$7,997.50	\$6,371.15	\$2,551.50	\$5,728.80	\$11,491.50	\$3,481.20	\$54,823.70
	June		\$5,006.30	\$3,602.00	\$2,494.40	\$3,477.25	\$6,882.50	\$1,886.85	\$9,507.70	\$6,231.00	\$39,088.00
	July		\$4,902.30	\$8,343.50	\$4,968.03	\$8,452.30	\$4,780.00	\$6,798.70	\$13,570.10	\$1,650.00	\$55,464.93
	August		\$4,943.64	\$6,154.00	\$8,025.30	\$8,997.20	\$5,529.25	\$4,501.80	\$7,375.50	\$4,455.00	\$49,981.69
	September		\$12,406.54	\$6,198.75	\$7,192.50	\$9,489.33	\$5,755.75	\$3,748.90	\$12,054.00	\$2,887.25	\$59,733.02
	October		\$14,703.23	\$9,043.00	\$8,051.55	\$7,322.27	\$3,392.00	\$6,780.45	\$13,745.00	\$7,291.00	\$70,328.50
	November		\$1,068.00	\$4,034.00	\$5,271.16	\$8,554.05	\$6,266.00	\$3,854.80	\$13,597.10	\$3,268.25	\$45,913.36
	December		\$14,706.43	\$11,675.25	\$9,191.98	\$6,201.60	\$5,810.75	\$6,252.60	\$10,590.50	\$13,047.15	\$77,476.26
2016	January		\$5,603.17	\$28,558.00	\$12,387.75	\$15,644.60	\$12,573.75	\$5,000.45	\$19,448.00	\$1,639.00	\$100,854.72
	February		\$23,739.86	\$35,869.50	\$10,026.15	\$11,591.69	\$4,127.75	\$6,727.20	\$11,277.00	\$1,202.80	\$104,561.95
	March		\$4,203.66	\$28,729.25	\$24,049.85	\$9,902.09	\$3,510.50	\$11,018.30	\$14,990.80	\$12,744.00	\$109,148.45
	April		\$22,612.88	\$24,470.00	\$9,183.53	\$10,312.30	\$5,789.25	\$10,737.50	\$36,452.10	\$15,073.00	\$134,630.56
	May		\$4,068.00	\$4,074.00	\$2,343.55	\$1,025.36	\$4,322.50	\$864.00	\$460.00	\$1,279.80	\$18,437.21
2018	March				\$253.00					\$424.00	\$677.00
Total	May		\$48.00	\$523.00	\$115.90	\$236.80	\$98.50	\$210.00	\$176.00	\$53.25	\$1,461.45

A CrossTab report built with the CrossTab Report Wizard

Create a CrossTab

CrossTab Reports can be added to an existing report from the Report Designer, or they may be created as a new report from the main menu.

From the Report Designer Toolbar

To add a CrossTab to a report in the Report Designer:

1. Select a **Group Footer** (including Footers in a Repeating Group) or **Report Footer** cell.
2. Open the **CrossTab Data Designer** dialog:
 - o (v2021.1+) Click the **Insert**  icon on the toolbar, then click **CrossTab**. The dialog resembles the Layout tab described below.

From the Main Menu CrossTab Report Wizard

CrossTabs are created from the Main Menu just as any other report is. Creating a CrossTab from the Main Menu will launch the **CrossTab Report Wizard**.

The CrossTab Report Wizard is an interactive tool which will walk through the process of creating a new Advanced Report with a CrossTab embedded within it. All of the settings in the wizard can be modified in the **Report Designer** after the report is created.

The CrossTab Report Wizard has four tabs: **Name**, **Categories**, **Filters**, and **Layout**. All tabs except Layout are required to create the new report.

Name

Complete the steps in the wizard below to create a new report

Name

Categories

Filters

Layout

Enter the report name

Products Ordered per Month

Select folder for the report

Products

Reporting

Test

Enter a description for the report

CrossTab Report displaying the amount of times a product was ordered per month.

Previous

Next

Cancel

Finish

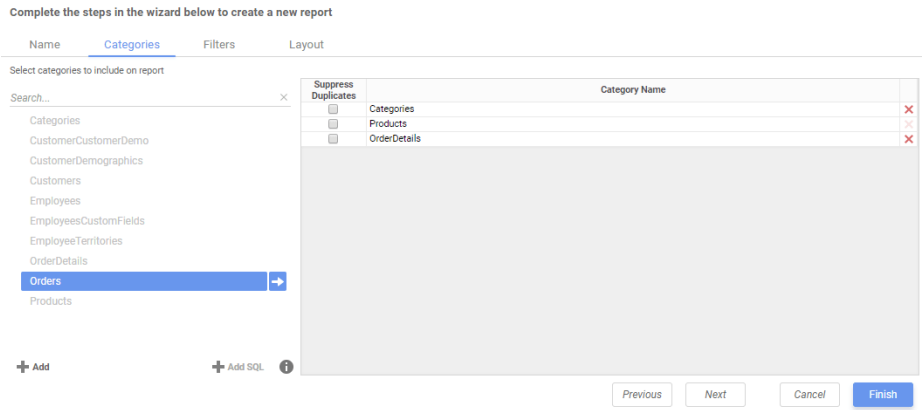
In the **Name** section, enter a name for the report and select a **Folder** where it will be saved.

The report name can be up to 255 characters long, but cannot contain the following special characters

? : / * " < >

Enter an optional **description** for the report in the textbox.

Categories

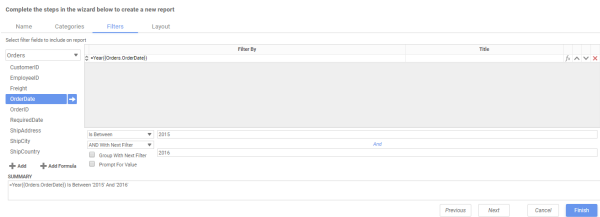


In the **Categories** section, select the **Data Objects** to include in the CrossTab. It is important to understand the difference between **Data Categories** and **Data Fields**. Data objects are arranged into folders. Those objects are further expanded into **fields**. A field is a parcel of data from a data object, such as the name of a Product or an Employee ID number.

- To add a Data Object, either drag and drop it to the **Data Object Name** Column, click the **+ Add** button, or double-click the field name
- To search for a specific Data Object or folder, type its name into the **Search** field.
- To see what fields are in a Data Object, click the **View Data Object Fields**  icon.
- Check the **Hide Repeated Values** checkbox to stop duplicate information from appearing on the report.
- Each data object must be referenced by a unique **Alias**. The alias can also be used to provide a different name for the data object. This column will only appear if enabled by the system administrator. See [Advanced Reports: Data Objects](#) for more information.
- To remove a Data Object, click the **Delete**  icon at the end of the row.

Filters

In the **Filters** tab, create statements to filter the data at runtime.



A date filter applied to output data from the years 2015 to 2016

There is no limit to the number of filters that can be defined. Filters can be numeric (up to eight decimals) or alphanumeric.

- To filter a Data Field, either drag and drop it to the **Filter By** column, click the **+ Add** button, or double-click on its name.
- To filter using a custom or built-in formula, click the **+ Add Formula** button.
More information about how to use this feature is contained in the [Filter by Formula](#) article.
- Use the **Move Item Up**  and **Move item Down**  icons to move the rows to set the filter priority. The top filter has the highest priority.
- To remove a filter, click the **Delete**  icon at the end of the row.

Detailed information about creating and editing filters can be found in the [Filters](#) article.

Layout

In the **Layout** tab, design the CrossTab by moving Data Fields into the **Row Header**, **Column Header**, and **Tabulation Data** panels.

Complete the steps in the wizard below to create a new report

Name

Categories

Filters

Layout

Orders

CustomerID

EmployeeID

Freight

OrderDate

OrderID

RequiredDate

ShipAddress

ShipCity

ShipCountry

ShipName

ShippedDate

ShipPostalCode

ShipRegion

Row Header Source

Categories.CategoryName

Products.ProductName

Column Header Source

=Year({Orders.OrderDate})

=MonthName({Orders.OrderDate})

Tabulation Data Source

Orders.OrderID

+≡

+III

+田

Theme: Peterbook

Options

		OrderDate	OrderDate 1		OrderDate 2	
CategoryName	ProductName	OrderDate	OrderDate 1	OrderDate 2	OrderDate 1	OrderDate 2
CategoryName 1	ProductName 1		92	86	0	96
	ProductName 2		48	90	67	39
CategoryName 2	ProductName 1		76	95	90	22
	ProductName 2		47	92	72	98

Previous

Next

Cancel

Finish

Row Headers

Row Headers expand a CrossTab vertically. A CrossTab has a row for each unique value of a Row Header. For example, if you were using sales data, you may have the Row Headers `Category.CategoryName` and `Products.ProductName` to provide rows for each product grouped by category.

- To add a Row Header, either drag and drop it to the **Row Header Source** panel or use the **Add Row Header** icon
- Click the **Formula Editor** icon to insert a formula into the **Row Header**.
- Click the **Edit Header** icon to open the **Header Options** menu.

Header Options

General Options

Label

Category

Sort Options

Method

None

Direction

Ascending

Total Options

Placement

None

Label

Total

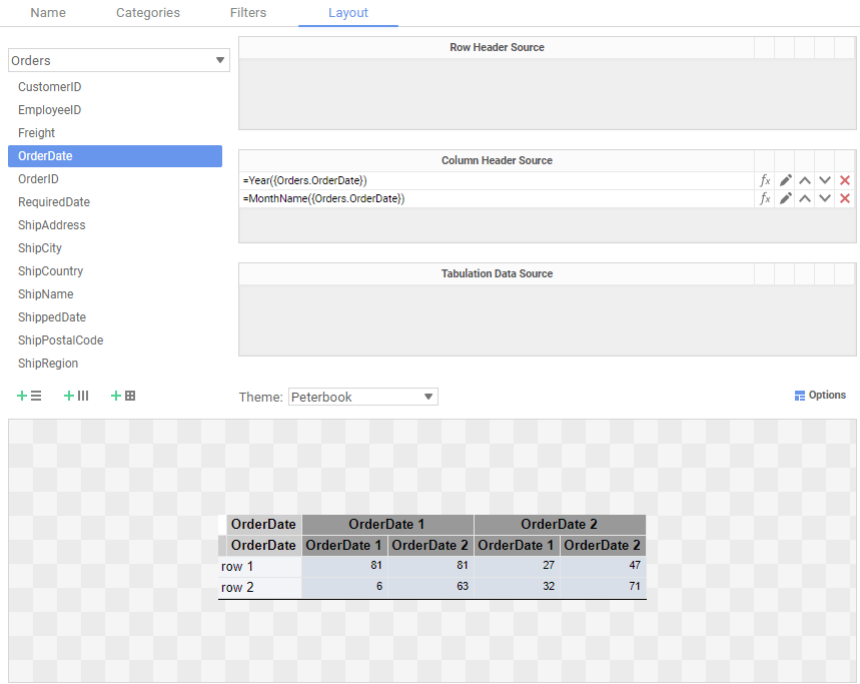
Okay

Cancel

- Set a label for the Row Header. This label will appear at the top of the CrossTab.
- Select a sorting method and direction:
 - *None*: Does not sort the Row Headers.
 - *Header Value (Text)*: Sorts the Row Header by its values as though they are text.
 - *Header Value (Number)*: Sorts the Row Header by its values as though they were numbers.
 - *Tabular Totals*: Sorts the Row Header by the totals of the Tabulation Data.
- Select where to display subtotals by using the **Placement** dropdown:
 - *None*: Does not display subtotals.
 - *Top*: Displays subtotals above the Tabulation Data for each Row Header value.
 - *Bottom*: Displays subtotals below the Tabulation Data for each Row Header value.
- Set a label for the subtotals.
- Use the **Move Item Up** and **Move Item Down** icons to rearrange the order of the **Row Headers**.
- To remove a Row Header, click the **Delete** icon.

Column Headers

Column Headers expand a CrossTab horizontally. A CrossTab has a column for each unique value of a Column Header. For example, if you were using sales data you may have the Column Headers `Year({Order.OrderDate})` and `MonthName({Order.OrderDate})` to provide columns for each month grouped by year.



CrossTab Design Wizard with two column headers

- To add a **Column Header**, either drag and drop a data field to the **Column Header Source** pane or click the **Add Column Header** icon.
- Click the **Formula Editor** icon to insert a formula into the Column Header.
- Click the **Edit Header** icon to open the **Header Options** menu.

Header Options

General Options

Label

Year

Sort Options

Method

None

Direction

Ascending

Total Options

Placement

None

Label

Total

Okay

Cancel

Column Header Options dialog

- Set a label for the **Column Header** to appear at the top of the **CrossTab**.
 - Select a sorting method and direction:
 - *None*: Does not sort the Column Headers.
 - *Header Value (Text)*: Sorts the **Column Header** by its values as though they were a text.
 - *Header Value (Number)*: Sorts the **Column Header** by its values as though they are numbers.
 - *Tabular Totals*: Sorts the **Column Header** by the totals of the **Tabulation Data**.
 - Select where to display subtotals by using the **Placement** dropdown:
 - *None*: Does not display subtotals.
 - *Left*: Displays subtotals to the left of the Tabulation Data for each Column Header value.
 - *Right*: Displays subtotals to the right of the Tabulation Data for each Column Header value.
 - Set a label for the subtotals.
- Use the **Move Item Up** icon and **Move Item Down** icon to rearrange the order of the Column Headers.
 - To remove a **Column Header**, click the **Delete** icon at the end of the row.

Tabulation Data

Tabulation Data provides information when data exists for both the **Column Header** and **Row Header** values. For example, if you have a Row Header on products and a Column Header on the month, then Tabulation Data of `Orders.OrderID` may use the `Count` function to display how many orders contained each product each month.

OrderDetails

Discount

OrderID

ProductID

Quantity

Revenue

UnitPrice

Row Header Source

Categories.CategoryName

Products.ProductName

Column Header Source

=Year({Orders.OrderDate})

=QuarterName({Orders.OrderDate})

Tabulation Data Source

OrderDetails.Quantity

OrderDetails.Revenue

+≡

+III

+田

Theme: Basic

Options

CrossTab Report Design Wizard with row header, column header and tabulation data sources

- To add a Tabulation Data field, either drag and drop it to the **Tabulation Data** pane or click the **Add Tabulation Data**  icon.
- Click the Formula Editor  icon to insert a formula into the **Tabulation Data**.
- Click the Edit Tabulation Data  icon to open the **Tabulation Options** menu.

Tabulation Options

General Options

Label

Tabulation Options

Method

Count

Value

Aggregate

Okay

Cancel

- Set a label for the **Tabulation Data** to appear at the beginning of each row.
- Use the Method dropdown to select the summary function to be applied to the **Tabulation Data**:
 - *Sum*: Totals the Tabulation Data.
 - *Count*: Counts the Tabulation Data.
 - *Average*: Takes the mean of the Tabulation Data.
 - *Minimum*: Displays the lowest value in the Tabulation Data.
 - *Maximum*: Displays the highest value in the Tabulation Data.
- Use the Value dropdown to select how the **Tabulation Data** should be displayed:
 - *None*: Displays the value of the Tabulation Data without applying any formula.
 - *Aggregate*: Display the result of the selected method.
 - *Percent of Row*: Display the result of the selected method as a percentage of the row total.
 - *Percent of Column*: Display the result of the selected method as a percentage of the column total.
- Use the **Move Item Up**  and **Move Item Down**  icons to rearrange the order of the Tabulation Data.
- To remove a Tabulation Data source, click the **Delete** icon .

CrossTab Themes

The **Theme** dropdown can be used to quickly style the **CrossTab** using a predefined theme.

+ Add Section

Report Footer

	A	B	C	D	E
1			OrderDate	Total	=Year({Orders.OrderDate})
2	CategoryName	ProductName	OrderDate		=MonthName({Orders.OrderDate})
3	Total			=({OrderDetails.Quantity}*{OrderDetails.UnitPrice})	=({OrderDetails.Quantity}*{OrderDetails.UnitPrice})
4	Categories.CategoryName				
5		Products.ProductName	=({OrderDetails.Quantity}*{OrderDetails.UnitPrice})	=({OrderDetails.Quantity}*{OrderDetails.UnitPrice})	=({OrderDetails.Quantity}*{OrderDetails.UnitPrice})

	OrderDate	2016						2018
CategoryName	ProductName	OrderDate	April	May	January	February	March	May
Total		1121228.49	134630.56	18437.21	100854.72	104561.95	109148.45	1461.45
Dairy Products								
	Camembert Pierrot	40222	5916		5304	3400	3740	68
	Gorgonzola Telino	11732.5	187.5	250	925	437.5	1912.5	
	Queso Cabrales	12087.6	210	210	1260	1890	1092	
	Queso Manchego La Pastora	12502	1672				1900	76
	Mascarpone Fabioli	7840	2720		640	192	1120	32
	Gudbrandsdalsost	20016	2376			1800	684	
	Flotemysost	15355.3	4235.5		1182.5	1182.5	752.5	
	Geitost	1319.5	137.5		137.5	175	55	
	Raclette Courdavault	66132	17710		8085	2200	220	
	Mozzarella di Giovanni	18475.8	1287.6		1914		3514.8	
Condiments								
	Original Frankfurter grüne Soße	9029.8	1027	364	676	845	910	26
	Grandma's Boysenberry Spread	6625		500	150	1250	2200	25
	Aniseed Syrup	2840	250		790			40
	Chef Anton's Cajun Seasoning	7541.6	550		462	660	110	22
	Northwoods Cranberry Sauce	9280	1200		800	1200	1440	80
	Louisiana Hot Spiced Okra	3111						17
	Veggie-spread	13870.4	1843.8				4609.5	
	Gula Malacca	8385.2	525.15		311.2		466.8	
	Sirop d'érable	16438.8	2764.5		855	1425	855	
	Louisiana Fiery Hot Pepper Sauce	11667	442.05		315.75	1347.2		
	Sauces	1593.5						

+ Add Section		A		B		C		D		E	
Report Footer	1					OrderDate		Total	=Year({Orders. OrderDate})		
	2	CategoryName	ProductName			OrderDate			=MonthName({Orders.Order Date})		
	3	Total						={OrderDetail s.Quantity}* {OrderDetail UnitPrice}		={OrderDetail s.Quantity}* {OrderDetail UnitPrice}	
	4	Categories.CategoryName									
	5	Products.ProductName						={OrderDetail s.Quantity}* {OrderDetail UnitPrice}		={OrderDetail s.Quantity}* {OrderDetail UnitPrice}	

		OrderDate						2018	
CategoryName	ProductName	OrderDate	Total	April	May	January	February	March	May
Total			1121228.49	134630.56	18437.21	100854.72	104561.95	109148.45	1461.45
Dairy Products									
	Camembert Pierrot		40222	5916		5304	3400	3740	68
	Gorgonzola Telino		11732.5	187.5	250	925	437.5	1912.5	
	Queso Cabrales		12087.6	210	210	1260	1890	1092	
	Queso Manchego La Pastora		12502	1672				1900	76
	Mascarpone Fabioli		7840	2720		640	192	1120	32
	Gudbrandsdalsost		20016	2376			1800	684	
	Flotemysost		15355.3	4235.5		1182.5	1182.5	752.5	
	Geitost		1319.5	137.5		137.5	175	55	
	Raclette Courdavault		66132	17710		8085	2200	220	
	Mozzarella di Giovanni		18475.8	1287.6		1914		3514.8	
Condiments									
	Original Frankfurter grüne Soße		9029.8	1027	364	676	845	910	26
	Grandma's Boysenberry Spread		6625		500	150	1250	2200	25
	Aniseed Syrup		2840	250		790			40
	Chef Anton's Cajun Seasoning		7541.6	550		462	660	110	22
	Northwoods Cranberry Sauce		9280	1200		800	1200	1440	80
	Louisiana Hot Spiced Okra		3111						17
	Veggie-spread		13870.4	1843.8				4609.5	
	Gula Malacca		8385.2	525.15		311.2		466.8	
	Sirop d'érable		16438.8	2764.5		855	1425	855	
	Louisiana Fiery Hot Pepper Sauce		11667	442.05		315.75	1347.2		
	Green Sausage		1502.5						

The same CrossTab as seen in the Report Designer and Report Viewer, with the *Tokyo Night* and *Office Park* themes applied.

Further styling can be done in the **Report Designer**.

CrossTab Options

Settings that affect the entire **CrossTab** are controlled in the **CrossTab Options Menu**. Open the **CrossTab Options Menu** by clicking the .

Options button. Using this menu, you can adjust the following settings:

Options

✕

General

Row Headers Placement

Columns ▾

☒ Repeat CrossTab Header every new page

Grand Total Row

Placement

None ▾

Label

Total

Grand Total Column

Placement

None ▾

Label

Total

Okay

Cancel

CrossTab Options Menu

General

- Use the **Row Headers Placement** dropdown to determine how the Row Headers are displayed:
 - Columns*: Display the Row Headers in columns from left to right in the order they appear in the Row Header Source panel.
 - Hierarchical*: Display Row Headers in a hierarchical structure using indentation to display their order.
- Check **Repeat CrossTab Header every new page** to repeat Row Header labels and Column Headers on each new page.

Grand Total Row

To get a total for each column, select *Top or Bottom* from the **Placement** dropdown in the **Grand Total Row** section and provide a label in the **Label** text box.

Grand Total Column

To get a total for each row, select *Top or Bottom* from the **Placement** dropdown in the **Grand Total Column** section and provide a label in the **Label** text box.

Preview

+ ≡

+ III

+ 田

Theme:

Sandstone

Options

		Year	Year 1		Year 2		Total
Category	Product	Quarter	Quarter 1	Quarter 2	Quarter 1	Quarter 2	
Category 1	Product 1		87	78	82	60	307
			\$30	\$4	\$15	\$2	53
	Product 2		68	82	72	86	308
			\$60	\$33	\$18	\$63	174
Category 2	Product 1		94	73	79	13	259
			\$0	\$12	\$4	\$22	38
	Product 2		68	84	55	39	246
			\$16	\$58	\$36	\$95	205
Total			317	317	288	198	1120
			106	109	73	182	470

A preview layout of the steps applied above

At the bottom of the **Layout** section, a preview will display how the **CrossTab** will appear based on the fields that have been added.

Finally, clicking the **Finish** button will create the report and open the **CrossTab Report Designer**.

Work with CrossTabs in the Report Designer

Upon entering the **Report Designer**, the new CrossTab appears in the Report Footer section:

+ Add Section

Report Header

Report Footer

1	PRODUCT CATEGORY PERFORMANCE				
2	Year	Month	Category	Categories.CategoryName	Total
3	=Year([Orders.OrderDate])	=MonthName([Orders.OrderDate])		OrderDetails.Revenue	OrderDetails.Revenue
4	Total			OrderDetails.Revenue	OrderDetails.Revenue

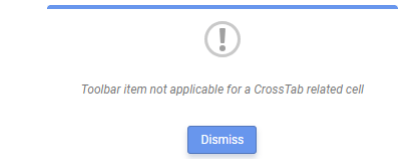
CrossTab Report in Report Designer v2021.1+

To edit the **CrossTab** after its creation open the **CrossTab Data Designer** dialog by either:

- right-clicking on the CrossTab then clicking **Edit CrossTab** or
- double-click anywhere on the CrossTab

The CrossTab Data Designer dialog resembles the Layout tab of the CrossTab Report Wizard.

Visualizations and formulas may not be added to the **CrossTab**. The following error message appears if trying to add one of these to the report:



CrossTab Formatting

CrossTabs often contain a large amount of information and may appear cluttered if they are not well formatted. To help avoid overwhelming appearing reports:

- Set predefined widths of rows containing long strings of characters or integers.
- Use a theme or apply color to cells via cell formatting to help differentiate between certain sections.
- Add borders with cell formatting to detail and header sections.

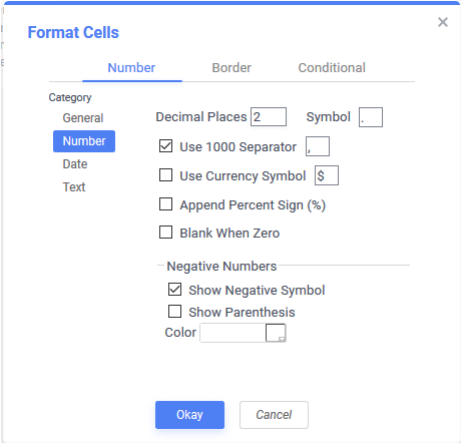
- Abbreviating longer strings using the built-in String functions. For example, `Left(MonthName({Orders.OrderDate}), 3)` will output the first three letters of each month.
- In the Report Viewer Options, uncheck **Simulate PDF**.
- Use filters to limit the size of the data set.

NOTE

Conditional formatting expressions are not evaluated for empty CrossTab cells.

Cell Formatting

Use the **Format Cells** dialog to customize how data values will display, add custom cell borders, and apply formatting based on certain conditions. The dialog is divided into three tabs: **Number**, **Border** and **Conditional**.



Number Tab

If a cell has a numeric, date, or time value use **Number** formatting to choose how the value should appear on the report. For example, add a dollar sign (\$) to monetary values and separate each three digits to make values easier to read.

\$2,770,955.00
\$3,685,471.00
\$1,145,701.00

Numeric values
with currency
styled formatting

The following options for Number formatting are available:

General

This is the default option. The application will examine the data then set formatting automatically. There are a few rules to consider when choosing *General*/based on what data type appears in the cell:

- The application will first check to see if the value is a number, then a date and then assume it is text if no other criteria are met.
- If the cell is determined to be a numeric value, and the **Apply Numeric Decimal Places to General Cell Formatting** feature is enabled by the system administrator, then a decimal separator character and a number of decimal places are included with the value. The number of places and the separator character are determined by the system configuration. To override these settings, change formatting to *Number* and set the corresponding settings.
- If the cell is determined to be a currency value, and the **Apply General Currency Right Alignment** feature is enabled by the system administrator, the value is automatically right-aligned in the cell.

Number

Format the data as a number, currency, or percentage. A number of optional settings control specific formatting options:

TIP

Leave the **Symbol** field, the **Use 1000 Separator** symbol field and **Use Currency Symbol** symbol field at their defaults when possible. This way, they can be automatically overridden by the application when the cultural or locale settings are changed. For example, the system can display £ in place of \$. Setting a value for these symbols at the cell level will set that symbol for all executions of the report, regardless of cultural/locale settings.

- In the **Decimal Places** field, enter a number for how many decimal places to display.
- Use the **Symbol** field to override the system's default decimal separator character. Changing the value of this field from the default will override the symbol for all executions of the report, regardless of the user's local/culture settings. Leave as the default (or change back to the default) to allow the application to change the symbol based on local/culture settings.
- To show a delimiter every three digits, check the **Use 1000 Separator** checkbox. Then, in the field to the right, enter a symbol to use as the delimiter. Like the **Symbol** field, changing the value of this field from the default will override the symbol for all

- executions of the report, regardless of the user’s local/culture settings. Leave as the default (or change back to the default) to allow the application to change the symbol based on local/culture settings.
- To show a currency symbol before the number, check the **Use Currency Symbol**. Then, in the field to the right, enter the symbol to show. Like the **Symbol** field, changing the value of this field from the default will override the symbol for all executions of the report, regardless of the user’s local/culture settings. Leave as the default (or change back to the default) to allow the application to change the symbol based on local/culture settings.
 - To show a percent sign (%) after the number, check the **Append Percent Sign (%)** checkbox.
 - To show no value if the number is 0, check the **Blank When Zero** checkbox.
 - To show a negative sign (-) in front of negative numbers, check the **Show Negative Symbol** checkbox.
 - To show parentheses () around negative numbers, check the **Show Parenthesis** checkbox.
 - To show negative numbers in a different color, enter a hexadecimal color code in the **Color** field or use the color picker to choose a color.

Date

Format the data as a date, time, or date and time.

Optional: Choose which date and time components to display, and how to show them. Either:

- select one of the patterns from the **Date/Time Format** list, or
- enter a custom pattern using the following variables:

Variable	Description	Result for sample date of “Sept-2-1907 5:08:04 PM”
d	day of the month, from 1 to 31	2
dd	day of the month, from 01 to 31	02
ddd	day of the week, abbreviated name	Mon
dddd	day of the week, full name	Monday
M	month, from 1 to 12	9
MM	month, from 01 to 12	09
MMM	month, abbreviated name	Sept
MMMM	month, full name	September
y	year of the century, from 0 to 99	7
yy	year of the century, from 00 to 99	07
yyyy	year, from 0001 to 9999	1907
h	hour using a 12 hour clock, from 1 to 12	5
hh	hour using a 12 hour clock, from 01 to 12	05
H	hour using a 24 hour clock, from 0 to 23	17
HH	hour using a 24 hour clock, from 00 to 23	17
m	minute, from 0 to 59	8
mm	minute, from 00 to 59	08
s	second, from 0 to 59	4
ss	second, from 00 to 59	04
t	A/P	P
tt	AM/PM	PM

Text

Does not apply any formatting to the data, and show it exactly as it appears in the data object.

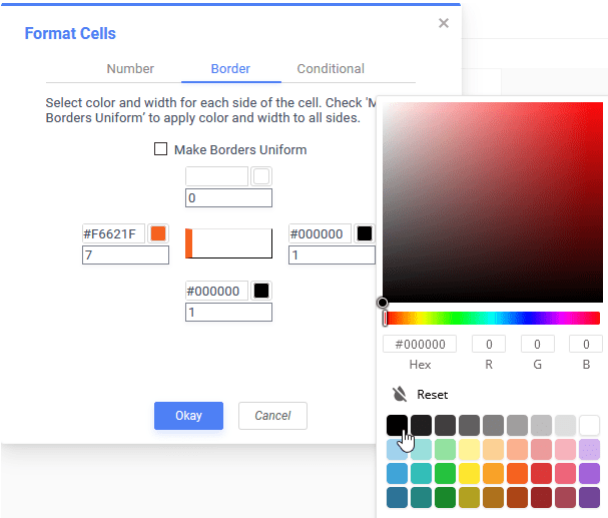
Border

Alter the width and color of the cell borders. To set a color for a cell border, enter a color code or select a color from the picker. To set the width of the border, enter a pixel value, or use the arrows to make the border thicker or thinner.

To set all the cell borders to the same color and width, check the **Make Borders Uniform** checkbox.

TIP

If gridlines are enabled for the Report Viewer, then cell borders will show in addition to the gridlines.



Choosing border colors and widths

Conditional Formatting

A conditional format allows you to format a cell according to its output data. The cell and text styles can depend on its data value, and you can even conditionally hide rows or entire sections. This can be useful for highlighting certain values in a data set, such as outliers from a trend.

Conditional Formatting uses a formula to set the condition. The formula must evaluate to *True* or *False*. If *True*, the formatting will be applied otherwise it will not. Conditional formulas are often based on data in the cell, but they can also be based on other cells, data fields, or other information about the report.

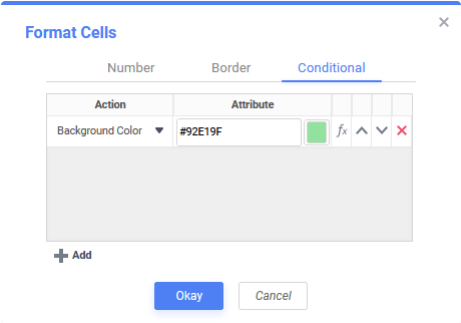
NOTE

Conditional formatting expressions are not evaluated for empty CrossTab cells.

Formula `CellValue() < 100000`

Example of a formula that evaluates to *True* or *False*

To set or modify the format of a cell based on a conditional formula:



Conditional format tab of **Format Cells** dialog

- 1. Click **Add** to create a new condition.
- 2. From the **Action** list, select an action to occur if the condition is met. If applicable, select an attribute for the action from the **Attribute** list.

Action	Attribute
Foreground Color	Enter a formula, hexadecimal color code or select a color using the color picker which will change the foreground (text) color of the chosen cell.
Background Color	Enter a formula, hexadecimal color code or select a color using the color picker which will change the background color of the chosen cell.
Font Family	Select a font to change the text to.
Font Size	Enter a font size, in ems, to change the font size to.
Bold	no attribute
Italic	no attribute
Underline	no attribute
Horizontal Alignment	Choose from <i>Left</i> , <i>Right</i> , <i>Center</i> or <i>Justify</i> to which the text in the cell will change to.
Vertical Alignment	Choose from <i>Top</i> , <i>Middle</i> or <i>Bottom</i> to which the text in the cell will change.
Suppress Row	no attribute

Suppress Section	no attribute
Page Break	no attribute

TIP

Hexadecimal color values may be upper or lowercase and may contain the # prefix character, but it is not required.

3. Click the **Formula Editor** *fx* icon to enter a formula for the condition. The formula must evaluate to *True* or *False*. The **Action** will be applied to the report when the formula evaluates to *True*.

To use the value of the current cell in the formula, use the function `CellValue()`. Click **+**

Cell Value to insert `CellValue()` into the formula.

A cell can have multiple conditional formats, each of which is a separate row in the Conditional tab. If two or more overlap, the lower condition takes precedence. Click the **Move Row Up** *^* and **Move Row Down** *^* icons to reorder the precedence of the conditions.

Format Cells

NumberBorderConditional

Action	Attribute				
Background Color	#92E19F		<i>fx</i>	^	v
Foreground Color	#F9A228		<i>fx</i>	^	v
Bold			<i>fx</i>	^	v

+ Add

OkayCancel

Multiple conditions and formats may be added for a cell

Using Formulas as Conditional Formatting Colors v2019.2+

In addition to selecting a static color with the color selector, a formula may be used to change the colors of a cell when conditional formatting.

A formula which returns a value convertible to a hexadecimal color code can be entered as the **Attribute** when the **Action** is *Foreground Color* or *Background Color*. When using this option, conditional formatting color properties can be determined at runtime instead of report design time.

One application of this feature is to read color values from a data source and use that color data to apply formatting to a cell.

#DB38382195656

HexRGB

Reset

fx

fx Set By Formula

+

Color Selector with Set by Formula button

Clicking on the **Color Selector's** *fx* **Set by Formula** button will open the standard **Formula Editor**. All formula elements available in conditional formulas are available, including `CellValue()`, references to other cells, application parameters and **Data Objects**. Aggregate functions are not available in attribute formulas.

TIP

Hexadecimal color values may be upper or lowercase and may contain the # prefix character, but it is not required.

If the formula returns null or an empty string, the conditional formatting is not applied. If the formula returns a value that is not convertible to a hexadecimal color code, an error message is displayed in the cell.

Examples

This example uses conditional and logical functions to combine multiple conditions into one clause.

```
If(And(CellValue()>=1000, CellValue()<10000), "FFFFFF", If(CellValue()>=10000, "ECECEC", "#00000"))
```

This example uses an application parameter named *ConditionalColor* to select a color to apply:

```
[email protected]
```

This example simply refers to a Data Field that contains a hexadecimal color value to apply:

```
{Products.ProductColor}
```

A few examples of valid hexadecimal color codes:

- #FFF
- #c0c0c0
- ff4c00
- F90

Conditional Row Suppression

Conditional Row Suppression allows the user to hide rows of data that meet a predefined condition. This might be useful when certain fields do not apply to all records.

Address Example

The below example displays contact information for company employees residing in the UK and USA. The `Employees.Region` field stores State values for USA residents and null value for UK residents.

When building an Employee Directory report, the formula below might be used for the "Address" column to joining together each individual component of the employee's address.

```
=({Employees.Address} & ", " & {Employees.City} & ", " & {Employees.Region} & ", " & {Employees.PostalCode})
```

Here's how this data is returned without the use of row suppression. Note that `Employees.Region` doesn't return any information for *Buchanan, Steven* or *Dodsworth, Anne* but is necessary to show the State for *Callahan, Laura* and *Fuller, Andrew*.

Employee Addresses - Conditional Row Suppression					
Employee Name	Address	Employee ID	Phone Number	Extension	
Buchanan, Steven	14 Garrett Hill, London, , SW1 8JR	5	(71) 555-4848	3453	
Callahan, Laura	4726 - 11th Ave. N.E., Seattle, WA, 98105	8	(206) 555-1189	2344	
Davolio, Nancy	507 - 20th Ave. E. Apt. 2A, Seattle, WA, 98122	1	(206) 555-9857	5467	
Dodsworth, Anne	7 Houndstooth Rd., London, , W62 7LT	9	(71) 555-4444	452	
Fuller, Andrew	908 W. Capital Way, Tacoma, WA, 98401	2	(206) 555-9482	3457	
King, Robert	Edgeham Hollow Winchester Way, London, , RG1 9SP	7	(71) 555-5598	465	
Leverling, Janet	722 Moss Bay Blvd., Kirkland, WA, 98033	3	(206) 555-3412	3355	
Peacock, Margaret	4110 Old Redmond Rd., Redmond, WA, 98052	4	(206) 555-8122	5176	
Suyama, Michael	Coventry House Miner Rd., London, , EC2 7JR	6	(71) 555-7773	428	

Conditional Row Suppression can be used in conjunction with another detail row to format the Address column on the report as appropriate for each employee's country of residence.

1. Add another Detail row to the report and copy all of the formulas from the first one to the second.

Section		A (FirstName)	B (Address)	C	D	E
Page Header	1	Employee Addresses - Conditional Row Suppression				
	2					
Detail	3	Employee Name	Address	Employee ID	Phone Number	Extension
	4	=([Employees.Last] & ", " & [Employees.FirstName])	=([Employees.Address] & ", " & [Employees.City] & ", " & [Employees.Region] & ", " & [Employees.PostalCode])	Employees.EID	Employees.HomePhone	Employees.Extension
	5	=([Employees.Last] & ", " & [Employees.FirstName])	=([Employees.Address] & ", " & [Employees.City] & ", " & [Employees.Region] & ", " & [Employees.PostalCode])	Employees.EID	Employees.HomePhone	Employees.Extension

2. Modify the formula for the second row's Address column to replace `{Employees.Region}` with `{Employees.Country}`.

Section		A (FirstName)	B (Address)	C	D	E
Page Header	1	Employee Addresses - Conditional Row Suppression				
	2					
Detail	3	Employee Name	Address	Employee ID	Phone Number	Extension
	4	=({Employees.Last} & ", " & {Employees.FirstName})	=({Employees.Address} & ", " & {Employees.City} & ", " & {Employees.Region} & ", " & {Employees.PostalCode})	Employees.EID	Employees.HomePhone	Employees.Extension
	5	=({Employees.Last} & ", " & {Employees.FirstName})	=({Employees.Address} & ", " & {Employees.City} & ", " & {Employees.Country} & ", " & {Employees.PostalCode})	Employees.EID	Employees.HomePhone	Employees.Extension

3. Select the first cell on the top detail row, and then click the **Format Cell** icon on the toolbar.
4. Switch to the **Conditional** tab of the Cell Formatting dialog.
5. Click the **Add** button at the bottom of the dialog to add a new condition.

Format Cells

NumberBorderConditional

Action	Attribute			
Suppress Row		<i>fx</i>	^	▼

6. For the **Action**, choose *Suppress Row* from the dropdown.
7. Click the **Formula Editor** icon to open the Formula Editor and enter this formula: `Not({Employees.Country} = "USA")`

Formula Editor

Employees

Address

BirthDate

City

Country

cin

+ Add

+ Cell Value

Search for Functions...

> Aggregate

> Logical

> Date

+ Add

Not({Employees.Country} = "USA")

Okay

Cancel

8. Click **Okay** to close the Formula Editor and again to close the Cell Formatting dialog.
9. Select the first cell of the second detail row, and repeat steps 3â€”8 for the second row. At step 7, enter this formula:
{Employees.Country} = "USA"

Now, whenever the employee's country is not the USA, the first row will be hidden and the second will be displayed. When the employee's country is the USA, the second row is hidden and the first one will be used. When this report is executed or reported, the output will now look this, with the correct fields:

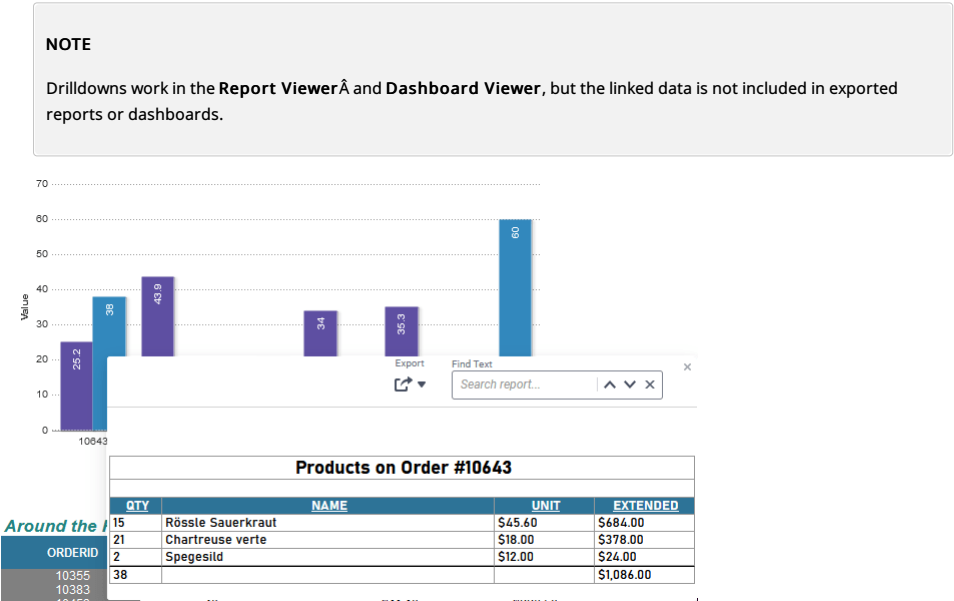
Employee Addresses - Conditional Row Suppression				
Employee Name	Address	Employee ID	Phone Number	Extension
Buchanan, Steven	14 Garrett Hill, London, UK, SW1 8JR	5	(71) 555-4848	3453
Callahan, Laura	4726 - 11th Ave. N.E., Seattle, WA, 98105	8	(206) 555-1189	2344
Davolio, Nancy	507 - 20th Ave. E. Apt. 2A, Seattle, WA, 98122	1	(206) 555-9857	5467
Dodsworth, Anne	7 Houndstooth Rd., London, UK, W62 7LT	9	(71) 555-4444	452
Fuller, Andrew	908 W. Capital Way, Tacoma, WA, 98401	2	(206) 555-9482	3457
King, Robert	Edgeham Hollow Winchester Way, London, UK, R61 9SP	7	(71) 555-5598	465
Leverling, Janet	722 Moss Bay Blvd., Kirkland, WA, 98033	3	(206) 555-3412	3355
Peacock, Margaret	4110 Old Redmond Rd., Redmond, WA, 98052	4	(206) 555-8122	5176
Suyama, Michael	Coventry House Miner Rd., London, UK, EC2 7JR	6	(71) 555-7773	428

Notice for the employees living in the UK, the name of the country replaces a null value. For employees living in the USA, their state of residence appears.

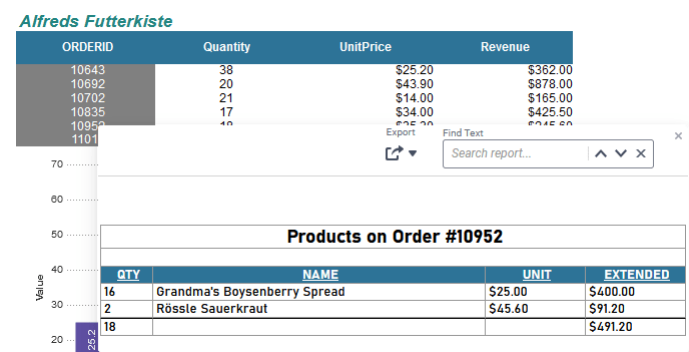
Linked Reports (Drilldowns)

Linked Reports are reports linked from cells or charts as a means of exploring data points by “drilling down” into their background data. Use the Advanced Report Designer to add them.

The terms **Linked Reports** and **Drilldowns** are used interchangeably throughout the application and this document, but they refer to the same concept.



Drilling down from a column chart by clicking one of the chart elements



Drilling down from report data by clicking on the data in the cell

Drilldowns require a *child report*, which can be an **Dashboard**, **Advanced**, **CrossTab** or **Express Report** that contains the background data for the *parent report*. Drilldowns can be created on a **Dynamic Cell** or a **chart** by linking to the *child report* from the *parent report*. Clicking each cell value or chart series will filter the *child report* by its respective value before opening it. Depending on system configuration, the *child report* will open at the mouse cursor location, in the center of the screen or in a new report tab.

NOTE

Currently, the prompt window will not appear when drilling down into a *child report* that contains prompting parameters. However, this can be partially bypassed by adding the prompting parameter in a hidden cell on the *parent report* so that the user will be prompted at runtime for the parameter value.

CAUTION

Adding a drilldown to a cell may override or interfere with any linked **Action Event** on the cell. Adding a linked report to a chart may override some aspects of the chart's **basic interactivity**.

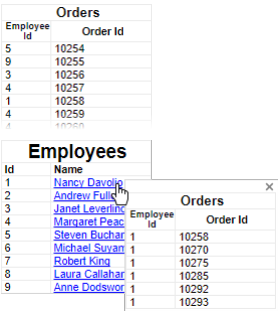
Since drilldowns are themselves reports they can have visualizations, be exported, and even have their own drilldowns.

Linking Types

Default Linking

By default, the **Data Field** in the *parent report's* linking cell filters the closest joined **Data Field** on the *child report*. The article on joins has more information on data field joining. If there is no direct join path, then fields may be linked manually in the **Fields** tab of the **Linked Report Wizard**.

For example, a parent report links an *Employees* data field to a child report with an *Orders* category. The two categories are joined on `Orders.EmployeeId >> Employees.Id`. For each *Employees* row, its `Employee.Id` value filters the linked report down to the *Order* rows with matching `Orders.EmployeeId` values. Therefore, clicking on an *Employee* name in the *parent report* will drilldown to a list of orders that the employee made.



Orders linked report filtered by Employee Id

TIP

Linking filters do not cascade down to *grand-children*, or child reports of the linked report.

Manually Defining Link Fields

To link on different fields or categories than the default link, use the **Fields** tab of the **Linked Report Wizard**. The *From* fields from the parent report filter the *To* fields on the child report. The Fields tab is suitable for the following situations:

TIP

The **From** fields from the *parent report* filter the **To** fields on the *child report*.

- The default join is not the desired link to use

Employees.Region >> Orders.ShipRegion

- Example:** Categories have related fields but are not joined, such as Orders and Suppliers

Orders.ShipCity >> Suppliers.City

- Example:** Fields are related to other fields in the category, such as Employee X supervises Employees Y and Z

```
Employees.Id >> Employees.ReportsTo
```

NOTE

This feature is disabled in system configuration by default. Contact the system administrator for more information.

The formula must return *True* or *False*. The formula is evaluated for each row in the *parent report*, and if the condition is not met, drilling down to the *child report* is not enabled.

```
Or({Products.UnitsOnOrder} > 1, {Products.UnitsInStock} <= {Products.ReorderLevel})
```

ProductName	UnitPrice	UnitsInStock	UnitsOnOrder
Queso Cabrales	\$21.00	22	30.00
Queso Manchego La Pastora	\$38.00	86	
Gorgonzola Telino	\$12.50	0	70.00
Mascarpone Fiolati	\$32.00	0	40.00
Gelato	\$2.50	112	
Raclette Courdavault	\$55.00	79	
Camembert Pierrot	\$34.00	19	
Gubbrandsdalsost	\$36.00	26	
Flotemysost	\$21.50	26	
Mozzarella di Giovanni	\$34.80	14	
Total for this category:	\$28.730	393.00	140.00

Therefore, only *Queso Cabrales*, *Gorgonzola Telino*, and *Marscarpine Fabioli* meet the criteria. Clicking on the other products will have no effect.

See the **Formulas** article for assistance with conditional formulas.

Beginning in v2019.2+, Dashboards can be drilled down to as *child reports*. Dashboard Drilldowns open in the standard Dashboard Viewer in a new tab. There are a few special considerations when drilling down to a Dashboard:

When drilling down to a Dashboard, filters on the *parent report* will affect the Dashboard tiles differently.

Linking filters are filters created during the linking process. **Interactive filters** are filters created on a Dashboard, or from Report Viewer Options in the Report Designer.

Report Filters are filters created in the *parent report* using either the Report Wizard or the Filters menu of the Report Designer.

Tile Type	Linking Filter Behavior	Report Filter Behavior
Existing  Advanced,  Express or  CrossTab Report	if the Filter Field is already on the report in the tile, or if it can be directly joined to the other Data Objects on the report, the filter is applied to the tile.	if the Filter Field is already on the report in the tile, the filter is applied to the tile. If not, the filter is not applied.
Existing  ExpressView	if the Filter Field is already on the report in the tile, or if it can be directly or indirectly joined to the other Data Objects on the report, the filter is applied to the tile.	
Visualization	if the Filter Field is already in the visualization in the tile, or if it can be directly or indirectly joined to the other Data Objects in the visualization, the filter is applied to the tile.	

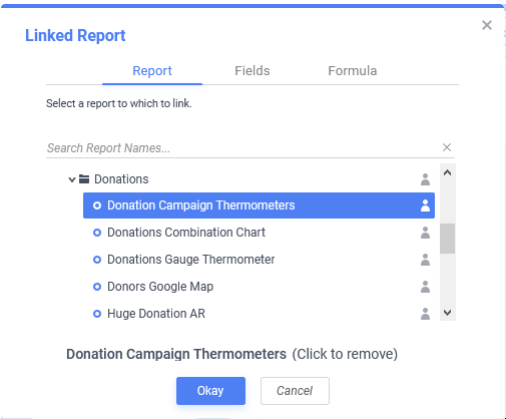
In the Dashboard Viewer's Filters Pane, all filters that are a result of the linking process except for non-prompting filters from the *parent report* are visible.

These filters are:

1. Filters from the Fields tab of the Linked Report Wizard
2. Filters that are a result of the formula in the Formula Tab of the Linked Report Wizard
3. If the *parent report* is on a Dashboard, interactive filters from *parent* and *parent-of-parent (aka grandparent)* reports
4. Prompting filters from *parent report*

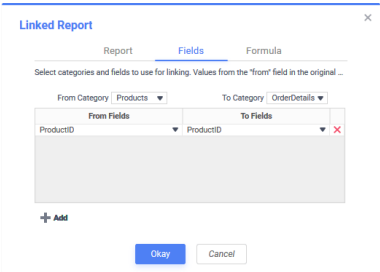
1. Create a new **Dashboard**, **Advanced**, **CrossTab** or **Express Report** that contains the drilldown data. This will become the

- linked *child report*. Linked reports typically open in a small window, so the child report should be simple and concise. Avoid large fonts, a lot of static content, or making it too large in size. The *child report's* **General Option** for **No Data Qualify Display Mode** should be set to *Show Report* in order to show an empty drilldown instead of an error message.
2. In the *parent report*, select the cell to link then click the **Link Reports**  icon in the toolbar. This will open the **Linked Report Wizard**.



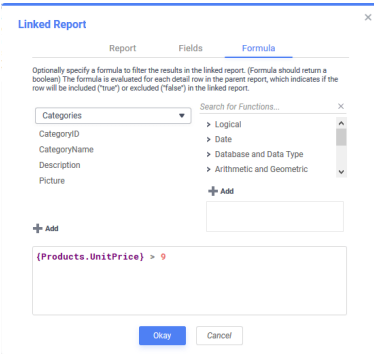
- The **Linked Report Wizard** in v2021.1+.
3. Select or search for the desired *child report*. This will use **default linking** to drilldown to the *child report*.

To manually define link fields:



- The **Fields** tab of the **Linked Report Wizard**
1. Select the **From Category** and **To Category** from their respective dropdowns.
 2. Click the  **Add** button for each set of linked fields to add. Use multiple linked fields to show only the drilldown rows that satisfy all of the link conditions.
 3. For each set of linked fields, select the **From Field** and **To Field**.

To conditionally link with formula:



- The **Formula** tab of the **Linked Report Wizard**
1. Add a data field by dragging and dropping it into the **Formula** pane or double-clicking it. Or enter it manually using the following format: {DataCategory.DataField}
 - Caution:** Linked report conditional formulas support only one data field. If multiple data fields are used, all but the first will be ignored.
 2. Add a Parameter by entering it manually using the following format: @.
 3. Add a function by dragging and dropping it into the **Formula** box or double-clicking it, or enter it manually.
 4. Click **Okay** to close the **Linked Report Wizard**.

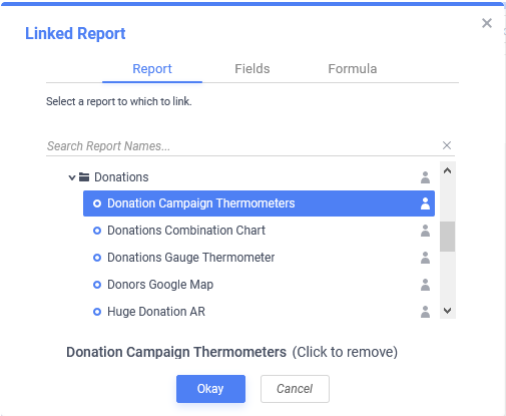
CAUTION

Because the *child* is a separate report from the *parent*, if the *child report* is moved to another folder, or the linked field is removed from the report, the link will be broken.

Modifying Linked Reports

1. Click the **Link** icon in the corner of the linking cell, or click the cell and then click the **Link Reports** icon in the toolbar.
2. Interact with the **Linked Report Wizard** just as if the link is being added (continue at step 2).

Deleting Linked Reports

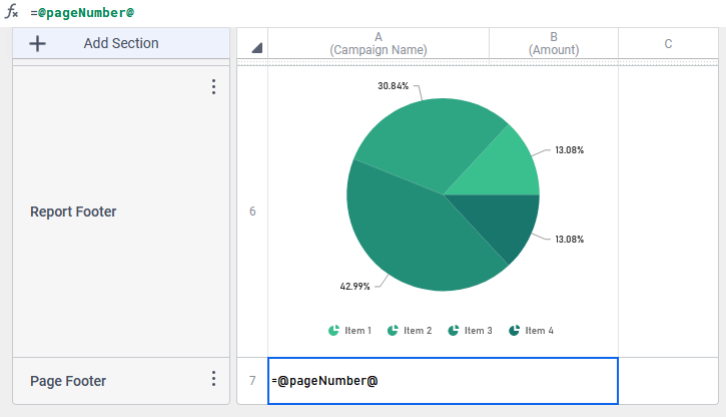


1. Click the **Link** icon in the corner of the linking cell, or click the cell and then click the **Link Reports** icon in the toolbar.
2. Click the name of the of the report at the bottom of the dialog. A **Remove Link** icon will also appear.
3. Click **Okay**.

Or, right-click the cell with the linked report in it, then click **Remove Linked Value**.

Display Page Numbers

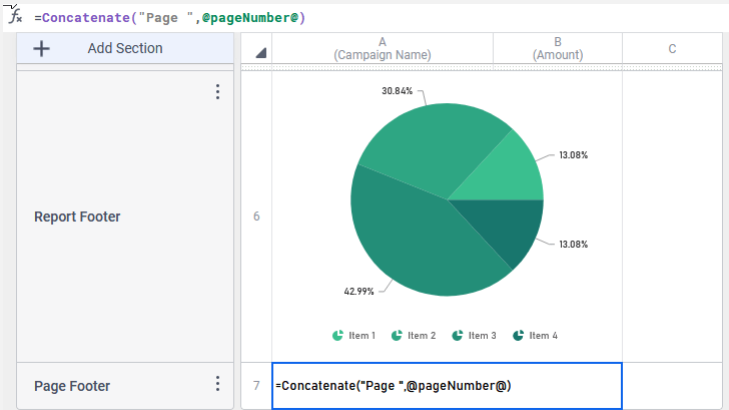
1. Add a **Page Footer** or **Page Header** section, depending on where you’d prefer the page number to be located.
2. Select a cell and manually add this formula:



For more information on formulas, refer to the article on formulas. For more information on parameters, review parameters.

TIP

To include the word “Page” with the page number, in step 2 above use the formula =Concatenate (“Page”,@()) instead.



Dashboard Viewer (v2019.2+)

⌵

When a **Dashboard** is run, it is displayed in a new tab called the **Dashboard Viewer**. **Reports**, **Visualizations** and other Dashboard content appear in rectangular **Tiles** on the **Canvas**. Reports, Visualizations and Filter tiles are interactive, as are any

embedded web pages. The tiles can be set to refresh periodically, or can be refreshed manually. **Filters** placed on the canvas or in the **Filters Pane** can filter the displayed data. Reports containing **Parameters** can have them adjusted in the **Parameters** pane. Basic Dashboard viewing is also possible on mobile devices, although the best experience will be with Dashboards specifically formatted for small mobile screens.



Running a Dashboard in the Dashboard Viewer

Run a Dashboard

- From the **Dashboard Designer**, click the **Run** button on the top toolbar. Depending on system configuration, this will also save the Dashboard.
- From the **Report Tree**, select the Dashboard in the tree, then click the **Run** icon, or click the **Menu** icon and click **Run Report**.

The **Dashboard Viewer** opens in a new tab, indicated by the **Viewer** icon. If a Dashboard refreshes automatically but is not currently the selected tab, the Dashboard's name will flash. If the Dashboard is edited in the Designer it will need to be run again to see the changes in the **Viewer**, which will launch in another new tab.



Two Dashboard Viewer tabs,
"Orange Dash" is the selected tab

If any of the reports on the Dashboard contain **filters** or **parameters** which have their **Prompt for value** setting enabled, a prompt will appear before the **Dashboard** loads.

Keyboard Shortcuts

There are several useful keyboard shortcuts available in the **Dashboard Viewer**. They are listed in the Keyboard Shortcuts article.

Interacting with Dashboards

There are a number of ways to interact with tiles on the canvas. The available options depend on how the Dashboard was designed and the type of content on it.

Every Dashboard Viewer will have a floating **Refresh** icon in the top-left corner of the canvas. Clicking on this icon at any time will refresh the data in the tiles.

If the **Dashboard** also includes **interactive filters**, a floating **Filter**

icon will appear below the **Refresh** icon. Clicking on the **Filter**  icon or pressing the **F** key on the keyboard will open the **Filters Pane** on the right side of the screen where filters can be viewed. Filters narrow down the data presented in a tile. More information is included in the Filters section below. Clicking the icon or pressing **F** again will hide the pane.

If any of the reports on the canvas include system or report level **Parameters**, a floating **Parameters** 

icon will appear along with the **Refresh** icon. Clicking on the icon or pressing the **P** key on the keyboard will open the **Parameters Pane** on the right side of the screen where these parameters can be changed. Clicking the icon or pressing **P** again will hide the pane.



This
Dashboard
has
both
Interactive
Filters
and
Parameters
on it

The floating icons may be relocated anywhere along the left edge of the canvas by clicking and dragging any of the icons along the edge. The icons disappear if the mouse is not moved over the canvas for a few seconds, and will reappear on the next mouse movement.

Reports and Visualizations

Report tiles are reports already created in the application and then loaded into a tile on the canvas. A **Visualization** tile is a graphical representation of data that can be designed directly on the canvas without first creating a report. Both report and visualization tiles can display tabular or graphical data.

Hover the mouse over a tile to show a navigation bar at the bottom of the tile. Depending on the particular tile's content and its **Advanced Properties**, some options may not be available:

- Page through the report by using the navigation icons . The **Page Up**  and **Page Down**  icons move one page at a time, and the **Page Home**  and **Page End**  icons will move to the first and last page of the report, respectively.
- Enter text into the **Find** field, then click the **up**  or **down**  icons to search for text in the report
- Click the **Show Chart**  and **Show Table**  icons to swap between chart or tabular view

Click the **Tile Menu** 

icon to access some additional options for interacting with tiles:

- **Expand Tile** will cause the tile to fill the entire canvas
- **Collapse Tile** will return the tile to its original size
- **Refresh Report** will refresh the data in the tile
- **Save as Advanced Report** will save the tile as an **Advanced Report**. The corresponding Report Designer will be launched.
- **Export** will export the tile's content in one of the available export file formats. Depending on the system configuration and the report's settings, choose from *Excel*, *RTF*, *PDF*, or *CSV*.

Filters

Use **Filters** to narrow down the data for multiple reports at once.

Interactive Filter tiles can appear as scales, menus, or checkboxes on the Dashboard. Hover the mouse over the filter tile to see which tiles on the canvas are affected by this filter. Affected tiles will be highlighted with a blue outline.

Select one or more data values, or a range of data, to apply the filter to all its affected tiles. This will automatically refresh the reports.

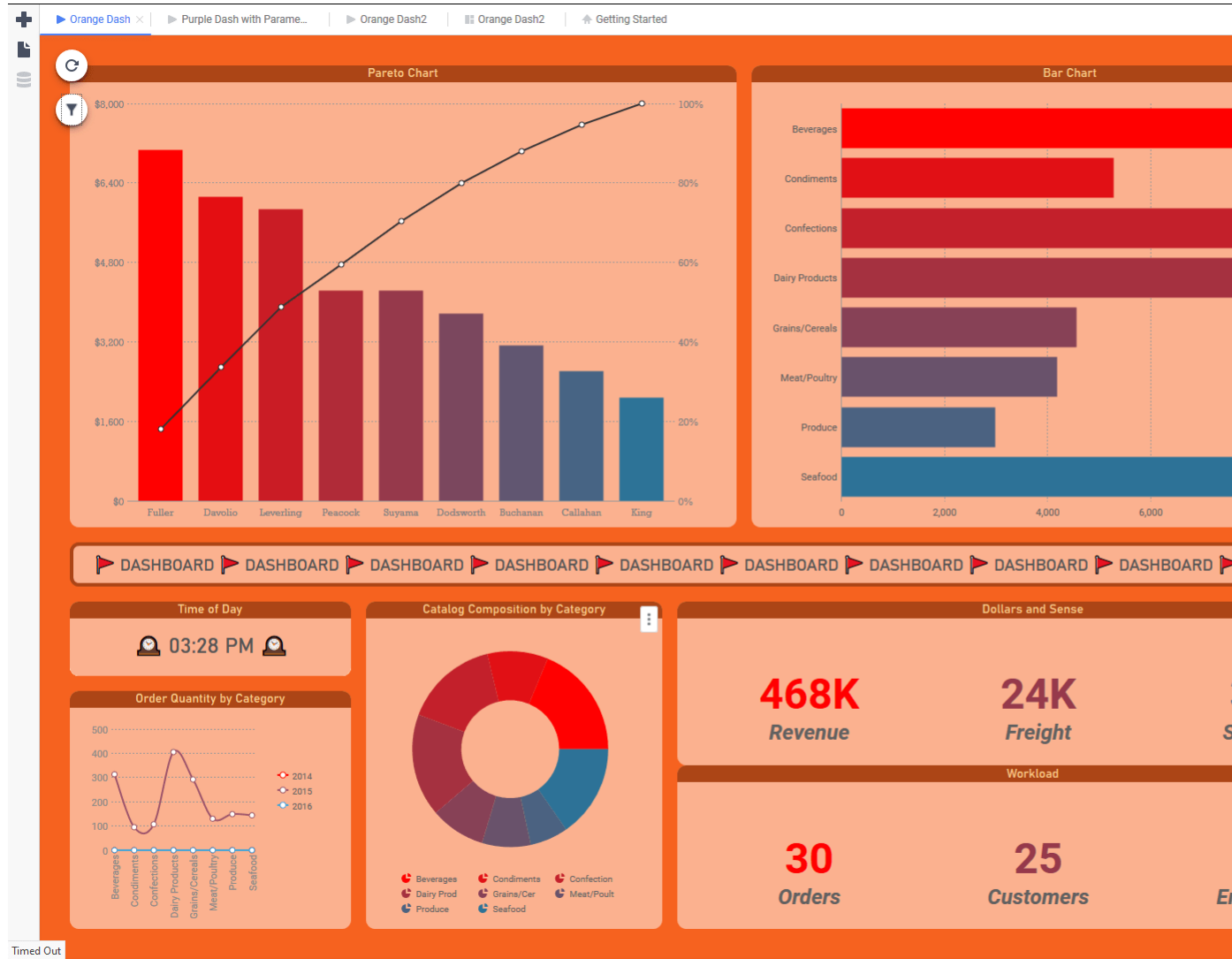


A vertical scale
Interactive
Filter tile which
selects a range
of shipping
dates

Clicking on the floating **Filter** 

icon will open the **Filters Pane** on the right side of the screen where filters can be viewed and modified. Filters in the pane are

called ** Docked Filters**. An example is provided below.



Dashboard Viewer with the Filters pane open on right side of screen

Filters

Suppliers.Country

Equal To

USA

Customers.CompanyName

Is One Of

Alfreds Futterkiste, Antonio Moreno

Orders.OrderID

Equal To

10835

The sample Filters Pane on the left is for a Dashboard with three docked filters.

Hovering the mouse over the filter item in the pane will highlight the affected tiles with a blue dashed outline.

- The first filter is an ** interactive filter** on the data object `Suppliers.Country`. The **operator** *Equal To* means that only data where the `Suppliers.Country` is equal to the value *USA* will be included. The *Country* value can be modified by using the dropdown
- The second two filters on `Customers.CompanyName` and `Orders.OrderID` are linked from a *parent report* which has linked (or drilled-down) to this Dashboard. This linking behavior is indicated by the **Linked Report** icon. Both the *linking filter* and any other filters on the *parent report* will be imported to the Dashboard. Linked filters cannot be changed in the Dashboard Viewer. Hover over the **Linked Report** icon to see the folder and name of the *parent report*.

For more information about how **Filters** interact with reports, review the article on [Filters](#).

Parameters

Parameters are system-wide or report-level variables that can be included in reports. There are several built-in parameters, and the system administrator can configure additional ones. Consult with them to find out what parameters are available. Individual reports can have their own parameters. The article on [Report Level Parameters](#) explains how to setup and use parameters in more detail.

Parameters

MyParameter

Report Master

DateParam

11/27/2019

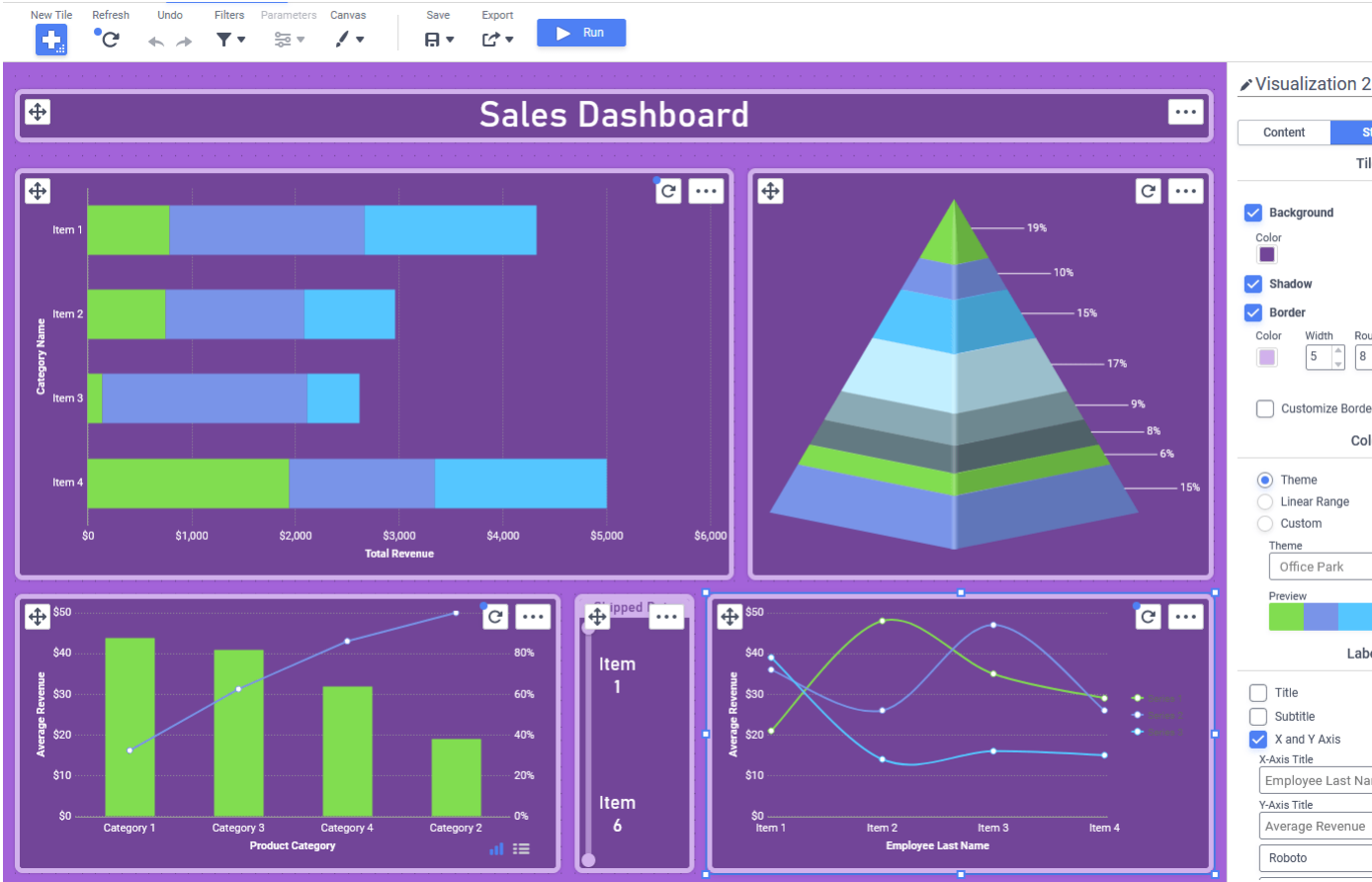
The sample **Parameters Pane** to the left is for a Dashboard with reports that contain two parameters, the first named `MyParameter` and the second named `DateParam` whose values are *Report Master* and *11/27/2019* respectively.

Both parameters can be modified by editing their respective values using the controls available in each parameter item.

Dashboard Designer (v2019.2+)

Å

Dashboards are a way to combine several related reports into one unified viewing space. Existing reports can be added to a Dashboard, and new **Visualizations** can be created directly on the Dashboard itself. Images, text, other web sites, and interactive filters can also be added. Dashboards can be exported as a Chained Report from the **Dashboard Designer**.



The Dashboard Designer

The Dashboard Designer is comprised of three sections: the **Toolbar**, the **Canvas** and the **Tile Properties Pane**.

Each element on a Dashboard is contained within a rectangular **tile** that can be resized and dragged to the desired location. Tiles are arranged onto a grid, and can snap into place next to each other.

Keyboard Shortcuts

There are several useful keyboard shortcuts available in the Dashboard Designer. They are listed in the Keyboard Shortcuts article.

Toolbar

The top of the Dashboard Designer contains a **Toolbar** for creating and interacting with the **canvas** and the **tiles**.

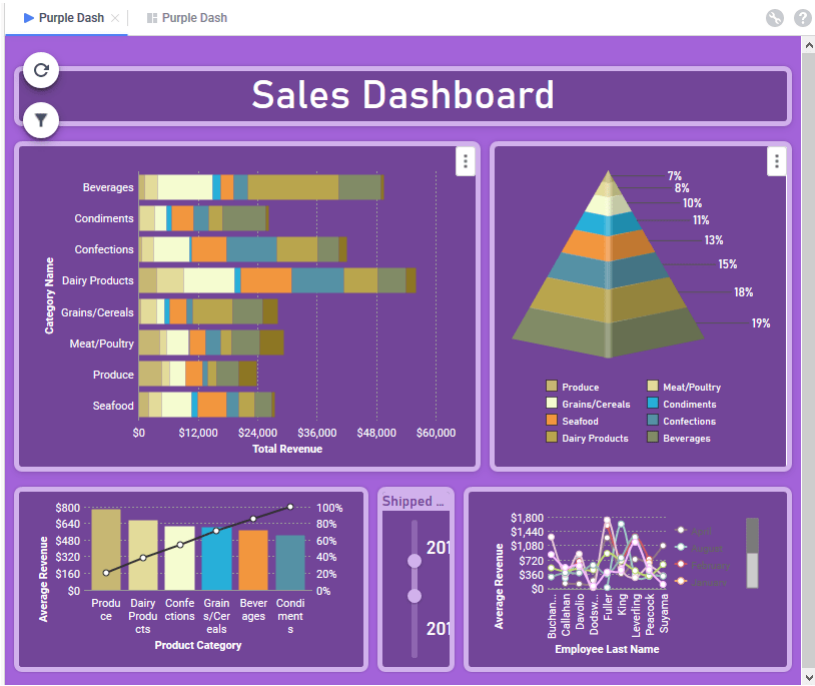


The Dashboard Designer toolbar v2020.1+

- **New Tile**: creates a new content tile on the canvas
- **Refresh**: refreshes the data in all tiles on the canvas from the data sources. The **Refresh Reminder** icon indicates that one or more report or visualization tiles on the canvas may not have the most up to date information
- **Undo**: undo the previous actions. Supports up to the last 100 actions, starting from the last action taken.
- **Redo**: redo the previous actions. Supports up to the last 100 undone actions.
- **Filters**: allows **filters** to be added to the Dashboard and shows prompting filters imported from the Dashboard's component reports. Full details on how this menu works can be found in the Dashboard Designer: Filters article
- **Parameters**: if report tiles on the Dashboard contain **Parameters**, this menu will be enabled and allow the parameters to be changed. More information can be found in the Dashboard Designer: Parameters article
- **Canvas Format**: controls how the tiles fit onto the canvas, PDF snapshot exports are formatted and sets default styling options
- **Save**: saves the Dashboard
- **Save Dropdown**: changes the name and description text of the Dashboard when saving
- **Export**: exports the contents of existing reports and visualizations on the Dashboard as a Chained Report or a PDF Snapshot.
- **Run**: launches the **Dashboard Viewer** and optionally saves the Dashboard (depending on system configuration)

Canvas

Every element on a Dashboard is contained on the **canvas** within a rectangular **tile** that can be dragged to the desired location, resized and styled. Tiles are arranged onto a grid, and can snap into place next to each other.



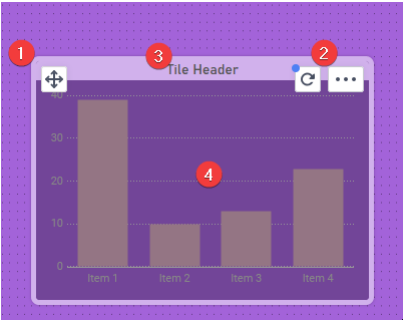
The Dashboard Designer Canvas

Tiles

Each element on a Dashboard is contained within a rectangular tile that can be resized and dragged to the desired location. Tiles are arranged onto a grid, and can snap into place next to each other.

Tiles contain four elements:

- 1. **Move handle** – click and drag the move handle to move the tile around on the canvas. Hold the **Shift** key while dragging the move handle to stretch the tile to fit the available space
- 2. **Refresh Icon/Reminder** and **Tile Menu** – contains additional options for tiles. Refer to the Managing Tiles section of this article for more information.
- 3. **Tile Header** – an optional header with title
- 4. **Content** – the content of the tile is displayed in this area



Anatomy of a tile in the Dashboard Designer

Adding Tiles

Several different types of tiles can be added to the canvas:

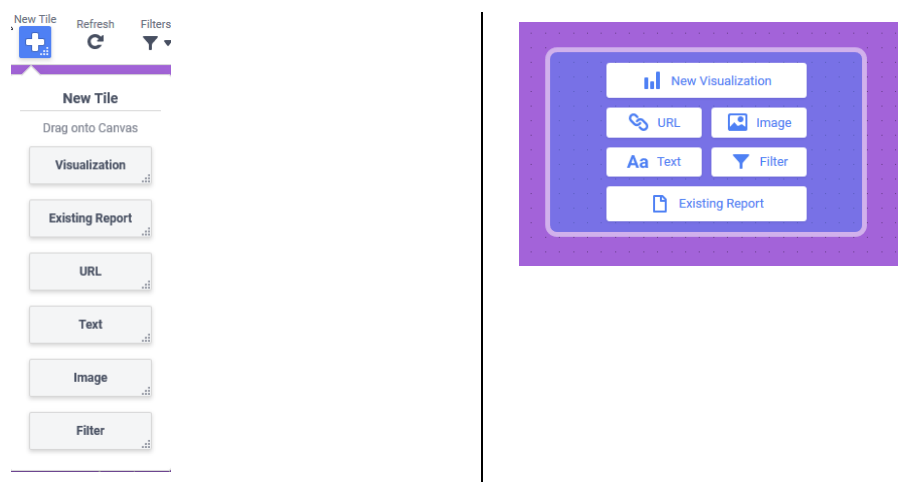
- Visualizations
- URL
- Image
- Text
- Existing Reports
- Filters

New tiles can be added to the canvas either one of two ways:

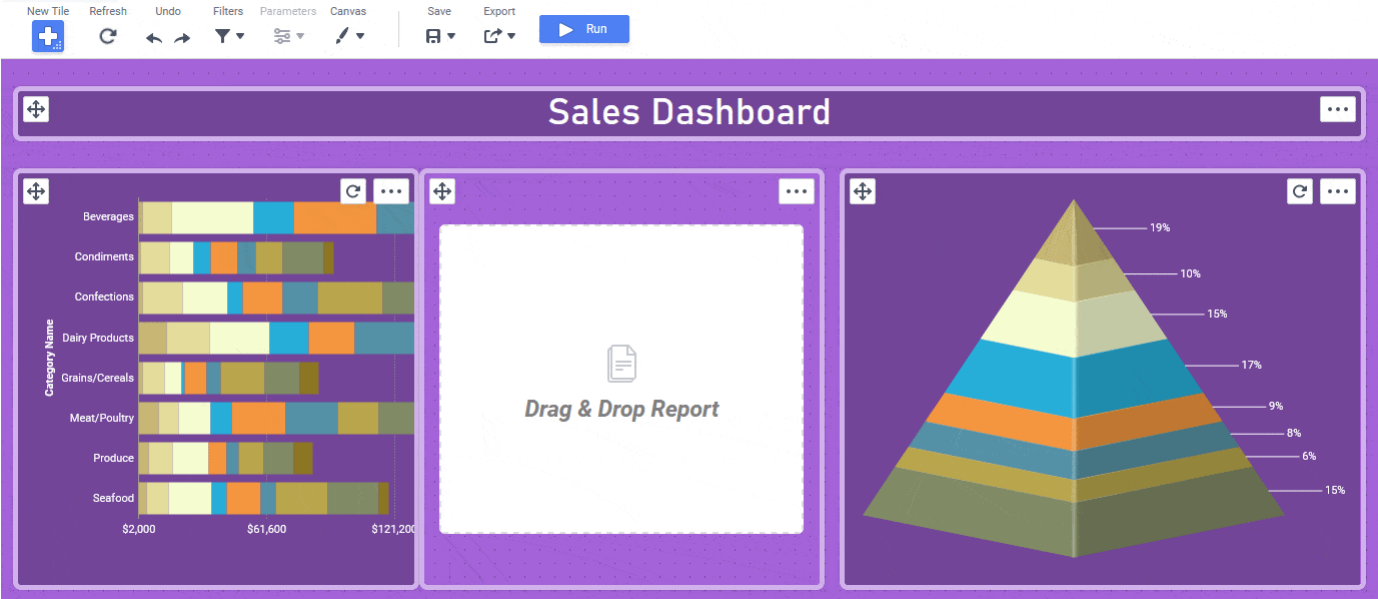
Click the **New Tile** icon to open the new tile menu, then drag the desired type of tile onto the Dashboard canvas.

Drag the **New Tile** icon onto the Dashboard canvas, and a new tile placeholder will be added onto the canvas.

Then choose the desired tile type by clicking on it in the placeholder.



Tiles can be dragged to an empty location to fill the space, to the side of an empty location to take up a portion of the space, or over another tile to place it adjacent and resize the other tile to fit. Tiles can then be resized by dragging the handles to alter the tile size.



Dragging a new tile over an existing tile on the left

Screen Fit and Scaling

Dashboards can scale to fit different screen sizes. Click the **Canvas Format** icon on the **Toolbar** to open the Canvas Format menu.

In v2021.2, the following **Size** options are available:

Size

Letter (8.5 x 11 inches)

☒ Portrait ☐ Landscape

Height 864 px Width 624 px

To set the size of the Dashboard canvas, choose a common US or ISO page size from the **dropdown**, or choose *Custom* to enter a specific **Height** and **Width**.

Choose either *Portrait* or *Landscape* to orient the selected page size on the canvas. These dimensions and orientation are also used when exporting the Dashboard as a PDF Snapshot.

The **Scale in Dashboard Viewer** checkbox sets how the Dashboard will fit the tiles to the canvas.

☒ Scale in Report Viewer

☒ ☐

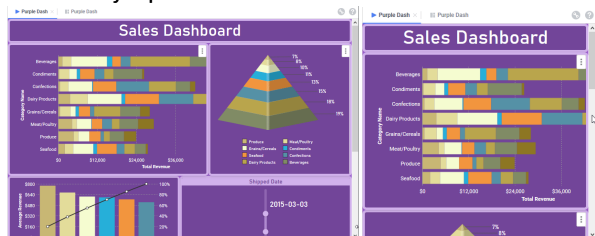
Stretch Canvas to Fit Height and Width
Preset height and width only applies to exports

CAUTION

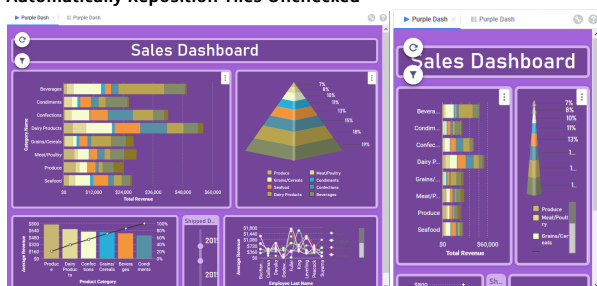
Changing the **Scale in Dashboard Viewer** mode or choosing a different **Stretch Canvas** option will automatically rearrange the position and size of the tiles on the canvas.

- When checked (default), the tiles resize to fit the height and width of the canvas in the Dashboard Designer and Dashboard Viewer. The canvas size is limited only by the window or screen on which it appears. When checked, the **Stretch Canvas** options appear:
 -  **Stretch Canvas to Fit Height and Width** the canvas stretches to fill the window both horizontally and vertically. This mode is similar to the *Scale to Screen* option in v2019.2a-v2021.1. The values in the **Height** and **Width** inputs apply to the size of an export as a PDF Snapshot.
 -  **Stretch Canvas to Fit Width** the canvas stretches horizontally to fit the window, but the width of the canvas is fixed. This mode is similar to the *Specify Height* option in v2019.2a-v2021.1. The value in the **Width** input applies to the size of an export as a PDF Snapshot and the size of the canvas.
 - Check the **Automatically Reposition Tiles** checkbox to make the tiles reposition each time the width of the canvas is changed. Leave unchecked if the tiles should maintain position when the canvas width is changed. See the examples below, which shows the same Dashboard with a set height and differing widths with the **Automatically Reposition Tiles** checkbox checked and unchecked:

Automatically Reposition Tiles Checked



Automatically Reposition Tiles Unchecked

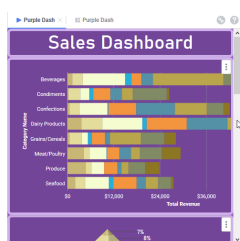
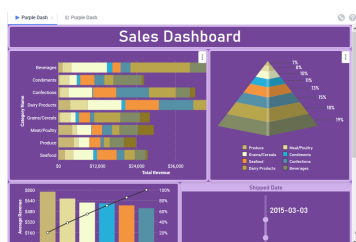


- When unchecked, the canvas will be limited to the **Height** and **Width** for both the Dashboard Viewer and in PDF Snapshot exports, and the **Stretch Canvas** options are not available. This mode is similar to the *Specify Height and Width* option in v2019.2a-v2021.1
 - Check the **Snap tiles to grid** checkbox if tiles should snap to the grid. Leave unchecked to allow free movement of the tile borders

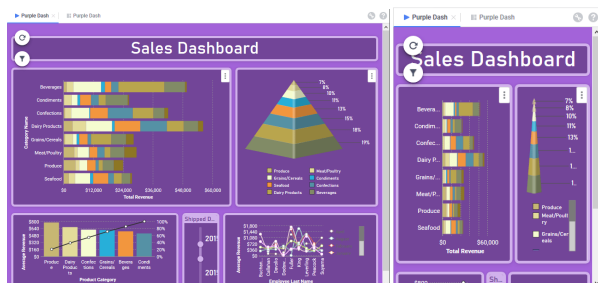
In v2019.2a-v2021.2, the following **Fit** options are available:

- Scale to Screen** causes tiles to resize to fit the height and width of the displayed canvas. Tiles must be larger than 3-grid units tall and/or 4-grid units wide or less to automatically resize.
- Specify Height** specifies a static height for the canvas. Enter the desired **Height** of the Dashboard into the textbox. Tiles must be larger than 20 pixels tall or 4-grid units wide to automatically resize.
 - Check the **Automatically Reposition Tiles** checkbox to make the tiles reposition each time the width of the canvas is changed. Leave unchecked if the tiles should maintain position when the canvas width is changed. See the examples below, which shows the same Dashboard with a set height and differing widths with the **Automatically Reposition Tiles** checkbox checked and unchecked:

Automatically Reposition Tiles Checked



Automatically Reposition Tiles Unchecked



- **Specify Height and Width** prevents tiles from automatically resizing, and the canvas will have a static height and width. Enter the desired **Height** and **Width** into the corresponding textboxes.
 - Check the **Snap Tiles to Grid** checkbox if tiles should snap to the grid. Leave unchecked to allow free movement of the tile borders.

Backgrounds and Borders

Default options for the **canvas** background color, **tile** and **tile header** background colors, and **tile border** colors and widths can also be customized from the **Canvas Format** menu under **Style**. These settings can be overridden for individual tiles through the respective tile's **Tile Properties Pane**.

- **Canvas Color** sets the background color of the entire canvas

The following **Tile Defaults** are applied whenever a new tile is added to the canvas.

- Check the **Background** checkbox to set colors for the tile and the tile header
 - **Tile** sets the default tile background color
 - **Heading** sets the default tile header background color
- Check the **Shadow** checkbox to enable a subtle shadow effect to be applied to the tiles
- Check the **Border** checkbox to set defaults for the tile borders. By default, the settings are applied to all four of the tile borders. To set individual color, width and roundness settings to each border check the **Customize Border** checkbox.
 - Click the **color selector** icon to choose a border color
 - Enter a **width** in pixels for the border
 - Choose a **round** value to set the roundness of the corners

Managing Tiles

Tiles have a menu with some additional options.

Refresh Icon/Reminder v2021.1+

For existing report and visualization tiles, clicking the **Refresh**

icon will reload the contents of the tile from the data source.

Depending on system configuration, the **Refresh Reminder**

Å appears when content in the tile is not the most current information. This can happen when:

- first opening the Dashboard Designer
- adding an existing report tile to the Dashboard
- changing the **content** of an existing report tile to a different report
- changing the data fields or field formulas of the **groups** or **values** of a visualization tile
- changing the aggregate **type** in a visualization tile
- changing a visualization **type** to or from *Tabular*
- adding, removing, or changing the **filter field**, **formula**, **operator**, or **value** of an interactive filter
- changing the **Input Type** of an interactive filter on the Canvas
- changing the value of a parameter on the **Parameters** menu

The Refresh Reminder feature is enabled by default, but can be disabled by the system administrator.

Tile Menu

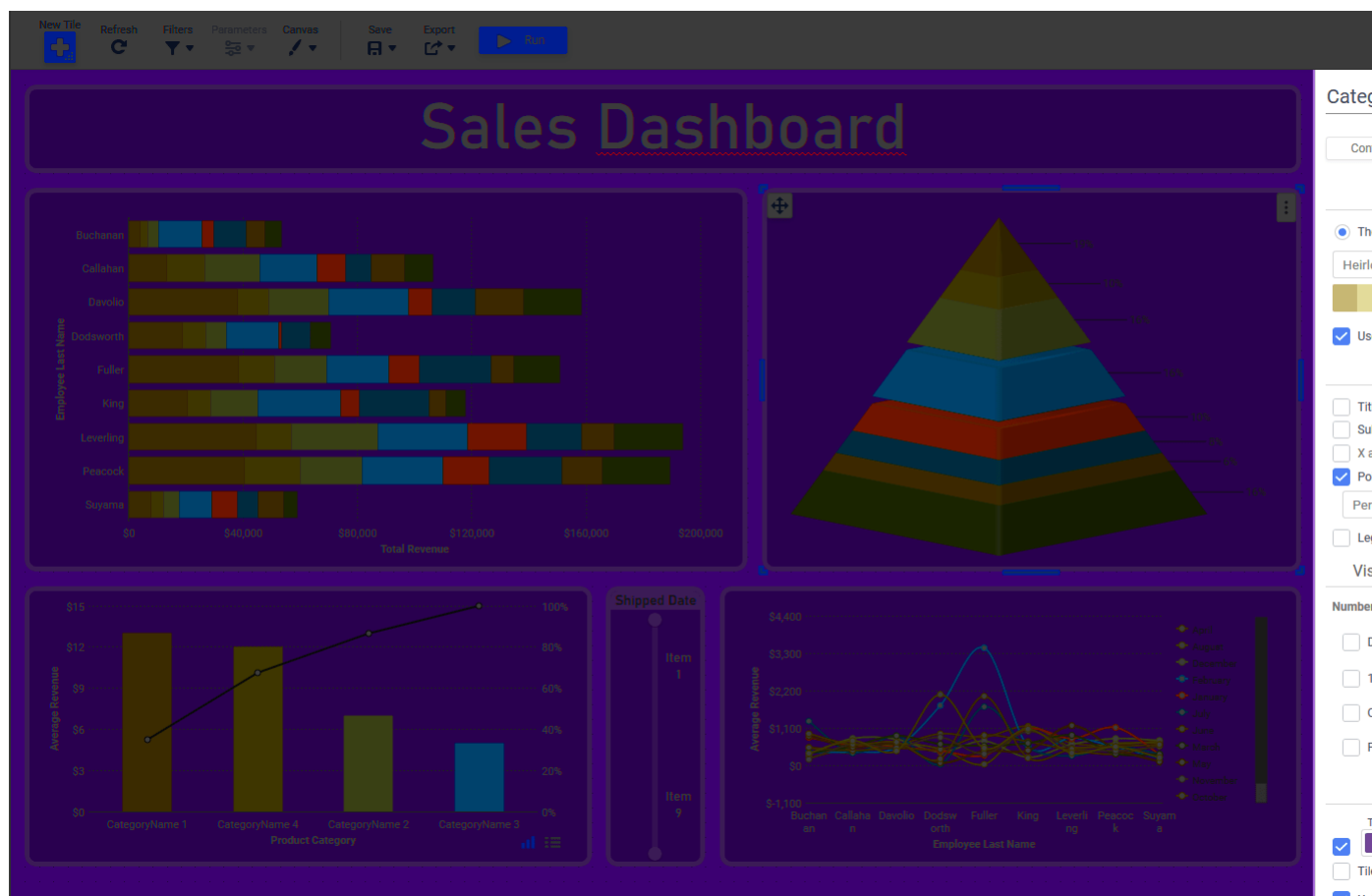
Click a tile on the canvas to select it, then click the **Tile Menu**

icon to access some additional options. Not all tile types have the same options available. For example, interactive filter tiles do not have expand tile or refresh report options.

- **Delete Tile** will remove the tile from canvas.
- **Duplicate Tile** will create a duplicate of the tile on the canvas.
- **Dock Filter to Toolbar** will relocate an **interactive filter** from the canvas to the **Filters** menu. When the Dashboard is run, the filter appears in a Filters pane instead of on the canvas. Applies to interactive filter tiles only.
- **Expand** Å **Tile** will fill the entire canvas with this tile. Once expanded, this option becomes **Collapse Tile** Å and will restore the tile back to its original size and location
- **Refresh Report** will refresh the data in report and visualization tiles
- **Open in Designer** will load an existing report tile into its respective designer for editing
- **Save as Advanced Report** will save tiles containing visualizations built directly on the canvas as an **Advanced Report** and then launch the **Advanced Report Designer**
- **Edit** will allow settings to be changed for visualization tiles. Different visualization types will have different options available:
 - **Type**: changes the visualization type displayed in the tile. Click on the different categories (*pie*, *line*, *column*, *bar*, *tabular*) to choose one of the available types. See the Dashboard Designer: Visualizations article for more information. Enable or disable a three-dimensional effect on the visualization with the **Use 3D Style** checkbox.

- **Theme:** changes a visualization's visual color theme
- **Legend Location:** changes the location of a visualization's legend location from *none*, *right* or *bottom*. Applies only to those *bar*, *column*, *pie*, *line* and *scatter* visualizations
- **Sort By:** change how the visualization is sorted
 - *Report Order* presents the data in the order in which the data source sends it to the application
 - *Data Labels* sorts the data based on the labels in the visualization
 - *Ascending* sorting order is from lowest to highest or from A to Z
 - *Descending* sorting order is from highest to lowest or from Z to A
- **Invert Data:** for multiple category visualizations (e.g. stack column and stack bar charts), swaps the order of the categories

Tile Properties Pane

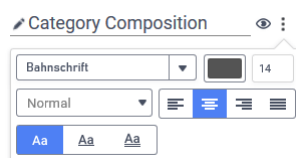


The Tile Properties Pane in the Dashboard Designer

The **Tile Properties Pane** on the right side of the Dashboard Designer is where the look, feel and behavior of individual tiles on the canvas can be changed. It contains three tabs: **Content**, **Style** and **Advanced**.

The very top of the Tile Properties Pane contains the **Tile Header** section, including a text entry field for providing a title that can optionally be displayed on the canvas. Clicking on the **Show Header** icon

next to the text entry field will show the header in the tile on the canvas. Clicking **Hide Header** icon will hide it. Clicking on the **Title Header Format** icon will show formatting settings for the tile header allowing the font type, size, alignment and styling to be applied. Clicking the **Title Header Format** icon again will hide these settings.



Tile Header portion of the Tile Properties Pane, with formatting settings shown

Depending on the type of tile selected on the canvas, the availability of the tabs in the Tile Properties Pane will change. Tabs which are not available for a particular tile type will be grayed out. Each tile type has its own article with details of the respective tile properties. A list of tile types with links to more information is at the beginning of this article.

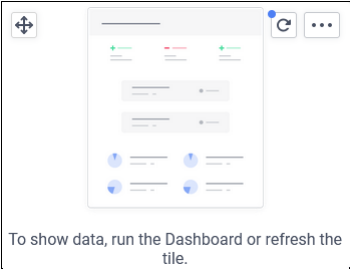
Dashboard Designer: Existing Report Tiles (v2019.2+)

Existing **ExpressViews**, **Advanced Reports**, or **CrossTab Reports** can be added to a **Dashboard**. Existing **filters** and **parameters** can be accessed and modified from the **Dashboard Designer**. Reports on Dashboards have most of the same interactivity as in the **Report Viewer**, with the exception of the interactive sorts/filters dock.

More information about creating reports can be found in the sections on Reporting.

To add an existing report to a Dashboard, review the **Dashboard Designer** article. Tiles can be added from the 

New Tile menu, or by dragging the report directly to the canvas from the  **Report Tree**.



By default when the Refresh Reminder feature is enabled, a placeholder image is displayed in the tile until it is manually refreshed by clicking the Refresh icon

If the report has **prompting filters** or **parameters** on it, these items can be modified in the corresponding **Filters** 

and **Parameters**  menus in the top toolbar. Review the Dashboard Designer: Filters and Dashboard Designer: Parameters articles for additional information.

Tile Properties Pane

Controls for building and interacting with the **Existing Report** tile are contained in the **Tile Properties Pane** on the right side of the screen. Click on the tile to select it and the Tile Properties Pane will fill with the properties for the selected tile.

Content

The **Content** tab for existing reports allows the report in the tile to be changed. Select the report from the list, and then click **Apply**. Only reports of the same type as the existing tile can be selected. For example, a tile which shows an ExpressView can only be changed to another ExpressView.

NOTE

Adding an existing report tile or changing the name of the report contained in the tile will require a **Refresh** of the tile's contents if the Refresh Reminder feature is enabled.

Style

ExpressView

The Style tab for ExpressViews contains the **Tile** and **Fit** sections. This is how this tile appears on the canvas is changed. The settings here override the **Canvas Format** defaults.

-  Setting a **Minimum Column Width** prevents columns of the ExpressView from shrinking below a set number of pixels wide. A column that starts off less than this value (in the report design itself, for example) won't expand to this value. Instead, originally narrow columns will use their own starting width as the minimum column width. If all of the columns are wider than the space available in the tile, a horizontal scrollbar appears. The default value is *100*.
- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the border width in pixels.
 - **Round** sets the roundness of the corners.

Other Report Types

The **Style** tab is broken down into two areas for other kinds of reports: **Fit** and **Tile**.

The **Fit** section determines how contents of the report are presented in the tile.

NOTE

Changing this setting will require a **Refresh** of the tile's contents.

- *Responsive Report Height* will change the height of rows based on the size of the tile so that when the tile is expanded, the rows will fill the available space.
- *Keep Original Report Cell Heights* will not change the row height when the tile size is changed.
- v2021.1.6+ Setting a **Minimum Column Width** prevents columns of the report from shrinking below a set number of pixels wide. A column that starts off less than this value (in the report design itself, for example) won't expand to this value. Instead, originally narrow columns will use their own starting width as the minimum column width. If all of the columns are wider than the space available in the tile, a horizontal scrollbar appears. The default value is *100*.

The **Tile** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the width in pixels of the border.
 - **Round** sets the roundness of the border corners.

Advanced

The **Advanced Tab** for **Existing Reports** is further broken down into two areas: **Refresh** and **Navigation**.

Refresh contains:

- **Viewer** – check the box to enable automatic refreshing of the data in the Dashboard Viewer. Check the box and then set the number of seconds in between report refreshes. Uncheck the box to disable automatic report refreshing.

Navigation contains additional options for controls which will be displayed in the tile when the report is run.

- **Allow searching**: check the checkbox to add a search box at the bottom of the tile that can search the report for data.
- **Allow scrolling**: will only be shown if the tile contains an **Advanced Report**. Check the checkbox to add scrollbars to the tile if the report contents extend beyond the bounds of the tile.
- **Table/chart toggle button**: will only be shown if the tile contains an **ExpressView**. Check the checkbox to include toggle buttons that allow switching between the visualization display mode and the tabular display mode. When unchecked, the toggle buttons are hidden.

Dashboard Designer: Visualization Tiles (v2019.2+)

Â

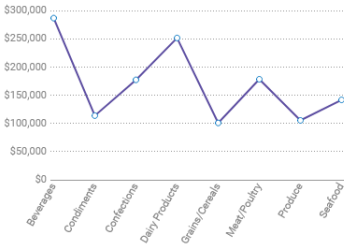
A **visualization** is a graphical representation of data that can be designed directly on the Dashboard canvas without first creating a report. The figures below are a small sampling of the visualizations that can be built directly on the Dashboard.

CategoryName	Orders Count
Seafood	330
Produce	136
Meat/Poultry	173
Grains/Cereals	196
Dairy Products	366
Confections	334
Condiments	216
Beverages	404
Report Totals	2155

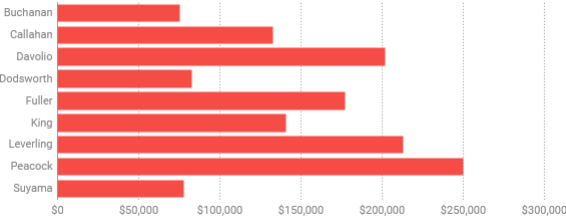
Tabular visualization



Pie chart visualization



Spline chart visualization

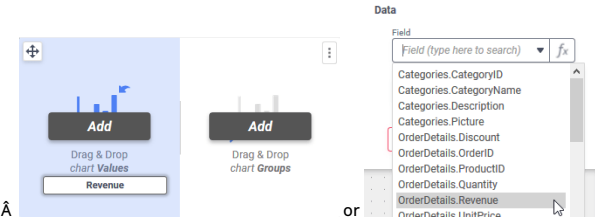


Bar chart visualization

To add a new **Visualization Tile** to a **Dashboard**, review the **Dashboard Designer** article. Add tiles with the  **New Tile** menu.

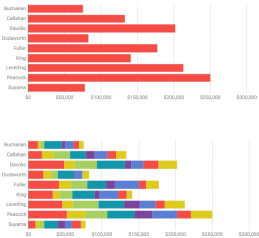
Creating Visualizations

- 1. Add a new **visualization tile** to the canvas.
- 2. Select the **Chart Type** from the **Content** tab of the **Tile Properties Pane** on the right side of the screen. When a new visualization tile is added to the canvas, *Bar* will be selected by default. The documentation section on Visualizations includes detailed information about the different chart types and how to build them. Dashboards also support an additional *Tabular* visualization type.
- 3. Next, add data to the visualization by dragging-and-dropping a **Data Object** from the  **Data Field Pane** on the left side of the screen to the tile. Once at least one Data Object is on the tile, the **Data** section of the **Tile Properties Pane's Content** tab will also allow Data Object selection. Drag the Data Objects either to the *Values* section on the left side of the tile, or to the *Groups* section on the right side of the tile. *Groups* represent the labels of the chart, whereas the *Values* represent the quantities that will be charted. For example, to create a bar chart that shows total Revenue for each Employee, the Data Object `OrderDetails.Revenue` would be added as a *Value* and `Employee.LastName` would be added as a *Group*.

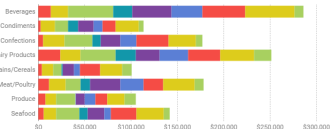


Some visualization types (*Tabular*, *Bar*, *Column* and *Line*) allow multiple *Groups* to be added. When a chart has multiple *Groups*, it can categorize the displayed *Values*. Additional groups can be added by dragging the Data Object to the tile, or clicking on the  **Add** button in the Content tab. For example, to see the total Revenue for each Employee by Category, `Category.CategoryName` could be added as a second group.

The figure below shows a single group bar chart on the left and a multi-group bar chart on the right. Every color change in each bar in the chart on the right represents a different category's contribution to that employee's total revenue.



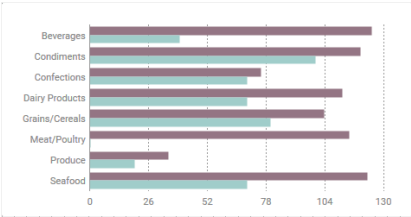
Multiple *Groups* can be re-ordered which changes how the *values* are categorized. Drag the *Groups* in the Content tab and move them up or down to reorder them. Using the same example above, but changing the order of the *Groups*, the chart changes to show each Employee's contribution to the Total Revenue for each Category:



Some visualization types (*Tabular, Bar, Column, Line, KPI*) allow multiple *Values* to be added to the chart. This adds another quantity to the display. For example, a bar chart showing the number of units in stock and the number of units on order side-by-side can be made by having both `Products.UnitsInStock` and `Products.UnitsOnOrder` as *Values*. Additional *values* can be added by dragging the Data Object to the tile, or clicking on the **+**

Add button in the Content tab of the Tile Properties Pane.

Multiple *Values* can be re-ordered which changes how the *values* are ordered. Drag the *Values* in the Content tab and move them up or down to reorder them.



TIP

When adding multiple values to a KPI visualization, choose values which have the same number formatting as only one format can be chosen for the whole visualization tile. For example, include only currency or date values in the same tile.

4. Then, in the **Data** section of the Content tab of the Tile Properties Pane, further customization of the input data can be applied. Click on either the *Group* or *Value* to open the popover.

Display Name

Revenue

Data

Field

=(OrderDetails.UnitPrice)*(_ ... f_x

Aggregate

Sum

☐ Sort

Format

Number

☒ Decimal

☒ 1000 Separator

☒ Currency

☐ Percentage

Symbol

.

\$

Places

2

Delete

Save and Close

Display Name

Enter Display Name...

Data

Field

Categories.CategoryName f_x

☒ Sort

Direction

Ascending

Format

General

Delete

Save and Close

Display Name

Enter Display Name...

Data

Field

Products.ProductName f_x

Aggregate

Count

Delete

Save and Close

From left to right: the Values popover from a tabular visualization, the Groups popover from a tabular visualization and the Values popover from a pie chart

- Formulas can be applied to both the *Groups* and the *Values*, including aggregate functions (for *Values* only) by clicking the **Formula Editor** *f_x* icon.
 - Values* can be given a friendly name in the **Display Name** field. This name is displayed prominently in KPI visualizations, chart legends and tabular visualization column labels. *Groups* in *Tabular Visualizations* may also be given a **Display Name**.
 - An **Aggregate** can be chosen from the dropdown (*Sum, Average, Count, Distinct Count, Min, Max or None*) which will aggregate the *Values*. For example, to get the total Revenue for each Employee, choose *Sum*. Functions not included in the list can be added with the Formula Editor.
 - Tabular Visualizations** have two additional properties that can be changed:
 - Groups* and *Values* can be sorted in either *ascending* or *descending* order by checking the **Sort** checkbox. When checked, the **Direction** dropdown appear allowing selection of sorting in *Ascending* or *Descending* order.
 - Checking the **Hide Detail** checkbox below the list of *Values* hides the individual rows from the table and shows only the aggregated category summary.
5. Formatting such as color themes, chart titles, X- and Y-axis labels, legends and number formatting can be customized in the Style tab of the Tile Properties Pane.
6. Advanced features such as automatic data reloading, sorting, changing the axes values, and applying Filters can be customized in the Advanced tab of the Tile Properties Pane.

NOTE

Modifying the groups, values, aggregates or changing between tabular and other chart types, or changing the Hide Detail property of a tabular visualization will require a **Refresh** of the tile's contents.

Tile Properties Pane

Controls for building and interacting with the **Visualization** tile are contained in the **Tile Properties Pane** on the right side of the Dashboard Designer.

Content

The **Content** tab for **Visualizations** is further broken down into two areas: **Chart Type** and **Inputs**.

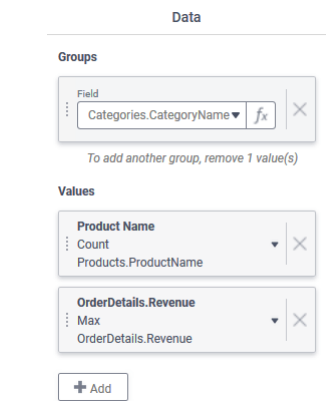
Chart Type sets the type of visualization displayed. The documentation on Visualizations includes detailed information about the different chart types and how to build them. Dashboards also have the *Tabular* type which is unique to the Dashboard Designer. *Tabular Visualizations* display data in a categorized table format.

Choose from the different categories:

-  *Tabular*
-  *Bar and Column Type*
 -  *Bar*
 -  *Stack Bar*
 -  *Stack Bar 100*
 -  *Pareto*
 -  *Column*
 -  *Stack Column*
 -  *Stack Column 100*
-  *Pie and Other Types*
 -  *Pie*
 -  *Donut*
 -  *Pyramid*
 -  *Funnel*
-  *Line*
 -  *Line*
 -  *Spline*
 -  *Line Area*
 -  *Spline Area*
 -  *Stacked Area*
 -  *Zoom Line*
 -  *Radar*
-  *Scatter*
 -  *Scatter*
 -  *Zoom Scatter*
-  *Key Performance Indicator (KPI)*

The **Data** section is where the *Groups* and *Values* for the visualization are configured. To add *Groups* or *Values*, click the corresponding .

Add button, or drag-and-drop a Data Object  from the  **Data Field Pane** on the left side of the screen to the tile.



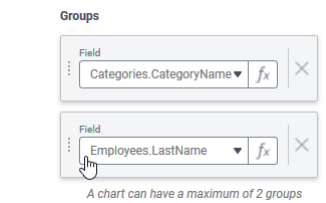
Data section of the **Content** tab for a newly created bar visualization tile

Groups represent the categorization of data on the report. **Values** represent the quantities of each of those categories. For example, a column chart showing the total revenue per employee could use *Employees.LastName* as the *Groups* and a formula which calculates the sum of *OrderDetails.Revenue* for the *Values*.

Formulas may be entered for either the *Groups* or *Values* by clicking on the corresponding *Group* or *Value* and then on the **Formula Editor** icon.

The Formula Editor article contains more information about how to use Formulas.

Groups and *Values* may be re-ordered by clicking on the **reordering handle** icon and dragging-and-dropping them. Re-ordering *Groups* changes how the *values* are categorized. Reordering *Values* changes the order multiple values appear in the visualization.



Re-ordering *Groups* in the **Content** tab

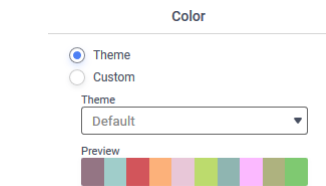
For a **Tabular Report**, checking the **Hide Detail** checkbox will remove the tabular data from the report and show only the aggregate summary. For example, the tile on the left below shows the detail rows, and they are hidden in the tile on the right.



Style

The **Style** tab for **Visualizations** is further broken down into additional areas depending on the type of visualization in the tile. They are: **Color**, **Labels**, **Number Format**, **Tabular Text**, **Fit** and **Tile**.

The **Color** section applies to all visualization types and is where the general appearance of the visualization is set.



Color section of the **Style** tab

- A **theme** can be chosen from the list,
- A **linear range** of colors can be specified (available for all types except *Tabular* visualizations), or
- A **custom** arrangement of colors may be chosen.
- Checking the **3D** checkbox will apply a three-dimensional effect to the visualization.

The **Tabular Text** section applies only to *Tabular* visualizations and is where the font type and color are set.

The **Fit** section applies only to *Tabular* visualizations.

- **v2021.1.6+** Setting a **Minimum Column Width** prevents columns of the table from shrinking below a set number of pixels wide. If all of the columns are wider than the space available in the tile, a horizontal scrollbar appears. The default value is *100*.

The **Labels** section applies to all of the chart types except *Tabular*. Labels on the visualization such as a title, axis labels, data points and a legend are configured here. These label choices will vary depending on the type of visualization.

Labels

☒ Title

Roboto18A

Top Center

☒ Subtitle

Roboto12A

☒ X and Y Axis

X-Axis Title

Y-Axis Title

Roboto11A

Slant

☒ Points

Data Values

☒ Legend

Right

Labels section

- **Title:** when checked, will add a title to the visualization and allow formatting of the font, size color and position of it
- **Subtitle:** when checked, will add a subtitle under the main title and allow formatting of the font, color and alignment of it
- **X and Y-Axis:** when checked, will add labels to the horizontal (X) and vertical (Y) axes and allow formatting of the font, color and position of them. Only available for *column*, *bar*, *spline*, *line (except Radar)* and *scatter* visualizations. For visualization types other than *bar* and *tabular*, an additional dropdown box will appear to set the orientation of the data labels. This tells the application what to do if there is not enough space in the tile to display the whole label. Choose from:
 - *Auto*: allow the application to select the best orientation for you based on available space in the tile
 - *Slant*: rotate the labels 45-degrees along the axis
 - *Wrap*: texts wraps to a new line
 - *Stagger*: values are staggered along two lines so they don't overlap
 - *Rotate*: rotate the labels 90-degrees along the axis
 - *None*: do not apply any change to labels, they may overlap
- **Points:** when checked, will add data points to the visual elements. Not available for *Tabular* or *KPI* visualizations. Different types will have different choices available:

Choice	Visualization Category	Description
None	All	Does not display data points on the chart.
Series Values	Bar, Line, Pie	Displays the value of the <i>Values</i>
Percent of Series Values	Pie	Displays the percentage of the whole represented by this <i>value</i> .
Data Labels	Pie	Displays the names of the <i>Groups</i> represented each segment of the chart.
Data Labels with Data Values	Pie	Combines the behavior of both <i>Data Labels</i> and <i>Series Values</i> modes to place both pieces of information in the label.

- **Legend:** when checked, will add a legend to the visualization located on the tile according to the choice made in the dropdown box, either *Right* or *Bottom*.

The **Number Format** section sets the way that numbers are displayed for *Bar* and *Column*, *KPI* and *Line charts*. It works very similar to the other number formatting options throughout the application.

Number Format

KPI Value Format
Expanded

Number Format

☒ Decimal Symbol: . Places: 2

☒ 1000 Separator ,

☒ Currency \$

☐ Percentage

Number Format section

- **Decimal:** when checked, will force a specified number of decimal places to be displayed. The symbol inserted between the whole and fractional part of the number can be specified, as well as the number places after the symbol.
- **1000 Separator:** when checked, will separate thousands places with the specified symbol
- **Currency:** when checked, will display the specified currency symbol in front of the value
- **Percentage:** when checked, will display a percent sign (%) after the value
- **KPI Value Format** applies only to KPI visualizations to set how the value is presented in the tile. Choose from:

- *English Short Scale*

\$1M
Total Revenue

- *Scientific Notation*

\$1x10⁶
Total Revenue

- *Expanded*

\$1,354,459
Total Revenue

The **Tile** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the border width in pixels.
 - **Round** sets the roundness of the corners.

Advanced

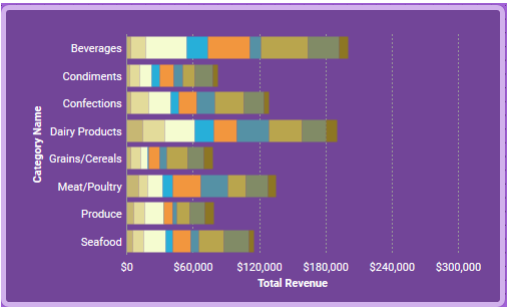
The **Advanced Tab** for **Visualizations** is further broken down into two areas: **Refresh** and **Navigation** (*Tabular* only) or **Data Display** (*Other Chart Types*).

Refresh contains one checkbox, to enable automatic refreshing of the data in the Dashboard Viewer. Check the box and then set the number of seconds in between report refreshes. Uncheck the box to disable automatic report refreshing.

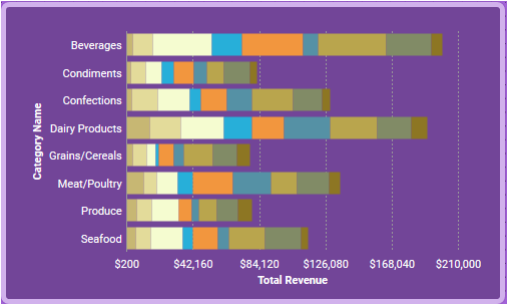
Navigation applies only to *Tabular* charts and contains one additional control **Allow searching** that will add a search box at the bottom of the tile.

The **Data Display** section applies to the other chart types and has additional controls for how the chart is formatted:

- Use the **Sort By** dropdown to apply a secondary sort to the chart that will affect the order *Values* are added to the visualization. Choose from *Ascending* or *Descending* order by selecting from the dropdown.
 - *None* adds the *Values* in the order they are returned from the data source.
 - *Data Labels* sorts the data based on the *Groups* in the visualization
 - *Data Values* sorts the data on the *Values* in the visualization
- Check the **Limit Values** checkbox to set a **Min** and **Max** value for the axes labels. If the *Values* in the chart exceed these settings, the settings are ignored.



Bar visualization with no **Limit Values** set



The same bar visualization with **Min** set to 200 and **Max** set to 210,000. Note the change in bar size and the labels along the X-axis.

- Check the **Exclude Values** checkbox to exclude *Values Less Than* or *Greater Than* these settings from appearing in the chart.
- Click the **Advanced Filters** button to open the **Visualization Advanced Filters Wizard**. Similar to the Report Designer’s Filter Wizard, this wizard allows Filters to be applied to this visualization tile. Advanced Filters created here do not show up in the **Dashboard Designer’s Filters** menu, nor do they appear in the **Dashboard Viewer’s Filters** pane. Advanced Filters created here are applied before the Dashboard Designer or Dashboard Viewer is launched and can be used to limit the amount of data returned from the data source, which can be useful when working with very large amounts of data to improve Dashboard performance.

Dashboard Designer: Image Tiles (v2019.2+)

An image file can be added to the **Dashboard** in an **Image** tile. Most image files supported by a modern web browser (e.g. JPG, PNG, GIF, SVG, ICO, BMP, WEBP, etc...) can be displayed in an Image tile.

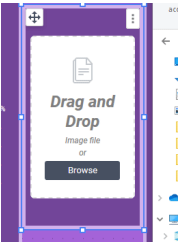
To add an **Image tile** to a **Dashboard**, review the **Dashboard Designer** article. Tiles can be added from the 

New Tile menu.

Controls for interacting with the Image tile are contained in the **Tile Properties Pane** on the right side of the screen. Click on the tile to select it and the Tile Properties Pane will fill with the properties for the selected tile.

Once the tile is created on the canvas, an image file can be:

- dragged-and-dropped onto the Image tile



- the **browse your files** link in the tile can be clicked to open a standard file browser

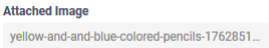
When a Dashboard is exported as a PDF Snapshot (v2021.2+), image tiles are included in the output

Tile Properties Pane

Content

The **Content** tab for Image tiles allows the image file to be changed. Either drag-and-drop the image file to the pane, or click the **browse your files** link to open a standard file browser to choose an image.

The **Attached Image** field displays the file name of the image contained within the tile.



Style

The **Style** tab for Image tiles is further broken down into two areas: **Fit** and **Tile**.

Fit sets how the image fits inside the tile. There are three options to select from.

- *Fit* will change the dimensions of the image so that the entire image can be seen in the tile, maintaining the image's aspect ratio. This is the default **Tile Fit** mode for new Image tiles.



- *Stretch* will stretch the image to completely fill the tile dimensions, ignoring the aspect ratio of the image file



- *Keep original size* will not change the dimensions of the image at all. The image appears with its original dimensions.



The **Tile** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

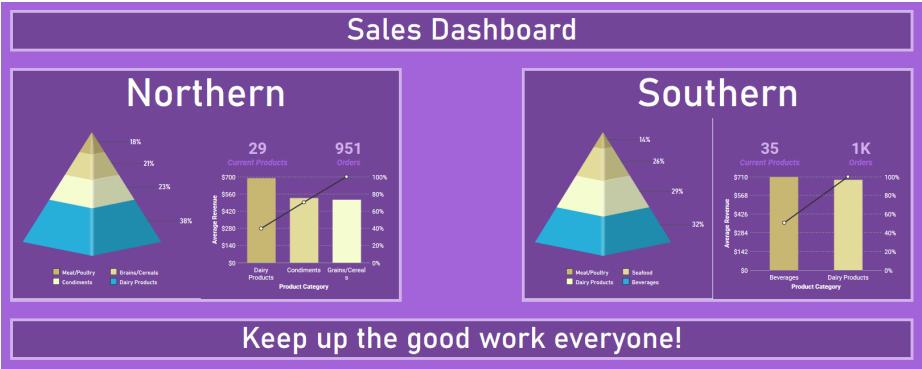
- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the border width in pixels.
 - **Round** sets the roundness of the corners.

Advanced

The **Advanced** tab is not available for Image tiles.

Dashboard Designer: Text Tiles (v2019.2+)

A textbox can be added to the **Dashboard** as a **Text** tile. Text tiles can be used for displaying static text, such as a header or section label. Creative use of the tile border properties can yield tile groups.



A Dashboard with four Text tiles, two of which are used as headers for groups of visualizations

To add a **Text** tile to a Dashboard, review the **Dashboard Designer** article. Tiles can be added from the 

New Tile menu.

Controls for building and interacting with a Text tile are contained in the **Tile Properties Pane** on the right side of the screen. Click on the tile to select it and the **Tile Properties Pane** will fill with the properties for the selected tile.

Once added to the canvas, text is entered directly into the Text tile by clicking on it and typing into it.



Entering text directly into the Text tile

When a Dashboard is exported as a PDF Snapshot (v2021.2+), text tiles are included in the output.

Tile Properties Pane

Content

The **Content** tab is not available for Text Tiles.

Style

The **Style** tab for **Text tiles** is further broken down into **Tile Fit**, **Text Attributes** and **Background and Border** sections.

Fit contains two choices to change how the text fits the tile.

- *Scale* will cause the font size to change to fit the available height of the tile
- *Keep Original* will use the font size specified in the **Text** section. Scrollbars will appear if necessary.

Text contains the standard text formatting controls to change font type, size, alignment, styling and color of the text contained in the Text tile. Checking the **Wrap Text** checkbox will cause text to wrap to a new line if it is longer than the available width. If unchecked, the text will appear on one line.

The **Tile** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the border width in pixels.
 - **Round** sets the roundness of the corners.

Advanced

The **Advanced Tab** is not available for Text tiles.

Dashboard Designer: URL Tiles (v2019.2+)

Web pages can be added to the **Dashboard** and interacted with in a **URL** tile.

NOTE

Some web site authors may choose to block their sites from being embedded into a URL tile. Therefore, not all web pages can be displayed on the canvas.

To add a URL tile to a Dashboard, review the **Dashboard Designer** article. Tiles can be added from the 

New Tile menu.

Controls for building and interacting with the URL tile are contained in the **Tile Properties Pane** on the right side of the screen. Click on the URL tile to select it and the Tile Properties Pane will fill with the properties for the selected tile.

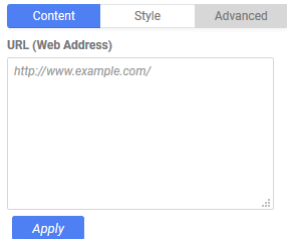
When a Dashboard is exported as a PDF Snapshot (v2021.2+), URL tiles are included in the output.

Tile Properties Pane

Content

The **Content** tab for URL tiles allows the URL in the tile to be changed. Enter the fully qualified web address (e.g. "http://www.mycompany.com") and then click **Apply** to update the tile.

Parameters can be used in the web address for a URL tile.



Content tab of the Tile Properties Pane

Style

The **Style** tab for URL tiles contains the **Tile** section. The **Background and Border** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - **Width** sets the border width in pixels.
 - **Round** sets the roundness of the corners.

Advanced

The **Advanced Tab** is not available for URL tiles.

Dashboard Designer: Filters (v2019.2+)

Â

The **Filters** menu in the toolbar is where filters are created, modified or removed, and imported prompting report filters can be modified.

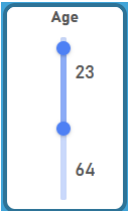
Click on the **Filters**  icon in the toolbar to open theÂ Filters menu. The menu is broken into two sections: **Interactive** and **Imported**.

SUGGESTED READING

A detailed description of how to create filters and how to use them can be found in our Report Designer Filters article.

Interactive Filters

Interactive filters are added in the Dashboard Designer and can be applied to one or more tiles on the canvas. Interactive filters can be displayed on the canvas in tiles where they can be interacted with directly, or are **docked** in the **Filters Pane** of the Dashboard Viewer.



An interactive filter displayed as a tile on the canvas

Filters

Donor Age

Is Between

 23  f_x

And

 64  f_x

The same interactive filter docked to the Filters Pane instead of appearing on the canvas

Filters with the *Equal To*, *Is One Of* or *Is Between* operator can appear on the canvas in a tile, and have a **grab handle**  which can be dragged to the canvas to create a tile from the Filters menu. Conversely, filter tiles on the canvas can be dragged into the menu to dock them, or click **Dock Filter to Toolbar** in the tile's Tile Menu.

Categories.CategoryName

Categories.CategoryName Is One Of 'Beverages', 'Condiments', 'Confections'



Interactive Filter that is not contained in a canvas tile as it appears in theÂ Filters menu, showingÂ filterÂ field (CategoryName), operator (Is One Of), value (Beverages,

Condiments, Confections) and grab handle.

Filters on the canvas only have a basic outline in the menu and don't show their filter field, operator or value.

Orders.ShippedDate

Interactive Filter that is contained in a canvas tile as it appears in the Filters menu, showing basic outline

All interactive filters can be docked in the Filters pane. Only filters with the *Equal To*, *Is One Of* or *Is Between* operator can appear on the canvas in a tile.

Filter Dependency

If the Filter Dependency feature is enabled by the system administrator, the filter values available to be selected are determined by the values of other filters on the Dashboard. For example, setting a Category filter would then only show Products in that Category in a separate Products filter.

Dashboard interactive filters are dependent on each other based on the order in which they are added and the reports that they affect.

☐ Beverages

☐ Condiments

☐ Confections

☐ Dairy Products

☐ Grains/Cereals

☐ Meat/Poultry

☐ Produce

☐ Seafood

☐ Alice Mutton

☐ Aniseed Syrup

☐ Boston Crab Meat

☐ Camembert Pierrot

☐ Carnarvon Tigers

☐ Chai

☐ Chang

☐ Chartreuse verte

☐ Chef Anton's Cajun Seasoning

☐ Chef Anton's Gumbo Mix

☐ Chocolate

☐ Côte de Blaye

Dashboard Filters

Product Name	Stock Full At	Supplier	Salesperson	Sales Phone
Beverages				
Outback Lager	26.91	Pavlova, Ltd.	Ian Devling	(03) 444-2343
Sasquatch Ale	4.93	Bigfoot Breweries	Cheryl Saylor	(503) 555-9931
Sasquatch Ale	7.82	Bigfoot Breweries	Cheryl Saylor	(503) 555-9931
Ipho Coffee	23.67	Leka Trading	Chandra Leka	555-8787
Chartreuse verte	5.78	Aux joyeux ecclésiastiques	Guyène Nodier	(1) 03.83.00.68
Chai	5.14	Exotic Liquids	Charlotte Cooper	(171) 555-2222
Chai	19.48	Exotic Liquids	Charlotte	(171) 555-2222

Here the top filter on Category was added before the one on Product Name below it. Choosing Produce from the top filter changes the bottom tile to only display products in the Produce category. Notice the report is filtered both times the filter values are selected.

☐ Beverages

☐ Condiments

☐ Confections

☐ Dairy Products

☒ Grains/Cereals

☐ Meat/Poultry

☐ Produce

☐ Seafood

☐ Alice Mutton

☐ Aniseed Syrup

☐ Boston Crab Meat

☐ Camembert Pierrot

☐ Carnarvon Tigers

☐ Chai

☐ Chang

☐ Chartreuse verte

☐ Chef Anton's Cajun Seasoning

☐ Chef Anton's Gumbo Mix

☐ Chocolate

☐ Côte de Blaye

Dashboard Filters

Product Name	Stock Full At	Supplier	Salesperson	Sales Phone
Grains/Cereals				
Wimmers gute Semmelknödel	19.65	Plutzer Lebensmittelgroßmärkte AG	Martin Bein	(069) 992755
Singaporean Hokkien Fried Mee	1.00	Leka Trading	Chandra Leka	555-8787
Wimmers gute Semmelknödel	29.99	Plutzer Lebensmittelgroßmärkte AG	Martin Bein	(069) 992755

Orders Crosstab										
		OrderDate	2016							
CategoryName	ProductName	OrderDate	Total	April	May	January	February	March	May	
Total			1121228.49	134630.56	18437.21	100854.72	104561.95	109148.45	1461.45	
Dairy Products										
	Camembert Pierrot		40222	5916		5304	3400	3740	68	
	Gorgonzola Telino		11732.5	187.5	250	925	437.5	1912.5		
	Queso Cabrales		12087.6	210	210	1260	1890	1092		
	Queso Manchego La Pastora		12502	1672				1900	76	
	Mascarpone Fabioli		7840	2720		640	192	1120	32	
	Gudbrandsdalsost		20016	2376			1800	684		
	Flotemysost		15395.3	4235.5		1182.5	1182.5	752.5		
	Geitost		1319.5	137.5		137.5	175	55		
	Raclette Courdavault		66132	17710		8085	2200	220		
	Mozzarella di Giovanni		18475.8	1287.6		1914		3514.8		
Condiments										

On this Dashboard, the top Category filter is not applied to the large Orders CrossTab tile, so selecting a Category does not filter the Product Names list, since that would remove potential filter values for the CrossTab. However, note that selecting a product from the list that is not a Grain/Cereal will cause the Dashboard Filters report tile to show a No Data Qualified message.

Add an Interactive Filter

To add a filter to the Dashboard, on the

Filters menu, click on the Add Filter button. A New Filter item will appear in the menu. Click on the new filter item to modify it.

New Filter

No Data Field Selected

New Filter Item as it appears in the Filters menu

Modify an Interactive Filter

NOTE

Adding, removing, or modifying the field, formula, operator, or value of an interactive filter or changing the Input Type of an interactive filter on the canvas will require a Refresh of any tiles affected by that filter.

Docked Filters (Not In a Canvas Tile)

An Interactive Filter not contained in a tile is called a **Docked Filter**. To modify a docked filter, click on the corresponding filter item in the menu and the **Filter Item Detail** options will appear.

Order Date

Affected Tiles

☐

Screenshots\Dashboards\Co...

☒

Pareto Chart

☐

Dollars and Sense

☐

Order Quantity by Category

Filter Field

Orders.OrderDate

Operator

Is Between

Value

06/01/2015

fx

And

06/30/2015

fx

Save and Close

Delete

Filter Item Details dialog of the Dashboard Filters menu

Click the corresponding tile names in the **Affected Tiles** section to apply the filter to the desired tiles. Only those reports containing the **Filter Field** or a direct relationship to it can be selected even though all of the reports on the Dashboard are available in the list.

Affected Tiles

☐

Additional Reports\Pareto Ch...

Additional Reports\Pareto Chart does not have a direct data relationship with the Filter Field and is therefore not available

The **Interactive Filter** can be given a title by clicking on and entering it into the text field at the top of the menu.

Categories.CategoryName

Filter Field

Categories.CategoryName

Changing title of a docked Interactive Filter from Categories.CategoryName to Category Name

The **Filter Field**, **Operator** and **Value** fields determine what Data Field to filter on, what comparison to make and what value to compare.

Consider an example where only orders whose Order ID number is larger than 1000 should be included in the tile. The Field is set to *Orders.OrderID*, the Operator is set to *Greater Than or Equal To* and the Value is set to *1000*.

On the Canvas

Interactive Filters that appear in tiles are modified by clicking on the filter tile and then interacting with the Tile Properties Pane on the right side of the screen.

Content

Filter Field sets the Data Field to filter on. The dropdown list will be populated with fields from the **Categories** included on the Dashboard as well as those with a direct relationship to those fields. Clicking on the **Formula Editor**  icon opens the Formula Editor so that a formula can be applied to the Filter Field.

SUGGESTED READING

The Formulas Section contains an extensive explanation of how to use formulas and what functions are available.

Check the corresponding tile names in the **Affected Tiles** section to apply the filter to the desired tiles. Only those reports containing the **Filter Field** or a direct relationship to it can be selected.

Affected Tiles

☐

Additional Reports\Pareto Ch...

Additional Reports\Pareto Chart does not have a direct data relationship with the Filter Field and is therefore not available

The **Sort** dropdown determines in which order the filter values appear in the tile, either in *Ascending* or *Descending* order. For example, if the Filter Field is `Employees.LastName`, setting this to *Ascending* will order the last names from A to Z, *Descending* will order them from Z to A.

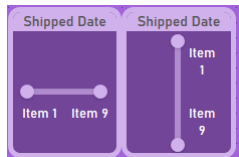
NOTE

The **Sort** dropdown does not affect the sorting of the data on the reports this filter affects. It only affects the order the filter values are listed in the tile.

An interactive filter in a tile contains a control to interactively change the filter values. Choose the **Input Type**. The four available control choices are:

-  *Dropdown:* allows one value to be selected at a time
-  *Checkboxes:* allows zero or more discrete values to be selected simultaneously
-  *Single Slider:* allows one value along a range of values to be selected
-  *Range Slider:* allows all values inside of a range of values to be selected

Orientation changes the orientation of the filter tile's control. Choose from *Horizontal* or *Vertical*.



Horizontal and Vertical orientation, respectively, of the same Range Slider control

The **Default Value** will be used to filter the data when the Dashboard is first run, before the user has interacted with the tile. When the Dashboard is exported as a Chained Report, the **Default Value** is applied to the tiles.

Style

The **Style** tab for Filter tiles is further broken down into three areas: **Text**, **Selector Format** and **Tile**.

Text contains typical controls for changing the font type, size, color, styling and alignment for the filter control's values.

Selector Format section contains controls to set the color, horizontal and vertical alignment of the filter's control. The **Select Format Type** dropdown specifies what type of data the filter controls. It works similar to the Number tab of the Cell Formatting window in the **Report Designer**.

The **Tile** section is where tile appearance can be changed. The settings here override the **Canvas Format** defaults.

- Check **Background** to set a background color for the tile. Click **Color** to open the color selector and choose a background color. Unchecking the **Background** checkbox makes the tile transparent.
- Check **Tile Header** to set a background color for the tile's header. Click **Color** to open the color selector and choose a background color. Unchecking the **Tile Header** checkbox makes the header background transparent.

NOTE

The Tile Header options are only shown if the Tile Header is visible on the canvas.

- Check **Shadow** to show a slight shadow effect around the tile.
- Check **Border** to apply a border to the tile.
 - Check **Customize Border** to set the properties of each of the four tile borders individually. Leave unchecked to have the border properties applied equally to the four sides.
 - Click **Color** to open the color selector and choose a border color.
 - Width** sets the border width in pixels.
 - Round** sets the roundness of the corners.

Advanced

The **Advanced** tab is not available for Filter tiles.

Delete an Interactive Filter

Docked Filters (Not In a Canvas Tile)

To delete an Interactive Filter from the Dashboard:

- Click on the **Filters** icon in the toolbar to open the **Filters** menu.
- Click on the desired filter item in the menu.
- Click the **Delete** button at the bottom of the **Filter Item Detail**.

On the Canvas

Click the Interactive Filter tile on the canvas, then click **Delete Tile** from the **Tile Menu**.

Exports

Interactive filter tiles will not appear in the resulting Chained Report when a Dashboard is exported. Though the tiles themselves will not display, the default values set for the filters will apply to their affected tiles in the exported file.

In PDF Snapshot exports (v2021.2+), filter tiles show a summary of the field, operator and values in place of their controls.



Snapshot of a simple Dashboard showing the values Dairy Products, Confections, Condiments and Beverages selected for the Categories.CategoryName filter tile

Refer to the Exporting Dashboards article for more information.

Imported Filters

When an existing report is added to the Dashboard and it contains prompting filters, those filters are **imported** into the Dashboard.

When more than one report is added with a prompting filter on the same Data Field, the filters will be automatically combined into a single **consolidated imported filter**.

Add an Imported Filter

A report added to the Dashboard that contains prompting filters will import those filters automatically.

Modify an Imported Filter

To modify an Imported Filter click on the corresponding filter item in the 

▼ **Filters** menu. The **Filter Item Detail** will appear.

=Year((Orders.OrderDate))

Affected Tiles

Screenshots\Chained Reports\Examp...

Imported from Employee Orders

Filter Field

=Year((Orders.OrderDate))

Operator

Equal To

Value

2014

On Run

Prompt for Value

Show on Output

Save and Close

Filter Item Detail

The Imported Filter can be given a title by clicking on and typing it into the text field at the top of the menu.

Categories.CategoryName

Filter Field

Categories.CategoryName

fv

Changing title of an Imported Filter from Categories.CategoryName to Category Name

The **Operator** and **Value** fields determine what comparison to make and what value to compare.

NOTE

To edit the filter field of an Imported Filter, edit the corresponding report in the **Report Designer**.

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The **Affected Tiles** section lists the tiles which are affected by this filter. If more than one report is filtered by the same Filter Field, it is grouped together into a **Consolidated Filter**. This consolidation happens automatically. There can only be one consolidation for a single data field on a Dashboard.

Employees.EID

Affected Tiles

ungroup

Screenshots\Chained Reports\...

ungroup

Screenshots\Chained Reports\...

Imported from Employee Orders, Employee Hire

Filter Field

Employees.EID

Operator

Is One Of

Value

6

5

4

On Run

☒

 Prompt for Value

☐

 Show on Output

Save and Close

Filter Details of a Consolidated Filter

When imported filters are **consolidated**, changing the **Operator** or **Value** will change it for all of the **Affected Tiles** simultaneously. To break the consolidation so that tiles may have their operators and values set individually, click the corresponding **Ungroup** button.

The **On Run** options work as follows for both consolidated and unconsolidated filters:

- **Prompt for Value** when checked will prompt the user to specify a filter value when the **Dashboard Viewer** is launched
- **Show on Output** when checked will show the filter in the **Dashboard Viewer's Filter Pane**. If unchecked, the filter will be hidden from the **Filter Pane** but will still affect the reports.

Delete an Imported Filter

To remove an **Imported Filter** from a Dashboard, it must be set to not prompt for a value or be removed from the report where it was imported from.

Dashboard Designer: Parameters (v2019.2+)

Â

When a report containing one or more parameters is added to a Dashboard existing report tile, those parameters are imported to the **Parameters** menu. Click on the toolbar **Parameters** icon to open the Parameters popover menu.

icon to open the Parameters popover menu.

Each imported parameter is shown as an item in the menu. For example, the **Parameters** menu below contains two parameters, one named **MyParameter** with a value *Teleportation*, and one named **EmployeeID** with the value *Johnson*.

Parameters

MyParameter

Teleportation

EmployeeID

Johnson

Parameters menu with two parameters imported from reports on the canvas

If more than one report references the same parameter, it is grouped together into a **Consolidated Parameter**. This consolidation happens automatically. Clicking on any of the parameter items in the menu will open the **Parameter Item Detail** menu.

RestaurantName

Imported From Restaurant Menu

Name

RestaurantName

Value

Restaurant Menu

Affected Reports

General Reports\Restaurant Menu

On Execute

☐

 Prompt for value

☒

 Show on Output

Close

Parameter Item Detail for a single

report

MyParameter

Imported From param-test3, param-test4

Name

MyParameter

Value

Teleportation

Affected Tiles

ungroup

Additional Reports\param-test3

ungroup

Additional Reports\param-test4

On Execute

☐

Prompt for value

☒

Show on Output

☒

Set Default Value

Close

Parameter Item Detail for a consolidated parameter

The **Parameter** can be given a title by clicking on and entering it into the text field at the top of the menu. This title is used in the **Parameters Pane** of the **Dashboard Viewer** to more clearly identify it.

Transit Method

Imported From param-test4, param-test3

Name

MyParameter

Providing a title for a Parameter in the Dashboard Designer

Parameters

Transit Method

Teleportation

How the title in the Dashboard Viewer Parameters Pane appears

The name of the report or reports that imported this parameter are displayed under the title.

The parameter’s **Name** and **Value** are displayed, and the **Value** can be changed.

The corresponding tile names in the **Affected Tiles** section show which tiles are affected by the parameter. If two or more reports on the canvas have a parameter with the same name, those parameters are consolidated into a **consolidated parameter**. Click the **Group All** button to consolidate all of the reports with the common parameter

In the example below, the *EmployeeID* parameter appears on two reports, *param-test1* and *param-test2*. In the **Parameter Item Detail** on the left, a **Group All** button allows consolidating all of the reports with the *EmployeeID* parameter. The resulting consolidated parameter is on the right.

Consolidated Parameters allow the Value to be changed for all of the reports simultaneously.

To break the consolidation, click the corresponding **ungroup** button.

EmployeeID

Imported From param-test2

Name

EmployeeID

Value

Johnson

Affected Reports

Additional Reports\param-test2

Group All

On Execute

☐

Prompt for value

☒

Show on Output

Close

EmployeeID

Imported From param-test2, param-test1

Name

EmployeeID

Value

Johnson

Affected Reports

ungroup

Additional Reports\param-test2

ungroup

Dashboards\param-test1

On Execute

☐

Prompt for value

☒

Show on Output

Close

becomes

The **On Execute** options work as follows:

- **Prompt for value** when checked will prompt the user to specify a value when the Dashboard is run. Otherwise the value in the menu is used when the Dashboard is run.
- **Show on Output** when checked will show the parameter in the **Dashboard Viewer's Parameters Pane**. If unchecked, the filter will be hidden from the **Parameters Pane** but will still affect the reports.
- **Set Default Value** when checked, will apply the **Value** specified in the Dashboard Designer to the parameter when the Dashboard is run. If unchecked, the parameter will use it's own default value, if any, when the parameter is run.

NOTE

Changing the value of a parameter will require a **Refresh** of any tiles affected by that parameter.

Adding/Deleting Parameters

To **add** a parameter to a Dashboard, it must be included in one of the Dashboard's component reports.

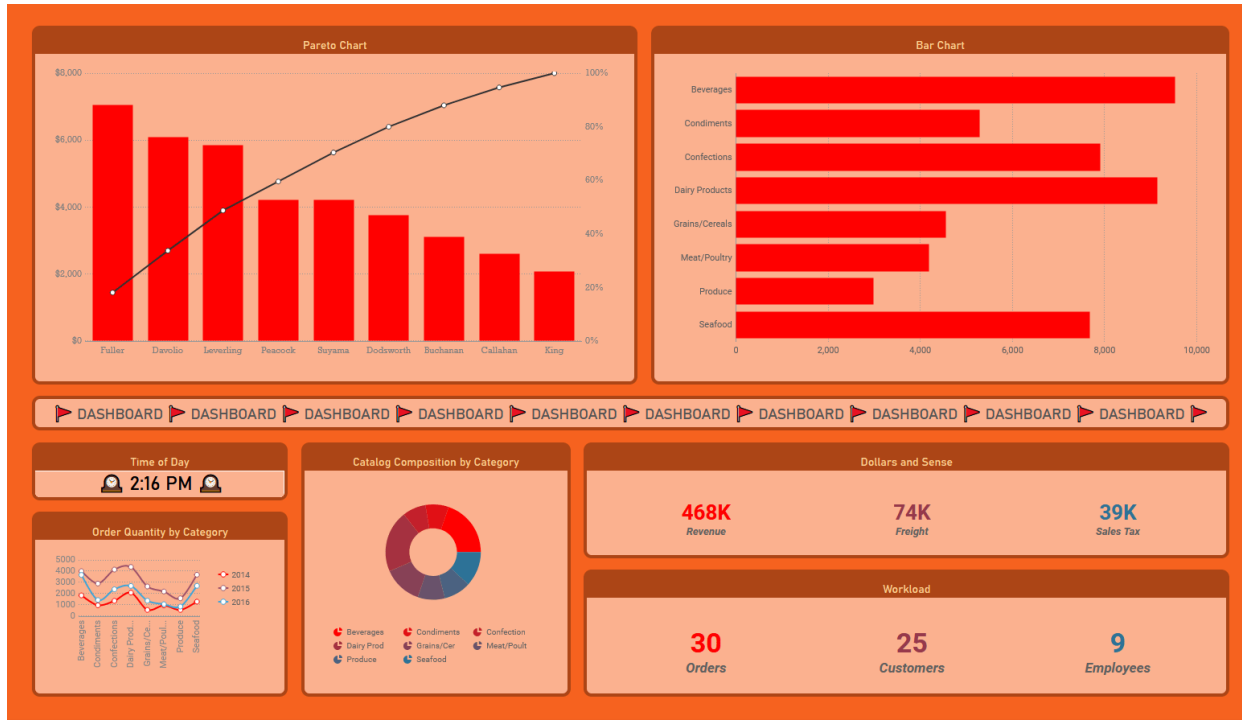
To **remove** a parameter from a Dashboard, remove it from the reports on the Dashboard.

Exporting Dashboards (v2019.2+)

Dashboards can be exported, scheduled and e-mailed as:

- **Chained Reports** to any of the available export types (*Excel, PDF, RTF, CSV*). Each tile appears on a separate page in the output file.
- **Snapshots** with a likeness of the Dashboard as it appears on screen in a single page PDF

In the examples below, consider this sample Dashboard:



Sample Dashboard in the Dashboard Viewer

Chained Report Output Mode

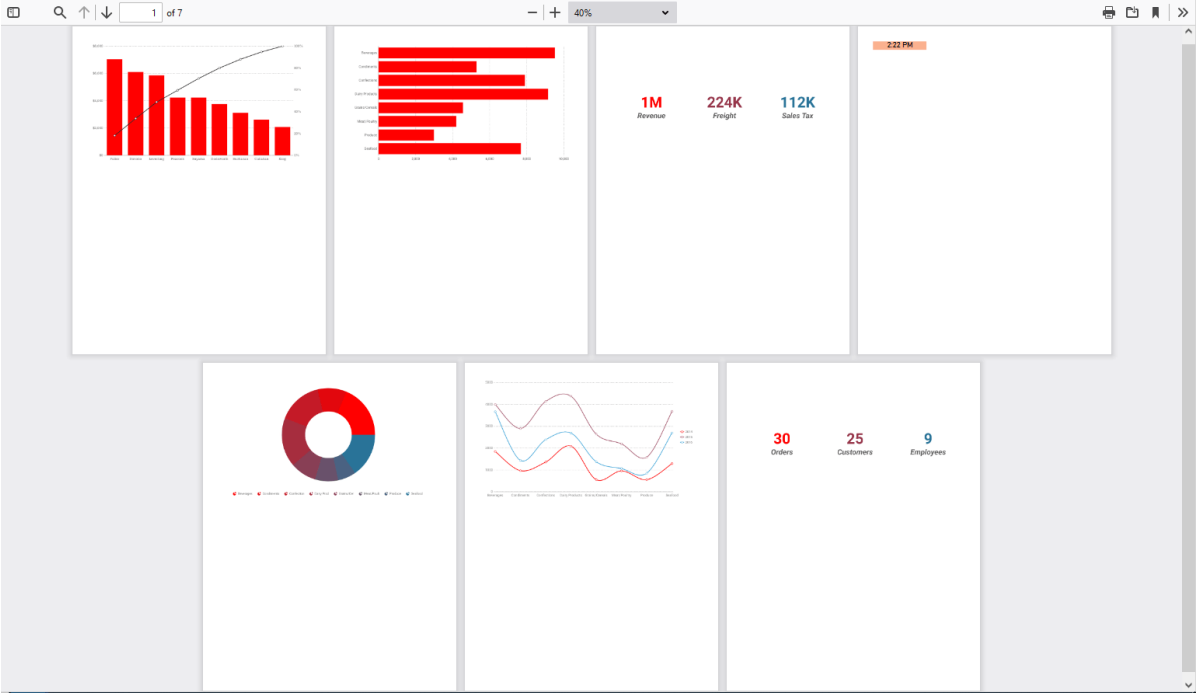
Dashboards exported in this mode consist only of report and visualization tiles. Filter tiles are excluded from the Chained Report output but the default filter values apply to their affected tiles.

For a Dashboard exported as a Microsoft Excel Workbook, each tile appears as a separate worksheet tab in the output. For CSV exports, each report tile's output will be in the output file, one right after the next. Visualization tiles will be blank lines.

NOTE

The default values of the filters are reflected in the exported Dashboard even if the filter tiles have been adjusted before exporting.

When exported in Chained Report mode, the sample Dashboard looks like this:



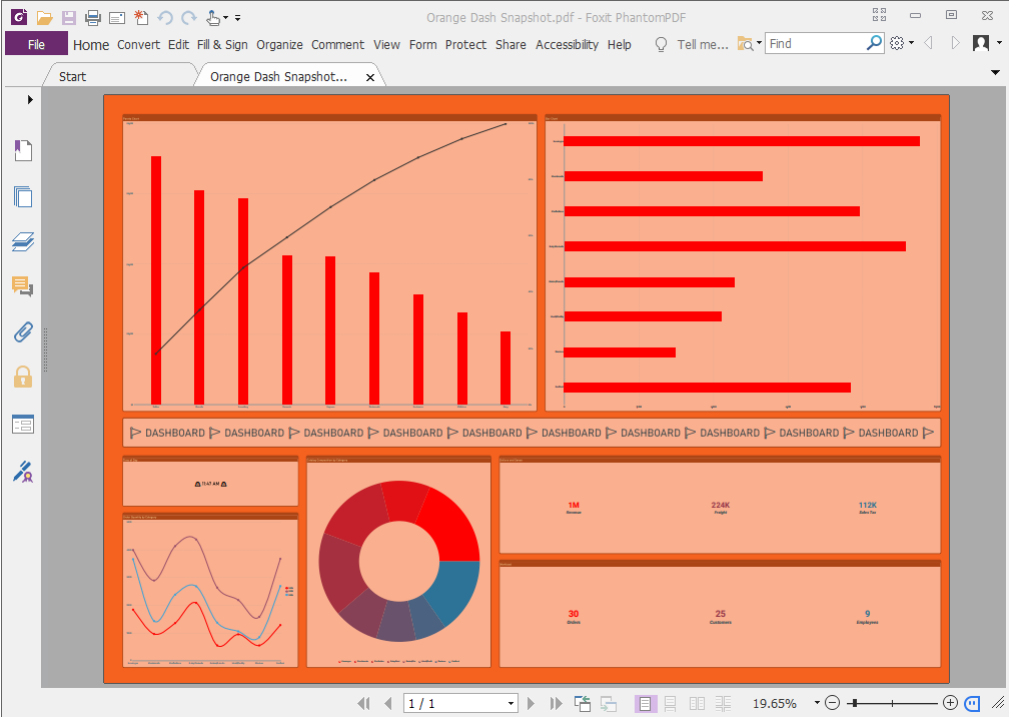
Each report or visualization tile appears in its own page of this PDF Chained Report output

Snapshot Output Mode v2021.2+

Dashboards exported in this mode resemble a screenshot of the entire canvas, with a few exceptions:

- scrollbars, the Tile Menu icon, Refresh icon, Move handle, report page buttons and search bar on each tile do not appear in the output
- the floating Refresh, Filter and Parameters icons of the Dashboard Viewer do not appear in the output
- ExpressView Existing Report tiles appear in their exported view style—not as they do in the ExpressView Designer or on the Dashboard canvas
- Interactive Filter tiles appear with a summary of the tile's filter settings

When exported as a Dashboard Snapshot, the sample Dashboard looks like this:



The sample Dashboard exported as a Dashboard Snapshot

How to Export a Dashboard

Dashboards may be exported from the 

Report Tree and the  Dashboard Designer.

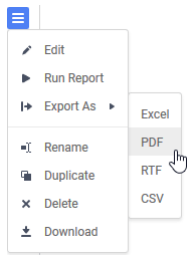
NOTE

If at least one report tile on the Dashboard has no export types selected, exporting of the Dashboard will be disabled.

From the Report Tree

From the 

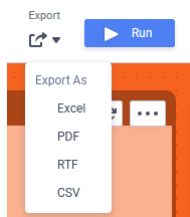
Report Tree by right-click the Dashboard name or by first select the report in the tree, then click the **Menu**  icon, hover over **Export As** and then choose the preferred export type from the list.



From the Dashboard Designer

Export from the Dashboard Designer by clicking the **Export** 

icon in the toolbar then choosing an export file type.



If some export types shown here are not available, they may be restricted by the system administrator, or one or more of the component reports may restrict them in their respective **General Report Options**.

Scheduling or E-Mailing Dashboards

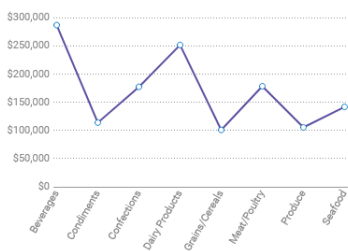
Follow the instructions in the Scheduling Reports to schedule or immediately e-mail a Dashboard.

Charts and the Chart Wizard

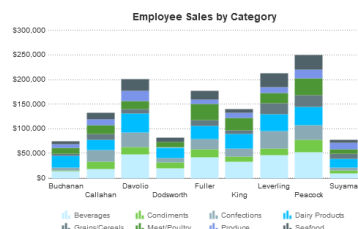
Charts are a way of illustrating data in order to make it easy to spot trends and patterns. Most types of charts are simply a collection of points on a grid, with interstitial designs and labels that make them easier to read.



Pie chart



Spline chart



Bar chart

By default, charts are generated dynamically, based on data points that come from **Data Objects**. Each data field can be thought of as a “series” of data, which have a common association and are connected in some way. When we put one data field on a chart, we have a **single-series** chart, which is useful for comparing values to each other. When we put multiple data fields on a chart, we have a **multi-series** chart, which is useful for comparing trends.

Before creating a chart, make sure that your data exists in cells on the report. These cells don’t have to be visible, so you can suppress them if desired. Charts are interactive in the Report Viewer, but will appear as static images in PDF, RTF, and Excel formats (CSV is incompatible with charts).

To insert a chart into an Advanced Report:

1. Select a **Group Footer** or **Report Footer** cell
2. Open the Chart Wizard:
 - (v2021.1+) Click the **Insert**  icon on the toolbar, then click **Chart**

The **Chart Wizard** has four tabs: Type, Data, Appearance, and Size and Preview. You can navigate between the tabs by clicking on the tab name or using the **Previous** and **Next** buttons.

Although the information in the Chart Types section below applies to all reports, the Chart Wizard is only available in the Advanced Report Designer. The ExpressView Designer and Dashboard Designer have their own chart building wizards. Review the [ExpressView: Visualizations](#) and [Dashboard: Visualizations](#) articles for more information.

Chart Types

The **Type** Tab lays out all the available types of charts you can create. There are 24 types, sorted into five general categories.

- Line
 -  Line
 -  Spline
 -  Area
 -  Spline Area
 -  Stacked Area (v2021.1+)
 -  Spark Line
 -  Zoom Line
 -  Statistical Process Control
 -  Radar (v2021.1+)
- Bar and Column
 -  Bar
 -  Stack Bar
 -  Stack Bar 100
 -  Column
 -  Stack Column
 -  Stack Column 100
 -  Pareto
 -  Spark Column
- Pie and Other Single-Series
 -  Pie
 -  Doughnut

-  Pyramid
-  Funnel
- **Scatter and Bubble**
 -  Scatter
 -  Bubble
 -  Zoom Scatter
 -  Combination
-  Heatmap (v2020.1.3+)
-  Tabular (available to Dashboards only)

Line

Line charts display series of data points on a grid, connected by straight lines. They are often used to display a trend over time.

Each series on a line chart is represented as a colored line. Line charts can have up to three Y-axes.

Variations:

- **Spline** chart – data points are connected by interpolated curves instead of straight lines.
- **Area** chart – area under each line is filled in by a color. Overlapping areas have mixed colors.
- **Spline-Area** chart – combination of a spline chart and an area chart.
- **Stacked Area** chart – similar to an area chart, but may display multiple series additively.
- **Spark Line** chart – has no grid or axes. Use point labels and benchmark lines for reference.
- **Statistical Process Control** chart – always have a central line for the average, an upper line for the upper control limit and a lower line for the lower control limit. Data points outside of the limits are indicative of an out-of-control process.
- **Radar** chart – also known as a spider chart, multiple series (typically three or more) may be compared along the same radial grid/axes

Learn more and see some examples in the Line Charts and Spark Charts articles.

Statistical Process Control

A **Statistical Process Control (SPC)** Chart is a graph used to study how a process changes (usually over time). Data is plotted in time order. SPC charts always have a central line for the average, an upper line for the upper control limit and a lower line for the lower control limit. Control limits are located 3 standard deviations above and below the centerline (mean). Data points outside of the limits are indicative of an out-of-control process.

SPC is a single series Line chart with the following attributes:

- **Data Label** – as with any other single series line chart, users must specify the column/formula to be used as the Data Label source for the chart. This value will display along the x-axis.
- **Data Value** – as with any other single series line chart, users must specify the column/formula to be used as the Data Value source for the chart. This value will display along the y-axis, and will be used to calculate the Control, Upper Control Limit, and Lower Control Limit.

Default Benchmarks

When SPC is the selected chart type, the following benchmarks will be added by default:

- **Mean** – a benchmark with the value –Mean– will be added to represent the Control. By default, this benchmark will have the label –Mean–, will be colored Green, and will have a Solid line style.
- **UCL** – a benchmark with the value –Standard Deviation +3– will be added to represent the Upper Control Limit. By default, this benchmark will have the label –UCL–, will be colored Red, and will have a Dashed line style.
- **LCL** – a benchmark with the value –Standard Deviation -3– will be added to represent the Lower Control Limit. By default, this benchmark will have the label –LCL–, will be colored Red, and will have a Dashed line style.

Benchmark definitions can be altered as desired.

Bar and Column

Bar charts use rectangular bars which extend horizontally left to right to show comparisons between categories. **Column** charts use vertical bars which extend upward. The length of a bar represents the quantity of the data value.

Each series on a bar or column chart is represented by a colored set of bars.

Variations:

- **Stacked** bar/column chart – Series are stacked on top of each other, additively.
- **100% Stacked** bar/column chart – Series are converted to a % of the max, then stacked on top of each other, additively to 100%.
- **Spark** column chart – Has no grid or axes. Use point labels and benchmark lines for reference.
- **Pareto** chart – Combines a descending column chart, where each column is the next highest data value, and an overlapping line chart, where each point is the cumulative sum to that point. Often used to highlight the most important field in a series. Single-series only.

Learn more and see some examples in the Bar Charts and Spark Charts articles.

Pie and Other Single-Series

Pie charts are used to show the relationship of data values in a series as portions of the total. The area of each slice is proportional to the quantity.

Each data value on a pie chart is represented by a colored “slice”. Pie charts are single-series only.

Variations:

- **Doughnut** chart – Pie charts with a hole in the center.
- **Pyramid** chart – Used to show data hierarchy in addition to value. Data values are represented by vertically stacked slices, the height (not width) proportional to the quantity. The vertical order of the slices is determined by the sort order.
- **Funnel** chart – Inverted pyramid chart. Often used to show retention amount, or stages in a process. Shape is inverted, not data order. To change the order, swap the sort direction.

Learn more and see some examples in the Pie, Doughnut, Pyramid, and Funnel Charts article.

Scatter and Bubble

Scatter charts use pairs of data fields with a common relation to generate coordinates as points on a grid. They are often used to find relationships between two variables in a set of data. Unlike most other report types, scatter charts often map data from detail rows, instead of group rows.

Each series on a scatter chart is represented by a different shape and color combination.

Variations:

- **Bubble** chart – The points become circular “bubbles”, with a third coordinate field as the radius of the bubble.

Learn more and see some examples in the Scatter and Bubble Charts article.

Zoom Charts

Zoom charts provide the ability to view data at various levels of granularity, especially when the data set under observation is large and can be organized into layers for easier interpretation. The ability to zoom-in and zoom-out makes it easy to view data at various macroscopic and microscopic levels.

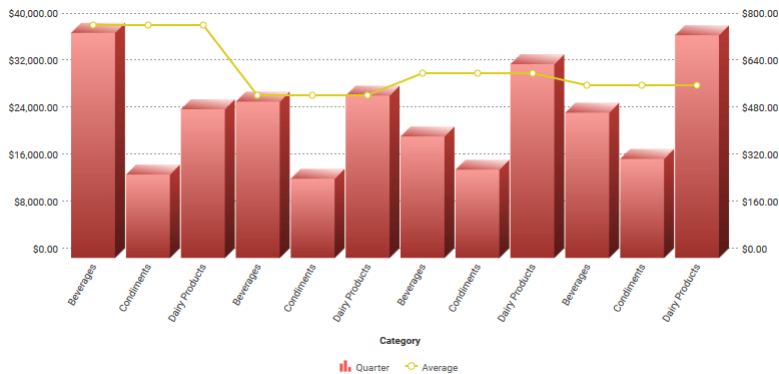
Variations:

- **Zoom Line** chart – A variation of a standard **Line** chart with zooming as an added capability.
- **Zoom Scatter** chart – A variation of a standard **Scatter** chart with zooming as an added capability.

Learn more and see some examples in the Line Chart and Scatter and Bubble Chart articles.

Combination Charts v2016.3+

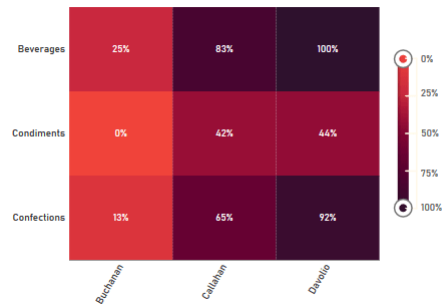
Combination charts are several different charts layered on top of one another. They comprise of a combination of Column, Line, Area, and/or Stacked Column charts. (Stacked Column charts are not compatible with other chart types). Combination charts can have up to two Y-axes.



Sample combination chart with a column chart and a line chart on the same axes

Heatmaps v2020.1.3+

A heatmap is a chart with a minimum of two related axes and as few as one or as many as six data series arranged on a grid. The defining characteristic of a heatmap is its use of color to indicate value in the cells. In addition to color, each cell may display up to five additional values (one in each corner of the cell and a fifth in the center). When hovering the mouse over a cell, a tooltip may optionally display information about the series.



A sample heatmap

Heatmaps have a unique Chart Wizard experience, visit the Heatmap Charts article for details.

The following sections pertain to building Line, Bar, Column, Pie, Pareto, Spark, Scatter and Bubble charts. For information on how to build Gauges, GeoCharts and Google Maps and Heatmaps, visit their respective articles.

Data

The **Data** Tab is used to specify which cells to use as chart data. You can change how data is translated into points by changing the data layout. You can also choose a sort order, as well as upper and lower boundaries for the data and axes.

Data for Chart

Data for Chart

X-Axis Labels

Categories.CategoryName

Series Values

Series Name

=aggavg((OrderDetails.UnitPrice))Avg Unit Price

=aggavg((OrderDetails.Quantity))Avq Quantity

+ Add Series

> Data Layout...

Add series to the chart by selecting a Data Field containing numeric values from the **Series Values** dropdown menu. Some charts may require you to select a data field to label the X-Axis. Some charts may ask for two or three data fields per series. The data axis is drawn automatically.

NOTE

Data is on the Y-Axis; this may not always be the vertical axis. Labels are on the X-Axis; this may not always be the horizontal axis. **Scatter charts** have no labels axis, but have X- and Y- data axes.

Add additional series by clicking +

Add **Series** (disabled for single-series charts). Give a **Name** to each series. Click the **Delete** icon to remove a series.

Change the data layout by clicking >

Data Layout... This will open the Data Layout dialog. If you change the data layout, this section will change for you to add either individual points, or groups of series, instead of adding individual series. See **Data Layout** below for details.

Other Options

The **Other Options** setup how data is sorted and what data points are excluded (if any) and sets boundaries for the axes (if applicable).

Other Options

Sort data by

Report Order

Descending

Exclude values less than

Exclude values greater than

25

Data Axis Minimum Value

Maximum Value

25

500

☒ Align Data Labels Across Series

Use the **Sort data by** dropdown to determine how series data should be ordered:

- Report Order – Use the sort order specified by the report.
- Data Labels – Sort by the label axis value, alphabetically or numerically.
- Data Values – Sort by the value of the data.

You can sort data in *Ascending* (A- Z, 0-9) or *Descending* (Z-A, 9-0) order.

Use the **Exclude values** fields to ignore values that are too large and/or too small.

(Grid charts) Use the **Data Axis Minimum Value** and **Maximum Value** fields to set upper and/or lower bounds for the data axis.

(Grid charts) **Align Data Labels Across Series:** Re-sorts the data in each series by the data labels. Enable this option if you have a chart where each series has the same data labels and the intent is to compare values per series and label. If you have series that don't necessarily have the same labels, you can disable this option.

(Pie charts) Use the **Other Category Percent** field to group data fields with small quantities into an “Other” category.

Data Layout

Your data may not fit neatly into series. This dialog accommodates different data layouts by allowing you to select from a couple of different ways to build a chart.

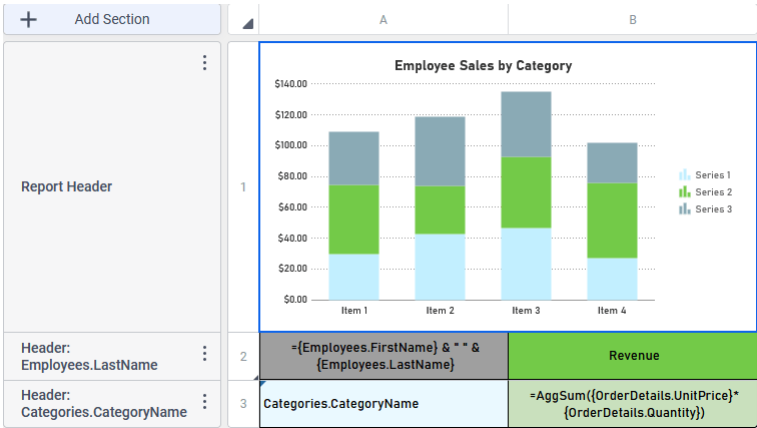
Column Based Chart is the default. This layout builds charts by taking data fields, and mapping selected values as Y-coordinates on the data axis. Determine which values are selected by specifying a data field with a common relation as the X-axis. This layout is useful if you want to plot one or more unrelated series in a group (e.g. Budget and Sales and Expenditures *per* Store).

Use *Column Based Chart* if... Your report contains a group with one or more elements. For example:

+ Add Section		A	B	C
Page Header	1	Product Category	Pieces Sold	Revenue
Footer: Categories	2	Categories.CategoryName	=aggSum({OrderDetails.Quantity})	=AggSum({OrderDetails.UnitPrice})

Row Based Chart is a little more complex. This layout still uses fields as series, but all your series are a group, nested within another group which determines the X-axis values. Data values are mapped per series per group. This layout is useful if you want to plot two or more related series in a group (e.g. Sales *per* Employee *per* Store).

Use *Row Based Chart* if... Your report contains a group within a group. For example:



If you select this layout, the data selector will change to allow you to add all your series as a group, nested within an outer group for the data labels:

Data for Chart

Data Values

=AggSum({OrderDetails.Revenue})

Data Labels

=[{Employees.FirstName} & " " & {Employees.LastName}]

Series Labels

Categories.CategoryName

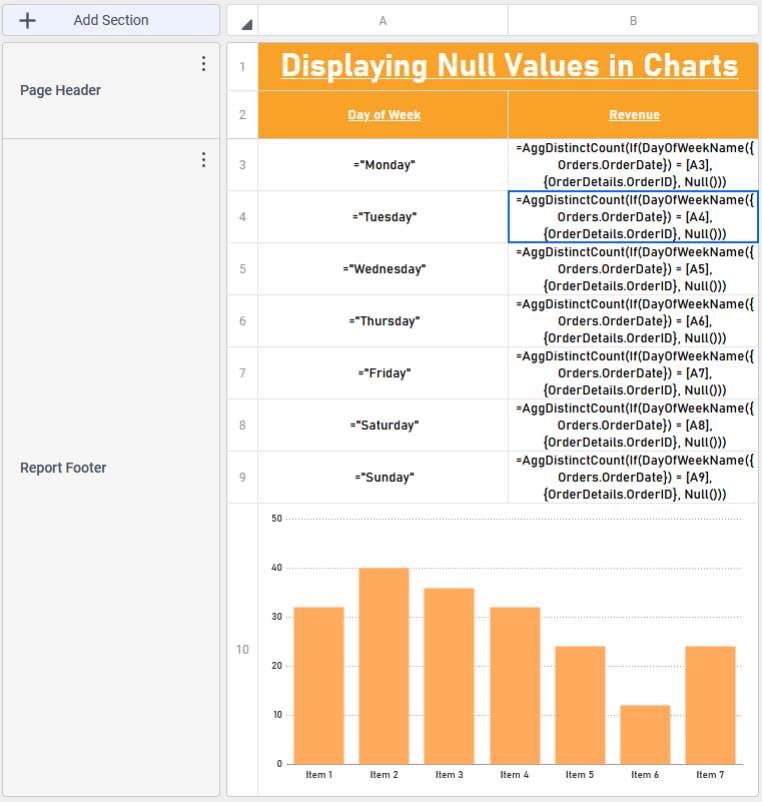
> Data Layout...

Cell Based Chart is the simplest option. This layout builds charts by taking pairs of static report values, and using them as (X,Y) or (label, value) coordinate pairs.

In order for the chart wizard to recognize report cells, they must be in **Formula** form, with a preceding = sign, text surrounded by quotes, and data fields surrounded by braces { }. Examples:

- *Number:* =42
- *Text:* ="February 24th"
- *Data field:* ={Employees.EmployeeName}
- *Formula:* =Month{Orders.OrderDate}
- *Math:* ={Orders.UnitPrice} * 2.43

Use *Cell Based Chart* if... You want to build a chart point by point, and only have one data series. For example:



If you select this layout, the data selector will change to allow you to add points. This layout only supports one series of data (duplicating data labels will create duplicate axis labels):

Type

Data

Appearance

Size and Preview

Setup the data to show in the chart

Data for Chart

Point Value

Point Label

=AggDistinctCount(If(DayOfWeekName({Or

=Monday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Tuesday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Wednesday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Thursday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Friday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Saturday

X

=AggDistinctCount(If(DayOfWeekName({Or

=Sunday

X

+ Add Point

> Data Layout...

Appearance

The **Appearance** Tab contains options for customizing how the chart will look.

Colors

Use the **Colors** dropdown to select either:

- a named color theme to apply to the chart

Colors

Crayola

☐ Use 3D Style

Labels

Chart Title

X-Axis Title

Y-Axis

- a custom gradient range of colors by selecting the *Linear Range* option.

Colors

Linear Range

☐ Use 3D Style

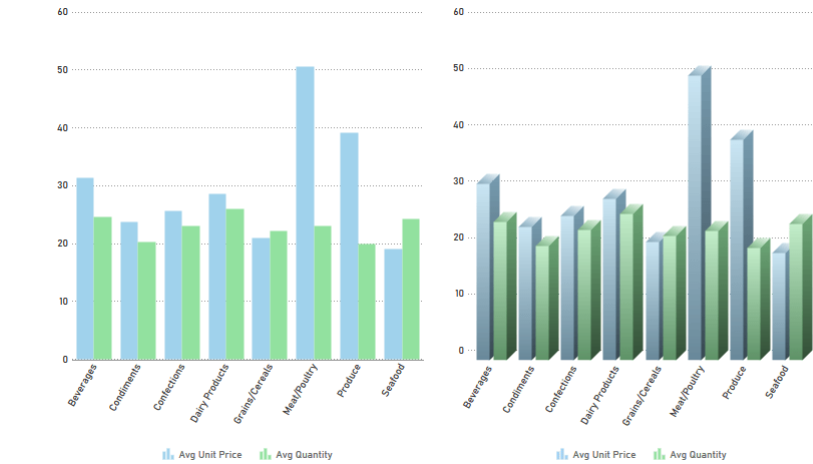
- a specific range of colors by selecting the *Custom* option.

Colors

Custom

+

Check **Use 3D Style** to give your chart a three-dimensional look.



The same column chart with **3D Look** turned on and turned off

Labels

Labels

Chart Title

Point Labels

Legend Position

None

Right

Label Font

Arial Narrow

Chart Axes...

Benchmark Lines...

Conditional Colors...

Chart Title – Enter the text you want to appear in at the top of the chart.

(*Grid charts*) **X-Axis Title** – Enter the text you want to appear on the X-Axis (horizontal axis).

(*Grid charts*) **Y-Axis Title** – Enter the text you want to appear on the Y-Axis (vertical axis).

Use the **Point Labels** dropdown to label the points on the chart:

- *Series Values*
- *Percent of Series Values*
- *Data Labels*
- *Data Labels with Data Values*

Use the **Legend Position** dropdown to choose where to display the legend relative to the chart, either:

- *None* – do not show a legend
- *Bottom* – show the legend along the bottom of the chart
- *Right* – show the legend along the left of the chart

Use the **Label Font** dropdown to specify the font for the labels.

Use the 

Number Format... dialog to specify how data and axis labels should be formatted:

Number Format

Format

Decimal Places

Symbol

2

.

☒ Use 1000 Separator

☒ Use Currency Symbol \$

☐ Append Percent Sign (%)

Okay

Cancel

Use the 

Conditional Colors... dialog to conditionally change chart element colors. Bars, columns, segments of pie charts, points in line and scatter charts, and bubbles in bubble charts can change color conditionally, depending on a formula. To add a conditional formula, click  **Add**. Choose a color by using the color picker, or enter a color value. Then click the **Formula**  icon to open the Formula Editor and set the condition.

There are additional parameters available when making chart conditional formulas that allow you to set the condition for coloring points based on the point data. The following parameters are available depending on the type of chart and data layout:

- `@[email protected]` – the value of the point's **Data Label** field, or **Y Value** field for scatter and bubble charts
- `@[email protected]` – the value of the point's **Data Value** field, or **X Value** field for scatter and bubble charts
- `@[email protected]` – the value of the point's **Series Label** field for charts using the Row Based layout
- `@[email protected]` – the value of the point's **Bubble Size** field for bubble charts
- `@[email protected]` – the value of the point's **Bubble Label** field for bubble charts

(*Line & combo charts*) Use the 

Chart Axes dialog to add and format axes:

Chart Axes

X-Axis

Title

Item

Y-Axis Formatting

Y-Axis 1

Axis Title

Count

Decimal Places

0

Symbol

Use 1000 Separator

Use Currency Symbol

Append Percent Sign (%)

\$

%

Y-Axis 2

Axis Title

Count

Decimal Places

2

Symbol

Use 1000 Separator

Use Currency Symbol

Append Percent Sign (%)

\$

%

Add Y Axis

Y-Axis Assignment

Series Name

Y-Axis

Products

Y-Axis 1

Categories

Y-Axis 2

Okay

Cancel

- Click **Add Y Axis** to add an additional axis. Give it a title, and use the formatting options to format the axis labels and data labels for associated series. Click the **Delete** icon to remove an axis.
- **Y-Axis Assignment** Use the dropdown menu for each series to associate the series with an axis. Each series will have the same format as the axis, and hiding an axis will hide associated series.
- Click **Okay** when done.

Use the

Benchmark Lines... dialog to add horizontal lines at specific sections of the chart:

Benchmark Lines

Line Type	Value	Label	Color	Line Style	
Mean	N/A	Mean	#00ff00	Solid	
Standard Deviat	$\mu + 3\sigma$	UCL	#ff0000	Dashed	
Standard Deviat	$\mu - 3\sigma$	LCL	#ff0000	Dashed	

New

Okay

Cancel

Benchmark lines dialog for a Statistical Process Control (SPC) chart

- Click **New** to add a benchmark line:
 - **Line Type** select one of the available pre-defined lines
 - *Static* a line that is set a fixed value
 - *Minimum* a line at the data's minimum point
 - *Maximum* a line at the data's maximum point
 - *Mean* a line at the data's mean
 - *Median* a line at the data's median
 - *Standard Deviation (Population)* a line at the data's population standard deviation
 - *Standard Deviation (Sample)* a line at the data's sample standard deviation
 - **Label** Enter the text you want to label the line.
 - **Value** Set the value for where the line will display.
 - **Color** Specify the color of the line.
 - **Line Style** Solid or Dashed.
- Click the **Delete** icon to remove a benchmark line.
- Click **Okay** when done.

Other Features

Other Features

Label display

Slant

Font color

#F9A228

Font size

12

Show tooltip

False

Background opacity

Add Attribute

This section allows you to customize a variety of attributes. The following attributes are supported:

- Font color
- Font size
- Background opacity
- Background color
- Title alignment
- Title font size
- Title on top
- Legend title

- Title font size
- Show border
- Show tooltip
- Subtitle
- Subtitle font size

To add a feature, select an attribute from the dropdown menu and click **+**

Â **Add Attribute**. Then enter a custom property into the attribute field or select from the attribute dropdown menu.

Click the **Delete** **×**

icon to remove a feature.

Advanced Features

Advanced Features

showBorder

1

×

borderColor

#F9A228

×

Element Name

+ Add Attribute

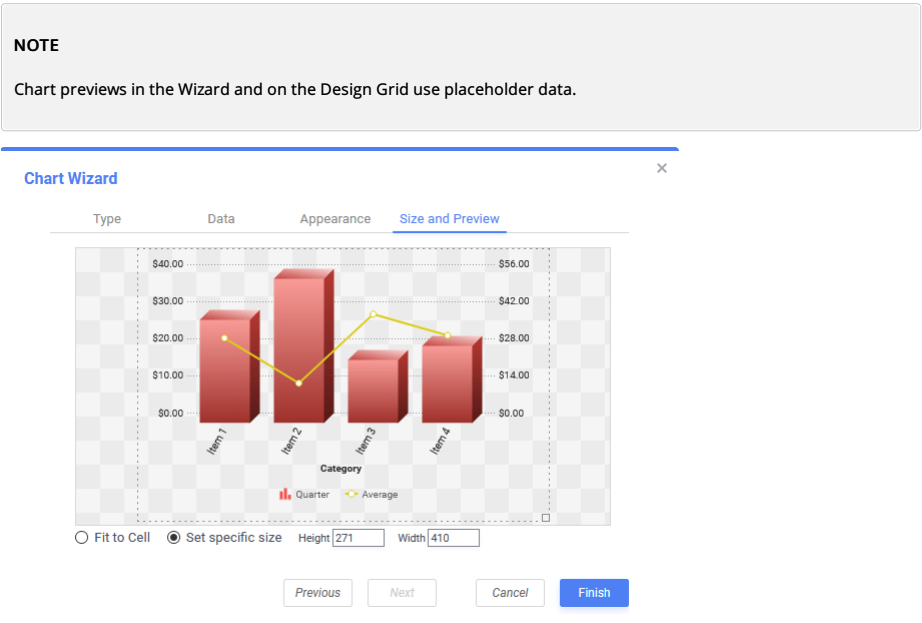
In addition to the Other Features, there are a number of **Advanced Features** that may be added to a chart. Contact your system administrator for assistance with this feature.

Size and Preview

The **Size and Preview** Tab allows you to change the size of the chart and preview any customizations.

NOTE

Chart previews in the Wizard and on the Design Grid use placeholder data.



Change the size of the chart in one of three ways:

- **Drag-and-drop** the resizing handle in the bottom-right corner.
- Check **Fit to Cell** and resize the chart cell on the Design Grid.
- Check **Set specific size** and enter a custom **Height** and **Width** in pixels

Chart Data Layout Types

Charts illustrate data to us so that we can spot patterns and trends easily, but it's important to remember that a chart is simply a collection of points on a grid. Each point has its label (typically along the x axis) and its value (typically along the y axis).

There are several ways to represent this collection of points on a report, and the application must be able to transform them into a chart regardless of the design you've chosen. For this reason, the Chart Wizard comes with three Data Layout Types. Understanding the way you've designed your report and data will help you select the right Layout Type, which will in turn tell the application how to transform your data into a chart.

Layout One: Cell-Based Chart

Layout One is for building a specific type of single-series chart using a collection of static points on your report. This layout type is cell-based because each point's labels and values come from a specific cell in the report output.

How do I know this is the right Layout for me?

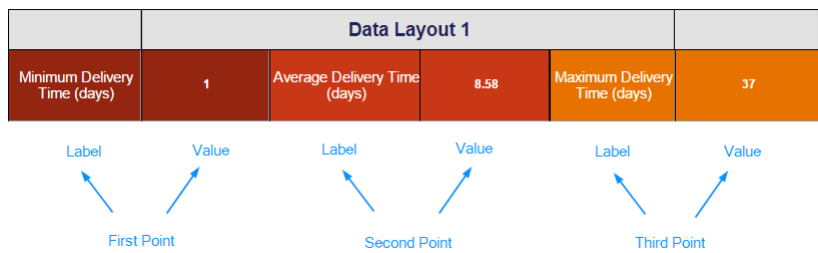
Take a look at your report design and determine whether the points you're interested in charting are static or dynamic. In the application, a dynamic data point is one that comes from a field. Fields are denoted by a little triangle in the upper left-hand corner of the cell.

Footer:	3	
Employees.Full...	4	Employees.FullName

In the example above, any data points coming from this cell will be dynamic because the cell contains a dynamic field (see the

triangle in the blue box). The Employees.FullName field is a placeholder for all the employee names that will appear on the report. These names will be added to the report *dynamically* after you're done designing it and have clicked the "run" button.

Static data points, by contrast, are defined explicitly in the report design and do not contain dynamic fields.



In the above example, every cell contains a static value. The first, third, and fifth cells each contain a string formula that will return the text inside the quote marks. No matter what section these formulas are in, they will only ever return their respective strings of text. The second, fourth, and sixth cells contain calculation formulas returning a static value, in this case the minimum, average, and maximum number of days it takes to ship an order, respectively. When we chart this data, we'll need to use Layout One in order to pinpoint each of these cells and define them as either data labels or data values. In this case, the string formulas will serve as the labels, and the calculations will be the values. Together, they make up three sets of coordinates on the chart.

How would that look in the Chart Wizard?

TypeDataAppearanceSize and Preview

Setup the data to show in the chart

Data for Chart

Point Value

Point Label

=aggrmin(datediff('d',(Orders.OrderDate),(Orders.ShippedDate)))

=Minimum Delivery Time (days)

X

=aggravg(datediff('d',(Orders.OrderDate),(Orders.ShippedDate)))

=Average Delivery Time (days)

X

=aggrmax(datediff('d',(Orders.OrderDate),(Orders.ShippedDate)))

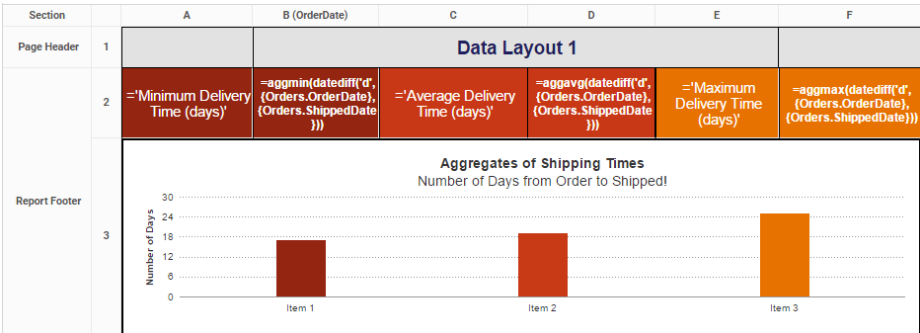
=Maximum Delivery Time (days)

X

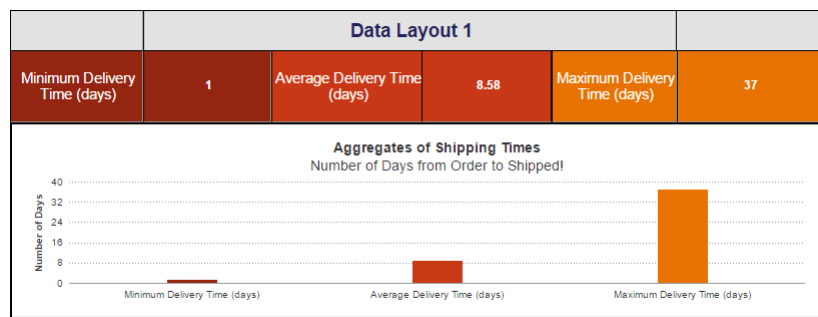
+ Add Point

> Data Layout...

What would the final report design look like?



How would the output look?



Layout Two: Column-Based Chart

Both Layout Two and Layout Three are for creating single and multi-series charts, but there are some important differences in the report designs they work with. Layout Two is great if you want to show two or more *unrelated* values for a single label. Values may be considered "unrelated" if they come from separate fields or columns. This layout is column-based because each column will add a new series of data to the chart.

How do I know this is the right Layout for me?

First, make sure you're working with *dynamic* data points. Second, make sure you're interested in calculations for just *one* group. If you have two columns representing values you'd like to plot against a column representing your labels, you're in the right place!

Data Layout 2			
Employee Name:	Years Employed:	Sales Made:	Revenue Generated:
Buchanan, Steven	8.00	42.00	\$75.57
Callahan, Laura	7.00	104.00	\$133.30
Davolio, Nancy	9.00	123.00	\$202.14
Dodsworth, Anne	7.00	43.00	\$82.96
Fuller, Andrew	9.00	96.00	\$177.75
King, Robert	7.00	72.00	\$141.30
Leverling, Janet	9.00	127.00	\$213.05
Peacock, Margaret	8.00	156.00	\$250.19
Suyama, Michael	8.00	67.00	\$78.20

Label

First Value Series

Second Value Series

Third Value Series

Static Series Labels

In the example above, each column becomes a new series charted against the label column. Since all the labels come from a single column, we know to use Data Layout 2. Another indication that Layout Two is correct to use in this case is that the series labels are *static* values rather than dynamic values that are part of the data fields.

How would that look in the Chart Wizard?

Type

Data

Appearance

Size and Preview

Setup the data to show in the chart

Data for Chart

X-Axis Labels

Employees.FullName

Series Values

=DateDiff('yyyy', (Employees.HireDate), Now())

=aggrdistinctcount((Orders.OrderID))

=aggsuam((OrderDetails.Revenue))/1000

Series Name

Years Employed

Orders Made

Revenue Generated (in thousands)

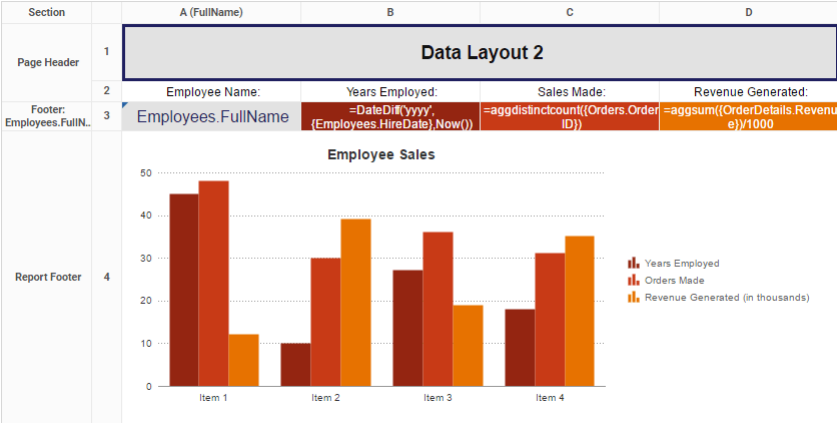
Add Series

Data Layout...

The Chart Wizard makes it easy to see the how this Layout is all about adding values to a given label.

It helps a lot if your calculations are also in the same numeric range. For example, charting tree height (0 – 50 feet) on the same y axis as tree species population in a forest (0 – 50,000 trees) will make it hard to read smaller values. If your values *aren't* in the same numeric range, you can add one or more y axes in different numeric ranges on the appearance tab. Note: this feature is only available as of v2016.3; see Charts for more information.

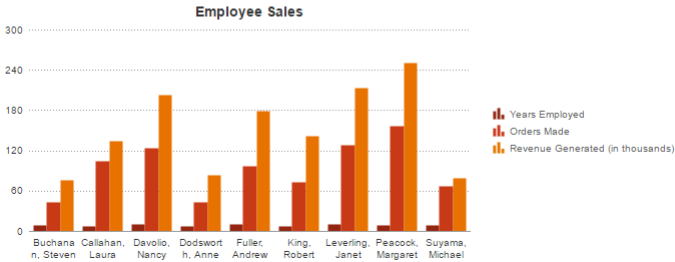
What would the final report design look like?



In this example, the label field is in cell A3, and the three value fields are in cells B3, C3, and D3, respectively.

How would the output look?

Data Layout 2			
Employee Name:	Years Employed:	Sales Made:	Revenue Generated:
Buchanan, Steven	8.00	42.00	\$75.57
Callahan, Laura	7.00	104.00	\$133.30
Davolio, Nancy	9.00	123.00	\$202.14
Dodsworth, Anne	7.00	43.00	\$82.96
Fuller, Andrew	9.00	96.00	\$177.75
King, Robert	7.00	72.00	\$141.30
Leverling, Janet	9.00	127.00	\$213.05
Peacock, Margaret	8.00	156.00	\$250.19
Suyama, Michael	8.00	67.00	\$78.20



Layout Three: Row-Based Chart

Layout Three is also for building single and multi-series charts, but when used to create a multi-series chart, it requires a bit more prep on the design end because it compares two or more *related* values for a given label. Values can be considered “related” when they come from the selfsame column or field. This layout is row-based because all series are coming from the rows of one column of data.

Data Layout 3		
Labels	Series Labels	Values
Buchanan, Steven	Year:	Revenue:
Buchanan, Steven	2014	\$21,985.20
Buchanan, Steven	2015	\$32,595.05
Buchanan, Steven	2016	\$21,007.50
Callahan, Laura	Year:	Revenue:
Callahan, Laura	2014	\$23,161.40
Callahan, Laura	2015	\$59,776.52
Callahan, Laura	2016	\$50,363.11
Davolio, Nancy	Year:	Revenue:
Davolio, Nancy	2014	\$38,789.00
Davolio, Nancy	2015	\$97,533.58
Davolio, Nancy	2016	\$65,821.13

In the above example, the series labels all come from the same column and are *dynamic* values coming from a data field. Each unique value coming from that field, in this case Year, will become a new series.

How do I know this is the right Layout for me?

First, make sure you’re working with *dynamic* data points. Second, make sure you have one group nested inside another. (See Understanding Sorting and Grouping for more information.) If you want to create a multi-series chart and you want to show a calculation *per* a group *per* another group, Layout Three is the setting you want.

Still unsure? Here’s a simple verbal test to show whether you’re looking for Layout Two or Layout Three when you build your multi-series chart. Which group of statements sounds truest to your case?

Group A

- I want to show income *per* employee *per* year.
- I want to show number of ad sales *per* sales rep *per* publication.
- I want to show amount donated *per* donor *per* month.

Group B

- I want to show the number of staff *and* students for each school.
- I want to show the sales *and* expenditures *and* remaining budget for each store.
- I want to show the average number of sales *and* the average number of calls for each sales rep.

If your case is more like Group A, you’re looking at Layout Three. If your case is more like Group B, you’ll want to go with Layout Two.

How would that look in the Chart Wizard?

Type

Data

Appearance

Setup the data to show in the chart

Data for Chart

Data Values

=aggsu

m((Orders

Details.Revenue))

Data Labels

Employees.FullName

Series Labels

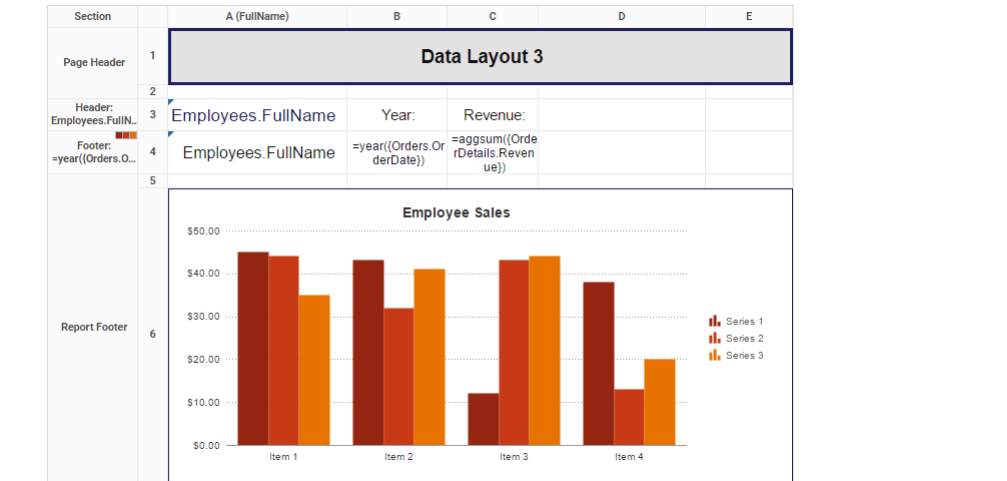
=year((Orders.OrderDate))

>

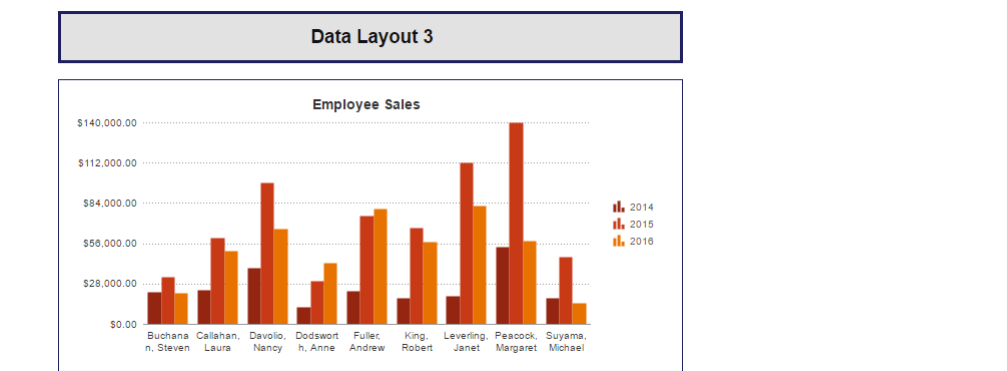
Data Layout...

What would the final report design look like?

In this example, I want the report to show revenue *per category per year*. I've made this possible by nesting a Year group inside a Category group. (CategoryName is the primary sort, and Year is the secondary sort.)



How would the output look?



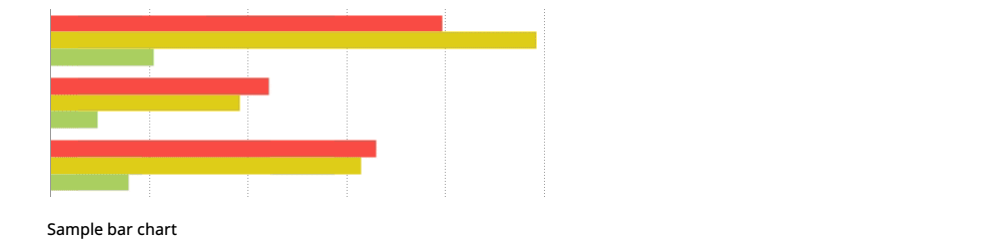
Additional Resources

- User Support Lab “ Chart Data Layouts (video)

Bar Charts

Bar

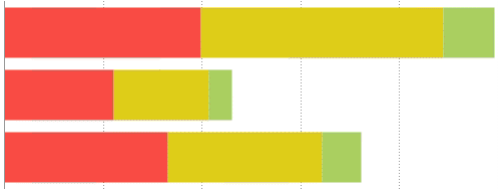
Bar charts use rectangular bars that extend horizontally to show comparisons between categories. Each data value is represented by a bar, the length of which represents its quantity. Bar charts can be **single-series** (one bar per category) or **multi-series** (multiple bars per category, each series differentiated by color).



Stacked Bar

Stack bar charts are a variation of a multi-series **Bar chart**. Each bar is a category of data values stacked additively. The length of

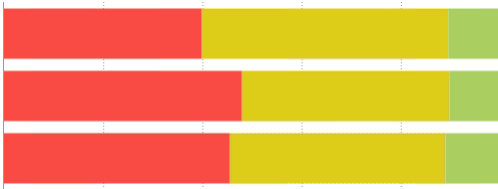
the bar represents the total quantity of the category, and each segment represents the data value in proportion to the total. Each series is differentiated by color. Stack bar charts can be created in the same manner as **multi-series Bar charts**.



Sample stacked bar chart

100% Stacked Bar

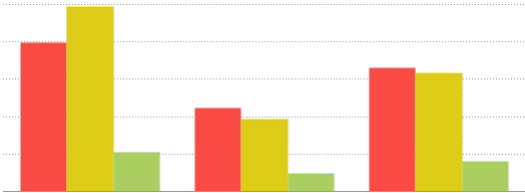
Stack bar 100% charts are a variation of a multi-series **Bar chart**. Each bar is a category of data values stacked additively. The length of the bar is fixed to 100%, and each segment represents the data value as a percentage of the total. Each series is differentiated by color. Stack bar 100% charts can be created in the same manner as **multi-series Bar charts**.



Sample 100% stacked bar chart

Column

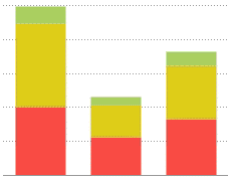
Column charts are a stylistic variation of a **Bar chart**. They use rectangular columns which extend vertically to show comparisons between categories. Each data value is represented by a column, the height of which represents its quantity. Column charts can be **single-series** (one column per category), or **multi-series** (multiple columns per category, each series differentiated by color). Column charts are created in the same manner as **Bar charts**.



Sample column chart

Stacked Column

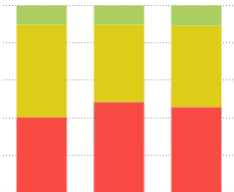
Stack column charts are a variation of a multi-series **Column chart**. Each column is a category of data values stacked additively. The length of the column represents the total quantity of the category, and each segment represents the data value in proportion to the total. Each series is differentiated by color. Stack column charts can be created in the same manner as **multi-series Bar charts**.



Sample stacked column chart

100% Stacked Column

Stack column 100% charts are a variation of a multi-series **Column chart**. Each column is a category of data values stacked additively. The length of the column is fixed to 100%, and each segment represents the data value as a percentage of the total. Each series is differentiated by color. Stack column 100% charts can be created in the same manner as **multi-series Bar charts**.



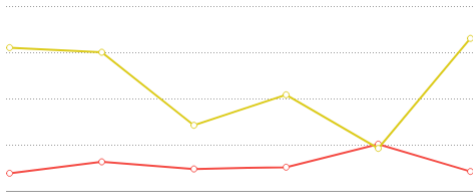
Sample 100% stacked column chart

Line Charts

All of the sample charts in this article have been generated using the same sample data set.

Line

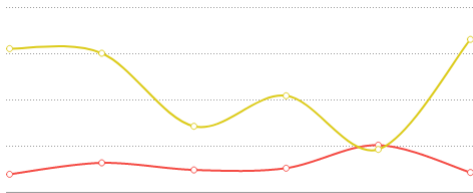
Line Charts display a series of data points on a grid, connected by straight lines. They are often used to display a trend in data over intervals of time. Lines are not necessarily representative of any data between connected points. Line charts can be **single-series** (one line), or **multi-series** (multiple lines). On a multi-series chart, lines are differentiated by color.



Example two-series line chart

Spline

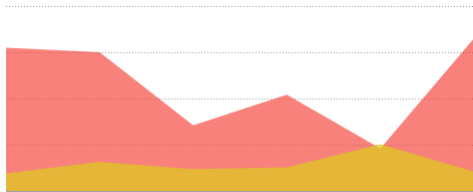
Spline charts are a stylistic variation of a **Line chart**. Data points are connected by an interpolated curve. They are often used to display a trend in data over time, with estimated data between points. Spline charts are created in the same manner as Line charts.



Example two-series spline chart

Area

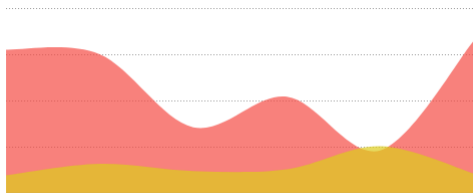
Area charts are a variation of a **Line chart**. The area below each line is colored to represent cumulative data. They are often used to compare cumulative totals over time. On a multi-series chart, each series is given a distinct color, and the colors blend where series areas overlap. Area charts are created in the same manner as **Line charts**.



Example two-series area chart

Spline Area

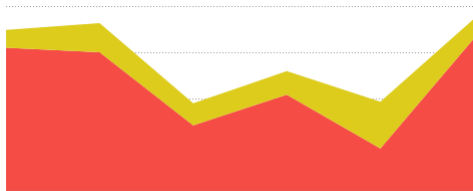
Spline Area charts are a stylistic variation of an **Area chart**. Data points are connected by an interpolated curve, and the area below each curve is colored to represent cumulative data. They are often used to compare cumulative totals over time, with estimated data between points. On a multi-series chart, each series is given a distinct color, and the colors blend where series areas overlap. Spline area charts are created in the same manner as **Line charts**.



Example two-series spline area chart

Stacked Area v2021.1+

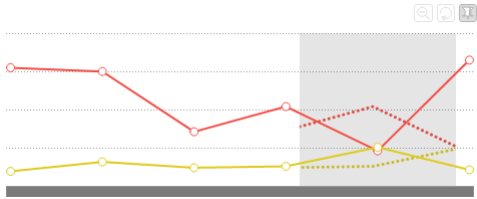
Stacked Area Charts are a variation of a multi-series **Line chart**. Each area is a category of data values stacked additively. The height of the area represents the total quantity of the category, and each segment represents the data value in proportion to the total. Each series is differentiated by color. Stacked Area Charts can be created in the same manner as multi-series line charts.



Example two-series stacked area chart

Zoom Line

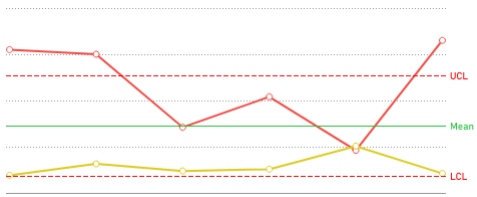
Zoom Line charts are variations of a standard line chart. Zoom line charts have the same basic construction and components of a line chart, but add in the ability to zoom in and out to see more or less data points in the user interface.



Example two-series zoom line chart

Statistical Process Control (SPC)

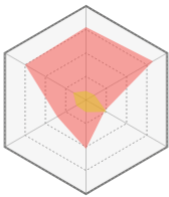
A **Statistical Process Control (SPC)** Chart is a graph used to study how a process changes (usually over time). Data is plotted in time order. SPC charts always have a central line for the average, an upper line for the upper control limit and a lower line for the lower control limit. Control limits are located 3 standard deviations above and below the centerline (mean). Data points outside of the limits are indicative of an out-of-control process.



Example two series SPC chart

Radar v2021.1+

Radar Charts also known as **Spider Charts** can be used to compare dimensions along a single radial grid. The name **Spider Chart** derives from the resemblance to a spider's web. Each dimension or label is located at the outer vertices of the grid, and the magnitude of that dimension's value is displayed by the distance of the data point from the center of the chart.



A radar chart with six dimensions (labels) and two series

Pie, Doughnut, Pyramid, and Funnel Charts

Pie

Pie charts are used to show the relationship of individual data fields in a series as portions of the total data in the series. They are shaped like a circle divided into colored "slices," each representing a data value. The area of each slice of the pie is proportional to the quantity it represents. Pie charts are **single-series**.



Doughnut

Doughnut charts are a stylistic variation of a **Pie chart**. They are ring shaped with a circular "hole" in the center like a doughnut. The ring is divided into colored "slices," each representing a data value. The area of each slice is proportional to the quantity it represents. Doughnut charts are created in the same manner as **Pie charts**.



Pyramid



Pyramid charts are a variation of a **Pie chart**. They are often used when it is necessary to show a hierarchical order of data as well as its quantity.

Each data value is represented by a vertically stacked “slice” of a triangle, the height of each proportional to the quantity it represents. The slices are stacked in sort order. The width of each slice corresponds to its order, but has no relation to its quantity. Pyramid charts are created in the same manner as **Pie charts**.



Funnel



Funnel charts are a variation of a **Pie chart**. They are often used to show stages in a process as a falling value or percentage.

Each data value is represented by a vertically stacked “slice” of a triangle, the height of each proportional to the quantity it represents. The slices are stacked in sort order. The width of each slice corresponds to its order but has no relation to its quantity. Funnel charts are created in the same manner as **Pie charts**.

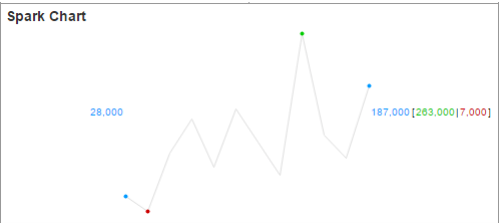


Spark Charts

Spark Line



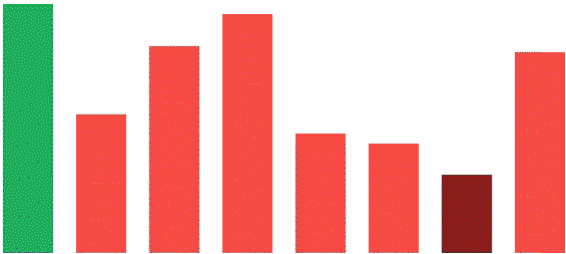
Spark line charts are a variation of a single-series **Line chart**. They are used to display continuous trends in data, usually with regard to time. Spark line charts have no grid or axes and instead rely on point labels and benchmark lines to provide reference. Spark line charts are **single-series**.



Spark Column

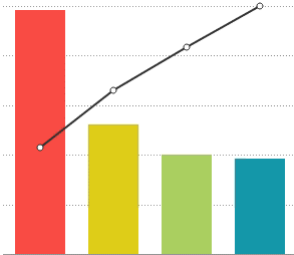


Spark column charts are a variation of a single-series **Bar chart**. They are used to show comparisons between data values. Spark column charts have no grid or axes and instead rely on colors and benchmark lines to provide reference. Spark column charts are **single-series**.



Pareto Charts

Pareto charts are a type of single-series chart generally used to highlight the most important element amongst a group. Pareto charts combine a **Column chart**, each column representing a data value sorted in descending order, with a **Line chart**, each point representing the cumulative percentage of the total.

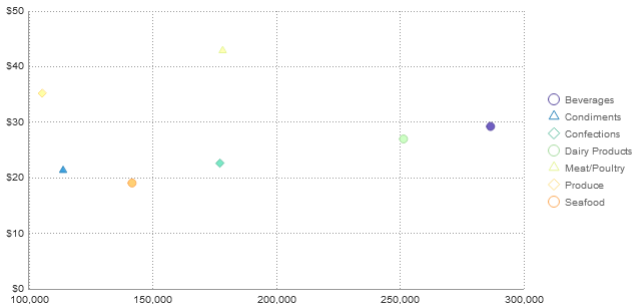


Sample Pareto chart

Scatter and Bubble Charts

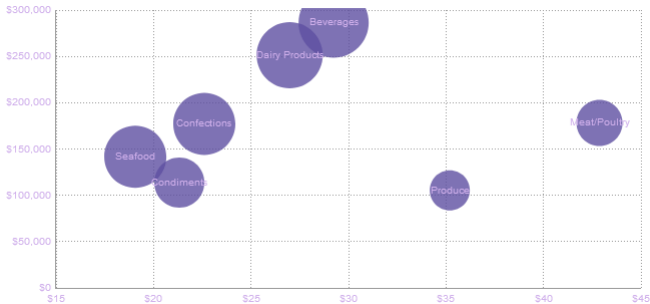
Scatter

Scatter charts use pairs of data values as coordinates for points on a grid. They are often used to find relationships between two variables in a set of data. Scatter charts can be **single-series** (one set of points) or **multi-series** (multiple sets of points). On a multi-series chart, series are differentiated by point color and shape.



Bubble

Bubble charts are a variation of a **Scatter chart**. They use pairs of data values as coordinates for “bubbles” on a grid, and a third data value for the size of the bubble. They are often used to find relationships between three variables in a set of data. Bubble charts can be **single-series** (one set of bubbles) or **multi-series** (multiple sets of bubbles). On a multi-series chart, series are differentiated by bubble color.



Heatmap Charts

À

Heatmaps are available in Advanced Reports starting with v2020.1.3+.

Heatmaps

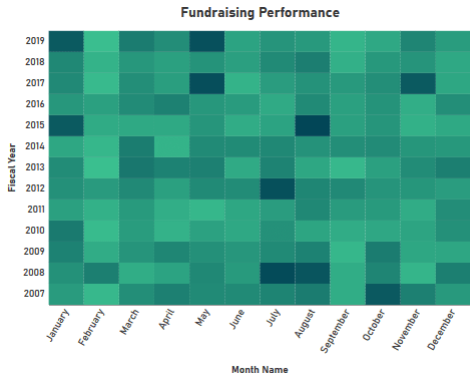
A **heatmap**, sometimes referred to as a **mosaic plot** or **density function visualization**, is a chart with two related axes and 1â€6

data series arranged on an X-Y grid. The defining characteristic of a heatmap is its use of color or shading to indicate data magnitude. In addition to color/shade, each cell may display up to five additional values (one in each corner and a fifth in the center). When hovering the mouse over a cell, a tooltip may optionally display information about the series. Like other charts, heatmap cells may be linked to other reports to drilldown into further detail.

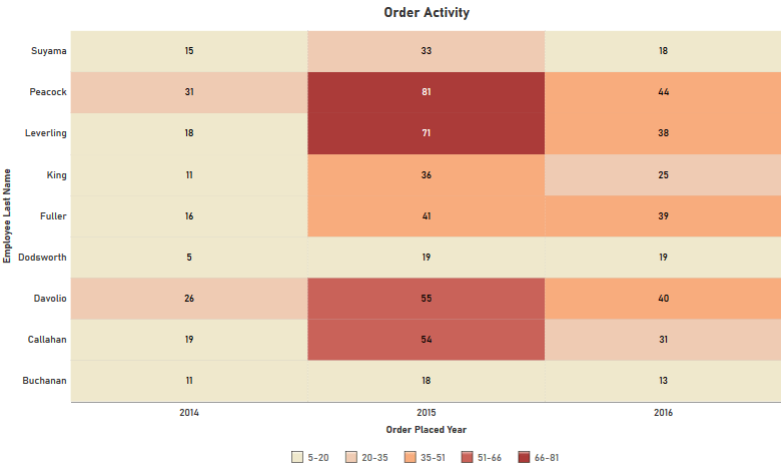
DATA LAYOUT

Heatmaps only support Column Based Chart Data Layout (Layout 2). Additional information about data layouts can be found in the Chart Data Layout Types article.

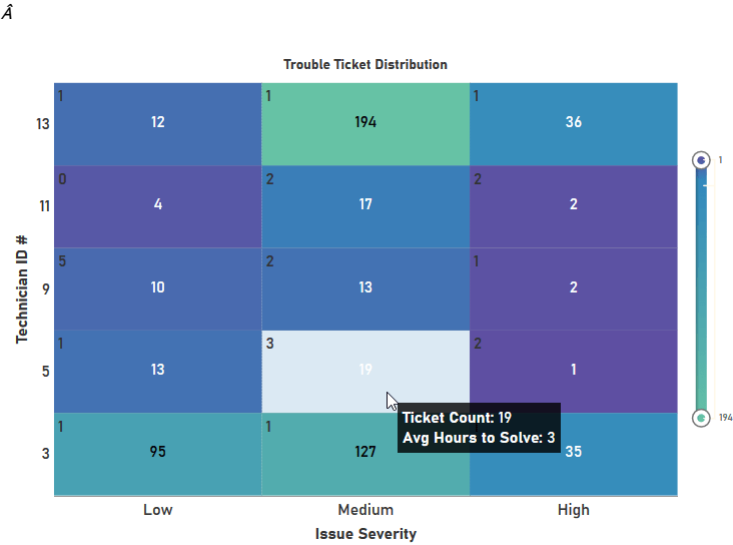
Examples



A heatmap in gradient coloring mode displaying fundraising activity by month over the last 12 years



A heatmap in interval coloring mode displaying the quantity of orders placed by each salesperson for several years, including a data series displayed in the center of each cell



A heatmap in gradient color mode displaying the performance of five service technicians on work tickets, including two displayed data series and a legend on the right side. A tooltip explains the meaning of the displayed data series.

Advanced Reports

Arranging Data for a Heatmap

Data to be displayed on a heatmap must be grouped into two sections.

For example, to show the number of products from each category ordered by each employee, the report should have a sort first on the Employee and then on the Category.

Report Sorts

Select sort fields

Categories

CategoryID

CategoryName

Description

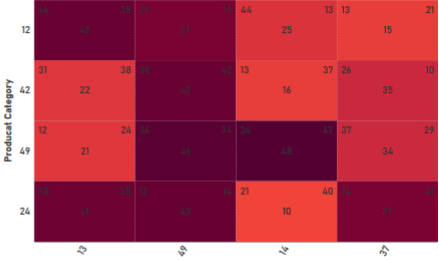
Picture

+ Add + Add Formula

Sort By	Sort Order
Employees.LastName	Ascending
Categories.CategoryName	Ascending

Okay Cancel

Data on the report should then be placed in a group header or group footer section that changes on the second (inside) sort object. In this example, the second (inside) sort is `Categories.CategoryName`. For more information about sorting and grouping on Advanced Reports, review the [Advanced Reports: Sorts](#) article.

Section		A (LastName)	B (CategoryName)	C (OrderID)
Report Header	1	Category Popularity by Employee 		
	2	Salesperson's Name	Product Category	# of Orders
	3	Employees.LastName		Orders.OrderID
	4			
	5	=Concatenate([Employees.FirstName], " ", [Employees.LastName])	Categories.CategoryName	=agggcount([Orders.OrderID])
	6	Footer: Employees.LastName		

TIP

To prevent the first sort object from repeating and to maintain a sense of hierarchical grouping, enable **Duplicate Suppression** on that column in the report. Select the cell and click the **Suppress Duplicates** (pre-v2020.1.1) **Hide Repeated Values** (v2021.1.1+) icon on the toolbar.

Salesperson's Name	Product Category	# of Orders
Steven Buchanan	Beverages	21
Steven Buchanan	Condiments	8
Steven Buchanan	Confections	15
Laura Callahan	Beverages	51
Laura Callahan	Condiments	30
Laura Callahan	Confections	42

Suppress Duplicates/Hide Repeated Values disabled for Salesperson's Name

Salesperson's Name	Product Category	# of Orders
Steven Buchanan	Beverages	21
	Condiments	8
	Confections	15
Laura Callahan	Beverages	51
	Condiments	30
	Confections	42

Suppress Duplicates/Hide Repeated Values enabled for Salesperson's Name

Adding a Heatmap to a Report

To insert a heatmap into an Advanced Report:

- Organize the data on the report as described in the above Arranging Data for a Heatmap section.
- Select a **Group Header**, **Group Footer**, **Report Header** or **Report Footer** cell.
- Click the **Chart Wizard** icon in the toolbar to start the Chart Wizard.
- On the **Type** tab, choose  **Heatmap**.
- Click **Next** to continue with the **Data**, **Appearance** and **Size and Preview** tabs, detailed below.

Data Tab

Set the axis labels, data series and data formatting options on the **Data** tab.

X Values

Orders.OrderDate

Sort X-Axis By

Report Order

Y Values

Orders.Freight

Sort Y-Axis By

Data Labels

Direction

Descending

> Data Layout...

☐ Percentage Mode

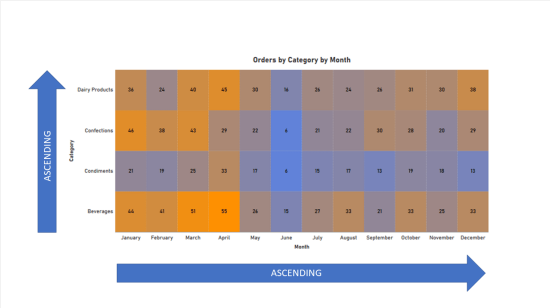
Select the X (horizontal) axis values and Y (vertical) axis values from the **X Values** and **Y Values** dropdowns respectively.

Optionally, select sorting of the X Values and Y Values from the **Sort X-Axis By** and **Sort Y-Axis By** dropdowns. Choose from:

- *Report Order* – axis values will be displayed in the order they are returned from the data source. This is the default sorting method.
- *Data Labels* – axis values will be sorted by the label that appears on the chart. For example, a list of seasons would be ordered *Fall, Spring, Summer, Winter* in alphabetical order. Choose a sorting direction from the **Direction** dropdown that appears, either *Ascending* or *Descending*.
- *Data Values* – axis values will be sorted by the value associated with the label. For example in the Northern Hemisphere, *Winter, Fall, Spring, Summer* since winter has the coolest temperatures and Summer has the warmest. Choose a sorting direction from the **Direction** dropdown that appears, either *Ascending* or *Descending*.

NOTE

Like Scatter and Bubble Charts, Heatmaps consider the lower-left corner as the origin for axis labels. This means when sorting axes in *Ascending* order, the smallest or earliest value will appear in the bottom or the left corner. The largest or latest value will appear on the top or the right corner. See the figure below for a graphical explanation.



Ascending sort order for axes in heatmaps

Check the **Percentage Mode** checkbox to transform the **Assign Color By** series (assigned in the Appearance tab) to relative percentages 0–100%. When percentage mode is enabled, the applicable series will show a % sign and only *Percentage of Data Color Distribution* mode will be available in the Appearance Tab.



A heatmap with **Percentage Mode** disabled (top) and the same heatmap with **Percentage Mode** enabled (bottom)

Data Layout... is disabled for heatmaps, as only column based chart layout (layout 2) is supported.

Add a minimum of one, and a maximum of six data series:

Add Heatmap Series

Display Area	Data Field	Show in Tooltip	Display Name	Number Format			
Center							
Top Left	=AggAvg([D5])	☒	Freight				
Top Right	=AggAvg([E5])	☒	Item Count				
Bottom Left							
Bottom Right	=AggAvg([OrderDetails.Revenue])	☒	Revenue				
Color Only							

IMPORTANT

At least one of the series must be numeric.

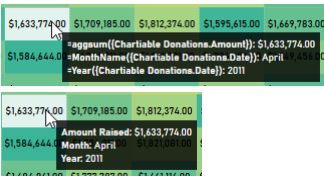
1. Click the **Add Heatmap Series** button. The first series will appear in the *Center* display area position. Series may also be displayed in the *Top Left*, *Top Right*, *Bottom Left*, and *Bottom Right* of a cell, or not at all if in the *Color Only* display area position.

To move the series to a different location, either:

- click and drag the **Move Grid Row** icon to move the series to the desired position.
- use the **Move Item Up** and **Move Item Down** icons to move the row up or down by one position at a time

Priority will be given to display the **Center** series in the cell if present. If the cells are not large enough to display the other series without them colliding vertically, then they will be hidden and only be visible in the tooltip if their **Show in Tooltip** checkbox is checked.

2. Choose the **Data Field** to include in the series from the dropdown. The data field must be in the same report section as the **X Values** and **Y Values**.
3. Uncheck the **Show in Tooltip** checkbox to prevent the series from appearing in a tooltip when the cell is hovered over with the mouse. The default is for all series to appear in the tooltip (checked).
4. If **Show in Tooltip** is checked, it is recommended to provide a friendly **Display Name** for the series. If no Display Name is provided, the name of the series as it appears in the **Data Field** dropdown will display instead. A colon will be automatically appended at the end of the Display Name.



Three data series with no Display Name specified (top) and with a Display Name specified (bottom)

5. Click the **Number Format** icon to change how the value is displayed in the cell and in the tooltip. This will open the Number Format dialog which works very similar to the Cell Format dialog in the Advanced Report Designer. The number formatting changes will only apply if the data field is numeric.
6. Remove a series by clicking the **Delete** icon at the end of the row.

Click **Next** to advance to the **Appearance** tab.

Appearance Tab

Set the heatmap coloring scheme, labels, legend and other features on the **Appearance** tab.

Colors

Colors

Assign Color By

=aggcount([Charitable Donations])

Theme

Default

Style

☒ Gradient ☐ Interval

Color Distribution

☒ Percentage of Data ☐ Data Values

Add

Color	Breakpoint	Legend Label	
	0 %		
	50 %		
	100 %		

Color section of the Appearance tab

The data values that color the cells are set in the **Assign Color By** dropdown. Choose one of the numeric data series defined in the Data Tab from the dropdown. The magnitude of the chosen series will be used to color/shade the cells.

There are four ways to style the coloring of the heatmap cells, by setting different combinations of the **Style** and **Color Distribution** options.

Choose the method of color transitioning by selecting one of the **Style** options, either:

- Gradient* colors will change smoothly, automatically and evenly between the color breakpoints. A minimum of 2 colors must

- be provided in gradient mode, with 3 being the default number provided for new heatmaps.
- Interval* colors will change in explicitly defined steps when the magnitude of the **Assign Color By** field falls within specified **Bottom Value** and **Top Value** settings. A minimum of 1 color must be provided in interval mode, with 5 being the default number provided for new heatmaps.

Choose the method of entering breakpoints into the color grid by selecting one of the **Color Distribution** options. Breakpoints are locations in the data where the color will have a defined change. Either:

- Percentage of Data* breakpoints are calculated as a percentage of the data values with the smallest value at 0% and the largest value at 100%. This is the default mode, and the only mode available when **Percentage Mode** on the Data tab is checked.
- Data Values* breakpoints in color happen at explicitly defined values of the data. This is useful when the desired data point changes are well known.

The **Color Grid** is where the colors, breakpoints and legend labels are set. Depending on the **Style** and **Color Distribution** options, the color grid will appear slightly differently for each expected input.

Table A ̂€" Color Grid Control Layouts

Color	Breakpoint	Legend Label	
	0	%	
	25	%	✖
	50	%	✖
	75	%	✖
	100	%	

Gradient, Percentage of Data

Color	Bottom Value	Top Value	Legend Label	
	0%	20	%	✖
	21%	40	%	✖
	41%	60	%	✖
	61%	80	%	✖
	81%	100	%	✖

Interval, Percentage of Data

Color	Breakpoint	Legend Label	
	lowest value		
			✖
			✖
			✖
	highest value		

Gradient, Data Values

Color	Bottom Value	Top Value	Legend Label	
	lowest value			✖
	> ...			✖
	> ...			✖
	> ...			✖
	> ...	highest value		✖

Interval, Data Values

Additional color breakpoints may be added by clicking the **+** **Add** button on top of the grid, and removed by clicking the **Delete** ✖ icon at the end of the corresponding row.

- For each breakpoint:
- set the location where the color break will happen. Breakpoint values must all be numeric and must be entered in ascending order.
If **Assign Color By** is a plain data field (i.e. not a formula) and **Color Distribution** is set to *Data Values* a filter dropdown will appear for each breakpoint value required, to aide in selecting values. Otherwise, values must be entered manually.
 - For *Gradient* specify the value where the background color of the cell will match the **Color** column. Colors will automatically shift towards and away from the **Color** as values approach and diverge from this point
 - For *Interval* specify the **Top Value** of each interval where the background color of the cell will match the **Color** column. The **Bottom Value** for the next breakpoints will be calculated automatically.
 - a **Legend Label** can be specified to appear in the optional chart legend. More detail about the legend is detailed in the Labels section below.
 - remove it by clicking the **Delete** ✖ icon at the end of the row

The background colors of the cells are controlled with the following settings:

- select a predefined color palette from the **Theme** dropdown. Available choices are:
 - Default* a color theme defined by the system administrator
 - Named Themes* a variety of named color themes are available (e.g. *Blue Gray*, *Emerald Forest*, *Prismatic Wave*, etc...)
 - Custom* the color palette may be manually specified as detailed below
- manually change the colors by choosing *Custom* from the **Theme** dropdown and then clicking on the squares in the **Color** column and choosing a new color

NOTE

The font color of the **Center** series will automatically change between black or white to contrast with the cell background color. The other series will always appear with black text.

Labels

Labels

Chart Title

Fundraising Performance

X-Axis Title

Month Name

Y-Axis Title

Fiscal Year

Legend Position

None

Label Font

Bahnschrift

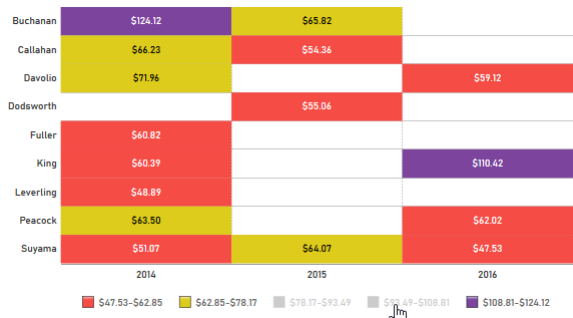
Enter a **Chart Title**, **X-Axis Title** and **Y-Axis Title** into their respective fields. The X-Axis Title and Y-Axis Title will always appear along

their corresponding axis, but the Chart Title may appear on either the top or bottom of the chart, determined by the **Title on top** setting in Other Features.

An optional legend can display on the heatmap. Choose a **Legend Position** from the dropdown:

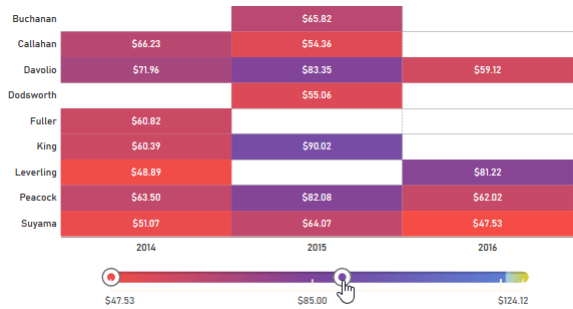
- *None* – no legend will be displayed
- *Right* (default) a legend will be displayed along the right side of the heatmap
- *Bottom* – a legend will be displayed along the bottom of the heatmap

The legend displays the range of available colors and their value/percentage assignments. As it does for other charts, the legend also provides a simple filtering capability by hiding certain ranges when clicked.



Using the filtering function of the legend on a heatmap with Interval color styling mode

When **Style** is set to *Gradient* on the Appearance tab, the legend appears as a double-ended range slider. The knobs on the legend can be dragged to change the filtered range of values.



Using the filtering function of the legend on the same heatmap with Gradient color styling mode

A font may be selected from the **Label Font** dropdown. This font will be applied to all content displayed on the chart including the data series, labels, legend and tooltips.

Other Features

The **Other Features** for heatmaps work the same as they do for other chart types. For more information about these features, review the Other Features section of the Charts article.

Advanced Features

Advanced Features allow special commands to be passed directly to the heatmap rendering engine.

To create a heatmap that displays only color in each cell, but still maintains the ability to show up to 5 data series in the tooltip, add the `showvalues` feature:

1. In the **Element Name** field enter `showvalues`.
2. Click the **Add Attribute** button.
3. In the field that appears next to the newly added `showvalues` feature, enter `0`.

Advanced Features

showvalues 0

This heatmap will show only color when rendered, but hovering the mouse over any cell can display up to 6 data series in the tooltip

To return to normal data display mode, click the **Delete** icon next to the `showvalues` item.

Otherwise, the **Advanced Features** for heatmaps work the same as they do for other chart types. For more information about these features, review the Advanced Features section of the Charts article.

Click **Next** to advance to the **Size and Preview** tab.

Size and Preview Tab

As it does for other chart types, the **Size and Preview** tab displays a simulation of the configured visualization. The data displayed is sample information only and is not representative of the data that will be included when the report is executed.

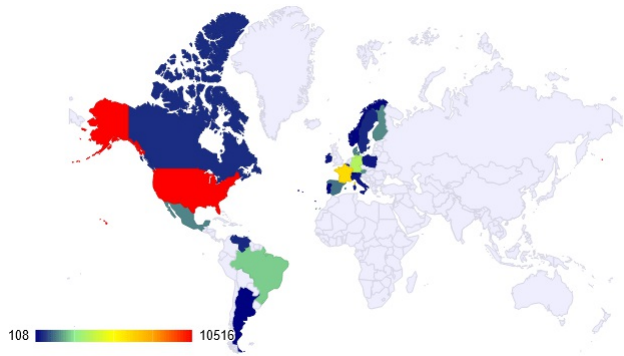
For more information about the settings available in this tab, review the **Size and Preview** section of the **Charts** article.

GeoCharts

NOTE

The system administrator can restrict access to this feature, therefore it may not be available in all environments. Contact the system administrator for more information.

A **GeoChart** can be displayed in an Advanced Report to give a basic visual representation of geographic data.



Add a GeoChart Visualization

To add a GeoChart to an Advanced Report:

- 1. Select a **Group Header**, **Group Footer**, **Report Header** or **Report Footer** cell.
- 2. Open the GeoChart Wizard:
 - (v2021.1+) Click the **Insert**  icon on the toolbar, then click  **GeoChart**

The GeoChart Wizard has three tabs: **Type**, **Locations** and **Data** outlined below.

Type

In the **Type** tab, select the initial view, size, colors, and if a legend should be displayed.

Map Wizard

TypeLocationsData

Base Map

Canada

Dimensions

Height

200

Width

300

☒ Fit to Cell

Colors

Forest

☒ Show Legend

PreviousNextCancelFinish

293

919

- 1. Use the **Base Map** dropdown to select the location that initially displays on the map. Select the world, a region or a country name.
- 2. In the **Dimensions** group, select the size of the GeoChart by either:
 - Check the **Fit to Cell** checkbox, which will cause the map to fill its containing cell.
 - Enter the **height** and **width** (in pixels). This requires that **Fit to Cell** be unchecked.
 - **Drag-and-drop** the resizing handle at the bottom-right corner of the preview. This requires that **Fit to Cell** be unchecked.
- 3. The **Color** dropdown determines the palette of colors that will color/shade the map. Choose from:
 - *Theme* – a variety of named color themes are available (e.g. *Coral*, *Election*, *Forest*, etc...)
 - *Linear Range* – choose a beginning (minimum) color and an ending (maximum) color. The application will automatically blend from the beginning to ending color. Click the color selector icons to open the color selector to choose the colors.
- 4. Check the **Show Legend** box to display a legend in the bottom-left corner of the map.

Click **Next** to advance to the Locations tab.

Locations

In the **Locations** tab, specify which geographic locations should display on the map.

Map Wizard

Type

Locations

Data

Add data fields to specify which locations to map

Location Type	Location Values
Country	Customers.Country
Region	Customers.Region
City	Customers.City

Show last location type as

Markers

Previous

Next

Cancel

Finish

1. Use the three **Location Values** dropdowns to select the cells that contain the geographic information for the corresponding **Location Type** on the map. To utilize Region information, such as states/provinces, Country information must be provided. Similarly, City information requires Region and Country information.

REGION NAMING SCHEME

Geographic naming schemes must be consistent within each level. Countries can be named by either their country code abbreviation, English name, or regional name. But do not mix schemes or the application may not interpret the data correctly.

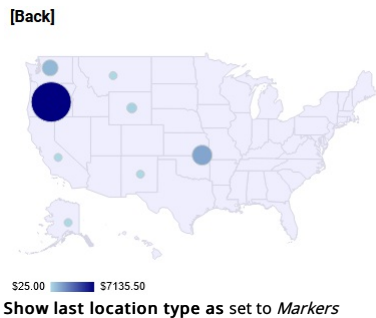
- Country – select a data cell with country names if the Base Map and data comprises multiple countries. This level is required if the **Region** or **City** names may be ambiguous between countries. For example, *Vancouver* is ambiguous between *Vancouver, British Colombia*, and *Vancouver, Washington*.
 - Region – This is for country subdivisions such as States, Provinces, or Districts. This level is required if the **City** names may be ambiguous between regions. For example, *Portland* is ambiguous between *Portland, Oregon* and *Portland, Maine*.
 - City – GeoCharts have no boundary data for cities, so they are shown as circular markers.
2. The **Show last Location type as** dropdown specifies how to display the data at the most specific **Location Type** where a **Location Value** is set. Choose from:
- Markers – circular markers will appear.

NOTE

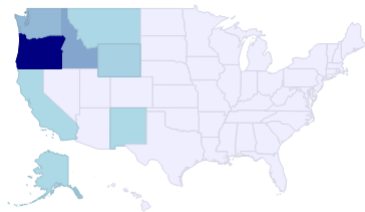
City level data will always be displayed as markers. If city level data will be the most specific, always choose *Markers*.

- Regions – the entire region will be shaded with a color.

See the examples below:



[Back]



Show last location type as set to *Regions*

Click **Next** to advance to the Data tab.

Data

In the **Data** tab, specify which data determines the color of each **Location Type** and the size of each marker.

Map Wizard

Type

Locations

Data

Add data fields to specify which data to display with each location, and how it aggregates

	Data Values	Data Labels	Aggregate Type	Display Format	Decimal Places
Color of Locations	None		Sum	Default	0
Size of Markers	None		Sum	Default	0

Previous

Next

Cancel

Finish

For both **Color of Locations** and **Size of Markers**, set the values below. **Color of Locations** is required, while **Size of Markers** is optional.

1. Use the **Data Values** dropdown to specify what cell on the report determine the color and size of each marker. Setting a cell for the size of marker is optional.

2. Enter a brief description in the **Labels** field. The labels appear in tooltips when hovering over the regions.

3. Select an **Aggregation Type** from the dropdown to choose how the **Data Values** will be summarized. Choose from:
 - Sum* – display the additive total of all data in the data value
 - Avg* – display the average (arithmetic mean) of this data value
 - Count* – display the number of rows in this data value. For example in the data set {1, 2, 3, 3, 4, 4} the count is 6.
 - Distinct Count* – display the number of unique rows in this data value. For example in the data set {1, 2, 3, 3, 4, 4} the distinct count is 4.
 - Min* – display the smallest or earliest value of this data value
 - Max* – display the largest or latest value of this data value

TIP

To use *fixed-size* markers instead of dynamic size:

1. Select a report cell containing a fixed numeric value, as written with a preceding equal sign (=). For example:
=10.

2. From the **Aggregate Type** dropdown, select *Avg*.

4. Select a **Display Format** from the dropdown to format the data value in the tooltip. Choose from:
 - Default* – displays the values without any formatting. (e.g. 1234.5678)
 - Currency* – prepends the US Dollar sign (\$) to the values. (e.g. \$1234.5678)
 - Percent* – multiplies the data value by 100 and appends a percent sign (%) to the values. (e.g. 123456.78%)
 - Scientific Notation*: displays the values in scientific notation. (e.g. 1.23456789E3)

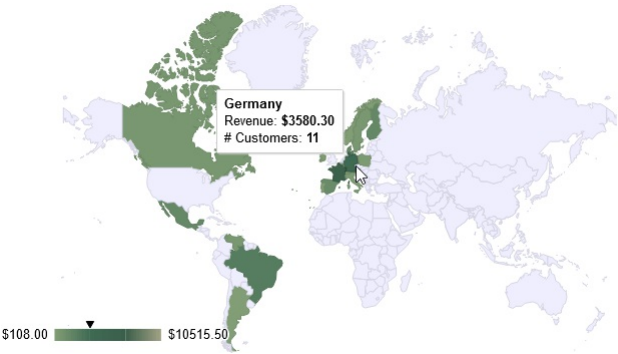
5. Choose from 0 to 6 **Decimal Places** to display on the data value from the dropdown.

Click **Finish** to add the completed visualization to the report.

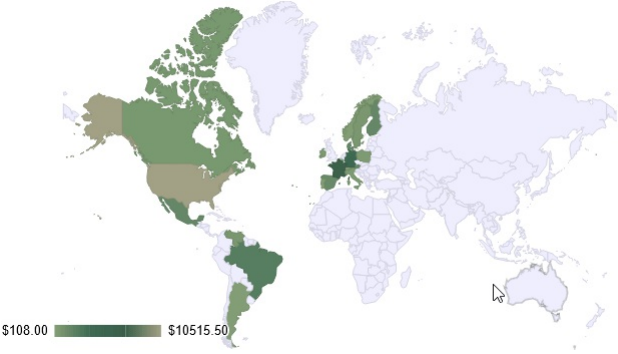
Interacting with GeoChart Visualizations

On the first run, it may take a few minutes for the map to populate with data and for the data to be aggregated.

Hover the mouse over a shaded region to display additional information in a tooltip.



If configured, click on the shaded regions to drill down into more detail. Click **[Back]** to zoom back up a level.



Drilling down from world view to the United States, then selecting Washington state, then viewing the map detail for the cities Seattle and Kirkland

NOTE

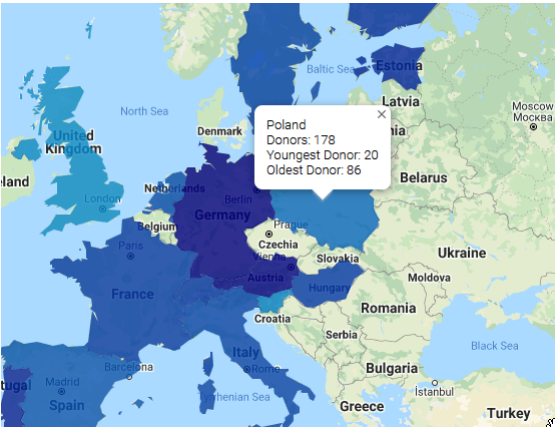
When an Advanced Report containing a GeoChart visualization is exported to an output file type that supports visualizations (i.e. PDF, RTF or Excel) the map will be reset to the default view defined in the Type tab of the wizard.

Google Maps

NOTE

The system administrator can restrict access to this feature, therefore it may not be available in all environments. Contact the system administrator for more information.

The **Google Maps Wizard** allows interactive maps with highlighted data to appear in Advanced Reports. Geographical areas can be pinpointed or highlighted dynamically depending on report data.



Â A sample Google Map visualization with a primary metric coloring the countries and three additional metrics displayed in a tooltip

This article is divided into two sections:

- **Add a Google Map Visualization** – instructions on creating a Google Maps visualization to an Advanced Report
- **Interacting with Google Maps Visualizations** – instructions for interacting with Google Maps visualizations in the Report Viewer

Add a Google Map Visualization

To add a Google Map to an Advanced Report:

1. Select a **Group Header**, **Group Footer**, **Report Header** or **Report Footer** cell.

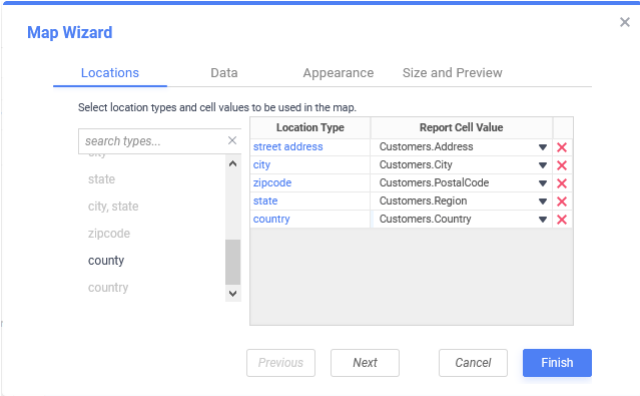
2. Start the Google Maps Wizard:
- (v2021.1+)

Click the **Insert**  icon on the toolbar, then click **Google Maps**

The Google Maps Wizard has four tabs: **Locations**, **Data**, **Appearance**, and **Size and Preview** outlined below.

Locations

Use the **Locations** tab to correlate data on the report with locations on the map.



Locations tab of the Map Wizard dialog

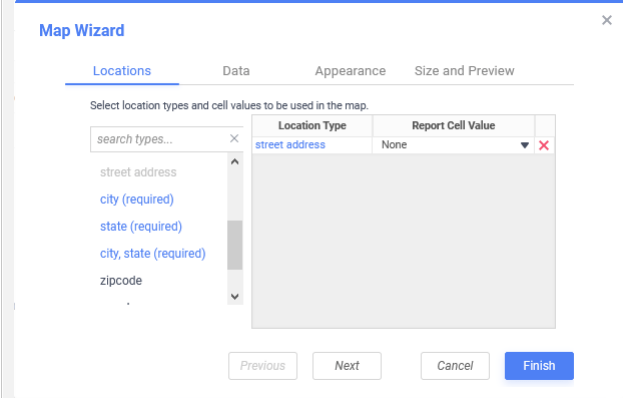
1. Add **location types** by either:
- dragging-and-dropping it to the selection pane,

double-clicking it, or

clicking on it then clicking the blue arrow icon

NOTE

Certain location types may require other types to be added or may prevent other types from being added.



The screenshot shows the 'Map Wizard' dialog box with the 'Locations' tab selected. The 'Location Type' list on the left now includes 'street address', 'city (required)', 'state (required)', 'city, state (required)', and 'zipcode'. The table in the center shows that 'street address' is selected with a 'Report Cell Value' of 'None'. The 'city (required)', 'state (required)', and 'city, state (required)' types are listed in the table but have no report cell values assigned yet. The 'zipcode' type is also listed. The 'Report Cell Value' column shows 'None' for 'street address' and is empty for the others. The 'Delete' icons (red X) are present for all types. The 'Next' button is highlighted in blue, indicating the next step in the wizard.

Adding street address requires that city and state, or city, state be added as well

2. Choose the content of the cell that correlates to each location type from the **Report Cell Value** column.

Location Type	Report Cell Value	
street address	Customers.Address	
city	None	
zipcode	<i>Detail</i>	
state	Customers.CompanyName	
country	Customers.Address	

Remove a location type by clicking the **Delete**  icon at the end of the row.

Click **Next** to advance to the **Data** tab.

Data

In the **Data** tab determine what values, called metrics, will color and display on the map. The **primary metric** is used to color/shade the map and any number of additional metrics may be displayed in a tooltip when the mouse hovers over a region.

Map Wizard

Locations

Data

Appearance

Size and Preview

Define the metrics to be displayed upon hovering over regions on the map. The primary metric will determine how the regions are shaded.

Metric

Donors.Donor ID

Agg. Type

Count

Labels

Donors

Primary Metric

☒

Number Format

×

Metric

=DateDiff("yyyy", {Donors.Birthday}, Today())

Agg. Type

Min

Labels

Youngest Donor

Primary Metric

☐

Number Format

×

Metric

=DateDiff("yyyy", {Donors.Birthday}, Today())

Agg. Type

Max

Labels

Oldest Donor

Primary Metric

☐

Number Format

×

+

Add Metric

Previous

Next

Cancel

Finish

Data tab of the Map Wizard dialog

There must be a minimum of one metric. Click the **+**

Add Metric button to add additional metrics. Click the **Delete** **×** icon to remove a metric.

For each metric in the list:

1. Use the **Metric** dropdown to select the report cell that contains its data.

2. Select how to summarize (aggregate) the data from the **Agg. Type** dropdown:

Sum

 display the additive total of all data in the data field

Count

 display the number of rows in this data field. For example in the data set {1, 2, 3, 3, 4, 4} the count is 6.

Distinct Count

 display the number of unique rows in this data field. For example in the data set {1, 2, 3, 3, 4, 4} the distinct count is 4.

Average

 display the average (arithmetic mean) of this data field

Minimum

 display the smallest or earliest value of this data field

Maximum

 display the largest or latest value of this data field

None

v2018.2+

 displays the raw cell value of this data field.

3. Enter a brief description in the **Labels** field.

4. Select whether it is the **Primary Metric**. The Primary Metric is used to color/shade each region.

NOTE

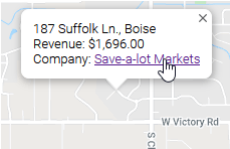
Metrics with an **Agg. Type** except *None* may be the **Primary Metric**.

5. Click the **Number Format**  icon to change how the metric is displayed in the tooltip. This will open the Number Format dialog which works very similar to the Cell Format dialog in the Advanced Report Designer. The number formatting changes will only apply if the data field is numeric.

Hyperlinks

v2018.2+

A hyperlink may optionally appear in the tooltip when zoomed in to the map at the drop pin level.



Demo of a hyperlink in a Google Map

To do this:

1. A cell on the report must contain the **Hyperlink** function.

For example, the report below will launch a Google search for the company name when the link in the tooltip is clicked by using this formula:

```
=Hyperlink("https://www.google.com/?q=" & {Customers.CompanyName}, {Customers.CompanyName})
```

Section		A	B	C	D	E	F
Page Header	1	Revenue Map					
Report Header	2						
Detail	3	OrderDetails.Revenue					
Footer: Customers.Com...	4	Customers.Com	Customers.Add	Customers.City	Customers.Reg	Customers.Cou	OrderDetails.Re
	5	panyName	ress	n	on	ntry	venue
		=Hyperlink("https://www.google.com/?q=" & {Customers.CompanyName}, {Customers.CompanyName})					

2. Add the cell with the hyperlink formula as a metric with **Agg. Type** set to *None*.

NOTE

Hyperlinks used for drop pins can be referenced from any section within the report; however, for dynamic linking, hyperlink information should be referenced from the detail section or a grouped section.

LocationsDataAppearanceSize and Preview

Define the metrics to be displayed upon hovering over regions on the map. The primary metric will determine how the regions are shaded.

Metric	Agg. Type	Labels	Primary Metric	Number Format
OrderDetails.Revenue	Sum	Revenue	☒	☐
=Hyperlink("https://www.google.com/?q=%&v")	None	Company	☐	☒

+ Add Metric

Click **Next** to advance to the Appearance tab.

Appearance

In the **Appearance** tab, determine the appearance of the metrics on the map.

Map Wizard

LocationsDataAppearanceSize and Preview

Primary Metric Colors

Theme

Linear Range

☒ Show Legend

Default

Coral

Election

Forest

Grayscale

Lilac

Metric Levels

Calculate Metrics Per:

☒ All Levels

☒ Country Level

☒ State Level

☒ County Level

☒ Zipcode Level

Display Drop Pins?

Yes

☒ Conditional Drop Pin Colors...

Previous

Next

Cancel

Finish

Appearance tab of the Map Wizard dialog

Primary Metric Colors

Choose a coloring style from the list on the left, either:

- Themes – a variety of named color themes are available (e.g. Coral, Election, Forest, etc...)

Primary Metric Colors

Theme

Linear Range

☐ Show Legend

Grayscale

Lilac

Peterbrook

Primary Hues

Sandstone

Selecting the *Peterbrook* theme

- Linear Range – choose a beginning (minimum) color and an ending (maximum) color. The application will automatically blend from the beginning to ending color based on the primary metric’s value. Click the color selector icon to open the color selector to choose a color.

Primary Metric Colors

Theme

Linear Range

☐ Show Legend

Begin (min)

#724598

End (max)

#D181EC

Entering a linear color range

Check **Show Legend** to add a legend in the bottom left corner of the map.

Metric Levels

Calculate Metrics Per – select for which geographic levels to summarize the metrics. Hover the mouse over the **More Information** icon to learn more about this function.

Display Drop Pins – select whether to display drop pins, which will appear on city, street address, or latitude/longitude locations.

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Hover the mouse over the **More Information** 

icon to learn more about this function.

NOTE

The summary function *None* requires a drop pin.

Conditional Drop Pin Colors dynamically modify a drop pin color based on its value (v2018.2+). This action is similar to conditionally formatting cells in a report.

1. Click the  **Conditional Drop Pin Colors...** button.

2. Click  **Add** to insert a new conditional statement. Select a color that the drop pin will become when the condition is met.

3. For each conditional color, add a condition that when true will color the drop pin. Click the **Formula Editor**  icon to open the **Formula Editor**.The left side contains a list of the Conditional Drop Pin Parameters that includes:
 - The metric values (listed in order of their creation),
 - the **Location Types** that are defined in the **Location** tab

The right side contains all of the application's built-in formulas. You can drag a data field or a formula to the Formula box, or type it in by hand. The editor also supports using parameters in the form *@*. For more information about building formulas, review the What are formulas? and Formula Basics articles.

The formula must return a logical *true* value to cause the drop pin to become conditionally colored.

Conditional Drop Pin Formatting

Color	Input			
#25C23E	=@metric_value_1@ < 50000	f_x	^	✓
#F9A228	=@metric_value_1@ >= 75000	f_x	^	✓
#AC4516	=@metric_value_1@ >= 100000	f_x	^	✓

 Add

Okay

Cancel

Conditional Drop Pin Formatting that will color the pin red if the value of the first metric is less than 50,000; amber if it is less than or equal to 75,000; red if it is greater than 10000

4. Click **Okay** to close the Conditional Drop Pin Formatting dialog.

Click **Next** to advance to the Size and Preview tab.

Size and Preview

Set the size, initial view, and type of map to display in the **Size and Preview** tab. This view will also be used when the report is exported.

Map Wizard

Locations

Data

Appearance

Size and Preview

Zoom and/or pan on the preview map below to specify the initial view.

Double Click a Region to Drill Down



☒ Fit map to cell

☐ Set specific size

Height 389

Width 704

Base Map Road Map

Previous

Next

Cancel

Finish

Size and Preview tab of the Map Wizard dialog

NOTE

The preview uses placeholder data values. It does not reflect the actual region shading.

Set the initial view of the map by panning and zooming to a location.

- **Click-and-drag** on the map to pan.



- Click the **Zoom In** and **Zoom Out**  icons to change the zoom level.
- **Double-Click** on a region to drill down into the child regions (e.g. double-click on a state to see data by city)

Change the size of the chart in one of three ways:

- **Drag-and-drop** the resizing handle at the bottom-right corner.
- Check **Fit map to cell** and which will cause the map to fill its containing cell.
- Check **Set specific size** and enter a custom **Height** and **Width** in pixels

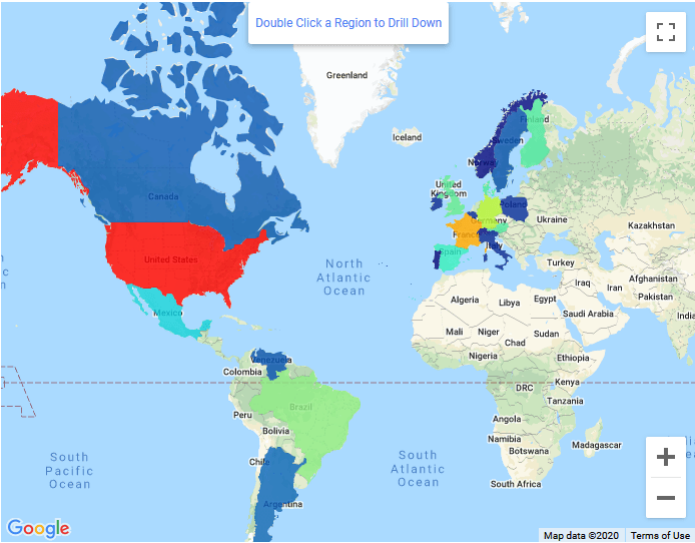
Select the style of map with the **Base Map** dropdown. Choose from:

- *Road Map* “ displays the default road map view. This is the default map type.
- *Terrain* “ displays a physical map based on terrain information
- *Satellite* “ displays Google Earth satellite images.
- *Hybrid* “ displays a mixture of road map and satellite views

Click **Finish** to add the completed visualization to the report.

Interacting with Google Maps Visualizations

On the first run, it may take a few minutes for the map to populate with data and for the metrics to be aggregated. A **Loading Data** message will appear in the top-left corner, then disappear once loading is completed.

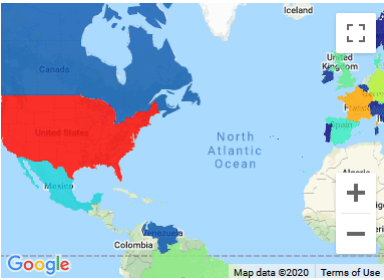


A Google Map visualization as it appears in the Report Viewer

Google Maps visualizations are interactive in a number of ways:

- **Navigate through the map**
 - Click the **Full Screen**  icon to open the map in a full screen view.
 - **Click-and-drag** on the map to pan left, right, up and down.
- 

 - Click the **Zoom In** and **Zoom Out**  icons, or scroll the mouse wheel to change the zoom level. At high zoom levels on *Satellite* and *Hybrid* map types two additional buttons appear:
 - Click the **Rotate map 90 degrees** icon  to rotate the map.
 - Click the **Tilt map**  icon to change the map's tilt.
- **Analyze the data presented**
 - **Hover** the mouse over a colored/shaded region to see a tooltip with the metric data. The color indicates the magnitude of the map's primary metric.
 - **Double-Click** on a region to drill down into the child regions (e.g. double-click on a state to see data by city). Click **[Back]** to move up one level.



- Other functions

NOTE

These functions are provided by Google and are not associated with the reporting application.

- Click **Report a map error** to report incorrect pin locations, missing roads and landmarks or wrong business, place or road information displayed on the map
- Click the **Google logo** in the lower-right corner to open the map in a new browser tab or window

NOTE

When an Advanced Report containing a Google Map visualization is exported to an output file type that supports visualizations (i.e. PDF, RTF or Excel) the map will be reset to the default view defined in the Size and Preview tab of the wizard.

Gauges

A **Gauge** gives a visual representation of the scale of a value. Refer to the Examples at the end of this article.

Gauge Wizard

To add a gauge to an Advanced Report:

1. Select a cell on the design grid where the gauge will reside. Gauges can be placed in any section of the report except for the **Page Header** and **Page Footer** sections.
2. Open the Gauge Wizard:
 - (v2021.1+) Click the **Insert**  icon on the toolbar, then click **Gauge**

The Gauge Wizard will appear. The Gauge Wizard has two tabs: Appearance and Data, detailed below.

Appearance

In the Appearance tab, choose the style and size of the gauge.

Type

Select the **Type** of gauge that will appear:

-  *Angular* – the indicating needle sweeps from left (minimum) to right (maximum) along a curved dial
-  *Linear* – the indicating needle sweeps from left (minimum) to right (maximum) along a horizontal line
-  *Bulb* – value is indicated by the presence of a single color, similar to a flag or semaphore. The value is shown below the bulb.
-  *Thermometer* – value is indicated by the thermometer tube filling from the bottom (minimum) to the top (maximum)

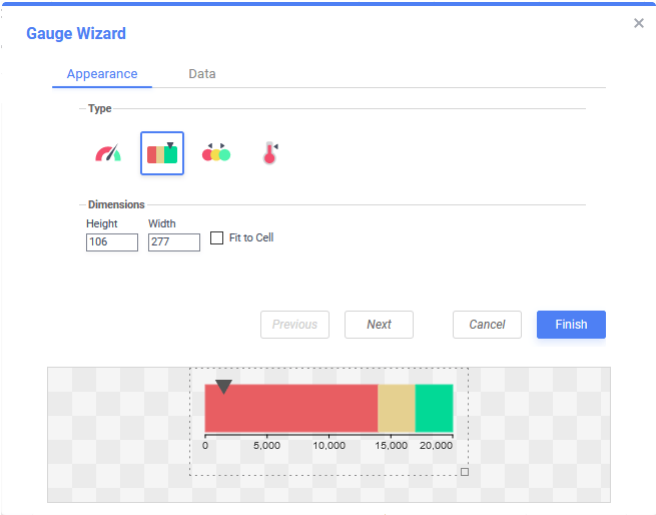
Dimensions

Select the size (**Dimensions**) of the gauge by either:

- **Drag-and-drop** the resizing handle  at the bottom-right corner.
- Check the **Fit to Cell** checkbox and resize the chart cell on the Design Grid.
- Enter a custom **Height** and **Width** in pixels directly into the corresponding inputs

NOTE

Angular gauges have a minimum width of 120 px.



Click **Next** to advance to the **Data** tab.

Use the Data tab to choose the value presented in the gauge, the range of values and the coloring of those values.

Value and Range

=aggsu... (OrderDetails.Revenue) ▼

Provide range as ☒ Static Value ☐ Cell Value

Min Max

0 100

- Static value specify explicit numeric **Min** and **Max** values

Min	Max
0	100

- Cell value – choose cells on the report that represent the **Min** and **Max** values

Min	Max
=0	=@SalesGoal@

To create a "semi-static" gauge, include a cell on the report with the desired static value preceded with an equals sign. In the example above, the gauge's minimum value will be 0 and the maximum value will be whatever the value of the `@[email protected]` parameter is at the time of report execution.

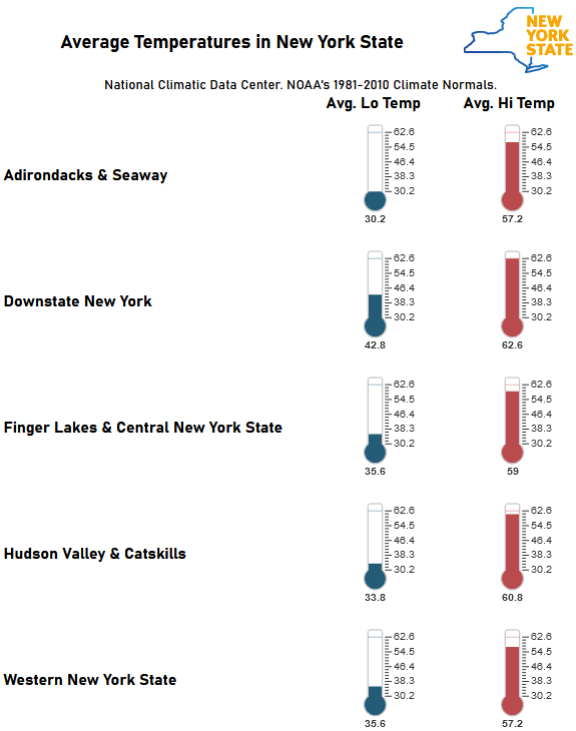
1. Choose a **Color by** method to determine how the color breakpoints will be applied to the gauge's dial:
 - o *Percentage* breakpoints are calculated as a percentage of the data values with the smallest value at 0% and the largest value at 100%
 - o *Static Value* breakpoints in color happen at explicitly defined values of the data
 - o *Cell Value* breakpoints in color happen at value changes that occur in cells on the report
2. **Add** or **Remove** color breakpoints, and select the locations of the breakpoints. Breakpoints values must be in ascending numeric order. There are three breakpoints by default.

Thermometers only have one color.

-

3. Click **Finish** to close the Gauge Wizard and add the visualization to the report.

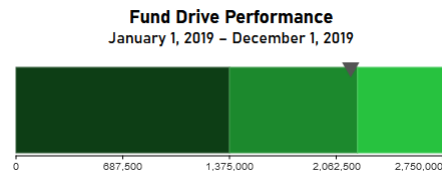
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Thermometers indicating the average minimum and maximum average temperature for regions of New York State



Gauge Wizard dialog settings for the NYS Average Temperatures example



A linear gauge that shows the performance of a fundraising campaign for an organization

Employee Revenue Totals					
Photo	First Name	Last Name	ID #	Revenue	Convergence on Annual Sales Goal
	Steven	Buchanan	5	\$75,567.75	0 43,750 87,500 131,250 175,000
	Laura	Callahan	8	\$133,301.03	0 43,750 87,500 131,250 175,000
	Nancy	Davolio	1	\$202,143.71	0 43,750 87,500 131,250 175,000
	Anne	Dodsworth	9	\$82,964.00	0 43,750 87,500 131,250 175,000
	Andrew	Fuller	2	\$177,749.26	0 43,750 87,500 131,250 175,000

A report with employee revenue totals and an angular gauge that shows how close to their annual goal they

came

Gauge Wizard dialog settings for the **Employee Revenue Totals** example

Tabular Visualizations

Tabular Visualizations are only available to Dashboards in *v2019.2+* of the application.

Tabular Visualizations

A **Tabular Visualization** as its name entails, displays content in a table like format. Unlike the other visualization types, tabular visualizations can display any number of unrelated fields.

LastName	CategoryName	Revenue Total
Buchanan		\$3,305,087.45
	Beverages	\$491,496.00
	Condiments	\$75,811.45
	Confections	\$152,220.75
	Dairy Products	\$1,012,149.60
	Grains/Cereals	\$116,535.75
	Meat/Poultry	\$945,850.40
	Produce	\$255,836.60
	Seafood	\$255,186.90
Callahan		\$4,340,246.45
	Beverages	\$741,085.60

A Tabular visualization grouped by Employee Last Name and Product Category

Beginning with *v2020.1*, each *Value* on a Tabular visualization can have a different data format type.

Detail rows can be optionally hidden.

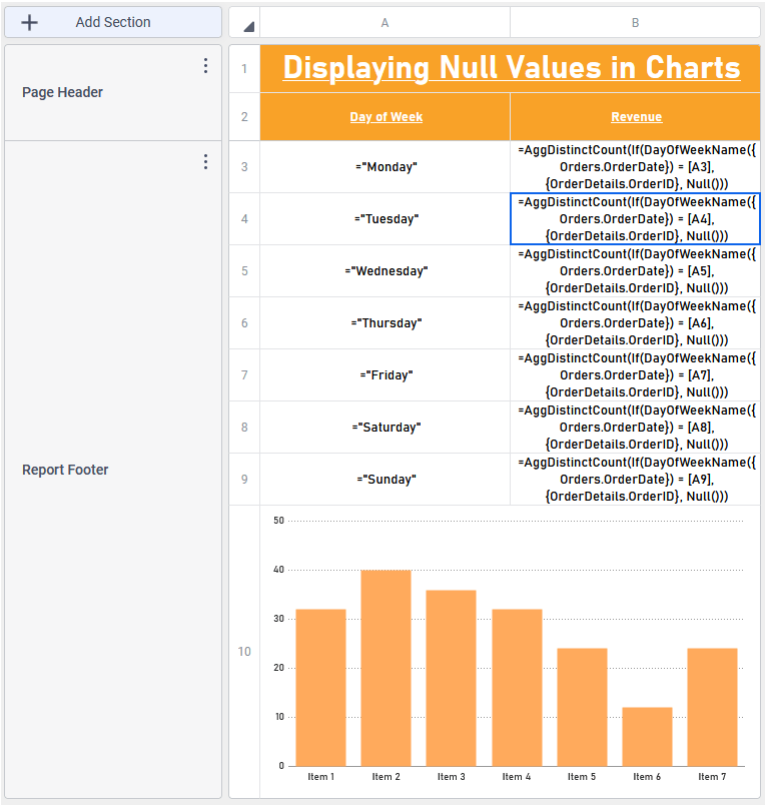
Displaying Null Values in Charts

By default, null values do not appear in charts. If, for example, a user creates a chart showing sales for each day of the week, days for which there were no sales would be omitted from the X axis.

Users looking to include null values in their charts can work around this limitation by using Cell-Based Layout (Layout 1). Cell-Based charts allow the user to define each point in a chart.

To ensure that a chart displays null values:

1. Set up the report so that each point in the chart has a unique cell corresponding to that point’s X and Y values. Below is how one might do this using the day-of-week sales report example. Each X value (day of the week) has its own cell, and each Y value (number of sales) also has its own cell.



NOTE

This below utilizes the **custom function** `DayOfWeekName()` . Ask the system administrator about the availability of this function.

2. Add the chart to the report footer section.
3. On the Chart Wizard's Data tab, advance to the Data tab, and begin assigning each point its X and Y values.

TypeDataAppearanceSize and Preview

Setup the data to show in the chart

Data for Chart

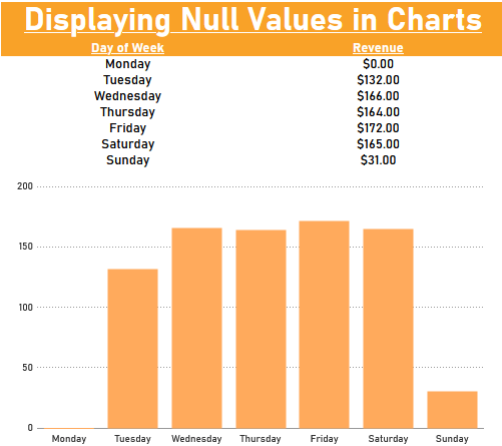
Point Value	Point Label
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Monday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Tuesday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Wednesday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Thursday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Friday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Saturday▼✖
=AggDistinctCount(IIf(DayOfWeekName({Or▼	=Sunday▼✖

+ Add Point

> Data Layout...

4. Click > **Data Layout...**, then click **Cell Based Chart** and finally click **Okay**.
5. Click **Finish** to close the Chart Wizard.

This method will produce output including a point for Monday, even though its Y value is null.



The example report in the Report Viewer

Chained Reports

Chained Reports combine multiple reports into a single multi-page document. They are a convenient way to bundle related reports into a format suitable for printing or sending to a mailing list.

For example, you could combine a report on total monthly sales over time, product sales for the month, and a report highlighting this month's top selling employee. And you could schedule it to be emailed regularly at the end of every month.

A benefit of Chained Reports is that unless you want to use collation, they do not need to have anything in common. You could chain entirely disparate reports together without a problem.

Dashboards are also exported in the form of Chained Reports in which each report or visualization tile is displayed on a single page in the report. See Exporting Dashboards for directions on how to export a Dashboard as a Chained Report.

Creating a Chained Report



1. Click the **Create New Report** + icon in the Main Menu and select **Chained Report**.
2. On the **Name** tab, enter a name for the report and select a folder to save it to. It does not have to be in the same folder as the reports that it contains. Optionally add description text to the **Enter a description for the report** field.

NOTE

A report name may contain all characters except for the following:
/ : * ? " < > |

3. Advance to the **Reports** tab, add the reports to include in the Chained Report. Supported report types are **Advanced Reports**, **Express Reports**, **CrossTab Reports** and **ExpressView**.The order of the reports in the list is the order they will appear in the output. Click and drag a report or use the **Move Item Up** ^ or **Move Item Down** v icons to move a report up or down in the list respectively. Click the **Delete** ✖ icon to remove a report from the list.Click the **Edit Report Options** ✎

- icon to set options for handling prompting filters and parameters on the report.
- **Report Filter Prompt** – the filter field of this particular filter
 - **Report Parameter Prompt** – the parameter name
 - **Action** – choose how to obtain a value for the filter or parameter
 - *Common Prompt* (default) – all reports which contain this filter field or parameter will use the specified value. In the **Data (Prompt Text or Value)** field, enter the text to prompt the user for a value. For filters by default, the prompt text will be *Specify value for {fieldname}* where {fieldname} represents the name of the common filter field.

NOTE

Filter dependency is not honored when executing a Chained Report in this mode.

- *Report Prompt* – only this report will use the specified value. In the **Data (Prompt Text or Value)** field, enter the text to prompt the user for a value. For filters by default, the prompt text will be the filter title from the corresponding report. Changing the filter text in this dialog only changes it for the Chained Report, not for the corresponding report itself.
- *Assign Value* – the Chained Report will not prompt for a value for this filter or parameter. In the **Data (Prompt Text or Value)** field, enter the value to use. For filters by default, if a value is provided in the corresponding report its value will appear here. Changing the value in this dialog only changes it for the Chained Report, not for the corresponding report itself.

TIP

Values for prompting filters and parameters cannot be set when scheduling a Chained Report. If a Chained Report is intended to be scheduled, use the *Assign Value* option to specify values.

4. Advance to the **Options** tab to set certain report options
- **Default Export Type** – choose the file type to which the Chained Report will export by default. Available types are limited by report export restrictions, and by the **Allowed Export Types** option. HTML is not supported. Choose *Default* to use the environment’s default export type.
 - **Allowed Export Types** – choose which file types the Chained Report is allowed to export to. At least one type must be selected.

NOTE

If one of the component reports in the chain cannot export to a certain file type, then the Chained Report cannot export to that type. All of the reports must share at least one export type, or else the Chained Report will have no compatible type to run as. Supported types are *PDF*, *RTF*, *CSV*, and *XLS* (Excel).

- **No Data Qualified Action** – choose what to display if there is no data to display when the report is executed. Select from:
 - *Show Placeholder* – show the report without any data in it
 - *Skip Report* – show nothing, and move on to the next report in the chain
- **Collate Reports on** – check to collate the Chained Report. This option is enabled only when all of the reports in the chain share at least one common sort field. The sort field must be a standard column type without a formula. See the Collating Reports section below for more information.
- **Page break after each report** – choose whether to start a new page after every report. This only affects PDF and RTF files.

TIP

When building a chained report with the **Page break after each report** checkbox unchecked, consider placing the title of the component reports in a **Report Header** section instead of a **Page Header** section. Consider the examples in Table A below.

5. Click **Save and Close** to save the report and close the wizard.

NOTE

Reports with document templates can be added to a Chained Report. The Chained Report must be exported to the same file type as the template. Multiple templates of the same file type can be chained together, with the exception of Microsoft Word based templates.

Table A – Best Practice for Report Titles when **Page break after each report** is unchecked

Report Title in Page Header Section	Report Title in Report Header Section

Employee Hire				
ID #	Photo	First Name	Last Name	Hire Date
5		Steven	Buchanan	10/17/2009
8		Laura	Callahan	03/06/2010
1		Nancy	Davolio	05/01/2008
9		Anne	Dodsworth	1/15/2010
2		Andrew	Fuller	08/14/2008
7		Robert	King	01/02/2010
3		Janet	Leverling	04/01/2008
4		Margaret	Peacock	05/03/2009
6		Michael	Suyama	10/17/2009

Employee Orders	
Order #	Order Date
10443	03/04/2010
10476	03/13/2010
10477	03/17/2010
10529	05/07/2010
10541	05/17/2010
10549	06/04/2010
10549	06/04/2010
10575	06/23/2010
10549	06/28/2010
10448	06/28/2010
10449	06/29/2010
10450	06/29/2010
10450	06/29/2010
10450	06/29/2010
10450	06/29/2010
10476	06/29/2010
10714	10/22/2010
10714	10/22/2010

Collating Reports

CAUTION

Collation is recommended for advanced users as it can have potential performance implications if used incorrectly. Review Best Practices below.

Collation breaks up the reports in the **Chained Report** by a chosen sort field, and then groups together the reports by each instance of that sort. Essentially, this turns a sort field into a common grouping for the reports, working in much the same way a group section would. This can allow you to use individual reports as pieces in a composite report.

Some common uses for collation include:

- Grouping disparate reports by order number, or employee number, or something else in common
- Combining mostly identical reports, only with different filters or joins, into a composite report
- Making a composite report with multiples of a feature which normal reports can only have one of, such as a detail section

Execution of Collated Reports

1. Report 1, filtered by group 1
2. Report 2, filtered by group 1
3. Report 1, filtered by group 2
4. Report 2, filtered by group 2
5. Report 1, filtered by group 3
6. Report 2, filtered by group 3

...and so on.

To accomplish the collation, the application will run each report for each filtered group. An non-collated chained report containing two reports will only execute those two reports. A collated chained report with the same two reports sorted on a field with 100 values will execute 200 individual reports.

The system administrator can limit the number of individual report executions. If a collated chained report requires more executions than this limit, the entire chained report will stop and display an error message like this:



Historical Employee Data was not run because it would cause 6 report executions (2 reports multiplied by 3 sort fields in the chain), which exceeds the set maximum of 4. To run this collated chained report, try reducing the number of reports or sorts in the chain.

Dismiss

If this error message appears, change how the report collates with the recommendations in the Best Practices section at the end of this article.

Consider the example reports below. Report 1 lists all salespeople in the company and Report 2 lists the orders placed by that salesperson.

Table B – Non-collated Report	
Report 1	Report 2

Employee Hire				Employee Orders	
ID #	Photo	First Name	Last Name	Hire Date	
5		Steven	Buchanan	10/17/2009	
8		Laura	Callahan	03/05/2010	
1		Nancy	Davolio	05/01/2008	
9		Anne	Dodsworth	11/15/2010	
2		Andrew	Fuller	08/14/2008	
7		Robert	King	01/02/2010	
3		Janet	Leverling	04/01/2008	
4		Margaret	Peacock	05/03/2009	
6		Michael	Suyama	10/17/2009	

Steven Buchanan	
Order #	Order Date
10443	03/04/2015
10474	03/13/2015
10477	03/17/2015
10529	05/07/2015
10549	05/27/2015
10569	06/16/2015
10575	06/20/2015
10607	07/22/2015
10648	08/28/2015
10649	08/28/2015
10650	08/29/2015
10654	09/02/2015
10675	09/19/2015
10711	10/21/2015
10714	10/22/2015
10721	10/29/2015
10730	11/05/2015
10761	12/02/2015
10	12/02/2015

Laura Callahan	
Order #	Order Date
10770	12/09/2015
10786	12/19/2015
10795	12/24/2015
10722	10/29/2015
10724	10/30/2015
10729	11/04/2015
10756	11/27/2015
10719	10/27/2015
10720	10/28/2015
10706	10/16/2015
10694	10/06/2015
10696	10/08/2015
10697	10/08/2015

Chained Output

When this chain is executed, only two reports run: one for each of the reports in the chain.

Report Execution Progress

Executing Report 2 of 20:01

Creating Document

Cancel

This yields a final output file that resembles the figure below:

Employee Hire

ID #	Photo	First Name	Last Name	Hire Date
5		Steven	Buchanan	10/17/2009
8		Laura	Callahan	03/05/2010
1		Nancy	Davolio	05/01/2008
9		Anne	Dodsworth	11/15/2010
2		Andrew	Fuller	08/14/2008
7		Robert	King	01/02/2010
3		Janet	Leverling	04/01/2008
4		Margaret	Peacock	05/03/2009
6		Michael	Suyama	10/17/2009

Steven Buchanan	
Order #	Order Date
10463	03/04/2015
10474	03/13/2015
10477	03/17/2015
10529	05/07/2015
10549	05/27/2015
10569	06/16/2015
10575	06/20/2015
10607	07/22/2015
10648	08/28/2015
10649	08/28/2015
10650	08/29/2015
10654	09/02/2015
10675	09/19/2015
10711	10/21/2015
10714	10/22/2015
10721	10/29/2015

When those same two reports are collated by checking the **Collate reports on** checkbox, and choosing *Employees.LastName* as the field,

Table C – Collated Report	
Report 1	Report 2

Employee Hire					Employee Orders				
ID #	Photo	First Name	Last Name	Hire Date					
5		Steven	Buchanan	10/17/2009					
8		Laura	Callahan	03/05/2010					
1		Nancy	Davolio	05/01/2008					
9		Anne	Dodsworth	11/15/2010					
2		Andrew	Fuller	08/14/2008					
7		Robert	King	01/02/2010					
3		Janet	Leverling	04/01/2008					
4		Margaret	Peacock	05/03/2009					
6		Michael	Suyama	10/17/2009					

Steven Buchanan				
Order #	Order Date			
10443	03/04/2015			
10474	03/13/2015			
10477	03/17/2015			
10529	05/07/2015			
10549	05/27/2015			
10569	06/16/2015			
10575	06/20/2015			
10607	07/22/2015			
10648	08/28/2015			
10649	08/28/2015			
10650	08/29/2015			
10654	09/02/2015			
10675	09/19/2015			
10711	10/21/2015			
10714	10/22/2015			
10721	10/29/2015			
10730	11/05/2015			
10761	12/02/2015			
18	12/02/2015			

Laura Callahan				
Order #	Order Date			
10770	12/09/2015			
10786	12/19/2015			
10795	12/24/2015			
10722	10/29/2015			
10724	10/30/2015			
10729	11/04/2015			
10756	11/27/2015			
10719	10/27/2015			
10720	10/28/2015			
10706	10/16/2015			
10694	10/06/2015			
10696	10/08/2015			
10619	09/23/2015			
10651	09/01/2015			
10640	09/08/2015			
10616	07/29/2015			
10623	06/07/2015			
10627	08/11/2015			
10631	08/14/2015			
10632	08/14/2015			

Chained Output

When this chain is run, since there are two reports in the chain and nine employee last names, there are eighteen reports to execute: two for each of the nine employees.

Report Execution Progress

Executing Report 13 of 180:05

Creating Document

Cancel

This yields a final output file that resembles the figure below. Now, instead of showing one complete report after the other, the two reports are **collated** by the *Employee's Last Name*.

Employee Hire																																																																																																																		
ID #	Photo	First Name	Last Name	Hire Date																																																																																																														
5		Steven	Buchanan	10/17/2009																																																																																																														
<table><tr><th colspan="5">Steven Buchanan</th></tr><tr><th>Order #</th><th colspan="4">Order Date</th></tr><tr><td>10443</td><td colspan="4">03/04/2015</td></tr><tr><td>10474</td><td colspan="4">03/13/2015</td></tr><tr><td>10477</td><td colspan="4">03/17/2015</td></tr><tr><td>10529</td><td colspan="4">05/07/2015</td></tr><tr><td>10549</td><td colspan="4">05/27/2015</td></tr><tr><td>10569</td><td colspan="4">06/16/2015</td></tr><tr><td>10575</td><td colspan="4">06/20/2015</td></tr><tr><td>10607</td><td colspan="4">07/22/2015</td></tr><tr><td>10648</td><td colspan="4">08/28/2015</td></tr><tr><td>10649</td><td colspan="4">08/28/2015</td></tr><tr><td>10650</td><td colspan="4">08/29/2015</td></tr><tr><td>10654</td><td colspan="4">09/02/2015</td></tr><tr><td>10675</td><td colspan="4">09/19/2015</td></tr><tr><td>10711</td><td colspan="4">10/21/2015</td></tr><tr><td>10714</td><td colspan="4">10/22/2015</td></tr><tr><td>10721</td><td colspan="4">10/29/2015</td></tr><tr><td>10730</td><td colspan="4">11/05/2015</td></tr><tr><td>10761</td><td colspan="4">12/02/2015</td></tr><tr><td>18</td><td colspan="4">12/02/2015</td></tr></table>					Steven Buchanan					Order #	Order Date				10443	03/04/2015				10474	03/13/2015				10477	03/17/2015				10529	05/07/2015				10549	05/27/2015				10569	06/16/2015				10575	06/20/2015				10607	07/22/2015				10648	08/28/2015				10649	08/28/2015				10650	08/29/2015				10654	09/02/2015				10675	09/19/2015				10711	10/21/2015				10714	10/22/2015				10721	10/29/2015				10730	11/05/2015				10761	12/02/2015				18	12/02/2015								
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Best Practices

Since **collating** a chained report can greatly increase the number of component reports to execute, there are a few considerations to alleviate the load on the system:

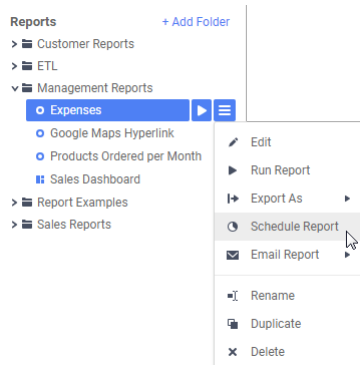
- Minimize the number of reports in the chain
- Minimize the number of data points in the sort field (e.g. reduce the number of employees) with a filter

Scheduling Reports

Use the **Scheduler Service** to execute reports and Dashboards regularly at specified times and sending e-mails directly from within the application. This can be useful for reports based on periods of time, such as weekly sales reports or quarterly earnings reports. Batch schedules (also called report bursting) add an additional layer of personalization by linking in a data field for each recipient.

NOTE

The **Scheduler Service** is an optional feature. Check with the system administrator for more information.



Choosing to schedule the Expenses report from the Report Tree's context menu

Creating a Schedule

Schedules are created and edited with the **Schedule Report Wizard**.

 A screenshot of the 'Schedule Report Wizard' form. The 'Recurrence' tab is active. The form includes fields for:

- Schedule Name:** Expenses - Daily
- Export Type:** PDF (dropdown)
- Password (optional):** (text field)
- Confirm Password:** (text field)
- ☐ **Execute Immediately**
- Schedule Time:** 12:00 pm (clock icon)
- ☒ **Repeat Every...**
 - 2 hour(s) 0 minute(s), until 08:00 pm (clock icon)
- Recurrence Pattern:**
 - Once
 - ☒ **Daily**
 - Every 1 day(s)
 - Weekly
 - Monthly
 - Yearly
 - Every weekday
- Range of Recurrence:**
 - Start: 04/22/2019 (calendar icon)
 - ☐ No end date
 - ☐ End after 1 occurrences
 - ☒ End by 06/18/2020 (calendar icon)

 At the bottom are buttons: Previous, Next, Cancel, and Finish.

Scheduling a report for daily expenses to run every 2 hours every day of the week until 6/18/2020

To schedule a report:

- Choose the report to schedule in the **Report Tree** then start the **Schedule Report Wizard** by either:
 - right-clicking on it then clicking **Schedule Report**
 - clicking the **Menu** icon and then clicking **Schedule Report**.
- Enter a user-friendly **Schedule Name**. The Schedule Name is displayed in the Schedule Manager.
- Select an **Export Type** to choose which file type to save the report as. Dashboards have two PDF output options: either as a Chained Report or as a Snapshot as it appears on screen.
- Optional:* For PDF or Excel export types, enter a **Password** to secure the output file.
- Select a date and time for the schedule, and how often it should run:
 - In the **Schedule Time** field, enter a time for when the schedule should run.
 - Optional:* To run the schedule as soon as it is created, select the **Execute Immediately** check box. This schedule cannot be given a recurrence pattern. Go to step 6.
 - Optional:* To run the schedule multiple times per day, check the **Repeat Every** check box and enter a time for how often it should repeat.
 - Optional:* To run the schedule multiple days, choose a **Recurrence Pattern** from the available options:
 - Daily**—the schedule repeats every day, every weekday, or every number of days. Enter a number of days for how often the schedule should repeat, or select **Every weekday** to run it every Monday–Friday.
 - Weekly**—the schedule repeats every week, or every number of weeks on one or more days. Enter a number of weeks for how often the schedule should repeat, and select one or more days when it should run.
 - Monthly**—the schedule will repeat every month, or every number of months, on a certain day. Enter a day for when the schedule should run, and a number of months for how often it should repeat.
 - Yearly**—the schedule will repeat every year on a certain day. Enter a day for when the schedule should run.

- *Optional:* If you have entered a recurrence pattern, enter a date for when the schedule should **Start**.
6. *Optional:* To add filters to the report click the **Filters** tab. If the report already has filters you can set their values here. See [Filters](#) for instructions.

NOTE

In versions prior to *v2018.2*, **Chained Reports** do not support scheduled filters.

7. *Optional:* To email this schedule to addresses from a database, see **Emailing personalized reports**.
8. Click the **Recipients** tab. To send the report to a list of email addresses, select the **Email Reports** check box and fill out the following fields:
1. Enter the recipients' email addresses in the **To**, **Cc**, and **Bcc** fields. Separate multiple e-mail addresses with a semicolon.
 2. *Optional:* Enter an email subject in the **Subject** field.
 3. *Optional:* Enter an email message in the large text field.

If you do not want to email the report, uncheck the **Email Reports** checkbox. The report will be saved to disk instead. You may have to ask your system administrator for the file location.

NOTE

To save the report to a repository instead of e-mailing it, review the **Saving Reports to a Repository** section below.

9. *Optional:* If this is a batch schedule, an **Attach Report Output to Email** check box is available. Clear this check box if you want to use this report to send alerts, and you do not want to email the report itself.
10. To execute a test run before finalizing the schedule, click the **Test E-Mail** button.
1. The **Test Recipients** textbox will be pre-filled with the e-mail addresses from the **To:** field. Add, edit or delete e-mail addresses to send the test to in this textbox.
 2. Click **Send** to send the schedule's email now. This is generally used to check the email's content and formatting.

Send Test Email



Test created and will run immediately.

Close

Test message sent successfully
confirmation dialog

11. Click **Finish** to save the schedule.

Schedules can be edited after they are created. See **Viewing and Editing Schedules** below for more information.

Saving Reports to a Repository

In addition to being emailed, Scheduled Reports can be set to run and automatically saved to a specific location. This can be useful for users who wish to automate certain report executions but do not wish to add extra clutter to an email inbox.

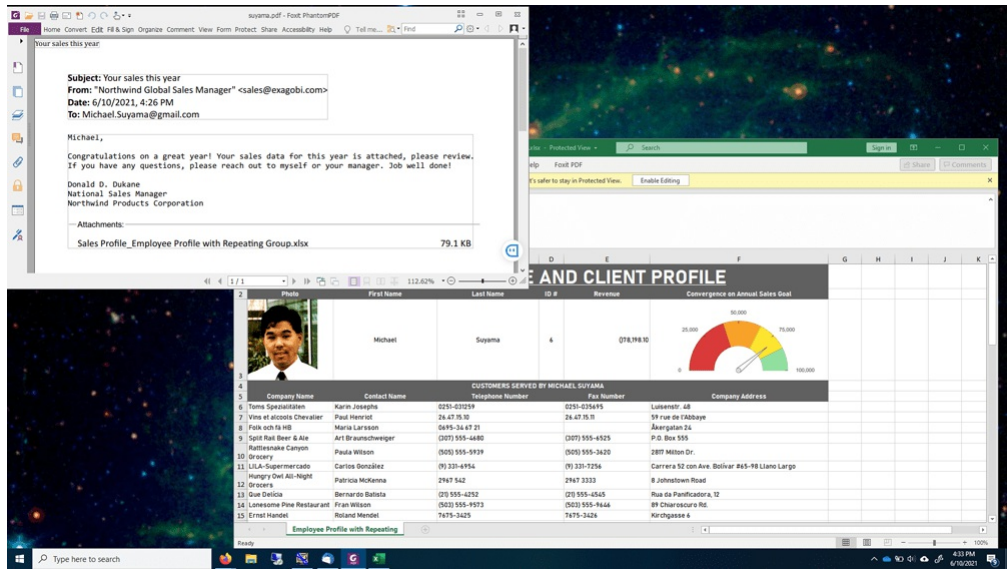
To send Scheduled Reports to a repository instead of a recipient via email, simply uncheck the 'Email Reports' option in the Recipients tab when creating a new Scheduled Report.

NOTE

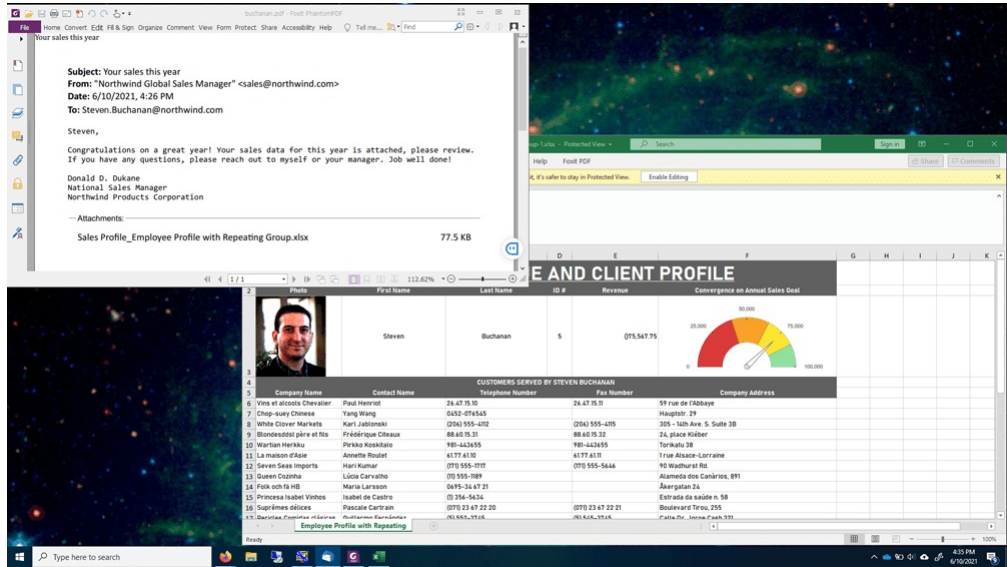
The availability of the **Email Results** checkbox is determined by the system administrator, so it may not be available in every environment.

Batch Emailing Personalized Reports

Batch scheduling or **bursting** can send personalized versions of reports to a list of email addresses. The addresses must be defined in a data object, the unique key of which is used as a blanket filter for the report. Each recipient receives a customized version, filtered by their unique key.



Example of customized e-mail message and filtered report sent to two unique recipients of a batch schedule, this one is for Michael Suyama



This second report output is customized for Steven Buchanan

In order for batch scheduling to work properly, it requires access to a data object with a column of email addresses that must be either located within or joinable to the underlying table. This data object can be added in the **Data Objects** menu of the report. If this column does not exist, the report will abend with the following error:

System.Exception: Batch email column has no join logic to attach to report.

NOTE

The data object containing the email addresses does not need to be added to the report itself.

To make a batch schedule:

1. In the Schedule Report Wizard, click the **Batch** tab.
2. Check the **Run as Batch Report** check box.
3. *Optional:* In the **To** and **Cc** fields, enter addresses to send a summary email for each completed execution.

Sales Profile : Batch Summary

Northwind Global Sales Manager <sales@northwind.com>
Thu 6/10/2021 4:26 PM
To: Northwind Global Sales Manager <sales@northwind.com>
1 : Nancy.Davolio@northwind.com : The scheduled report executed successfully.
2 : Andrew.Fuller@northwind.com : The scheduled report executed successfully.
3 : Janet.Leverling@northwind.com : The scheduled report executed successfully.
4 : Margaret.Peacock@northwind.com : The scheduled report executed successfully.
5 : Steven.Buchanan@northwind.com : The scheduled report executed successfully.
6 : Michael.Suyama@northwind.com : The scheduled report executed successfully.
7 : Robert.King@northwind.com : The scheduled report executed successfully.
8 : Laura.Callahan@northwind.com : The scheduled report executed successfully.
9 : Anne.Dodsworth@northwind.com : The scheduled report executed successfully.

Total Jobs : 9
Successful : 9
No Data Qualified : 0
Failed : 0

Example batch summary e-mail

- 4. From the **Batch Email Field** list, select the data field containing the email addresses for this schedule. Fields can contain a list of email addresses, separated by semicolons (;).
- 5. *Optional:* Click the **Recipients** tab to enter a subject and message for the batch email.

You can reference data values from the email address data row in the message body. Type the parameter `@batch_column`, where *column* is the name of a data field in the address category (in lowercase text). The value of the field replaces the parameter text in the message output.

TIP

The **To**, **Cc**, and **Bcc** fields are unavailable when using Batch. Dashboards can not be scheduled as a Batch report.

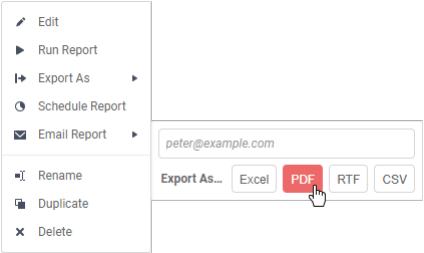
Emailing a Report Immediately

NOTE

This feature can be disabled by the system administrator, it may not be available in every environment.

In addition to creating a recurring schedule, the application provides the option to email a report immediately directly from the Report Tree.

To do this, select the desired report to email and select the **Email Report** option from the context menu. Users are then prompted to fill out the email address and select the output format for the report. Only the export types available for a report can be selected from the list. If a report has no export types, it may not be emailed.



Sending an report as a PDF immediately to

Schedule Manager

Click the **Schedule Manager**  icon on the application's main menu to open the **Schedule Manager**. Depending on system configuration, you may be able to see reports scheduled by other users. Ask your system administrator for more information.

- Search for a schedule, report name, company ID or user ID with the **Search schedules...** field at the top of the tab.
- Click **Refresh**  to reload all of the available schedule information from all of the Scheduler Services
- Click **Flush**  to clear any completed, deleted, abended or aborted from the Scheduler Manager view and the Scheduler Services working directories

Search schedules... Refresh Flush

Company Id	User Id	Host	Schedule Name	Type	Report Name	Last Execute Date	Next Execute Date	Status	Run Count		
Hughes Markets	DonnieH.Lane	http://localhost:2001	Customer Orders (email)	Daily	Orders per Customer	01/18/2021 14:27:50		Completed	1		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Customer Orders	Daily	Orders per Customer	01/18/2021 14:27:47	01/18/2021 14:28:00	Ready	3		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Customer Orders (email)	Daily	Orders per Customer	01/18/2021 14:26:45		Completed	1		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Customer Orders (email)	Daily	Orders per Customer	01/18/2021 14:25:41		Completed	1		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Immediate (email)	Once	Company Orders	01/18/2021 14:24:39		Completed	1		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Immediate	Once	Company Orders	01/18/2021 14:24:37		Completed	1		✖
Janeville Nursing Home	AnnaEPope	http://localhost:2001	Immediate (email)	Once	Dukane Memorial Nurse Calls	01/18/2021 14:21:35	01/18/2021 14:31:35	Ready	1		✖
Exago, Inc.	Tim Light	http://localhost:2001	Orders per Customer (cache)	Daily	Orders per Customer	01/18/2021 09:00:35	01/19/2021 09:00:00	Ready	31		✖
Exago, Inc.	Tim Light	http://localhost:2001	User Profile with Friends (cache)	Daily	User Profile with Friends	01/18/2021 08:00:33	01/19/2021 08:00:00	Ready	27		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Immediate	Once	long report			Running (53%)	0		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Current Data	Daily	long report		01/18/2021 15:00:00	Ready	0		✖
Exago, Inc.	Tim Light	http://localhost:2001	Quarterly Earnings Report	Monthly	Donations Gauge Thermometer		01/31/2021 09:00:00	Ready	0		✖
Hughes Markets	DonnieH.Lane	http://localhost:2001	Played Today	Daily	Songs Played		01/18/2021 23:55:00	Ready	0		✖

Example of a Scheduler Manager view for multiple users showing several jobs, some completed, some ready to run and some currently in execution

Each scheduled event is on a row with its most recent and forthcoming run times and a status indicating its condition:

- **Ready** – this schedule will run at the next scheduled execution time.
- **Running** – this schedule is currently executing
- **Transmitting** – this scheduled event has finished running, and the report is being sent to its recipients
- **Completed** – this schedule has completed its final event, and will not run again. It will be removed from the list when the cache is flushed.
- **Deleted** – this schedule has been deleted, and will be removed from the list when the cache is flushed.
- **Abended** – the last run failed due to an error. The schedule will not run again.
- **User Aborted** – this schedule is running, but it was requested to be canceled. It will be marked as Deleted.

Scheduled events which have passed are copied to their own row, so that there is a log of previous run times, with a disposition after their name. Event dispositions may be:

- (archive) – a completed execution of a scheduled report that was saved to disk
- (email) – a completed execution of a scheduled report that was emailed
- (cache) – an Execution Cache job
- (test) – a schedule test triggered with the **Test Email** button v2019.2.2+

Deleting these rows does not affect the main schedule. These rows are cleared when the cache is flushed, either automatically or by clicking the **Flush** icon.

icon.

Editing, Deleting and Managing Schedules

To edit an existing schedule click the **Edit** icon at the end of the row. Changes to the recurrence pattern will affect all forthcoming run times. You can reuse or reset deleted or completed schedules by editing them. This will reset their status to Ready.

To delete a schedule click the **Delete** icon at the end of the row. This sets its status to Deleted. If the schedule is already marked as Deleted, this removes the schedule from the list.

Completed and canceled schedules and archives may be periodically removed from the list by the Scheduler Service's automatic cleanup routine. Click **Flush** icon

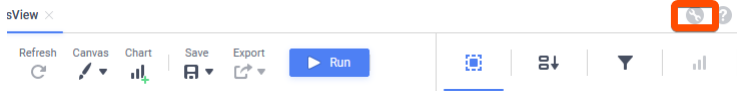
to clear the Scheduler cache and remove them immediately.

User Preferences and Context Sensitive Help

User Preferences

NOTE

The **User Preferences** are an optional feature. Check with the system administrator for more information.



Click the wrench icon in the top-right corner to open the User Preferences dialog

Click the **User Preferences** icon to open the User Preferences dialog. The dialog consists of tabs:

- Startup Reports
- User Reports

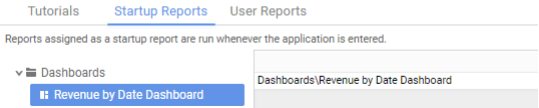
Startup Reports

Startup Reports run in their own tabs each time a user starts a session. The system administrator can limit the number of startup reports allowed.

- To **add** a startup report, use the Report Tree panel in the dialog on the left to either:
 - Drag-and-drop it to the **Report Name** panel on the right
 - Click a report name and then click the **Add** button
 - Double-click a report name

- To **reorder** the reports use the **Move Item Up** ^ and **Move Item Down** v icons.
- To **remove** a startup report, click the **Delete** ✖ icon on the corresponding line. This only stops the report from loading on startup, it does not remove the report from the application.

User Preferences



The Startup Reports tab of the User Preferences dialog with one startup report, named Revenue by Date Dashboard

User Reports

User Reports are customizations made by a user to an existing report. Customizations may include formatting, sorts and filter values chosen in the Report Viewer. This is an optional feature, and requires that the system administrator has enabled it.

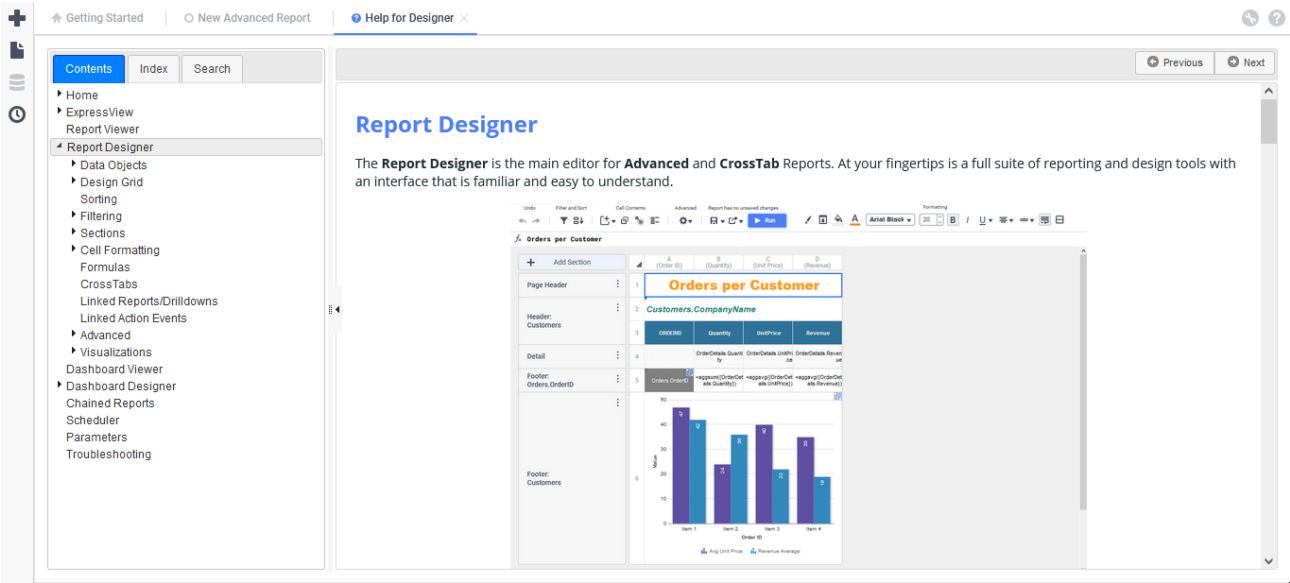
This tab will show a list of user reports saved for the current user.. To **remove** a User Report, click the **Delete** ✖ icon on the corresponding line.

This only stops the report from loading with customization, it does not remove the report from the application.

To create a user report, execute the report into the Report Viewer, make changes and then save them using the Report Viewer's toolbar. For more information, review the Report Viewer article.

Context Sensitive Help

Context sensitive help is available at any point in the application. Click the **Help** ? icon to open documentation in a new tab. The guide will automatically open to the content pertaining to the active Designer, dialog or feature.



Context Sensitive Help window opened showing the Report Designer help content