Creating Reports Using Db2 Web Query Designer Volume 2

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Contents

Chapter 1

Creating Reports

You can create reports in a visualization in Db2 Web Query Designer similar to the way in which you create charts. Reports allow you to communicate information at a high level of detail using a familiar tabular format. You can create a stand-alone report in a visualization, or combine multiple reports in a page.

In this chapter:

Styling Reports in Db2 Web Query Designer

You can apply styling changes to a report to help it visually match the styling of your other content, and make it easier to read and more visually appealing. You can style a report from the Format tab on the Properties panel.

On the Format tab, you can select a theme (.sty file, or StyleSheet), to apply to your report. Themes style multiple components of a report, such as headers, column titles, and data text, all at once. Themes include associated cascading style sheet files along with a StyleSheet to help coordinate styling between an individual report and the entire visualization.

When creating a stand-alone report, the default theme is Designer 2018. When you change a visualization into a page by adding a second new content item, the theme used for the report is applied to the page. When you add items to the page, either by creating them or adding them as external content, the page theme is used as the default for all content items. You then can change the theme for each individual item.

If you prefer, you can specify one of the themes included with Db2 Web Query, such as the Designer 2018, Light, Midnight, or Vivid theme, select a custom theme saved to the Global Resources area in the repository, or you can click *Custom* to select a legacy template or a StyleSheet saved to a workspace in your repository. When you select a StyleSheet using the Custom option, it is applied to the report and added to the Theme list.

To make a custom theme available directly from the Theme menu, create a folder for it in the Global Resources area, in the Themes folder, in the Custom folder. In that folder, you can add a custom StyleSheet to use with charts and reports, and a custom CSS file to use for pages. The .sty file and .css file must both be named *theme*. An .sty file and .css file that share the same theme folder are associated. If you select a theme for a report, which uses the .sty file, then when you convert it to a page, the associated .css file is used as the page theme, by default.

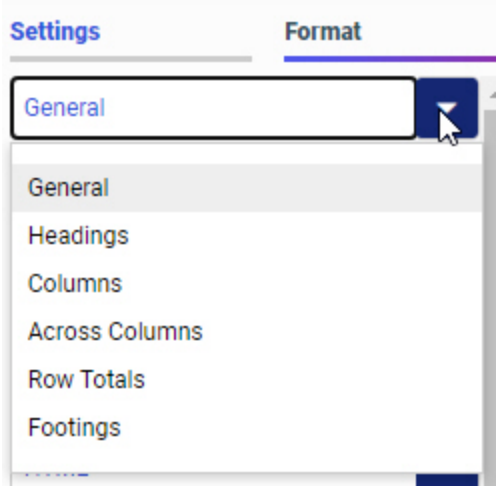
Tip: When creating a custom theme, you can copy the CSS and StyleSheet syntax from existing themes to use as a model.

Note: Charts and reports created for use on pages can use a transparent background to allow the defined background color of the page containers to show through. Since the themes used for charts and reports (.sty files) can be associated with themes for pages (.css files), you can coordinate the background, text, and element colors used in both themes to create content with unified styling. At design time, the page theme associated with the chart or report theme is used for the canvas background. This is for visibility purposes only, and shows how the chart or report will appear when added to a page with the associated theme. The stand-alone chart or report does not include this background.

If a chart or report is run stand-alone instead of being added to a page, the run-time view displays a white background only. This means that if, in order to display on a dark colored page, the font color in the selected theme is defined as white and uses a transparent chart background, then the text will not be visible on the white preview background. An example of such a theme is the Midnight theme, provided as one of the default themes in the Global Resources. To view the white text, build your chart or report on the canvas, or add it to a page container with a dark background.

You can apply styling changes to a report to help it visually match the styling of your other content, and make it easier to read and more visually appealing. You can style a report from the Format tab on the Properties panel.

On the Format tab, you can use the quick access menu to select the section or component of the report whose styling properties you want to change, as shown in the following image.



You can style the following sections or components of a report:

- **General.** Set properties, such as a theme, font, or background color, that affect the entire report.
- **Headings.** Set text, border, background, and cell margin properties for report level and page level headings.
- **Columns.** Format the text and cells for column titles and data values.
- **Across Columns.** Format the text and cells for across column titles and data values. You can create across columns by adding dimensions to the Columns bucket in a report.
- **Row Totals.** Set text and cell properties for column and row totals.
- **Footings.** Set text, border, background, and cell margin properties for report level and page level footings.

If you are styling Columns, Across Columns, or Row Totals in a report, you can select a specific field whose title or values you want to style. You can revert the changes you made in any area by clicking *Reset to Theme* on the Format tab. Only the settings in the selected area are reset.

Setting General and Columnar Report Properties

When you select *General* from the quick access menu on the Format tab, you are presented with options to style and format the entire report. These options include the ability to set a theme, change the output format, change the font style and size, style cells and cell borders, set cell margins, and configure how column widths are set. Font and cell styling options can be set for the entire report, or for specific columns within it.

Applying Themes to Reports

On the Format tab, in the General settings, in the General Options section, you can select a theme (.sty file, or StyleSheet), to apply to your report from the Theme menu. Themes style multiple components of a report, such as headers, column titles, and data text, all at once. Themes include associated cascading style sheet files along with a StyleSheet to help coordinate styling between an individual report and the entire visualization.

When creating a stand-alone report, the default theme is Designer 2018. When you change a visualization into a page by adding a second new content item, the theme used for the report is applied to the page. When you add items to the page, either by creating them or adding them as external content, the page theme is used as the default for all content items. You then can change the theme for each individual item.

If you prefer, you can specify one of the themes included with Db2 Web Query, such as the Designer 2018, Light, Midnight, or Vivid theme, select a custom theme saved to the Global Resources area in the repository, or you can click *Custom* to select a legacy template or a StyleSheet saved to a workspace in your repository. When you select a StyleSheet using the Custom option, it is applied to the report and added to the Theme list.

To make a custom theme available directly from the Theme menu, create a folder for it in the Global Resources area, in the Themes folder, in the Custom folder. In that folder, you can add a custom StyleSheet to use with charts and reports, and a custom CSS file to use for pages. The .sty file and .css file must both be named *theme*. An .sty file and .css file that share the same theme folder are associated. If you select a theme for a report, which uses the .sty file, then when you convert it to a page, the associated .css file is used as the page theme by default.

Tip: When creating a custom theme, you can copy the CSS and StyleSheet syntax from existing themes to use as a model.

Note: Charts and reports created for use on pages can use a transparent background to allow the defined background color of the page containers to show through. Since the themes used for charts and reports (.sty files) can be associated with themes for pages (.css files), you can coordinate the background, text, and element colors used in both themes to create content with unified styling. At design time, the page theme associated with the chart or report theme is used for the canvas background. This is for visibility purposes only, and shows how the chart or report will appear when added to a page with the associated theme. The stand-alone chart or report does not include this background.

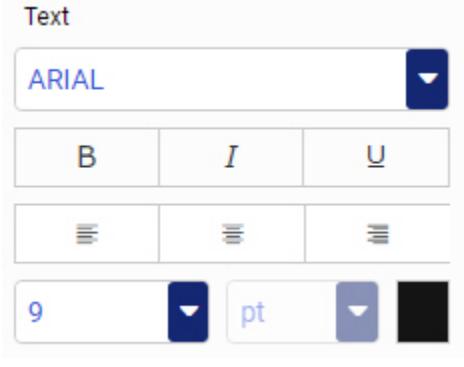
If a chart or report is run stand-alone instead of being added to a page, the run-time view displays a white background only. This means that if, in order to display on a dark colored page, the font color in the selected theme is defined as white and uses a transparent chart background, then the text will not be visible on the white preview background. An example of such a theme is the Midnight theme, provided as one of the default themes in the Global Resources. To view the white text, build your chart or report on the canvas, or add it to a page container with a dark background.

Formatting Text in a Report

You can use text formatting options to change the font, font style, alignment, size, and color of the text in your report. On the *Format* tab, in the *General* options, you can set these options for the entire report.

To set the same properties but only apply them to particular columns in your report, select *Column* from the quick access menu. In the Select Elements and Columns area, you can then specify whether your formatting should apply to the column titles, data values, or both, and which column should be affected. This allows you to set styling options that affect specific columns of the report, highlighting or distinguishing certain fields.

The text formatting options are shown in the following image.



A list of default fonts is provided. To add a font to this list, specify the font files for each font style, such as regular, bold, and italic, in the fontuser.xml file, in your server installation. This file is located in the etc subdirectory of the server configuration directory, for example, /qibm/UserData/qwebqry/ibi/srv/wfs/etc. If you are configuring a TrueType font, you do not need to specify the AFM font metrics file.

Formatting Cells in a Report

You can style the body of your report by applying cell border lines, specifying cell background colors, and setting cell margins. These options can help to make your report more legible by separating and spacing out the text, and by delineating different rows of data. On the *Format* tab, select *General* from the quick access menu to apply this formatting to the entire report. Select *Columns* and then make selections from the Select Elements and Column menus to apply cell formatting to the data values, column headers, or both areas of the selected column or columns.

You can add borders to the report to visually separate each value in the report. Borders are applied around each cell. Select the *Show Border* check box to enable cell borders. You can then set the border style, thickness, and color. The following border styles are available:

- **Solid.** Applies a solid line border.
- **Dot.** Applies a dotted line border.
- **Dash.** Applies a dashed line border.
- **Double.** Applies a two line border.
- **Groove.** Applies a three-dimensional grooved border. Half of the border is shaded to make it appear three-dimensional.
- **Ridge.** Applies a three-dimensional ridged border. The shaded half of the ridged border is opposite to that of the grooved border.
- **Inset.** Applies a three-dimensional inset border. The inset border is shaded similarly to the ridged border.
- **Outset.** Applies a three-dimensional outset border. The outset border is shaded similarly to the grooved border.

Note that since these border options are applied around the entire cell, they are considered more general than side-specific borders that can be set in a theme or StyleSheet. If your theme or StyleSheet uses these side-specific borders, they will override the borders applied in Db2 Web Query Designer.

You can change the background color that appears behind the entire report, only the column titles, or only the data values in one or more columns of a report. Click the color swatch next to Report, Title Row, or Data Row to change the background color for the associated area. If you change the color for Report, the background color of the entire report, including the column title area and data values, is changed. Alternatively, you can set the background color for just the column titles using just the Title Row color option, or for just the data values using the Data Row color option. If you select *Columns* from the quick access menu and then select a specific column from the Select Elements and Columns menus, the background color is only applied to a single column.

When setting the background color for the data values in the report, you can apply different colored bands to made it easier to differentiate different rows or sort groups. You can set alternating bands in a repeating pattern of up to 4 rows. To add bands, click the plus (+) icon to the right of the Data Row option, then set a second color. To add another color to the band pattern, click the plus (+) sign again. To remove a band color, click the minus (-) sign. The following image shows a report with 4 Data Row colors set in a pattern of yellow, white, blue, and white.

Sale Year	Sale Quarter	Product Category	Quantity Sold	Revenue	Gross Profit
2015	1	Accessories	4,580	$1,125,123.02	$347,865.02
		Camcorder	3,873	$1,225,199.72	$406,657.72
		Computers	1,343	$302,839.60	$117,086.60
		Media Player	11,717	$3,427,197.08	$925,302.08
		Stereo Systems	15,000	$3,320,151.66	$1,072,105.66
		Televisions	3,925	$1,566,904.80	$385,015.80
		Video Production	1,720	$477,391.46	$154,764.46
	2	Accessories	4,662	$1,165,106.04	$362,612.04
		Camcorder	3,812	$1,244,408.92	$409,405.92
		Computers	1,235	$285,463.66	$110,264.66
		Media Player	11,618	$3,268,394.69	$894,116.69
		Stereo Systems	13,259	$3,026,456.46	$948,934.46
		Televisions	3,748	$1,577,021.42	$387,599.42
		Video Production	1,731	$480,282.56	$149,265.56

By default, each band spans a single row of the report. As an alternative, you can set each band to span a sort group, visually distinguishing values for different sort fields. To change the scope of each band, open the Alternate On menu and select a sort field in your report. To following image shows a report with 4 Data Row colors set in a pattern of yellow, white, blue, and white, alternating on each value of the Sale Quarter field.

Sale Year	Sale Quarter	Product Category	Quantity Sold	Revenue	Gross Profit
2015	1	Accessories	4,580	$1,125,123.02	$347,865.02
		Camcorder	3,873	$1,225,199.72	$406,657.72
		Computers	1,343	$302,839.60	$117,086.60
		Media Player	11,717	$3,427,197.08	$925,302.08
		Stereo Systems	15,000	$3,320,151.66	$1,072,105.66
		Televisions	3,925	$1,566,904.80	$385,015.80
		Video Production	1,720	$477,391.46	$154,764.46
	2	Accessories	4,662	$1,165,106.04	$362,612.04
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		Stereo Systems	13,259	$3,026,456.46	$948,934.46
		Televisions	3,748	$1,577,021.42	$387,599.42
		Video Production	1,731	$480,282.56	$149,265.56
	3	Accessories	4,783	$1,270,872.45	$390,073.45
		Camcorder	4,346	$1,536,974.19	$484,041.19
		Computers	1,659	$349,989.27	$137,694.27
		Media Player	12,688	$3,585,613.72	$976,931.72
		Stereo Systems	10,607	$2,738,062.03	$817,195.03
		Televisions	4,301	$1,796,316.25	$443,139.25
		Video Production	1,909	$557,392.58	$170,352.58
	4	Accessories	6,127	$1,478,196.06	$458,077.06
		Camcorder	5,691	$1,871,848.70	$608,214.70
		Computers	2,493	$503,542.66	$195,915.66
		Media Player	14,943	$4,699,372.86	$1,250,601.86
		Stereo Systems	14,541	$3,790,147.58	$1,124,739.58
		Televisions	4,431	$1,540,975.20	$373,803.20
		Video Production	2,675	$753,824.57	$232,170.57

To better space out the values in your report, you can change the cell margins. You can select preset small, medium, and large margin options, or click the ellipsis button to set custom cell margins. When setting custom margins, you can set different margin sizes for each side of the cells in your report. When setting custom margins, note that the selected units are used. The default unit is inches.

To undo all custom styling changes made in the General options or Columns options, click *Reset to Theme*. All options revert to their default values, which are dependent on the theme used in the report.

Controlling Column Width

When you create a report, the width of each column depends upon the values in the column, and the width of the page in which the report is displayed. Three options are available to set column width behavior. They are available in the Column Width menu, in the Other Options section of the General options on the Format tab.

The default Column Width option is *autofit*. When the autofit option is used, the width of each column is set to fit the column title or row with the most characters, minimizing the amount of space that each column uses while still displaying each value in its entirety.

If you change the Column Width option to *based on value*, the maximum width of each column is based on the format of each field used in the report. If the report is filtered so that the longest values are not included, the column width is still wide enough to include those values.

Select *fixed value* to create a report that always fills the width of the container into which it is placed, no matter how wide the container is.

Note that if your theme specifies values for the SQUEEZE or AUTOFIT options, that this may override the Column Width setting in Db2 Web Query Designer.

Adding Margins to Report Headings and Footings

When you edit the text in the heading or footing of a chart or report, a set of basic text styling options appears in the styling toolbar at the top of the canvas. This toolbar provides options to change the font, text size, font style, alignment, text color, and background color of the heading or footing text. For more information about these options, see *Adding Headers and Footers to Content* on page 16.

You can set margins for the headings and footings in a report from the Format tab. Open the *Format* tab and then select *Heading*s or *Footing*s from the quick access menu. In the Heading Options and Footing Options areas, you can apply a preset margin by selecting the preset *Small*, *Medium*, or *Large* options, or you can select the custom margin option and use a spinner control to set your own top and bottom margins separately. These can be set in intervals of 0.05 inches.

Formatting Across Column Labels in a Report

When you add a field to the Columns bucket in a report, measure columns are repeated for each value in that field. The field values are shown above the measure column titles, identifying the across field value that they represent.

When creating a report with across fields, such as a crosstab report, you can select *Across Columns* from the quick access menu on the Format tab to style the field names and values for each one. As when styling columns in a report, from the Select Elements and Columns menus, you can choose whether to style the field titles and values, or just one or the other. You can also choose whether to style the field titles and values for all across fields, or a single across field. Note that while the default field selection is *All Columns*, across field names and values display in a row. *All Columns* in this case refers to all columns from your data source, and allows you to style across field titles and values for all fields in the Columns bucket.

You can style across field titles and values by changing the font, style, alignment, size, and color of the text; changing the background color of the title and values; and adjusting margins.

In the Other Options area, you can select *Show title on the side* to display the across field titles and value in the same row of text. This is especially useful in Excel output, where placing the across field title on a separate row from the values would result in empty cells. Select *Hide null columns* to hide across values that only have null values on a page of a report, so that columns without values are not shown. For example, the following image shows a report with the Hide null columns option enabled and page breaks on the Customer Business Sub Region field. Since there are no values in the SA-Span subregion for the Sale Year value of 2015, the columns for that year are removed. Since there were sales in 2015 in the SA-Port region, the columns are still included on that page of the report.

Customer Business Sub Region	Customer Country	Sale,Year	2015		2016		2017		2018		2019		2020	
		Sale Quarter	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue
SA-Port	Brazil	1	2,913	$758,872.92	2,424	$696,323.37	3,230	$977,632.64	3,992	$1,208,934.86	7,827	$2,338,258.15	11,506	$3,543,181.76
		2	2,704	$754,038.17	2,402	$726,464.44	2,965	$871,365.78	3,916	$1,135,701.57	7,513	$2,248,101.13	11,048	$3,370,391.00
		3	2,786	$830,428.29	2,476	$757,953.22	3,098	$929,426.40	3,892	$1,144,110.09	7,556	$2,266,851.43	11,202	$3,410,163.83
		4	3,261	$953,077.54	2,839	$843,447.26	3,613	$1,097,622.47	4,728	$1,415,255.60	8,695	$2,660,081.25	13,076	$4,057,437.51

Customer Business Sub Region	Customer Country	Sale,Year	2016		2017		2018		2019		2020	
		Sale Quarter	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue	Quantity Sold	Revenue
SA-Span	Argentina	1	121	$36,972.02	237	$71,371.51	451	$134,132.41	1,128	$331,643.90	2,305	$733,850.62
		2	36	$13,222.94	163	$45,623.08	273	$86,068.07	1,290	$388,889.87	2,359	$723,122.37
		3	31	$10,626.43	135	$49,648.69	365	$115,185.13	1,209	$383,173.44	2,315	$729,792.09
		4	69	$24,776.34	288	$83,087.18	486	$134,938.27	1,510	$448,663.33	2,500	$747,160.23
	Chile	1	26	$8,494.90	62	$21,456.32	128	$38,534.80	371	$100,920.15	1,672	$492,892.81
		2	20	$8,772.07	60	$17,561.90	98	$37,152.65	375	$111,845.71	1,585	$470,194.13
		3	24	$5,962.78	48	$11,319.72	124	$37,608.52	316	$103,306.90	1,635	$505,128.92
		4	16	$4,153.56	68	$22,154.70	134	$52,312.80	618	$173,818.12	2,066	$635,053.55
	Colombia	1	119	$32,515.48	248	$65,653.68	446	$125,805.02	1,195	$356,998.75	2,118	$661,305.33
		2	38	$10,115.36	192	$56,986.40	306	$88,305.99	1,141	$341,219.41	2,239	$671,470.67
		3	48	$12,757.68	154	$39,297.93	378	$117,021.59	1,084	$341,864.84	2,036	$634,554.16
		4	50	$15,558.34	311	$87,747.48	506	$144,973.88	1,374	$418,698.79	2,555	$798,390.36

You can also select *Repeat across values* to show the across value above every measure column in the report instead of only once for each group of measure columns.

Styling Column and Row Totals in a Report

As with the data values in a report, you can apply styling to the row and column totals in a report to visually separate them from the rest of the values in your report and to draw attention to them. To add row and column totals to a report, on the Settings tab, in the Content Settings area, select *Enable column totals* and *Enable row totals*. To style your totals, on the Format tab, select *Row Totals* or *Column Totals* to display row or column total styling options. These options include text styling options, such as the font, style, alignment, size, and color; background color options; and cell margin sizing.

From the Select Elements and Columns menus, you can choose whether the styling changes should affect the total label, values, or both. When styling row totals, you can also choose which columns are affected if there are across columns in the report. When row totals are added to a report with across columns, a separate row total column is generated for each measure field in the report. When there are no across fields, all measure fields are summed into a single row total column to which your styling is applied.

Column totals, on the other hand, are always arranged into a single row to which you can apply styling. However, if you select a single column from the drop-down menu, then you can style the total value, or values if there are across columns, for the selected field. The styling that you apply to the column totals is also applied to subtotals and recomputes, by default.

Adding Headers and Footers to Content

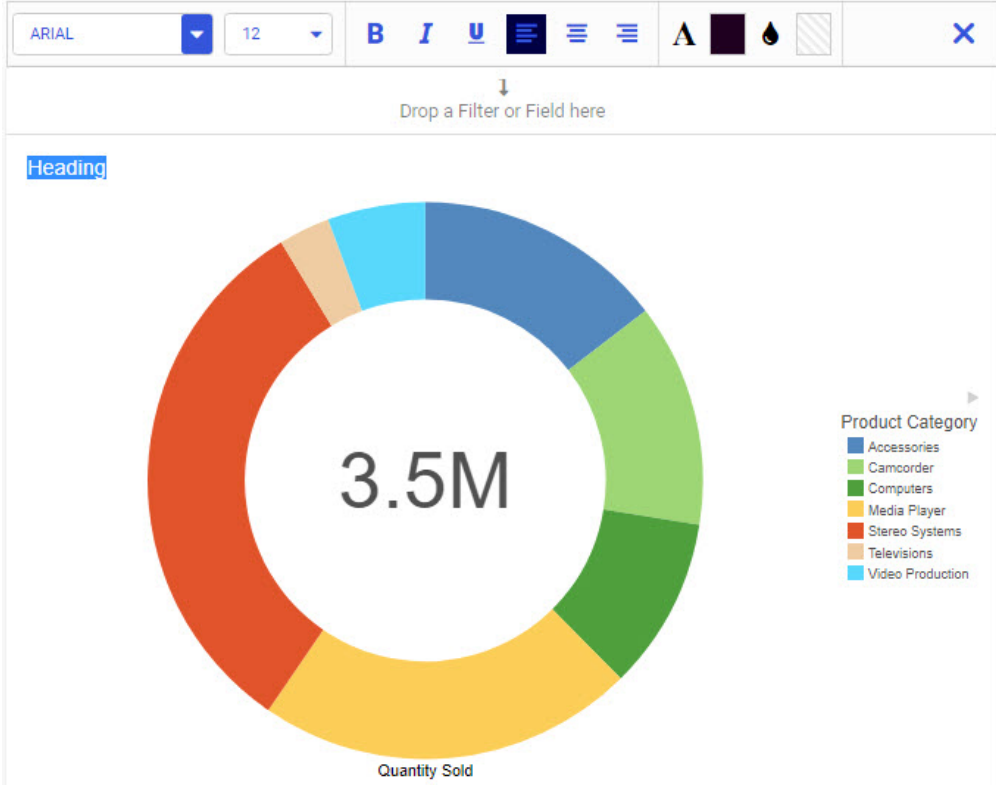
You can use headers and footers to add key information, such as the purpose of your chart or report and the audience for whom it is intended.

You can add multiple lines of information into the heading and footing areas, and apply different styling options to different sections of the heading or footing. This accommodates thorough explanations and additional information, while offering the most readable presentation.

When you create a chart or report, the heading area is available above your content, and the report footer is available below your content. You can click within these areas to edit them. To show or hide these areas, on the Settings tab, expand the Content section, then select the *Enable heading* or *Enable footing* check boxes.

When you double-click the Page Heading or Page Footing placeholder text in the canvas, the heading or footing is selected for editing and the styling toolbar appears.

You can make styling changes to the text in your headers and footers, according to your preferences. Using a WYSIWYG canvas, formatting changes are applied instantly, allowing you to see the results of your styling selections as you make them. When editing your header or footer, you can find the options at the top of the canvas, as shown in the following image.



You can change the font and font size using the drop-down lists. You can add bold, italic, and underline accents to your text. In addition, you can change the positioning of your text (left, center, and right). You can also customize the color of the text, as well as the background of the header or footer text area. When your formatting is complete, you can close the toolbar and continue working with your report. The canvas adjusts to ensure that all lines of the heading or footing are visible.

You can add a new line in the heading and footing by pressing the Enter key. The number of lines of heading and footing you can add to a report is only limited by the available space on your screen. A scrollbar is added to a report if all of the data cannot fit on the canvas or in the container.

When you are done editing the heading or footing, click the X button on the styling toolbar to close it. Once you have edited the header or footer, the updated text will appear when the report is run.

If you delete the header or footer text and then close the styling toolbar, the header or footer is removed from the report. You can select the header or footer area and enter text to add them to the report again.

Heading and footing text in Db2 Web Query Designer is created at the page level, so the heading or footing is displayed for each separate page of a chart or report. You can create separate pages in a chart by adding a field to the Multipage bucket, or in a report by right-clicking a field in the Rows bucket, pointing to *Insert breaks*, and selecting *Continuous numbering* or *Restart at 1*.

You can add dynamic heading or footing text by dragging a field from the Fields tab into the heading or footing text area, or by typing a less-than sign (<) followed by the field name. At run time, the first value for the selected field is displayed in place of the field name in the header or footer. You can combine dynamic page heading or page footing text with filters or page breaks to provide more relevant information at run time.

Procedure: How to Add a Dynamic Page Heading to a Report

You can add a dynamic page heading to a report that changes depending on filter selections and sort values for each page.

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace and a data source available from that workspace.

   Once you select a data source, Db2 Web Query Designer loads with options to create a single content item.

3. On the Content picker, select a report format, such as the standard report or grid report layout.
4. With the Fields tab selected on the sidebar, In the Dimensions area of the Resources panel, expand *Product*, and add the *Product Category* and *Product Subcategory* fields to the Rows bucket, in that order.
5. In the Measures area of the Resources panel, expand *Sales*, and drag *Quantity Sold* and *Revenue* to the Summary bucket.
6. Create a filter for Customer Country.

   In the Dimensions pane, expand *Customer* and drag *Customer Country* into the Filter toolbar.

7. Select *Argentina*, and click outside of the filter control to apply the filter.
8. Create a page break after each Product Category value.

   Right-click the *Product Category* field in the Rows bucket, point to *Insert Breaks*, and click *Continuous numbering*.
9. Double-click the Page Heading text above the report to select it for editing.
10. Delete the placeholder text in the heading area, and type *Sales for*.
11. From the Dimensions pane, drag the *Product Category* field into the heading area after where you typed Sales for.

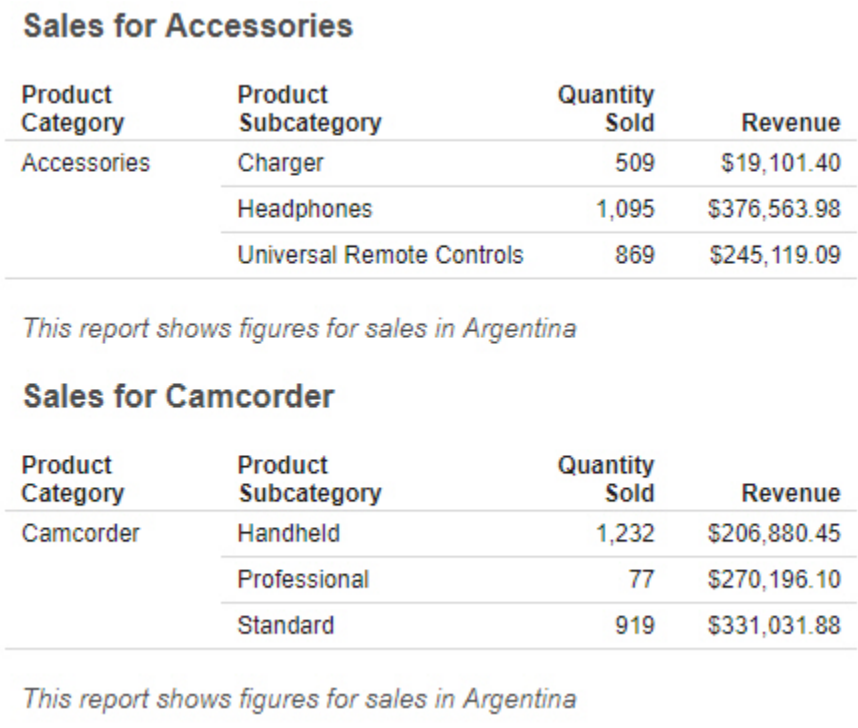
    The heading should resemble the following image. Dynamic values for the Product Category field will be substituted for the text string starting with the less-than sign (<) at run time.

    Sales for <WF_RETAIL_LITE.WF_RETAIL_PRODUCT.PRODUCT_CATEGORY
12. Click the close button on the styling toolbar to finish editing.
13. On the Properties panel, on the Settings tab, expand the Settings area and select *Enable footing*.
    The page footing placeholder text appears at the bottom of the page.
14. Double-click the page footing area to select it for editing.
15. Type, *This report shows figures for sales in*.
16. From the Dimensions pane, drag the *Customer Country* field into the footing area after the text that you just typed.

    The name of the field, with a less-than sign in front of it, appears in the page footing area.
17. With the entire page footing text selected, click the *Italic* button on the styling toolbar.
18. Click *Run in new window* to see a run-time view of the report.

    Notice that the page header appears and displays a different value for each Product Category value. The Page footer appears below each section of the report, and indicates that values are for Argentina, since this was the value selected for the Customer Country filter. If you were to select a different value for Customer Country, the footing text would automatically change.

The following image shows an example of what a section of the report may look like.



Sales for Accessories

Product Category	Product Subcategory	Quantity Sold	Revenue
Accessories	Charger	509	$19,101.40
	Headphones	1,095	$376,563.98
	Universal Remote Controls	869	$245,119.09

This report shows figures for sales in Argentina

Sales for Camcorder

Product Category	Product Subcategory	Quantity Sold	Revenue
Camcorder	Handheld	1,232	$206,880.45
	Professional	77	$270,196.10
	Standard	919	$331,031.88

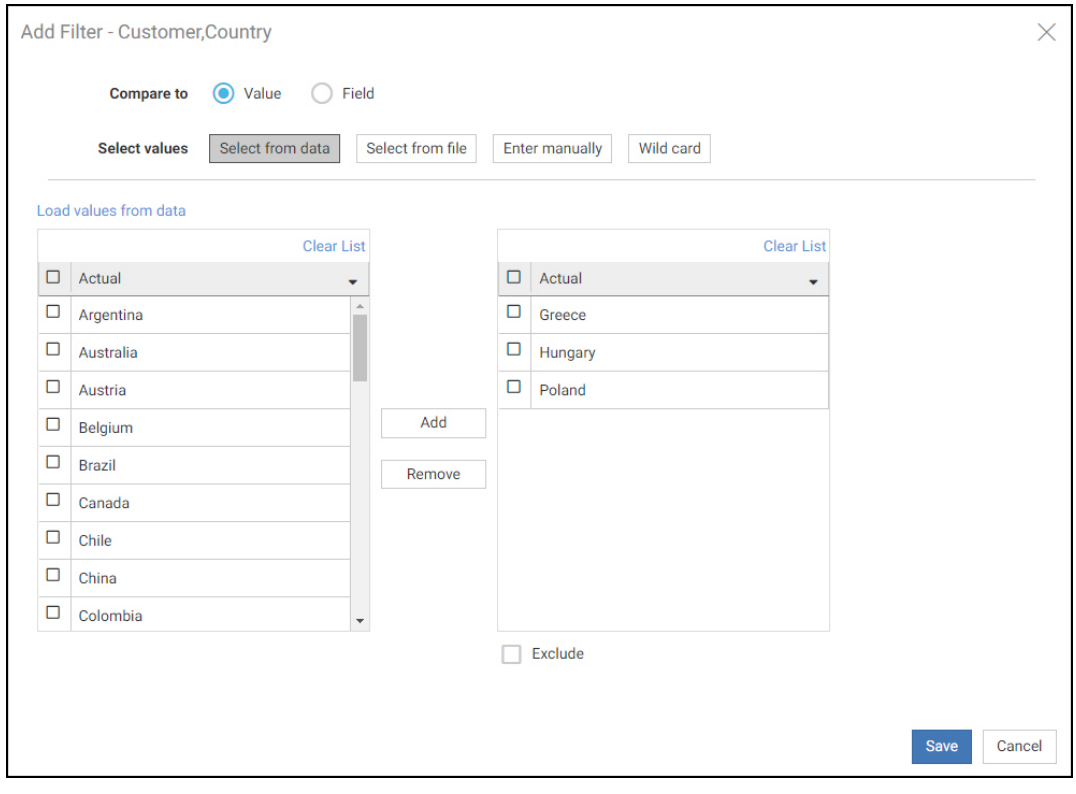
This report shows figures for sales in Argentina

Adding Filters to a Visualization

As you create charts and styled tabular content in Db2 Web Query Designer, you may want to narrow the display of information that is shown. You can do this by creating filters for fields in your data source. You can also use filters as a way to create custom displays of the data that you show in your content. For example, you may only want to show revenue information for specific product categories and models in a given year, or for product categories that exceed a certain revenue value.

Filters in Db2 Web Query Designer can utilize one of two behaviors: static and prompted filtering. Static filters are applied to individual content items at design time, and allow you to apply consistent filter values to a chart or report. Prompted filters, on the other hand, allow users to select the filter values to use in your content at run time. When you create a new prompted filter, it affects all new content on the page. In addition to adding prompted filters to new content, when existing content using a prompted filter is added to a page, you can create automatic filter controls that can be used at run time. Any content that uses the same parameters can be filtered using the same control. These controls are not generated for static filters.

To create a static filter for a selected field, drag it from the Fields tree on the Resources panel to the Filter bucket, which is located below the field container buckets on the Properties panel when you select a content item. When you create a static filter, the Add Filter dialog box appears, as shown in the following image.



You can select filter values and the relationships those values have to the data that you want to display in your chart or report. Static filters can only be created for new content.

You can add prompted filters to a visualization using new or existing content in one of the following ways:

- When creating new content, drag a data field to the Filter toolbar below the page toolbar.
- When creating new content, right-click a data field and click *Add to filter toolbar*.
- When creating or interacting with new content, select one or more sections of a chart by clicking or lassoing them, then click *Keep*.
- When creating or interacting with new content, use the filter options in the In-Document Analytics menu on the column of a report.
- When creating a visualization from existing content, add an item that uses dynamic parameter filters to the visualization.

Click the resulting label on the Filter toolbar to open a control, from which you can select default filter values. Users will be able to change the selected value at run-time.

Adding Static Filters to Content

Filters allow you to limit the data that displays in your content, making it easier to find useful information by removing extraneous data values. You can create prompted filters, which allow users to select the filter values to use in your content at run time, or you can create static filters, which are always applied to your content whenever it is run. Prompted filters allow you to create controls when the content that uses them is added to an assembled page, while static filters do not. Additionally, prompted filters affect all new content on the page, or any referenced content that uses the filter. Static filters, on the other hand, affect only the item for which the filter was created.

Static filters are a good choice when you want the same filter values to be applied to your content at all times, or want to create a filter that only affects a single content item.

To create a static filter, when creating a new chart or report, drag a field into the Filters bucket on the on the Settings tab of the Properties panel. The Add Filter dialog box opens, and presents options relevant to the type of field that you are filtering.

These options also differ depending on whether you are filtering compared to selected values or to another field. You can change this option by setting the Compare to option to *Value* or *Field*.

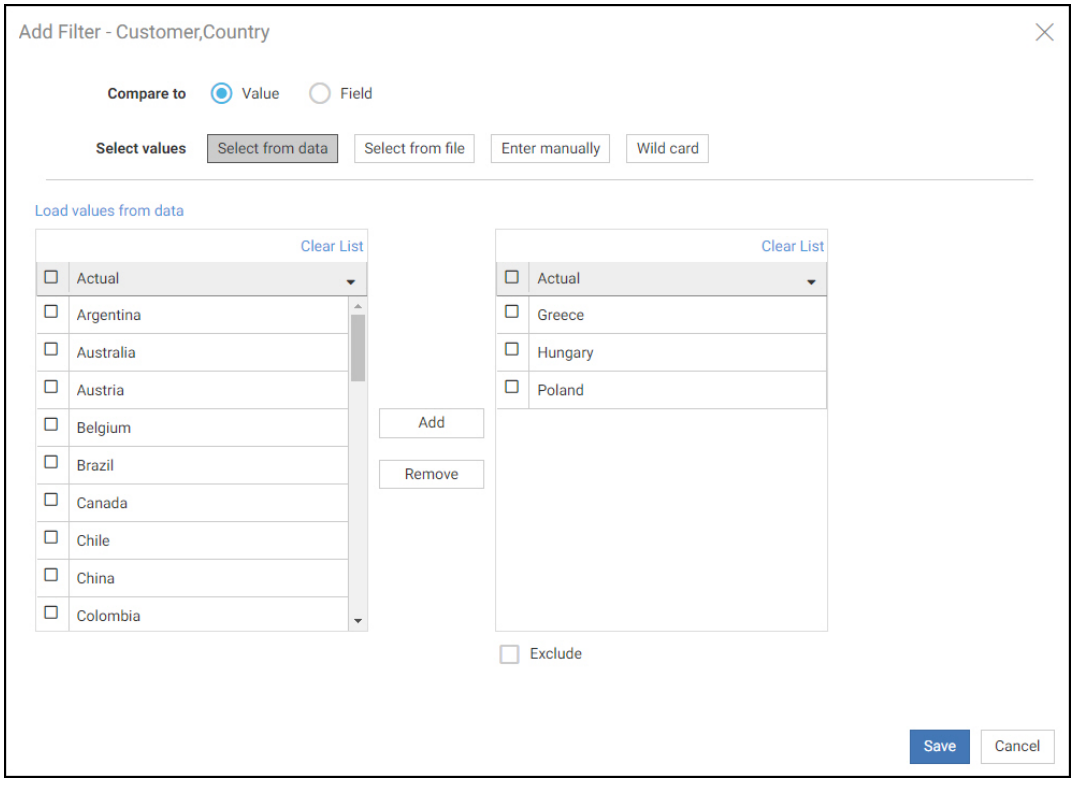
When you set the Compare to option to *Value* you can filter alphanumeric fields using the following options:

- **Select values.** When using the Value comparison type, select the values that will be used to define the filter.
  - **Select from data.** Search for and select values from the data source used in your content.

    Click *Load values from data* to display all available values from the selected field in the left list. Select one or more values and click *Add* to add them to the list of selected filter values on the right. To remove a value from the list of selected filter values, select one or more values and click *Remove*. You can also click *Clear List* to remove all selected values.
  - **Select from file.** Allows you to pull data values from a file on your system. You can select a delimited flat file, such as a CSV file, or an Excel spreadsheet from which to import values for selection. These values are taken from the first column of the file. This option can be an easy way to select a large number of values that are found in another data source.

    Click *Load values from file* to select a data file and display all available values from it in the left list. Select one or more values and click *Add* to move them to the list of selected filter values on the right. To remove values from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all values.
  - **Enter manually.** Type a value and click *Add* or press the Enter key to move it to the list of selected filter values on the right. Multiple values must be typed separately. You can also choose whether or not to include missing or blank values in the filter. To remove a value from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all selected values.
  - **Wildcard.** Manually type a single string that you can use to select multiple filter values. You can specify that the values in your content should start with the string, end with the string, or contain the string at any point. Wildcard value filtering is case-sensitive. You cannot use a wildcard filter value at the same time as specified values.
- **Exclude.** Available when using the Value comparison type. When the *Exclude* check box is selected, the values selected for the filter are excluded from the request. When cleared, which is the default state, the selected values are included.

The Add Filter dialog box when filtering an alphanumeric field is shown in the following image.



When you set the Compare to option to *Value*, you can filter numeric fields using the following options:

- **Select values.** Select the values or field that will be used to define the filter.
  - **Select ranges.** Provides options to specify a range of values for your filter. When selecting data ranges, you can apply an aggregation option to use when filtering the selected field. Use None to filter on data values before aggregation, or use a different aggregation to filter on sorted values, aggregated by the selected operation. For example, use Summary to filter by measure values summed for each sort value. For more information, see *Summarizing Numeric Data Using Filters* on page 46.
    - **Single value.** Select a filter operator, then filter for all values before or after a selected start or end point. You can select a value using the slider or type a value into the text box.

- **Range of values.** Set a static range of values to use for the filter. Select a start and end point using the slider or text boxes, and set filter operators for each.

  You can type a value that is outside the range of values in your data. In this case, the text box displaying the value is outlined in purple and a message indicates that the value is out of range.

- **Select from data.** Search for and select values from the data source containing the filter field.

  Click *Load values from data* to display all available values from the selected field in the left list. Select one or more values and click *Add* to add them to the list of selected filter values on the right. To remove a value from the list of selected filter values, select one or more values and click *Remove*. You can also click *Clear List* to remove all selected values.

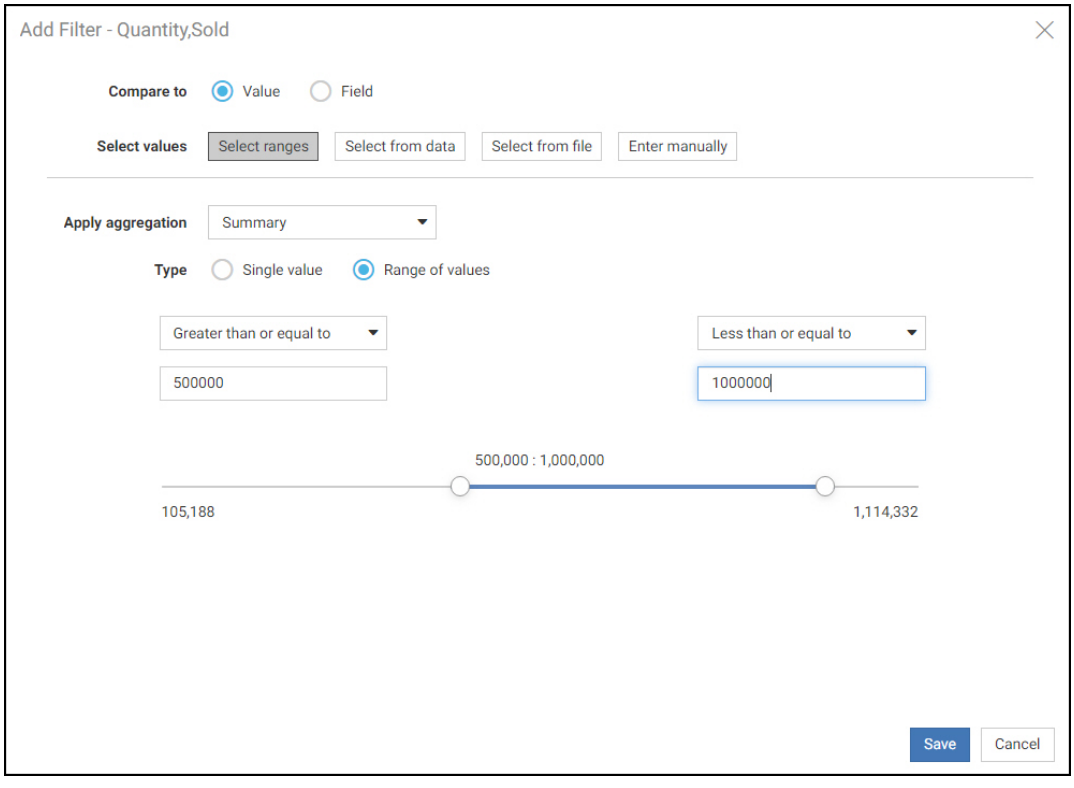
- **Select from file.** Allows you to pull data values from a file on your system. You can select a delimited flat file, such as a CSV file, or an Excel spreadsheet from which to import values for selection. These values are taken from the first column of the file. This option can be an easy way to select a large number of values that are found in another data source.

  Click *Load values from file* to select a data file and display all available values from it in the left list. Select one or more values and click *Add* to move them to the list of selected filter values on the right. To remove values from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all values.

- **Enter manually.** Type a value and click *Add* or press the Enter key to move it to the list of selected filter values on the right. Multiple values must be typed separately. You can also choose whether or not to include missing or blank values in the filter. To remove a value from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all selected values.

- **Exclude.** Available when using the Value comparison type. When the *Exclude* check box is selected, the values selected for the filter are excluded from the request. When cleared, which is the default state, the selected values are included.

The Add Filter dialog box when filtering a measure field is shown in the following image.



When you set the Compare to option to *Value*, you can filter date fields using the following options:

- **Select values.** Select the values or field that will be used to define the filter.
  - **Select ranges.** Provides options to specify a range of dates for your filter.
    - **Single date.** Filter for all dates before or after a selected start date or end date, by selecting a filter operation and a date value.
    - **Range of dates.** Set a static range of dates to use for the filter by selecting a start and end date and setting filter operators for each.
  - **Select from data.** Search for and select values from the data source containing the filter field.

Click *Load values from data* to display all available values from the selected field in the left list. Select one or more values and click *Add* to add them to the list of selected filter values on the right. To remove a value from the list of selected filter values, select one or more values and click *Remove*. You can also click *Clear List* to remove all selected values.

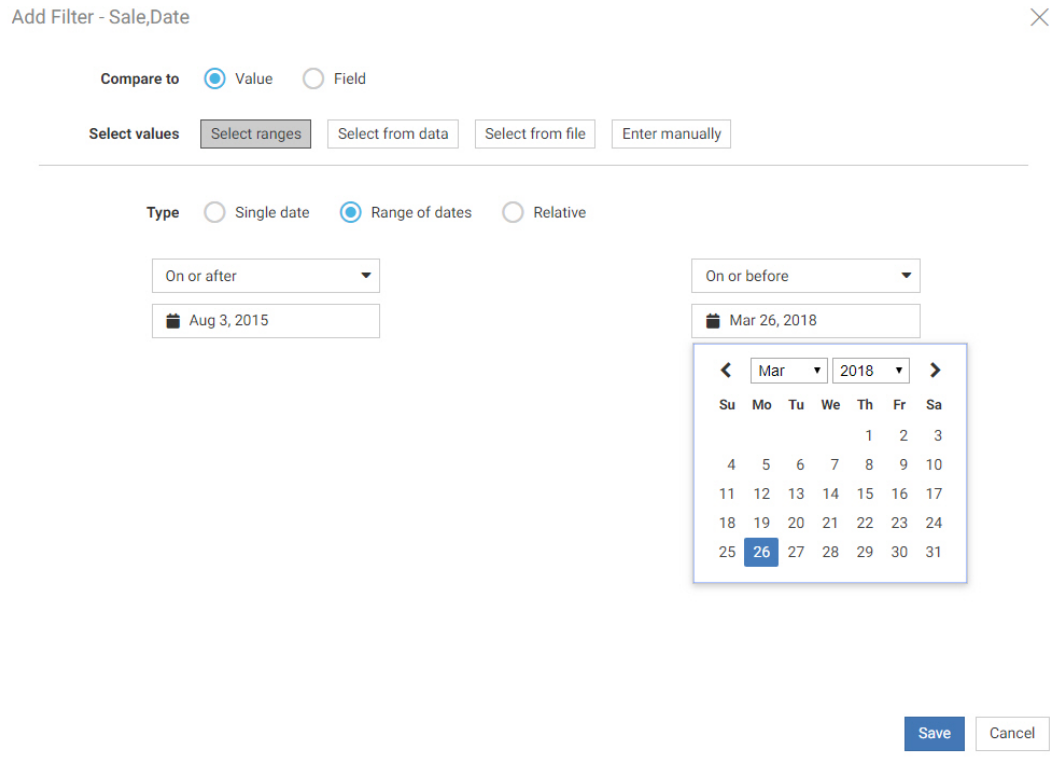
- **Select from file.** Allows you to pull data values from a file on your system. You can select a delimited flat file, such as a CSV file, or an Excel spreadsheet from which to import values for selection. These values are taken from the first column of the file. This option can be an easy way to select a large number of values that are found in another data source.

  Click *Load values from file* to select a data file and display all available values from it in the left list. Select one or more values and click *Add* to move them to the list of selected filter values on the right. To remove values from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all values.

- **Enter manually.** Type a value and click *Add* or press the Enter key to move it to the list of selected filter values on the right. Multiple values must be typed separately. You can also choose whether or not to include missing or blank values in the filter. To remove a value from the list of selected filter values, select one or more values and click *Remove*, or click *Clear List* to remove all selected values.

- **Exclude.** Available when using the Value comparison type. When the *Exclude* check box is selected, the values selected for the filter are excluded from the request. When cleared, which is the default state, the selected values are included.

The Add Filter dialog box when filtering a date field is shown in the following image.



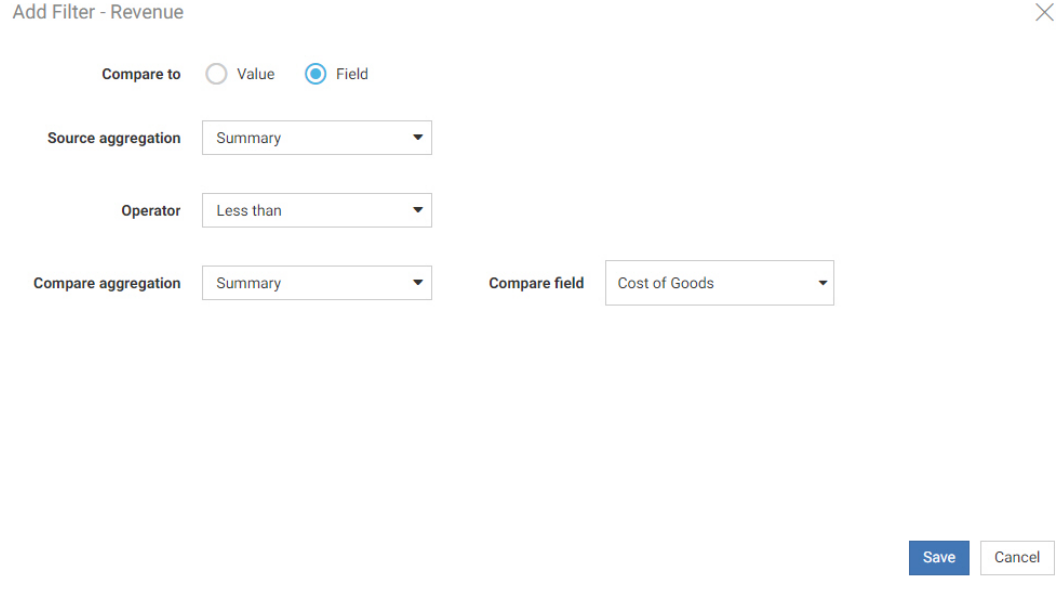
Set the Compare to value to *Field* to filter the selected field in relation to another field in the request. For example, you could use this filter to identify values for which the revenue was less than the cost of goods sold. When filtering by compared field values, the following options are available:

- **Source aggregation.** Available only for numeric fields. Select an aggregation option to use for filtering the selected field. Use None to filter on data values before aggregation, or use a different aggregation to filter on sorted values, aggregated by the selected operation. For example, use Summary to filter by measure values summed for each sort value.
  - **Operator.** Set the relationship that will define how the filter is applied. Options are:
    - **Equal to.** Values display in your content if they match the specified filter values.
    - **Not equal to.** Values display in your content if they do not match the filter values.
    - **Greater than or equal to.** Values display in your content if they match the selected filter values, come after them alphabetically, or have a higher numeric value.

- **Greater than.** Values display in your content if they come after the selected filter value alphabetically or have a higher numeric value.
- **Less than or equal to.** Values display in your content if they match the selected filter value, come before it alphabetically, or have a lower numeric value.
- **Less than.** Values display in your content if they come before the selected filter value alphabetically or have a lower numeric value.

- **Compare aggregation.** Select an aggregation to apply to the field that the selected field is being compared to. Use None to compare to data values before aggregation, or use a different aggregation to compare to sorted values, aggregated by the selected operation. For example, use Summary to compare values from the selected field to values in the comparison field summed for each sort value.
- **Compare field.** When using the Field comparison type, provides a list of fields in your data source. Values from the field for which you are creating the filter are compared to those in the comparison field and filtered out based on the selected operator.

The Add Filter dialog box when filtering a numeric field by comparison to another field is shown in the following image.

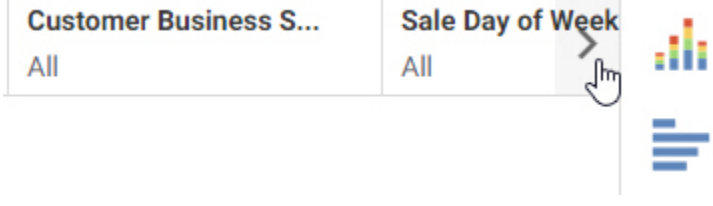


Adding Prompted Filters to a Visualization

As you create charts or styled tabular content in Db2 Web Query Designer, you may want to narrow the display of information that is shown. You can do this by creating filters for data fields in your content. You can also use filters as a way to create custom displays of the data that you show in your content. For example, you may only want to show revenue information for specific product categories and models in a given year.

Prompted filters can be created for external content added to a page, in which case any parameters in that content can be added as filter prompts, or for new content, in which case the filter affects all new content on the page.

When you add filtered content to a page, you can open the Filters tab on the sidebar and click *Add all filters to page* to add the filters to the page automatically, providing interactive controls that your users can choose from to change the view of data available to them. Filtered content can also be kept stand-alone, and you can choose to enable parameter prompting, which requires a user to make a selection before the content displays. There is no limit to the number of filters that you add, however, as you add more than five filters, all filters may not fit on your screen. If you are using a carousel filter layout, used for prompted filters added to new content, you can use the arrow control to scroll over to see any filters that are not visible in the Filter toolbar, as shown in the following image.



If you are using a columnar layout, which is used for a visualization assembled from existing content, then filters are split into additional rows as they exceed the number of columns on the page, as shown in the following image.

You can add prompted filters to a chart or styled tabular content in one of the following ways:

- When creating new content, drag a data field to the Filter toolbar below the page toolbar.
- When creating new content, right-click a data field and click *Add to filter toolbar*.

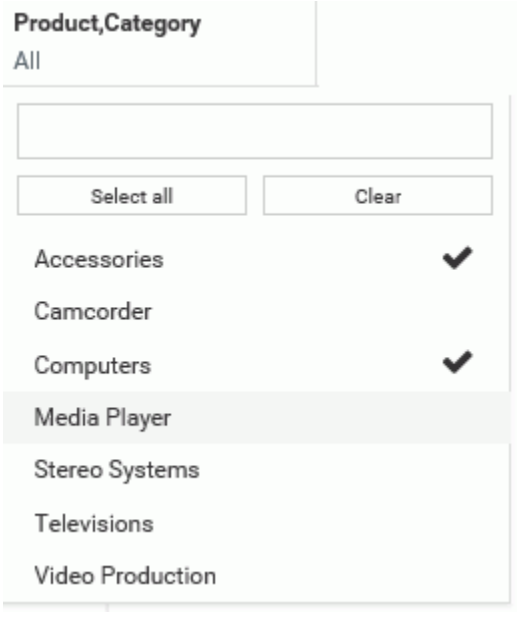
- When creating or interacting with new content, select one or more sections of a chart by clicking or lassoing them, then click *Keep*.
- When creating or interacting with new content, use the filter options in the In-Document Analytics menu on the column of a report.
- When creating a visualization from existing content, add an item that uses dynamic parameter filters to the visualization.

Note: You can add data fields to the filter toolbar even if you do not have it displayed in your view.

You can remove filters from the filter toolbar by clicking the *X* in the upper-right corner of the filter, or by right-clicking the filter and then clicking *Delete*.

You can create a maximum of one filter per measure field, and a maximum of two filters per dimension field, for individual dimension field values and for an aggregation of the dimension field. The aggregation of a dimension field can be a count, count of distinct values, or a percent of count. You can create an aggregated dimension filter by adding the dimension to your content as a measure, right-clicking the aggregated field in a measure bucket, and then clicking *Add to filter toolbar*. If you right-click a field that already has a filter and click *Add to filter toolbar*, or drag it into the filter toolbar, the existing filter control expands for you to select filter values.

Once you have created filters, you can click them to select default data values and set selection options for each filter. For example, when you create a filter using a dimension, it lists the available data values. You can then select the default filter values, as shown in the following image.



By default, no values are initially selected in the list control, which means that all values are displayed by default. To select default values, you click the filter control, and begin clicking the data values that you want to use as the default, then click outside the filter control area to apply the selection.

If you select one or two values, each selected value is listed by name in the filter control. If you select three or more values, the filter control shows the number of values selected out of the total number of available values. If no values are selected, the filter control says All. All available filter values are reflected in your content. If you select all listed values or click *Select all*, then the filter indicates that *n* of *n* values are selected. If the values in the field change in the data source, then the filter does not dynamically update to include them like it would if no values had been explicitly selected.

The selected values are displayed in the chart at run time by default, and users can select other values to display them.

Note: In charts, reports, and visualizations with new content, drop-down list controls and slider controls using the Detail option have a record limit of 5000 values. Values beyond this limit are not available for selection in the filter control. There is no record limit for filters in visualizations assembled from existing content, calendar controls, or slider controls using a summary aggregation.

When multiple prompted filters for alphanumeric dimension fields are created in a visualization created with new content, they are chained in all directions, by default. This means that the selection from one prompted filter control automatically filters and updates the available values in the other controls, so they only display relevant values. This ensures that you cannot select filter values that result in no data displayed in the visualization. You can change the chaining setting from multidirectional chaining to hierarchical chaining, or turn chaining off, from the Filter options menu.

In pages assembled from existing content, chaining is unidirectional, applied only to filters lower in the chaining hierarchy than the filter for which you selected values. Filters for fields in the same hierarchy are chained automatically, and you can drag a field onto another field in the filter list in the Filters tab to manually make it a child of that filter for chaining purposes. For more information about filter chaining in new content and pages assembled from existing content, see *Chaining Filter Control Selections* on page 39.

When creating prompted filters for new content, you can choose to exclude data values from the list. To do this, right-click the filter and select *Exclude*. You can then click the filter control again, and begin clicking the data values that you want to exclude from the list. Once you have selected the data values that you want to exclude, your chart refreshes. At run time, instead of choosing which values to display in the chart, users select values to exclude from the chart.

You can also set a prompted filter for new content to use a single value instead of multiple values. If you right-click a prompted filter for new content and click *Single*, when you click the filter control again, you are only able to select a single value. In filters for existing content, you will have already defined whether or not the filter is multiselect or single-select.

If you add a filter using a numeric field, such as a measure, (for example, Cost of Goods), you can use a slider to adjust the range of data values that display, as shown in the following image.

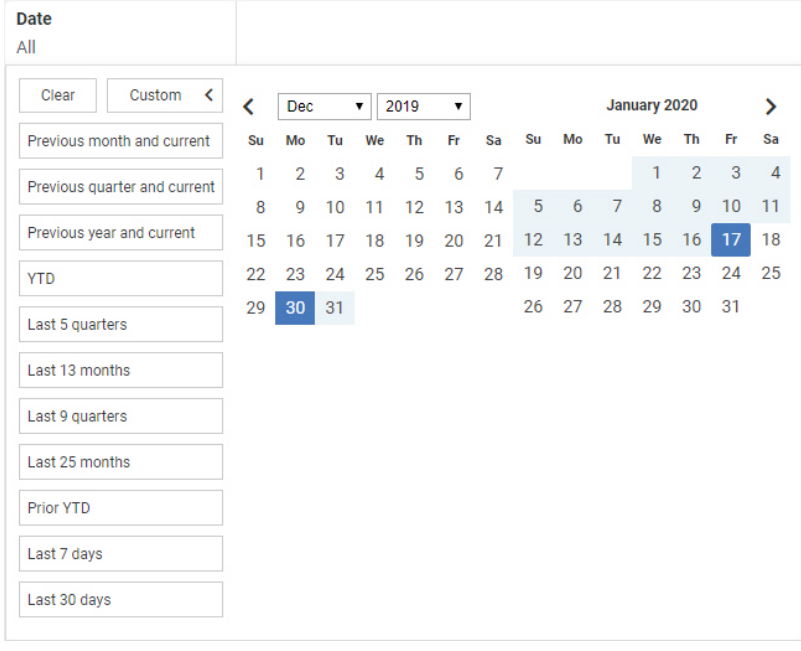
Click the filter, and use the slider options on either side to modify the range of data values. You can set a range using both ends of the slider. To select a single value, set both ends of the slider to the same value.

The filter for a numeric field is applied after aggregation by default. That means that the filter is applied based on summed values for all sort values in the chart instead of filtering each row of the data source before aggregation. You can right-click a new prompted filter and point to *Aggregation* to select a different aggregation operation, or select *Detail* to apply the filter to each row before aggregation. For more information, see *Summarizing Numeric Data Using Filters* on page 46.

If you right-click a new numeric filter and select *Greater than or equal* or *Greater than*, you can select a minimum value for the filter range. The upper limit on the slider is fixed and cannot be moved. Selecting *Greater than or equal* includes the value indicated by the slider in the filter, while selecting *Greater than* excludes this value. Similarly, if you right-click a numeric filter and select *Less than or equal* or *Less than*, you can select a maximum value to display. The lower limit on the slider is fixed and cannot be moved. Selecting *Less than or equal* includes the value indicated by the slider in the filter, while selecting *Less than* excludes this value. The slider displays the greater than (>), less than (<), greater than or equal to (≥), and less than or equal to (≤) symbols to differentiate your choices.

Note: Selecting the full range of values in the slider includes all values in the filter. The value indicated by the slider head is not excluded in this case, even if the *Greater than* or *Less than* filter options are used.

If you add a date field, you can use the date picker window to select a start or end date, range of dates, and more, as shown in the following image.



You can use a default range available in the list on the left, or select your own range of dates from the calendar. Click the same date twice to select a single day.

If you right-click a new date filter and select *After* or *Before*, you are unable to select a range using either the preset or custom range options. Instead, use the calendar to select a start or end date for the filter.

Similar to filtering a numeric field, you can right-click a date filter control and click *On or after* or *On or before*, as an alternative to *After* or *Before*, to include the start or end date selected in the calendar. The *After* and *Before* options do not include the selected date in the date range of the filter.

In addition to the options specific to each type of filter, you can make the filter required. When a filter is required, filtered content will not load until the user makes a selection for that filter. To make a prompted filter for new content required, right-click the filter and click *Require selection*. To make a prompted filter for existing content required, select the filter control and, on the Settings tab of the Properties panel, clear the *Optional* check box.

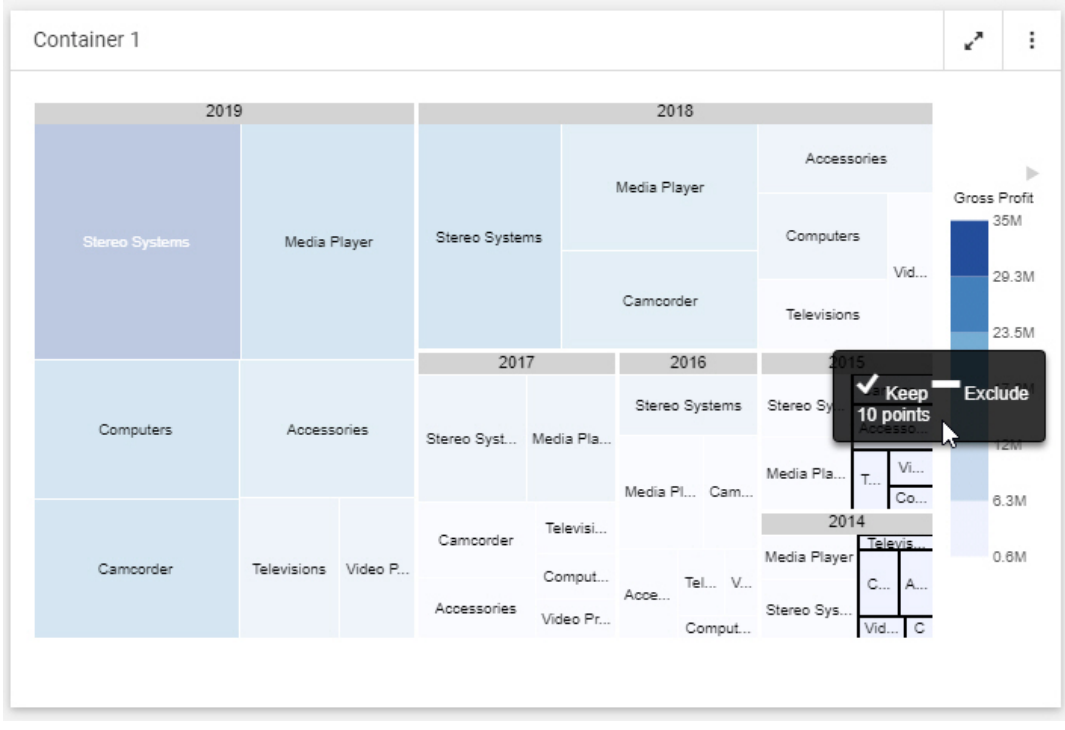
You can right-click a filter control for existing content on a page to access formatting options. For example, you can convert a list control to radio buttons, check boxes, or a button pane, merge two related controls, and access configuration and format options on the Properties panel. For more information, see *Styling Filter Controls in a Visualization* on page 63.

Filtering a Chart with Visual Selections

You can visually create prompted filters by selecting areas of a chart directly from the canvas as you create it, as well as at run-time. This is called on-chart filtering. Since on-chart filtering is performed based on visual selections on a chart, they are quick and intuitive to create. On-chart filters created from one item immediately affect all other content created on the page, allowing you to see the impact of your filter immediately. On-chart filtering is available from pages containing one or more new content items, and from stand-alone charts created using the AHTML output format.

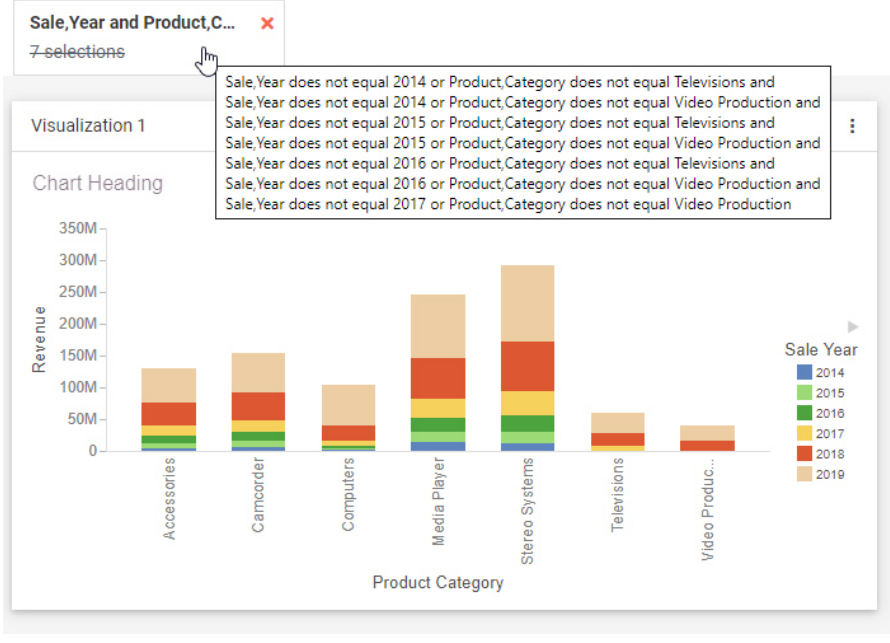
On-chart filtering is enabled in applicable content types by default. To disable on-chart filtering, open the *Filter options* menu and deselect *Use content as filters*.

To use on-chart filtering, select one or more areas of a chart by clicking a single section or by clicking and dragging, or lassoing, an area of the chart. The selected sections of the chart are highlighted, and a tooltip appears with information about the selected area, as shown in the following image.



From the tooltip, you can filter the entire visualization for the data that you selected in the chart. Click *Keep* to create a prompted filter for the selected values, or click *Exclude* to create a filter that excludes the selected values.

You can create several filters using on-chart filtering to further refine the data that you display in the visualization. Each of these filters affects every item on the page. When a filter is created, it is added to the Filter toolbar. If the filter applies to a single dimension, you can click the filter label in the toolbar to edit it. If the filter is applied to multiple dimensions, such as a bar chart with one dimension in the Horizontal bucket and another dimension in the Color bucket, then the filter is not editable from the Filter toolbar. However, you can point to it to see a tooltip listing the filter selections, as shown in the following image.



You can right-click the filter label at design time to delete the on-chart filter or swap between keeping and excluding the selected values. You can also delete a filter created with on chart filtering by selecting an area of the chart and clicking *Remove Filter* on the tooltip, or by clicking the *X* on the filter control in the Filter toolbar. The visualization restores the values previously hidden by the on-chart filter.

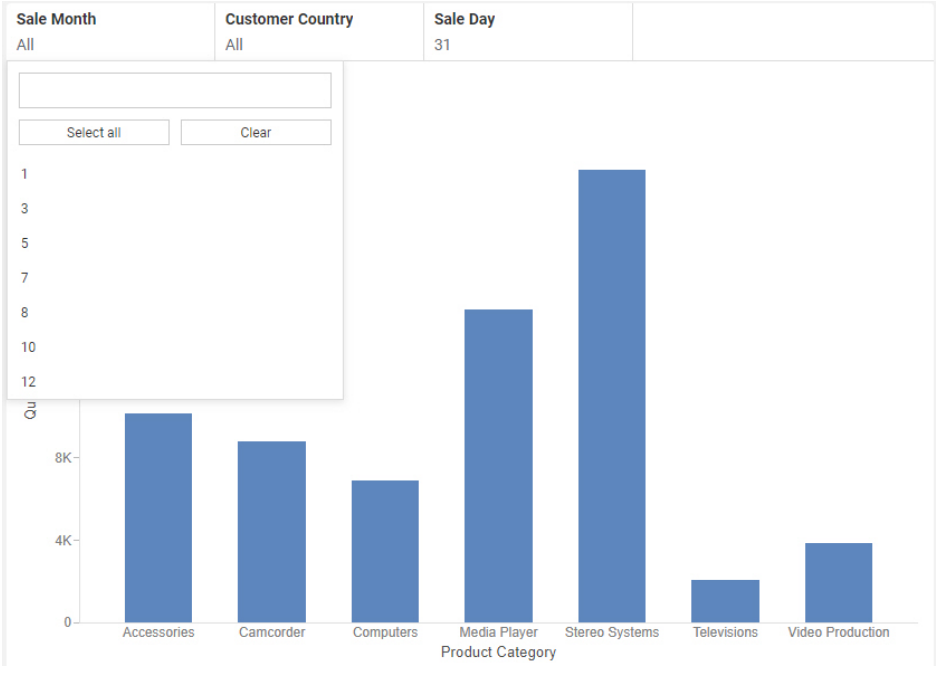
On-chart filtering works similarly at run time. When you run a page created with new content, you can click or lasso different areas of a chart to dynamically filter the entire page.

Chaining Filter Control Selections

When a content item or page includes multiple filters, chaining ensures that those filters always return valid values to your content. When you select a value from one of the filter controls, the other controls can be filtered and updated based on the value that you select, if chaining is applied For example if you have a filter for Sale Quarter chained to a filter for Sale Month, then if you select Q1 from the Sale Quarter filter, the Sale Month filter updates to show only the months of January, February, and March, and automatically excludes any month values that were not in Q1.

Two different chaining behaviors are available: multidirectional and hierarchical. When multiple prompted filters for alphanumeric dimension fields are created in a visualization created with new content, they are chained multidirectionally, by default. This means that the selection from one prompted filter control automatically filters and updates the available values in all other controls for alphanumeric fields, so they only display relevant values. This ensures that users cannot select filter values that result in no data displayed in the visualization, regardless of the order and arrangement of the filter controls. To select a value that has been hidden because of chaining, clear any other filters that may have resulted in the value being unavailable. Note that on-chart filtering also affects the available filter values when multidirectional chaining is enabled.

For example, the following image shows a chart with multidirectional filter chaining enabled. Notice that, since the filter for Sale Day was set to *31*, only months with 31 days are shown in the drop-down list for Sale Month.



If you make selections in one filter control, and then make selections in another chained filter control that make some of the original values unavailable, those originally selected values are restored when the other filters are cleared. For example, if you set the Sale Month filter to *September* and *December*, and then set the Sale Day to *31*, September is no longer visible in the Sale Month control, since it only has 30 days. Only December is selected. When you clear the Sale Day control, both September and December are selected once again in the Sale Month control.

Full multidirectional chaining is only applied to list controls in new charts and reports that are standalone items or created as part of a page. Calendar and slider controls are not chained. While slider controls and preset ranges in calendar controls update to reflect the current range of data, similar to chaining, the values selected using a slider or calendar do not affect the other controls.

You can change the chaining setting for filters in new content items to use hierarchical chaining or no chaining by clicking the *Filter options* menu and selecting *Link hierarchies* or *Do not link filters*, respectively. The option to change chaining behavior is only applicable to stand-alone content or content created within a visualization.

Hierarchical chaining is based on drill levels in your metadata. When you select a filter value, chaining is applied to fields that are lower in the same metadata hierarchy. Filter controls for fields that are higher in the same hierarchy are not affected by filter selections when using hierarchical chaining, nor are filter controls for fields that are not in the same hierarchy.

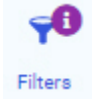
Hierarchical chaining is the default behavior for filter controls that are added to a page from external content. When external content is added to a visualization, hierarchical chaining is applied automatically to any content with WHERE filters using a WITHIN phrase. Db2 Web Query Designer automatically adds the WITHIN phrase to filters from the same metadata hierarchy, so hierarchical chaining is enabled for content items created in Db2 Web Query Designer by default when they are added to a page as external content.

You can also manually apply hierarchical chaining relationships to filter controls from the Filters tab on the sidebar when assembling a page from existing content. Drag one parameter in the list on the Filters tab onto another parameter to make it a child of that filter control. You can create a multi-level chaining hierarchy so that selections from one filter apply chaining to a second filter, and selections from the second filter apply chaining to a third filter. To remove a chaining relationship, in the parameter list, drag a filter onto the name of the content item from which the filter was generated. Selections from other filter controls will no longer affect the available filter values for that parameter.

Applying Prompted Filters From External Content

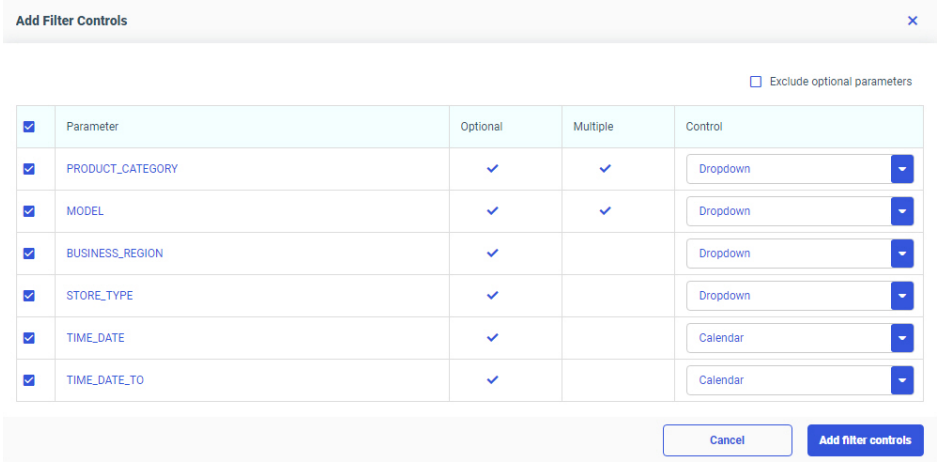
Importing a filter from external content in Db2 Web Query Designer is a quick and intuitive process. Additionally, parameter filters added to a page from existing content can be rearranged and styled with options unavailable to filters created for new content in a page.

Whenever you add a parameterized content item to the canvas, such as a chart or report that uses a prompted filter or dynamic parameter, the parameters are recognized and you can filters for them automatically. A badge is overlaid on the Filters tab on the sidebar, as shown in the following image.



The Filters tab provides options to add filters to your page and apply chaining to them.

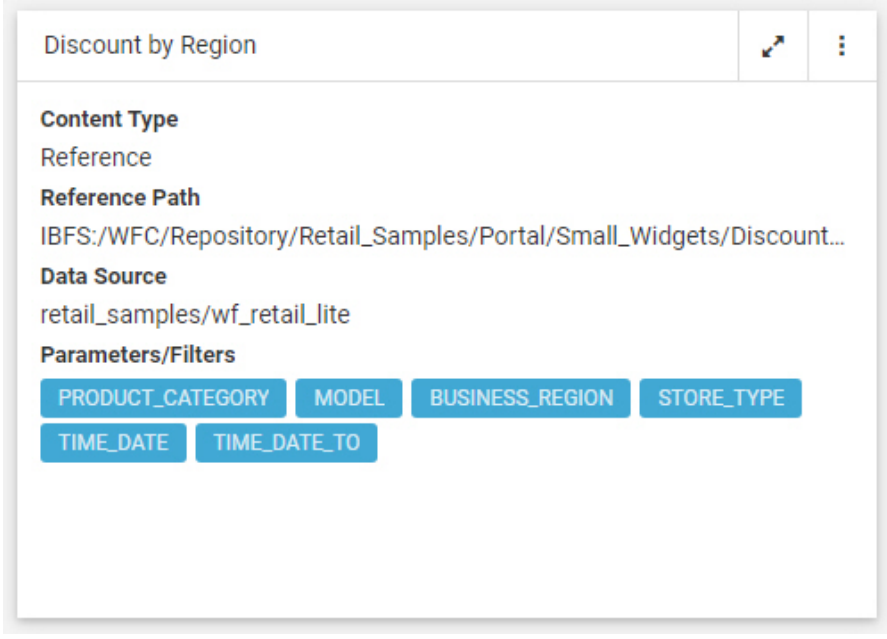
Open the Filters tab and then click *Add all filters to page* to create filters for all identified parameters. Alternatively, right-click a parameter in the list to create a single filter control. If the Filter toolbar is visible on the page, you can also right-click a cell and then click *Add filter controls* to open the Add Filter Controls dialog box. You can select the particular filters that you want to create, quickly exclude optional parameters from filter creation, see which filters will be multiselect, and change the type of control that each filter uses. The Add Filter Controls dialog box is shown in the following image.



After you add filters from external content to a page, you can right-click a filter control to access formatting options. For example, you can convert a list control to radio buttons, check boxes, or a button pane, merge two related controls, and access configuration and format options on the Properties panel.

As an alternative to using the Filter toolbar, or in addition to it, you can also add a grid container to a page assembled from existing content by dragging it from the Resources panel when you select the Container tab on the sidebar. A grid container includes multiple cells into which filter controls can be placed. You can also move the original filter toolbar or have it display in a modal window by selecting the entire page and then clicking one of the filter location options on the Settings tab of the Properties panel.

To see which filters apply to which external content items, click *Info* on the Visualization toolbar. Each content item on the page lists the parameters by which it is filtered. The chart displayed in the following image is affected by filters for six fields, listed under Parameters/Filters.



Procedure: How to Add Filters From Existing Content to a Page

When you bring existing, parameterized content into a page, you are prompted to create filter controls for each parameter. Once created, these controls can be modified with a set of additional options that are not available when creating new content items.

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click the plus button and then click *Assemble Visualizations*.

   Db2 Web Query Designer opens in a new browser tab.

2. In Db2 Web Query Designer, select a template for the page. You can use a predefined template, or select *Blank* to build the page from scratch.
3. With the Content tab selected on the sidebar, drag a parameterized item of your choice from the Resources tree to the canvas.

   A badge appears on the Filters tab icon on the sidebar, indicating that there are unbound filters.

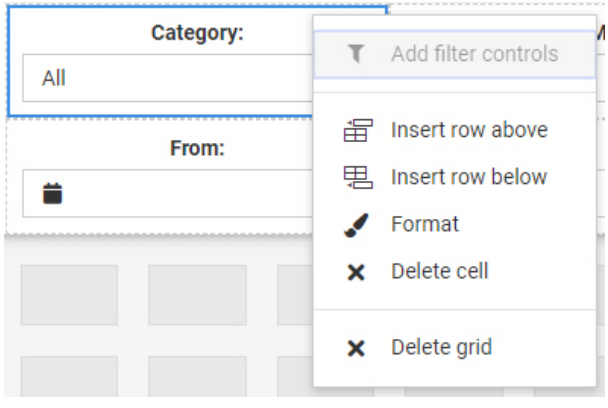
4. Optionally, add more content.

5. Click the *Filters* tab on the sidebar. Click *Add all filters to page* to create controls for all listed parameters, or right-click each parameter for which you want to create a filter control, and click *Add to page*.

   The filter bar appears above your content with the controls that you chose to create.

6. Optionally, customize your filter bar as described below.

   - Change the location of the filter bar from below the page toolbar to above it or into a modal window. Select the entire page and, in the Properties panel, on the Settings tab, select *Below Header*, *Above Header*, or *Modal*.
   - Move filter controls to a filter grid. When assembling a page from existing content, you can create a filter grid by dragging a grid container from the Resources panel with the Container tab selected. You can then resize and reposition the filter grid to customize where the filter controls should display on your page.
   - Right-click a cell to access shortcut menu options, as shown in the following image.



   To right-click a cell, right-click the margin above or to the left of a filter control.

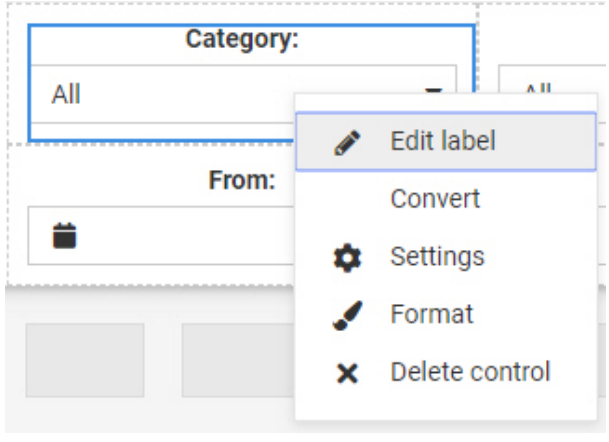
   The available options are:

   - **Add filter controls.** Opens the Add Filter Controls dialog box, where you can choose from the list of available controls and add them to the filter grid.

     Note: If all available filters display on the page, the Add Filter Controls setting is inactive.
   - **Insert row above.** Inserts an empty row above the current row in the filter grid.
   - **Insert row below.** Inserts an empty row below the current row in the filter grid.
   - **Format.** Opens the Properties panel to the Format tab, where you can customize the grid style and cell alignment.

- **Delete cell.** Deletes the current cell.
- **Delete grid.** Deletes the entire filter bar.

- Right-click a control to access shortcut menu options, as shown in the following image.



The available options are:

- **Edit label.** Selects the label text for editing.

  Note: Another way to edit a control label is to double-click the filter label, type the new text, and press the Enter key.

- **Convert.** Opens the Convert Control To dialog box, where you can choose between various control types.

  You can convert a list control, created for alphanumeric fields, to radio buttons if single-select, check boxes if multiselect, or a button panel. You can convert a single-headed slider, created for single-select numeric fields, to an input box.

- **Settings.** Opens the Settings tab of the Properties panel, where you can customize control configuration options.

- **Format.** Opens the Format tab of the Properties panel, where you can customize control styling options.

- **Delete control.** Removes the filter control from the visualization.

- Drag any filter cell to a new location in the grid to reposition or reorder the filter controls.

- Multi-select two related controls, right-click one of them, and then click *Combine* to combine the two controls into one. An example of two combined controls is shown in the following image.

  The Combine option only applies to single-select date and numeric slider controls. They can be combined into a single control with a start and end point.

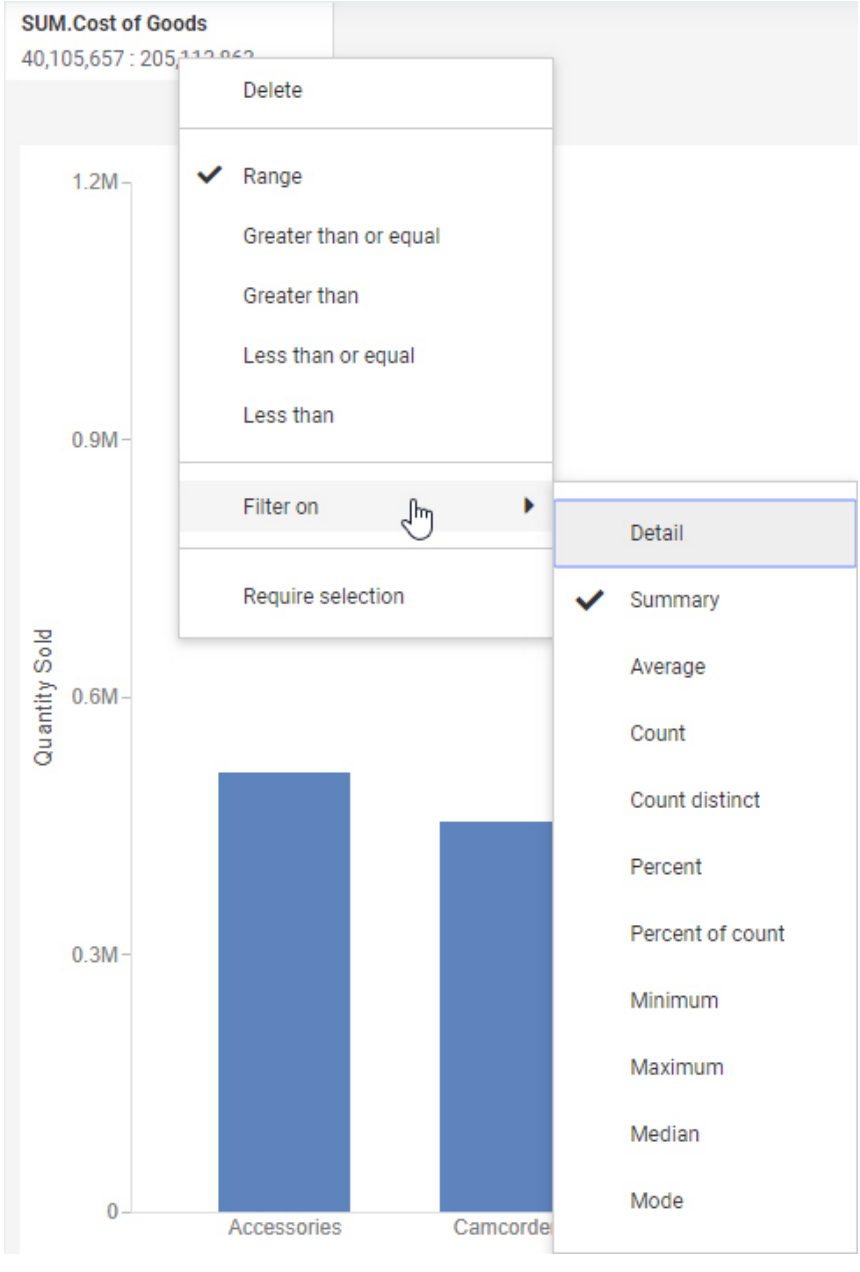
- Drag a control into a cell with other controls. This action puts two separate controls into one cell. The drag marker is shown allowing you to position one controls in front or behind another control. You can separate the controls again by dragging one control out of the cell.

7. Save your changes.

Summarizing Numeric Data Using Filters

When you create a filter for a measure field in new content, you can choose to filter by aggregated values, using a Summary filter, or by individual records, using a Detail filter. This enables you to review data from a high level or based on a more granular view.

To specify one of these options in a new prompted filter, when you place a measure on the Filter toolbar, right-click it and point to *Filter on* to access the Detail and aggregated filter options, which are shown in the following image.

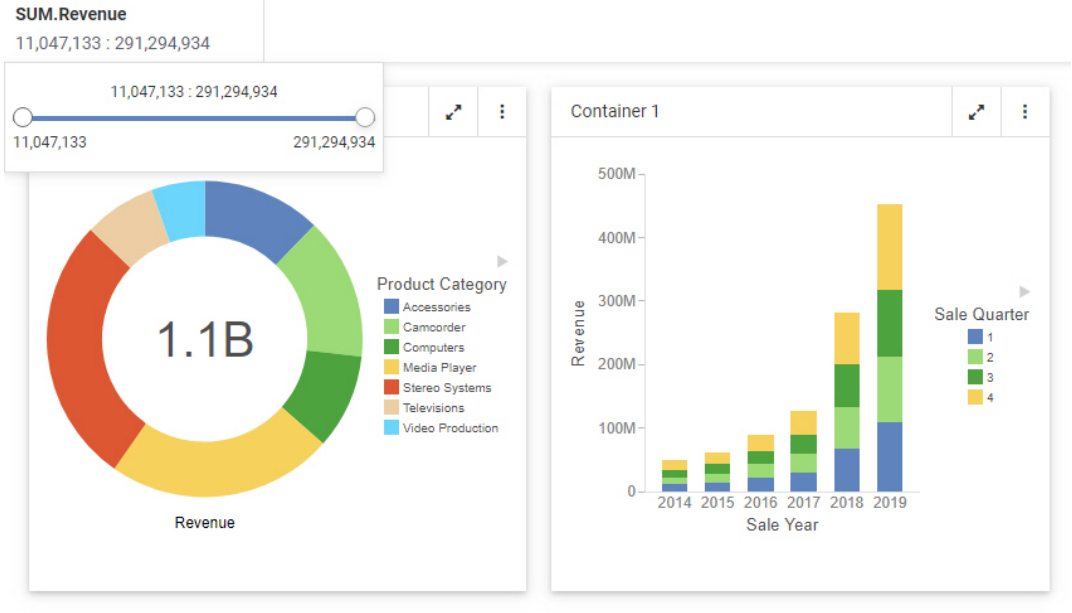


To choose between detail and aggregated filter options when creating a static filter, drag a measure to the Filter bucket and select an option from the Apply aggregation drop-down menu.

Summary filters are indicated by an aggregation prefix operator on the filter control label.

The Summary option, which is the default for measure fields, allows you to select records based on the summed, aggregated value of a field. All values for the chart, report, or page are calculated, and then the aggregated values are filtered based on whether they meet the filter requirements. For example, if you create a chart that shows Revenue sorted into Product Categories, you can use a summary filter to display only the Product Categories that meet the selected filter requirements.

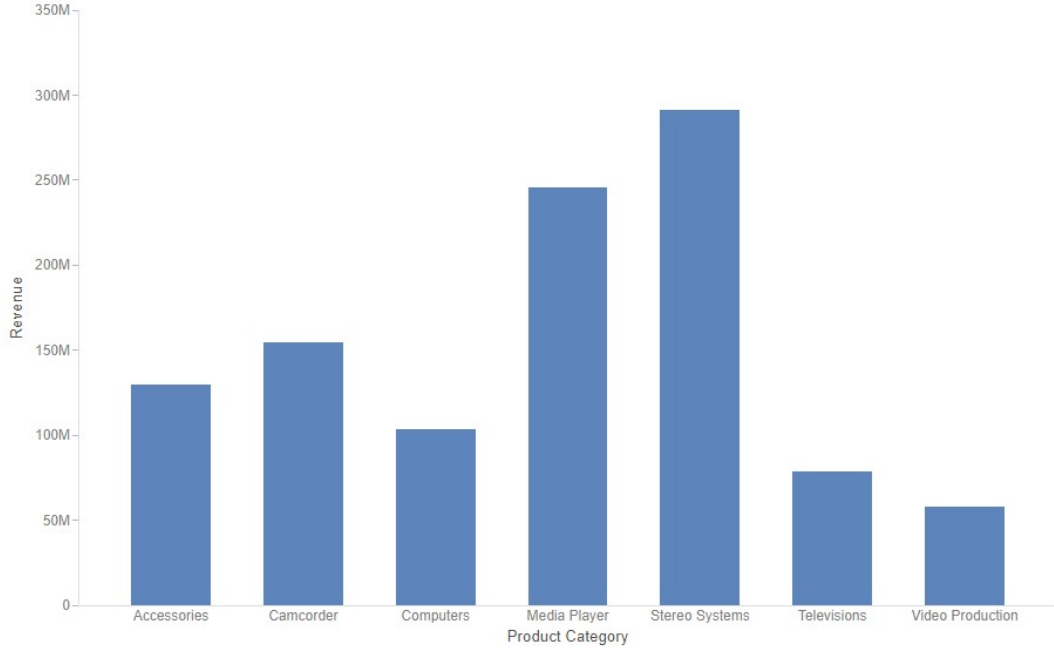
If you create a new summary filter in a visualization with multiple content items, the minimum and maximum values available in the filter control are the minimum and maximum values across all combined sort fields in the entire visualization. For example, if you created a chart that was sorted by Product Category, and then added a second chart that was sorted by Sale Year and colored by Sale Quarter, then the values in the summary filter would reflect the range of values for each product category and each combined sale year and sale month. In the following image, the minimum available value for the summary filter on the Revenue field is 11,047,133, which is the revenue from Q1 2014 in the bar chart on the right. This is the smallest value on the page. The maximum available value, 291,294,934, is the revenue for stereo systems in the pie chart on the left. This is the largest value on the page.



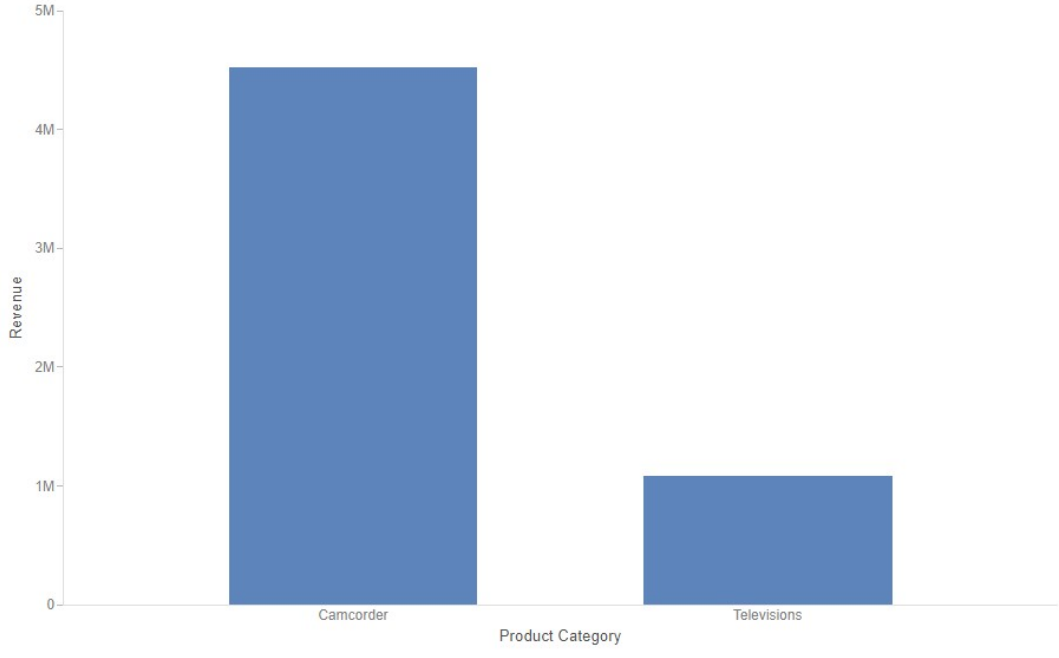
All of the other values in the pie chart and the bar chart on the page fall between these two points. As a result, certain summary filter selections may exclude all values from one chart, but not another.

You can also filter using Detail values, which represent each record of your data source. In this case, filtering occurs before the values are calculated for each sort value. If you create a chart that shows Quantity Sold sorted by Product Category and add a Detail filter, the individual record values from the data source are filtered based on whether they meet the filter requirements, and then sorted into product categories and aggregated to display the quantity sold for each.

Consider the following two charts, each of which uses a filter for Revenue greater than $10,000. The first chart uses a Summary filter, so it is filtered after aggregation. It displays Revenue values for every product category that had over $10,000 in total revenue. Each of the seven product categories met this criterion, and are therefore displayed in the chart, as shown in the following image.

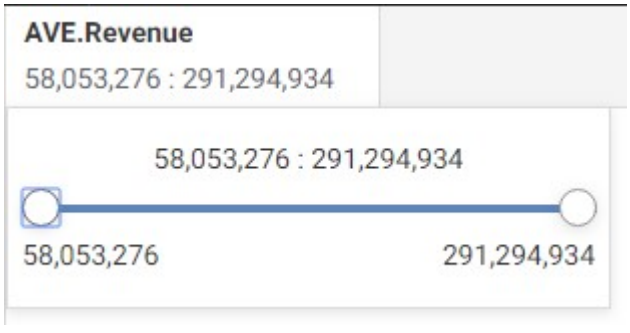


In the second chart, the Summary filter has been changed to a Detail filter where Revenue is greater than $10,000. This filter is applied before data aggregation. Since each record in the data source represents a single sale, the data is filtered for individual sales that earned revenue of over $10,000. Those values are then grouped by Product Category into the chart shown in the following image.



In this case, the only individual sales for more than $10,000 were for camcorders and televisions.

In addition, when working with numeric filters, you can select the type of aggregation to be used in a Summary filter. By default, a Summary filter, created using the Summary option, uses the sum aggregation. You can also apply standard aggregation methods including average, count, count distinct, minimum, and maximum to a Summary filter. Selecting one of these options filters your content for aggregated values matching the specified criteria, indicated by the label on the filter control, as shown in the following image of a filter control using the average aggregation method.



If you create a filter for a field in your chart or report that already uses a prefix operator aggregation, by dragging the field from a bucket to the filter toolbar or by right-clicking it in a bucket and clicking Add to filter toolbar, a Summary filter is created with the prefix operator aggregation applied.

If the field with the prefix operator is a dimension field, which can use the count, count distinct, or percent of count prefix operator aggregations, then you can create two filters for the field, one for the non-aggregated dimension field and one for the aggregated version of the field.

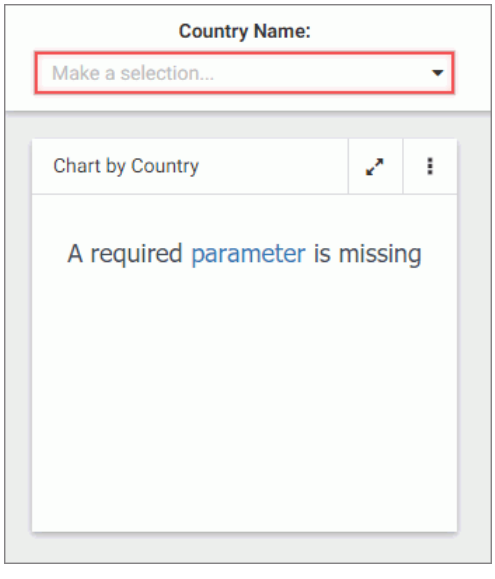
If your request produces a single aggregated value before applying a Summary filter, such as when there are no sort values, the filter control shows a single Summary value instead of providing a range. If you point to the filter value on the Filter toolbar, a tooltip appears that says, *Summary filter irrelevant. Change to Filter on Detail or add a sort field to your request*.

If you create a Summary filter and then changes are made to the request such that the minimum or maximum value on the Summary filter range falls outside the range of values in your data, then that filter value appears in red in the control. If you point to it, a tooltip indicates that it is outside the range of your data. The filter is still valid, but may not be applicable to the current state of your content. Similarly, when creating a static filter, you can type a value that is outside the range of values in your data. In this case, the text box displaying the value is outlined in purple and a message indicates that the value is out of range.

If you create a numeric range in a static filter where the minimum value is greater than the maximum value, the filter is not valid, and you cannot save it. A warning appears alerting you that the start and end points are invalid.

Working With Required Parameters

By default, when you create a prompted filter in Db2 Web Query Designer, the filter is optional. You can right-click a new prompted filter and select *Require selection*, or select a prompted filter for existing content and clear the *Optional* check box on the Settings tab to make it required. This means that users must select a value at run-time before affected content on the page loads. Required controls from external content are marked in red, prompting you to make a selection for the request to be processed. The image below shows an example of a required filter control.



Procedure: How to Convert an Optional Filter Control in an Assembled Page to a Required One

1. In Db2 Web Query Designer, add filters to a page, as described in *Applying Prompted Filters From External Content* on page 41.
2. Select an optional filter control and open the Settings tab on the Properties panel.

   Be sure to select the filter control itself. If you click just outside the filter control, you will select the cell containing the control, which can also be styled and formatted.
3. In the Control Settings area, clear the *Optional* check box to make the control required.

The filter control is marked in red and the *Make a selection* text displays inside the control field.

4. Optionally, to change the default text from *Make a selection* to a prompt of your choice, change the value of the Placeholder text setting on the Properties panel.
   The default text in the required control changes.
5. If the filter was created for an alphanumeric field, on the Settings tab, in the Data Settings area, disable the *Show All option* setting.
6. Click the *Run in new window* button.

   Your content opens in a new browser tab or window. The content affected by the filter does not initially load. You must select a filter value first.
7. Select a value for the required filter control.

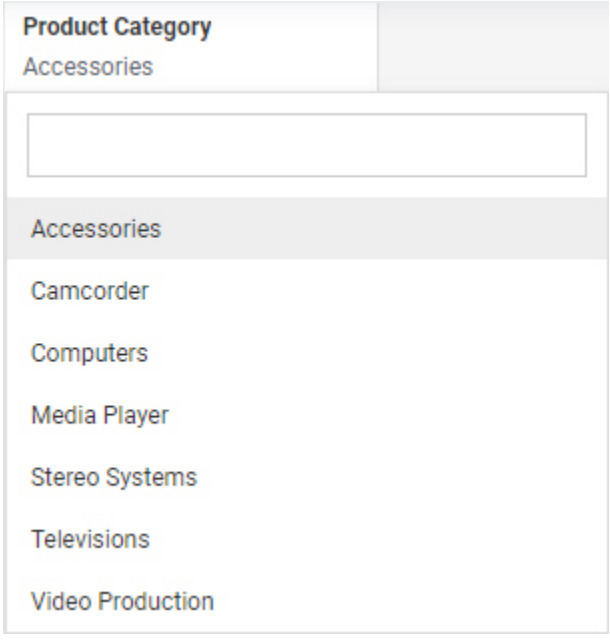
   The content refreshes to reflect your selection.
8. Return to Db2 Web Query Designer and save your changes.

Working With Single and Multiple Select Lists

In Db2 Web Query Designer, list controls are created for alphanumeric fields and numeric dimension fields. There are two types of list controls in Db2 Web Query Designer:

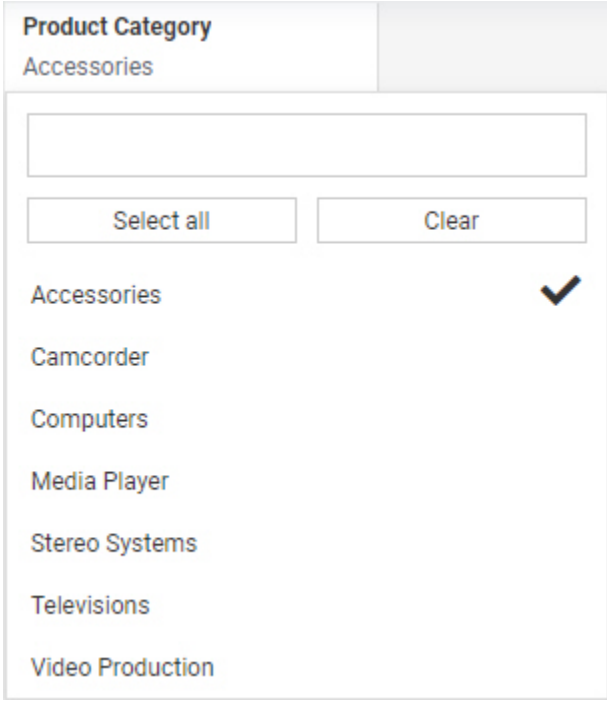
- **Single Select List.** Allows you to pick a single value at run time.
- **Multiple Select List.** Allows you to pick multiple values at run time.

An example of a single select list control is shown in the following image.



Once you have made a selection in a single select list, your content instantly refreshes to reflect that selection.

An example of a multiple select list control is shown in the following image.

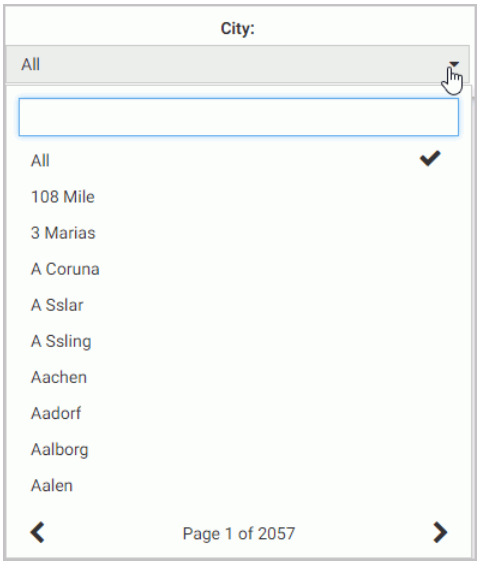


Once you have made all your selections in the multiple select list, you must click outside of the control for the content to refresh.

If the prompted filter was created in a visualization with new content, you can switch between a single and multiple list control by right-clicking the control and selecting *Single* or *Multiple*. If the prompted filter was created for external content, the parameter on which it is based is already defined as single- or multiselect.

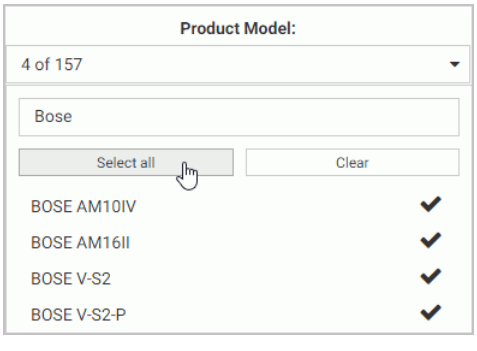
List controls for new content include a search feature to make it easy to select the filter values you want to use. To add or remove the search box for a filter for external content, select or clear the *Search* check box on the Settings tab of the Properties panel. Once search is enabled in the control, simply start typing any word or syllable and all values that contain it will display.

If a list contains 200 or more values, the paging feature is added to the bottom of the control. When paging is active, 10 values display per page. An example of a long list with the paging feature enabled is shown in the following image.



List controls for new content also include the *Select all* and *Clear* buttons. These are especially useful when you need to eliminate just a few values from your results. You can click *Select All*, clear the values that you need to eliminate, and click outside of the control to refresh your content. These can also be added to multiselect list controls for existing content by selecting the *Selection controls* option on the Settings tab.

Once you've typed a search term, you can use the *Select all* button to select all search results, as shown in the following image.

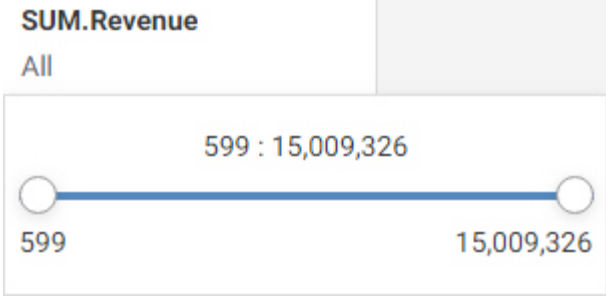


Note that the Select All option selects all values in the control. If the control does not contain all field values, then those values won't be included in the filter. Additionally, the filter selection will not update to include new values added to the data source. To ensure that all values for the selected field are included in the filter, clear the filter selection. *All* displays on the filter control, indicating that all values are used in the filter.

Note: In charts, reports, and visualizations with new content, drop-down list controls and slider controls using the Detail option have a record limit of 5000 values. Values beyond this limit are not available for selection in the filter control. There is no record limit for filters in visualizations assembled from existing content, calendar controls, or slider controls using a summary aggregation.

Working With Slider Controls on a Page

A slider control is a horizontal track with a marker or markers that you can slide between a minimum and maximum value. This versatile control is often used to choose a numeric value within a fixed range. An example of a slider control is shown in following image.



Procedure: How to Create a New Slider Control Using Db2 Web Query Designer

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace and a data source available from that workspace.

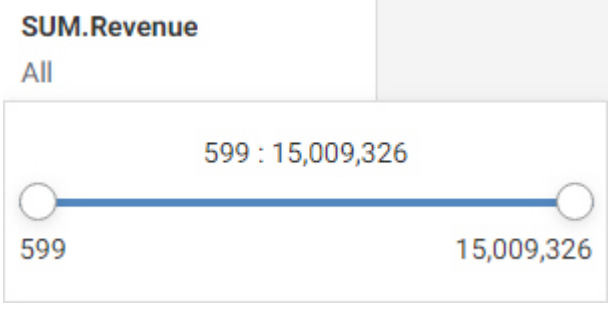
   Once you select a data source, Db2 Web Query Designer loads with options to create a single content item.

3. Add a dimension field and, optionally, a measure field to your chart.

   If there are no dimension values in the chart by which to aggregate the numeric values on the slider, a tooltip indicates that slider selections are not relevant.

4. Drag a measure field into the Filter toolbar.

A slider control appears, allowing you to select default values for the filter parameter, as shown in the following image.



5. Set the default range of values for the filter.
6. Optionally, right-click the control on the Filter toolbar and click *Greater than*, *Greater than or equal*, *Less than*, or *Less than or equal* to select only the minimum or maximum value for the filter.

   When a parameter using one of these options is added to a page in Db2 Web Query Designer, the control is a slider with a fixed start or end point.

Procedure: How to Create a Slider Control From Content Created in InfoAssist

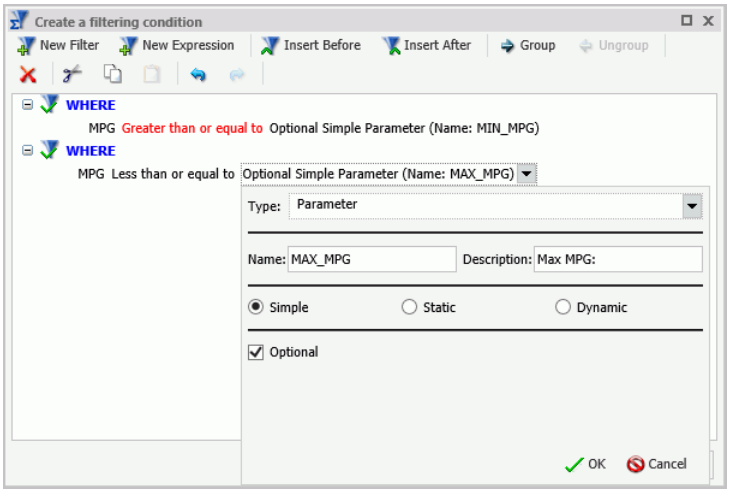
1. On the default Db2 Web Query Home Page, in the Workspaces view, in the InfoAssist section of the Action bar, click *Report* or *Chart*.

   The Open dialog box opens.
2. Select a data source in the Open dialog box and click *Open*.

   InfoAssist opens.
3. Create a report or chart.
4. On the *Data* tab, click *Filter*.

   The Create a filleting condition dialog box opens.
5. Create two optional simple parameters representing minimum and maximum values and make them optional.

In this example we create the minimum and maximum parameters for the MPG field in the car report. MPG should be greater than or equal to the minimum MPG parameter, and less than or equal to the maximum MPG parameter. An example of the completed filtering condition is shown in the following image.



6. Save your changes and exit InfoAssist.
7. On the Home Page, right-click your new content item, and then click *Edit with text editor*.

   The Text Editor window opens.
8. Edit the syntax by providing the data range values.

An example of the modified syntax is shown in the following image.

ReportSlider

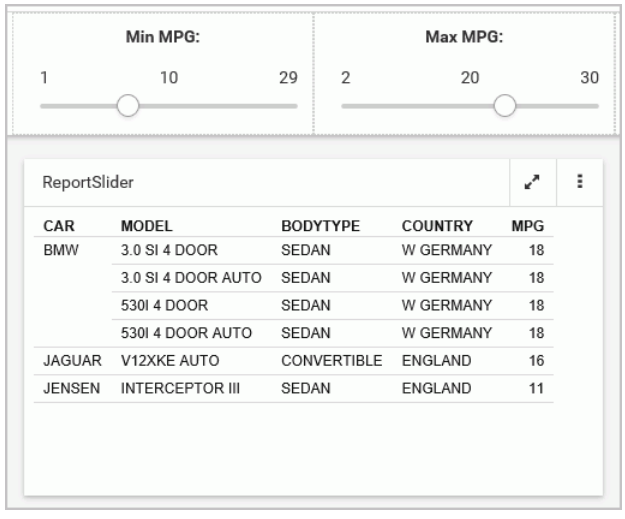
```
ENGINE INT CACHE SET ON
SET PAGE-NUM=NOLEAD
SET SQUEEZE=ON
-DEFAULTH &WF_HTMLENCODE=ON;
SET HTMLENCODE=&WF_HTMLENCODE

SET HTMLCSS=ON
-DEFAULTH &WF_EMPTYREPORT=ON;
SET EMPTYREPORT=&WF_EMPTYREPORT

-DEFAULTH &WF_ARVERSION=2;
SET ARVERSION=&WF_ARVERSION

-DEFAULTH &WF_SUMMARY='Summary';
-DEFAULTH &WF_TITLE='WebFOCUS Report';
-DEFAULT &MIN_MPG=10;
-DEFAULT &MAX_MPG=30;
TABLE FILE ibisamp/car
PRINT CAR.SPECS.MPG
BY CAR.COMP.CAR
BY CAR.CARREC.MODEL
BY CAR.BODY.BODYTYPE
BY CAR.ORIGIN.COUNTRY
WHERE CAR.SPECS.MPG GE &MIN_MPG.(FROM 1 TO 39 FORMAT=D6).Minimum MPG:.;
WHERE CAR.SPECS.MPG LE &MAX_MPG.(FROM 2 TO 40 FORMAT=D6).Maximum MPG:.;
ON TABLE PCHOLD FORMAT HTML
ON TABLE NOTOTAL
ON TABLE SET CACHELINES 100
ON TABLE SET GRWIDTH 1
ON TABLE SET STYLE *
INCLUDE=IBFS:/FILE/IBI_HTML_DIR/ibi_themes/Warm.sty,$
TYPE=REPORT, TITLETEXT=&WF_TITLE.QUOTEDSTRING, SUMMARY=&WF_SUMMARY.QUOTEDSTRING, ORIENTATION=LANDSCAPE, $
ENDSTYLE
END

-RUN

```

9. Save your changes and exit the Text Editor.
10. Create a new visualization using existing content. On the + menu, click *Assemble Visualizations*.

    Db2 Web Query Designer opens in a new tab.
11. Select a template for your visualization.
12. In Db2 Web Query Designer, in the Resources panel with the Content tab selected on the sidebar, drag your new content item to the canvas.

    A badge appears on the Filters tab of the sidebar, indicating that filters are available to add to the page.
13. Click the Filters tab on the sidebar, and then click *Add all filters to page*.

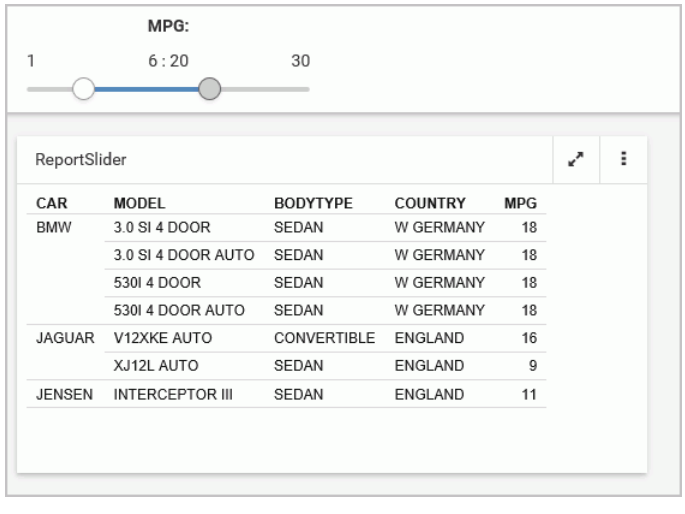
The slider controls display in the filter grid, as shown in the following image.



CAR	MODEL	BODYTYPE	COUNTRY	MPG
BMW	3.0 SI 4 DOOR	SEDAN	W GERMANY	18
	3.0 SI 4 DOOR AUTO	SEDAN	W GERMANY	18
	530I 4 DOOR	SEDAN	W GERMANY	18
	530I 4 DOOR AUTO	SEDAN	W GERMANY	18
JAGUAR	V12XKE AUTO	CONVERTIBLE	ENGLAND	16
JENSEN	INTERCEPTOR III	SEDAN	ENGLAND	11

14. Optionally, combine two controls together. Multi-select both controls, right-click one of them, and then click *Combine*.

    Your controls are combined. You can double-click the label to edit it to reflect your new combined control. An example of the combined slider control is shown in the following image.

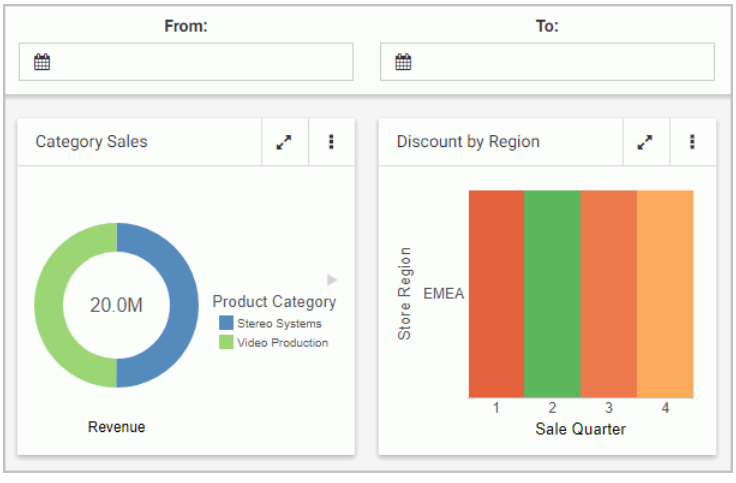


CAR	MODEL	BODYTYPE	COUNTRY	MPG
BMW	3.0 SI 4 DOOR	SEDAN	W GERMANY	18
	3.0 SI 4 DOOR AUTO	SEDAN	W GERMANY	18
	530I 4 DOOR	SEDAN	W GERMANY	18
	530I 4 DOOR AUTO	SEDAN	W GERMANY	18
JAGUAR	V12XKE AUTO	CONVERTIBLE	ENGLAND	16
	XJ12L AUTO	SEDAN	ENGLAND	9
JENSEN	INTERCEPTOR III	SEDAN	ENGLAND	11

15. Save your changes.

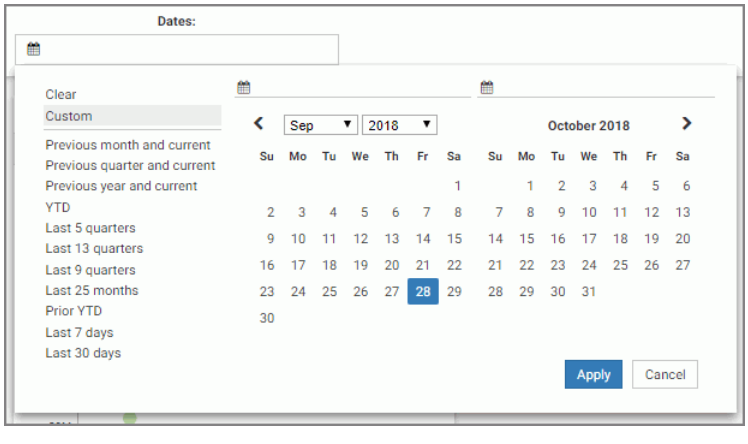
Working With Date Controls

Parameters that contain dates are recognized by Db2 Web Query Designer as date controls. An example of the date controls for external content on the page is shown in the following image.



In this example, each of the controls is associated with a distinct parameter. One parameter uses the Greater Than WHERE condition, the other parameter uses the Less Than WHERE condition.

Optionally, when creating a visualization with external content, you can combine two date controls into one date range control. To do so, multi-select two date controls and then click *Combine*. An example of a combined date range control is shown in the following image.



When creating new content with a date filter, the date control is automatically a combined control that allows you to select a date range.

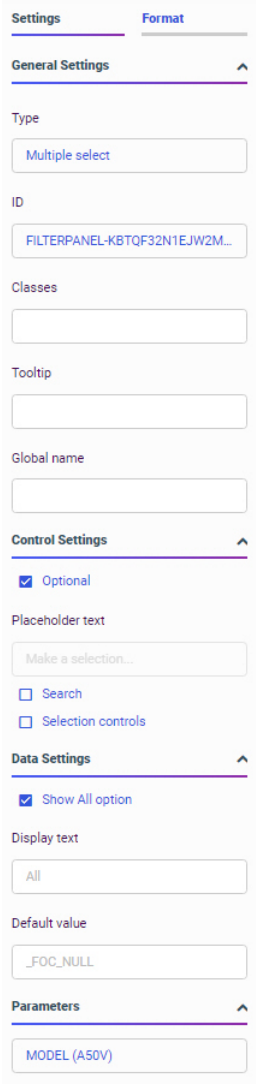
The user can select a custom range of dates from the calendar, as shown in the image, or use any of the preset options to select a common date increment. Click the same date twice to set the date range to a single day.

The calendar feature inside a date control allows you to select a specific date value. Once you pick a specific date, it is always spelled out, so that it can be supported by all internationalized applications.

Styling Filter Controls in a Visualization

When creating a page from external content, you can configure the properties of the filter toolbar, a filter grid panel, or single filter control by using the Properties panel, which is context-sensitive. For example, when you click a filter cell on the toolbar or in a filter grid, the cell style properties open in the Properties panel. When you click a filter control within a cell, the configuration and style properties for this control open in the Properties panel. You can access properties for the entire Filter toolbar or a filter grid by selecting it from the outline. When creating a page from new content, a smaller set of options are available for a filter control or for the filter toolbar.

The Properties panel consists of the Settings tab and the Format tab. The Settings tab includes options to configure the behavior of the Filter toolbar, a filter cell, or a filter control. The Settings tab on the Properties panel for a filter control created for external content is shown in the following image.



When you select the entire page, if it was assembled from existing content, you can change the position of the filter toolbar using the following options:

- **Include Page Filters.** Select this check box to add a filter toolbar to the page, even if no filters have been added yet. Clear this check box to remove the filter toolbar.

  If *Include Page Filters* is selected, you can select one of the following options to change the position of the filter toolbar:

  - **Below Header.** The filter toolbar is placed below the page toolbar and header. This is the default.
  - **Above Header.** The filter toolbar is placed above the page toolbar and header.
  - **Modal.** The filter toolbar is accessible in a modal window overlaid onto the page. Click the *Show filters* button on the page toolbar to open the modal window and make filter selections.

When the Filter toolbar or a filter cell is selected, the Settings tab includes two properties:

- **ID.** Contains a read-only unique CSS identifier.
- **Classes.** Allows you to add one or more custom CSS classes that you can reference in custom JavaScript and CSS code.

Filter controls created within a page have different configuration and styling options than filter controls added to the page from referenced, external content. When you select a filter control that you created directly within the page, the Settings tab contains the following properties:

- **General Settings.** This section includes the following options:
  - **Type.** Displays the type of the control.
  - **ID.** Contains a read-only unique CSS identifier.
  - **Classes.** Allows you to add one or more custom CSS classes that you can reference in custom JavaScript and CSS code.
  - **Tooltip.** Displays a tooltip when you hover over the filter control.

When you select a filter control that was generated from external content using the Filters tab on the sidebar, the Settings tab contains the following properties:

- **General Settings.** This section includes the following options:
  - **Type.** Displays the type of the control.
  - **Tooltip.** Displays a tooltip when you hover over the filter control.

- **Global name.** Designates a global name to the control, allowing you to synchronize control values on different pages.

- **Control Settings.** This section includes the following options:

  - **Optional.** Toggles between optional and required control.

  - **Allow reordering.** If selected, allows you to reorder values inside the control at run time. The default order is alphabetical. This property is only available for check box controls.

  - **Placeholder text.** Enables a configurable placeholder text that you can show users inside a required control when it has no value. The default text is *Make a selection*. This property is only available for drop-down list controls.

    Note: The Placeholder text property is only used for required controls. The placeholder text appears before a selection has been made. To change the default text for an optional control, enable the *Show All option* property and type a value for the Display text property. The display text option in the control represents all values.

  - **Search.** Adds a search field to the filter drop-down menu. This option is available for drop-down list, check box, and radio button controls.

    Note: If the select list contains 50 or more values the Search option is enabled automatically.

  - **Selection controls.** Adds *Select all* and *Clear* buttons to the filter drop-down menu. This property is only available for multiple select lists and check box controls.

    Note: The Selection controls and Show All options cannot be selected at the same time.

- **Data Settings.** This section includes the following options:

  - **Show All option.** Adds an All option to the control that the user can select.

    Note: Choosing this option results in the parameter receiving a _FOC_NULL value. If this parameter is used in a WHERE condition, it results in the WHERE condition being removed from the request and all data values for this field displaying the page.

  - **Display text.** Allows you to specify a custom value for the Show All option in the control. The default text is *All*.

    Note: The Display text property is available when *Show All option* is selected. The display text option in the control represents all values. To supply a placeholder value for required controls that appears before a selection is made, use the Placeholder text property.

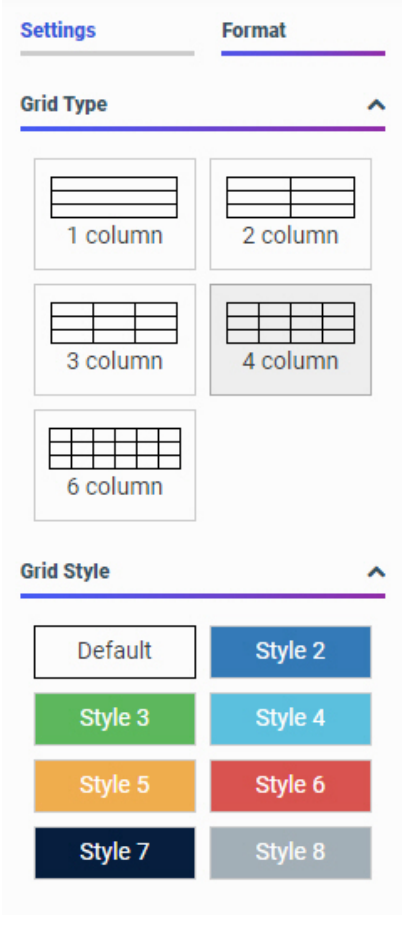
- **Default value.** Displays the default value of the control. For optional parameters you can edit this field and override the control value.

- **Parameters.** Shows the name of the parameters that are associated with this control.

- **Relationship Settings.** Shows chaining relationships that affect the values displayed in the filter, namely the parent control.

When creating a visualization using external content, the Format tab of the Properties panel provides layout and styling options for the Filter toolbar, a filter cell, or a filter control. These options differ depending on the origin of the filter and the item selected. Format options are not available for new prompted filters created in a visualization.

The Format tab of the Properties panel, for the filter bar on the Filter toolbar or in a grid container, is shown in the following image. You can use these options to change the layout of the cells in the Filter toolbar or grid container, and change the theme style it uses.



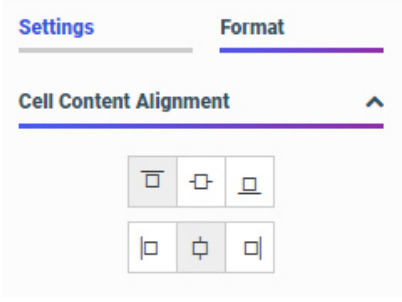
The Format properties for a bar are:

- **Grid Type.** Controls the grid layout of the filter bar. The options include 1-Column, 2-Column, 3-Column, 4-Column, and 6-Column.

  When you are using a columnar layout and the number of filters exceeds the number of columns, the extra filter controls are added to new rows in the Filter toolbar. In the carousel layout, you can use the arrows on either side of the Filter toolbar to scroll to additional filter controls.

- **Grid Style.** Controls the style of the filter grid. The available styles are defined in the theme used for the page. When you select a style for a cell, the entire Filter toolbar is affected.

The Format tab for a cell is shown in the following image.

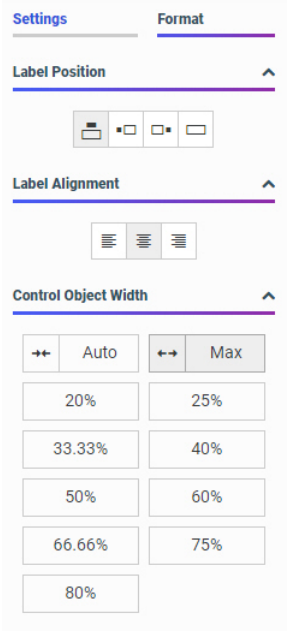


When you configure these properties, you modify the alignment of a control or other object within a cell. Cell format properties are only available for cells in the columnar grid or toolbar layout used in a visualization with external content. The cell and filter control in the carousel style layout used in a visualization with new content are not separate components, so the cell cannot be selected for formatting.

The properties for a filter cell are:

- **Cell Content Alignment.** Controls the alignment of the label and control inside the cell. The options include top, middle, bottom, left, center, and right. These options are available when using a columnar filter grid layout.

The Format tab for a filter control created for external content is displayed in the following image. You can modify the positions of labels in a control, define the alignment, and set the object width.



The style properties for filter controls in a page with external content are:

- **Label Position.** Controls the position of the filter label in the relation to the control. The options are above, right, left, and no label.
- **Label Alignment.** Controls the alignment of the filter label. The options are left, right, and center.
- **Direction.** Controls the alignment of the elements inside the control. This property is available for radio button, check box, and button set controls. The options are horizontal and vertical. The vertical option is enabled, by default, when the control has five or more values.
- **Label/Control Split.** Controls the space ratio between the label and control inside the cell. This option is only available when the label position is set to right or left.
- **Control Object Width.** Sets the width of the control in relation to the filter cell. The options are:
  - **Auto.** Adjusts the width of the control automatically to accommodate the name of each value.

- **Max.** Fills the entire filter cell. This is the default value.
- **Percentages.** Set the control width to various percentages, as they relate to the filter cell.

- **Control Object Height.** Sets the maximum height of the control. If the list of elements exceeds the maximum height of the control, a scrollbar is added to this control. This property is available for radio button, checkbox, and button set controls when their Direction property is set to vertical. The default value is 150px. You can change this value as necessary.

Prompted filter controls created in a visualization with new content always use a predefined, simple filter style. No format options are available for these controls.

Choosing an Event Model for Your Page Filter

When assembling a visualization from existing content, WeDb2 Web QuerybFOCUS Designer supports two event models for passing parameters to your page content:

- **On-selection Change.** Whenever you change a value of any filter control on the page, parameterized content refreshes to reflect your selection. This model is enabled, by default.
- **Submit Button.** After you make all desired changes to filter controls on the page and click the *Submit* button, parameterized content refreshes to reflect all your selections. This model can be enabled by dragging a Submit button from the Control tab on the sidebar into the filter grid.

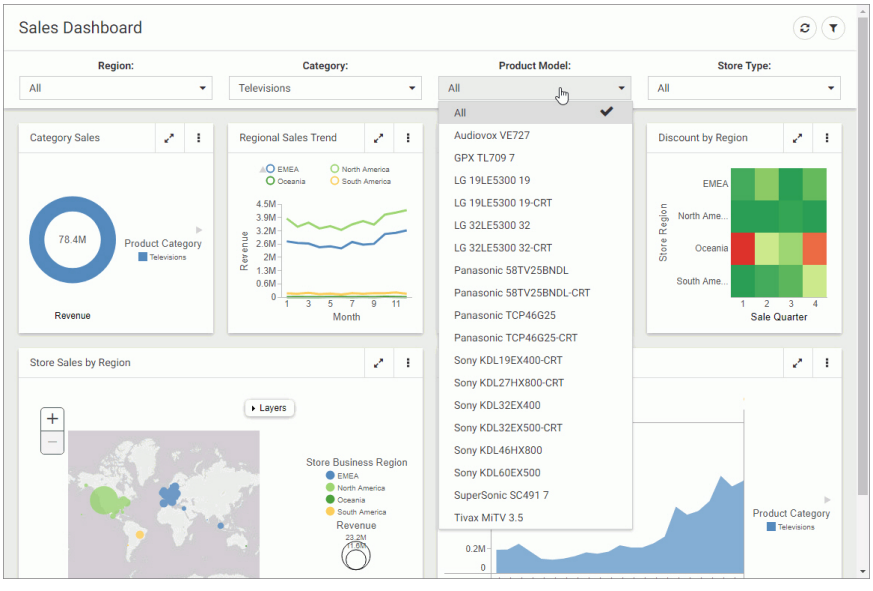
Procedure: How to Use On-selection Change Filters

1. Add filters to a page as described in *Applying Prompted Filters From External Content* on page 41.
2. Click the *Run in new window* button.

   Your content opens in a new browser tab or window, allowing you to interact with content and filters. If your page content contains default values, page filters and page content run in parallel, which results in a faster loading time.
3. Make filter selections.

   Each time you make a selection, the content refreshes to reflect it.

Note: Notice that, if you have parameters that come from the same field hierarchy in your data source, the filter controls are chained in such a way that each selection automatically reflects the available choices in other filters. In our example, we set *Category* to *Televisions*. Now, the Product Model filter only shows models of televisions, as shown in the following image. Db2 Web Query Designer chains controls automatically, if the parameters are defined in the metadata layer with the WITHIN keyword to relate them.



4. Return to Db2 Web Query Designer and save your changes.

Procedure: How to Use Filters With a Submit Button

1. Add filters to a page assembled from existing content, as described in *Applying Prompted Filters From External Content* on page 41.
2. From the Resource selector, click the *Controls* tab, and then drag the *Submit* button onto the filter grid. This can be the filter grid in the Filter toolbar, or in a grid container.

   The Submit and Reset buttons display in the filter grid.
3. Optionally, customize the Submit and Reset buttons in any of the following ways:

   - Align the Submit and Reset buttons by selecting the cell in which the buttons reside and customize the Cell Content Alignment option on the Format tab of the Properties panel. In this example, we selected *Align control bottom* and *Align control center*.
   - Change the label text in either button by double-clicking it and then typing a new label.

- ❑ Add a tooltip to the buttons by selecting each one and populating our the Tooltip field on the Settings tab of the Properties panel.
- ❑ Customize the width of the buttons in relation to the filter cell by selecting one of the options under the Control Object Width property. In this example, we selected *50%*.

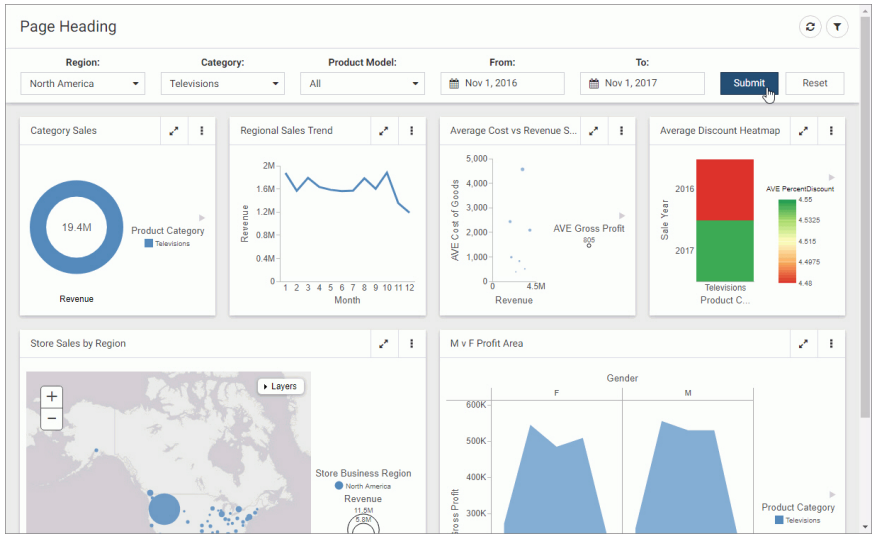
Note: You can delete one or both buttons by right-clicking them and clicking *Delete*.

4. Click the *Run in new window* button.

   The content runs in a new browser tab or window, allowing you to interact with content and filters.

5. Make filter selections. Your parameterized content does not update immediately.
6. Click *Submit*.

   The content refreshes to reflect all your selections upon clicking the Submit button, as shown in the following image.



7. Click *Reset*.

   The filters return to their default values.

8. Optionally, click *Submit* again to refresh the content with the default values.

   Note: If you deleted the Reset button in the previous step, you must select default values manually, and then click *Submit* to return to the default state. Alternatively, you can click the refresh button on the page toolbar to refresh all content and filter controls on the page.

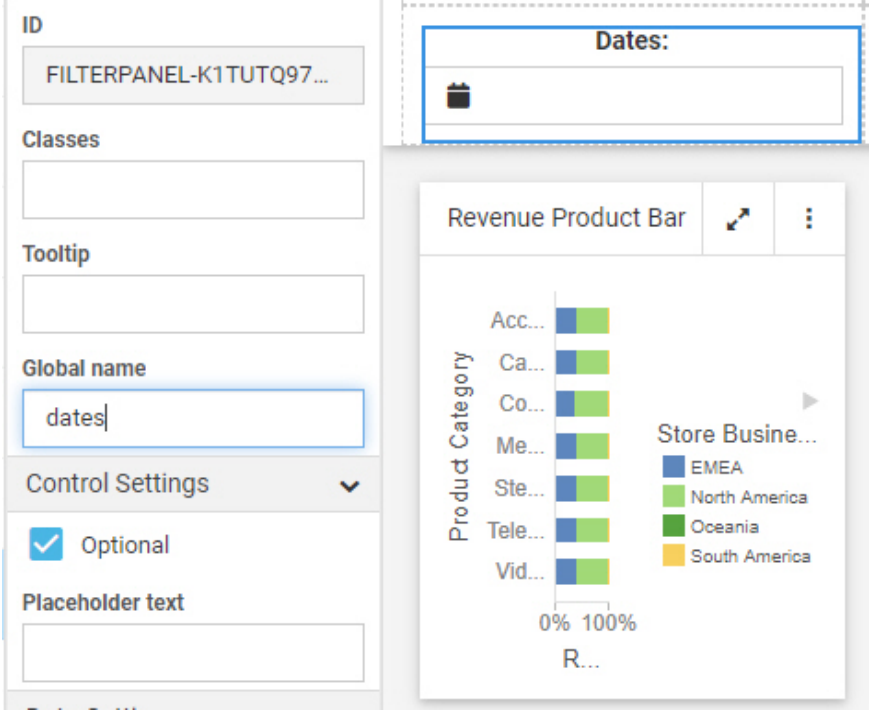
9. Return to Db2 Web Query Designer and save your changes.

Using Global Name to Synchronize Filter Controls

The Global Name property is a powerful tool that allows you to quickly synchronize filter control values between different pages. The Global Name property is configured on the Settings tab of the Properties panel for a filter control in an assembled page. Once enabled, it allows you to match your filter selections across multiple pages at run time within the same browser session. The global name can be used to synchronize filter control selections across multiple pages.

Procedure: How to Configure Global Name Filter Control Property

1. In Db2 Web Query Designer, add filters to a page using existing content, as described in *Applying Prompted Filters From External Content* on page 41.
2. Click a filter control that you want to synchronize.
3. On the Properties panel, in the Settings tab, populate the *Global Name* field, as shown in the following image.

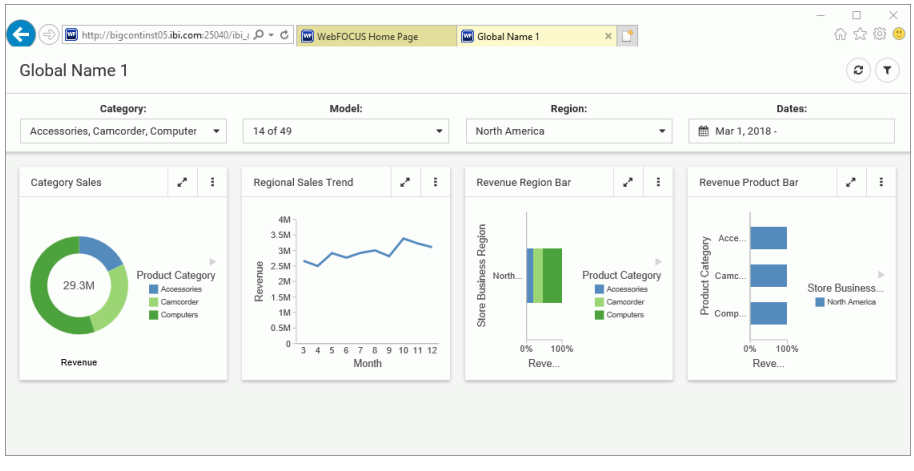


Note: You can choose any text as a global name for your control. Combined controls, such as date ranges and slider controls, have a single global name property.

4. Optionally, repeat step 3 for all the filter controls that you want to synchronize.
5. Save the page.
6. Create a second page, populate it with parameterized content, and add the same set of filter controls as you did in step 1.

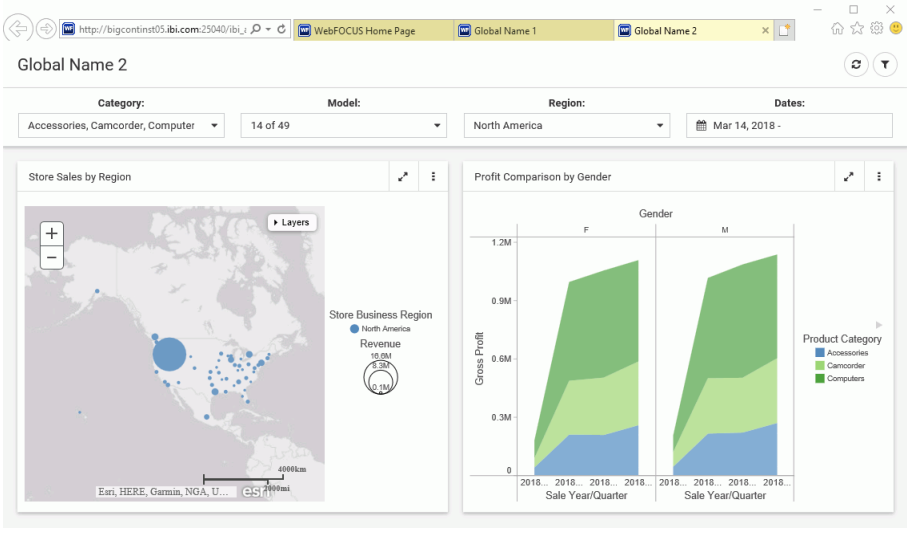
   Note: To streamline this process, you can use the Save As option to create a new version of the existing page, leave the configured filters intact, and replace the content on the canvas. Make sure the Global Name values are identical between the filter controls on both pages.
7. Save the second page and exit Db2 Web Query Designer.
8. Run one of your newly created pages.
9. Select filter control values.

   An example of the filter control selections is shown in the following image.



10. Run the second page.

The page runs with the same filter control values as the ones you have selected on the previous page, as shown in the following image.

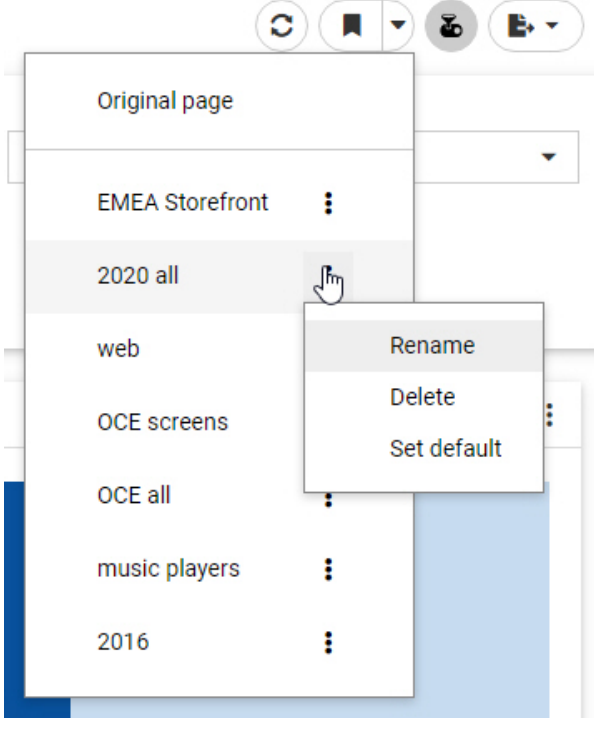


11. Optionally, change the filter control values on the second page and see how they synchronize with the ones on the first page.

Bookmarking Control Selections in a Page

Bookmarking allows users to save filter control selections and other run-time content customizations that they make in a page so that they can easily reapply them when they run the page again later. This is especially useful when there are many filter controls on a page that a user may want to apply each time they access it. Bookmarks are personal to each user and can easily be created and deleted as needed.

Bookmarking is enabled automatically once the page has been saved, and is available in authored pages created with new content and in assembled pages built from existing content. To add a bookmark, make some filter selections when running a page, and then click the *Bookmarks* button , which appears on the page toolbar at run time. You are prompted to type a name for the bookmark. Click *OK* to apply it. Once applied, the bookmark is added to the list, which you can open by clicking the drop-down menu arrow next to the Bookmarks button. Select a bookmark from the list to refresh the page and apply the associated set of filter values. The bookmark list also includes the *Original page* option, which reloads the page with the default filter values selected. From the bookmark list, you can also use the menu for each existing bookmark to rename or delete the bookmark, or make it your personal default set of filter values when you load the page, as shown in the following image.



Each user can create a maximum of ten personal bookmarks for a page. If you reach this limit on a page, delete an existing bookmark to add a new one. The Original page bookmark is always available and cannot be deleted.

Bookmarks also save certain user customizations made in the page. For example, if you use on-chart filtering in an authored page at run-time to create a new filter, you can create a bookmark to save it. In authored pages, you can also change the filter condition from included values to excluded values and change the aggregation operation, and in assembled pages, you can change the content that displays in unlocked containers. All of these changes are saved when you create a new bookmark.

Setting Dynamic Default Values for Filter Controls

When assembling pages from external content, you can personalize default values for filters in a page based on users or conditions. This feature uses an amper-amper (&&) global variable to specify the default option for a filter control. You can then use variables, functions, and conditions to set the values of these global variables. For example, you can set the Region value for a user, using the && global variable, and link it to the filter control to show their region as the selected value, or you can base the default values for a calendar control on the current date so that they always show a relevant, relative date range.

Procedure: How to Personalize Default Values for Filter Controls

You can use global variables to dynamically set the default values of filter controls based on the user who is running the page.

1. Start by creating a FOCEXEC which specifies the global variable and the default values. In this example, we are setting default values for different users for the Region control.

   a. On the default Db2 Web Query Home Page, in the Workspaces area, on the Action bar, click the *Other* tab, and then click *Text Editor*.

      The New Text Resource dialog box opens

   b. In the New Text Resource dialog box, click *FOCEXEC (fex)*.

      The Editor opens.

   c. Add the following FOCEXEC code to set the global variable:

      ```
      - &&DEFREGION
      -SET &&DEFREGION= IF &FOCSECUSER EQ user1 THEN 'North America' ELSE
      -IF &FOCSECUSER EQ user2  THEN 'EMEA' ELSE  'South America'
      ```

   d. Save your changes and close the Text Editor.

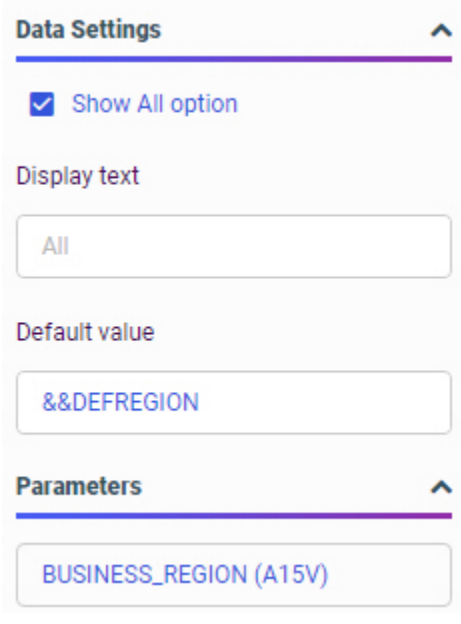
   e. Publish the FOCEXEC.

2. Bring the global variable in effect by either running the FOCEXEC or mapping its path in the Administration Console for it to be run when the user signs in.

To map the FOCEXEC you just created in the Administration console, add the FOCEXEC path to the *Paths to be executed on user Sign-in* field in the *Other* section under Application Settings. The FOCEXEC path name can be copied from the Properties panel in the Home page.

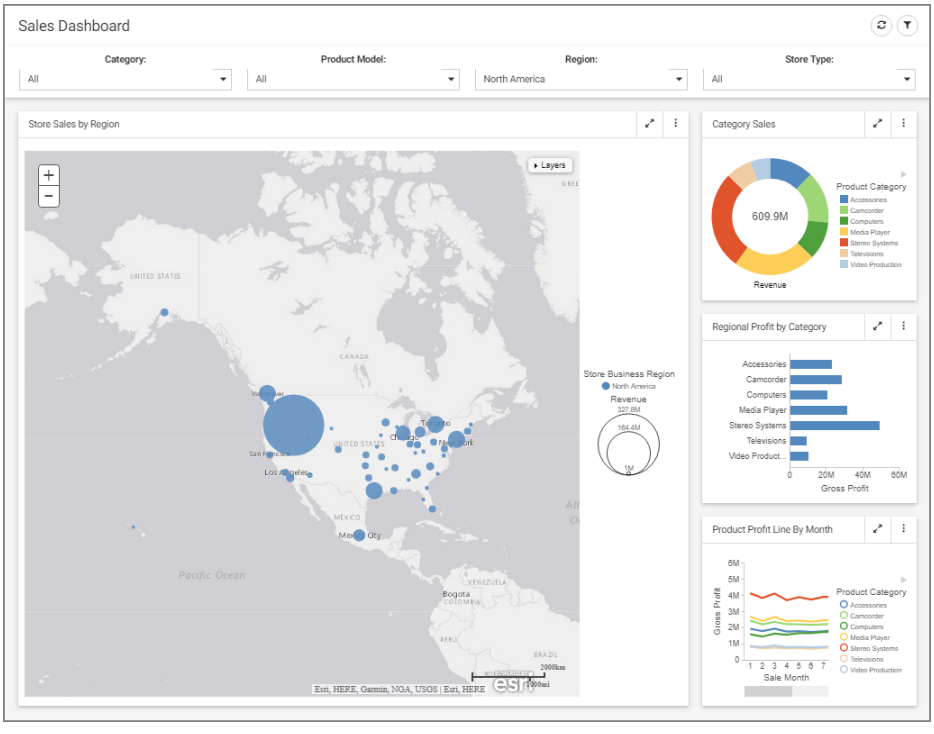
3. Assemble a page from existing content, as described in the *Visualizing Data Using Db2 Web Query Designer* technical content.
4. Populate your new page with the content that features the Region parameter and add the *Region* filter to the canvas, as described in *Adding Prompted Filters to a Visualization* on page 30.
5. Click the *Region* filter and, in the Settings tab, under Data Settings, type the default value variable that you created in the FOCEXEC (in this case, &&DEFREGION).

   The following image shows an example of the Default value property populated with the variable.



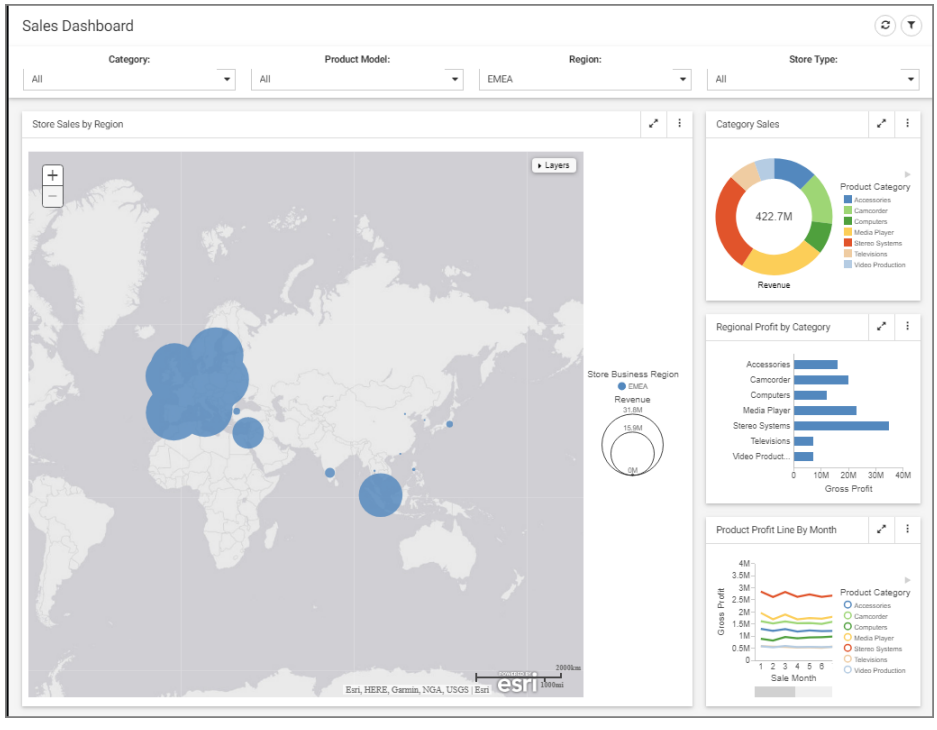
6. Save, publish, and run your page.

The default value for the Region filter control is North America, as shown in the following image.



7. Sign in to Db2 Web Query as one of the users mentioned in the FOCEXEC.
8. Run the same page.

The following image shows an example of the user with the username *user1* running the page. The default Region value now is EMEA.



Procedure: How to Set a Dynamic Default Range for a Calendar Control

A calendar control in a page assembled from existing content is a combined control that allows you to filter for a date range by selecting a start date and an end date. You can use date functions to set global variables for the start and end date to a fixed length of time from the current date, then use those global variables as the default start and end date values for a calendar control.

The calendar control default dates must be entered using the full month name, for example, *December 31 2019*.

1. Start by creating a FOCEXEC procedure that specifies global variables for the default start and end dates. In this example, we will make the default start date a week before today, and the end date today.

   a. On the default Db2 Web Query Home Page, in the Workspaces area, on the Action bar, click the *Other* tab, and then click *Text Editor*.

      The New Text Resource dialog box opens.

b. In the New Text Resource dialog box, click *FOCEXEC (fex)*.

The Db2 Web Query Editor opens.

c. Add the following Db2 Web Query code to set the global variable:

```
-SET &LASTWEEK = AYMD(&YYMD, -7, 'YYMD');
-SET &&FROM_DATE = CHGDAT('YYMD', 'MDYYX', &LASTWEEK, 'A17');
-SET &&TO_DATE = CHGDAT('YYMD', 'MDYYX', &YYMD, 'A17');
-DONE
```

Three variables are defined in this FOCEXEC: &LASTWEEK, &&FROM_DATE, and &&TO_DATE. &LASTWEEK is a variable that provides the date from one week ago. It does need to be used directly in the calendar control, so it is not created as a global variable. &&FROM_DATE and &&TO_DATE need to be saved for use as default values in the calendar control in our page, so they are created as global variables.

&LASTWEEK is created using the AYMD function, which takes a date, a number of days to add to that date, and a date format. In this case, we are using &YYMD, which is a system variable that provides the current date in YYMD (year-month-day) format. We are subtracting one week (seven days) from the current date. The date format is YYMD.

The date format needs to use the full month name, and must be in month-day-year order. We will use the CHGDAT function to convert the date to the proper format for both the &&FROM_DATE and the &&TO_DATE global variables. The CHGDAT function uses four parameters: the format of the input date, the order of the output date, the input date value, and the output date string format as an alphanumeric field.

The format of our two input dates, the date of one week ago set by the AYMD function and the current date, are both in YYMD format, so that is the first argument of both CHGDAT functions. Similarly, the output of both functions is MDYYX, which generates a date with the full month name in month-day-year order. Typically, the format for such a date would be MtrDYY, but since the CHGDAT function uses date character strings instead of actual date values, it has its own date format designations. MDYY sets the date order as month-day-year, with the year written in four digits, and the X indicates that the full month name should be displayed.

The third argument of the CHGDAT function is the date to be converted. For the &&FROM_DATE variable, it is &LASTWEEK, which was previously defined in this FOCEXEC using the AYMD function. For the &&TO_DATE variable, it is &YYMD, a system variable representing the current date in YYMD format.

Finally, A17 defines the string length of the converted date. 17 characters is long enough to fit any date string.

For more information about the AYMD and CHGDAT functions, see the *Using Functions* technical content.

d. Save your changes and close the Text Editor.

The FOCEXEC must be available to any users for whom you want to set default values in the page. Save it in a location where it will be accessible and then publish the FOCEXEC, or share it with any users after saving.

2. Bring the global variable into effect by either running the FOCEXEC or mapping its path in the Administration Console for it to be run when the user signs in.

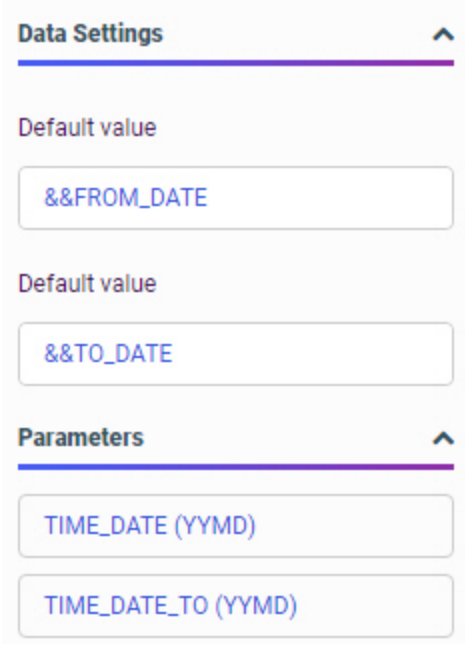
To map the FOCEXEC you just created in the Administration console, add the focexec path to the *Paths to be executed on user Sign-in* field in the *Other* section under Application Settings. The FOCEXEC path name can be copied from the Properties panel on the Home page.

3. Assemble a page from existing content, as described in the *Visualizing Data Using Db2 Web Query Designer* technical content.

4. Populate your new page with the content that is filtered for a date range, and add the calendar control to the page using the Filters tab on the sidebar, as described in *Applying Prompted Filters From External Content* on page 41.

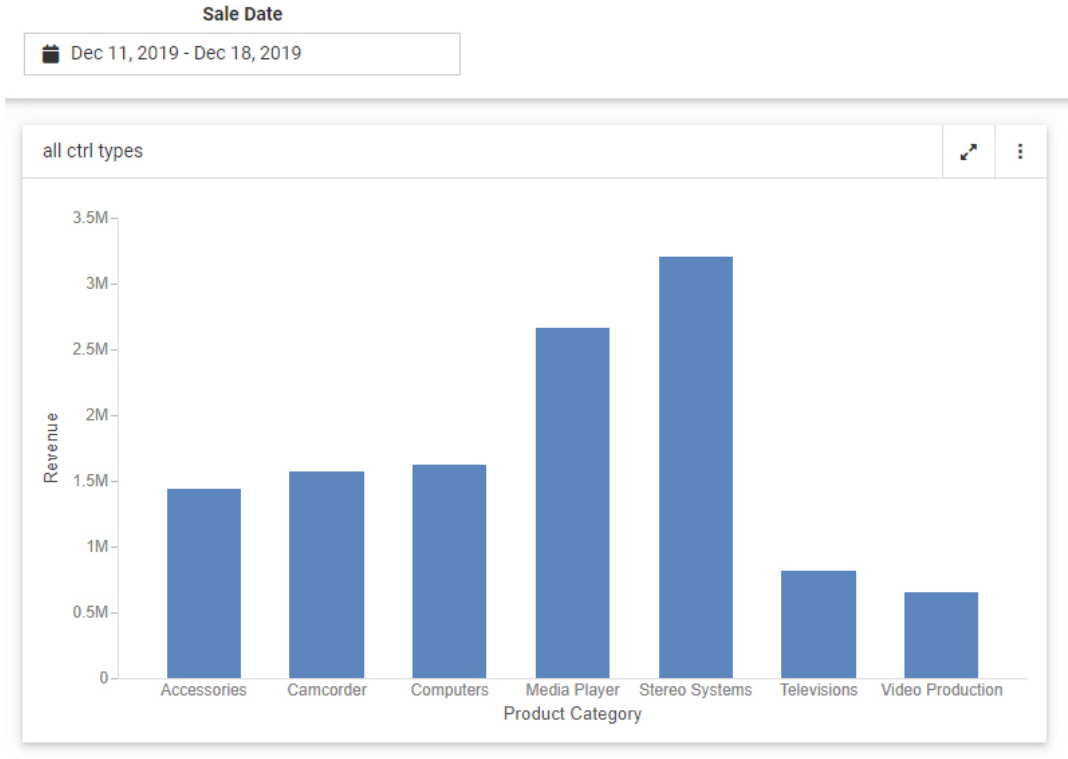
5. Select the calendar control, open the *Properties* panel and, in the Settings tab, under Data Settings, type the default value variables that you created in the FOCEXEC (in this case, &&FROM_DATE for the first value and &&TO_DATE for the second value).

The following image shows an example of the Default value property populated with the variable.



6. Save and run your page.

The default date range in the calendar control is automatically set to the past week. The dates will update every day to always represent a period of one week.



Changing a Field Format

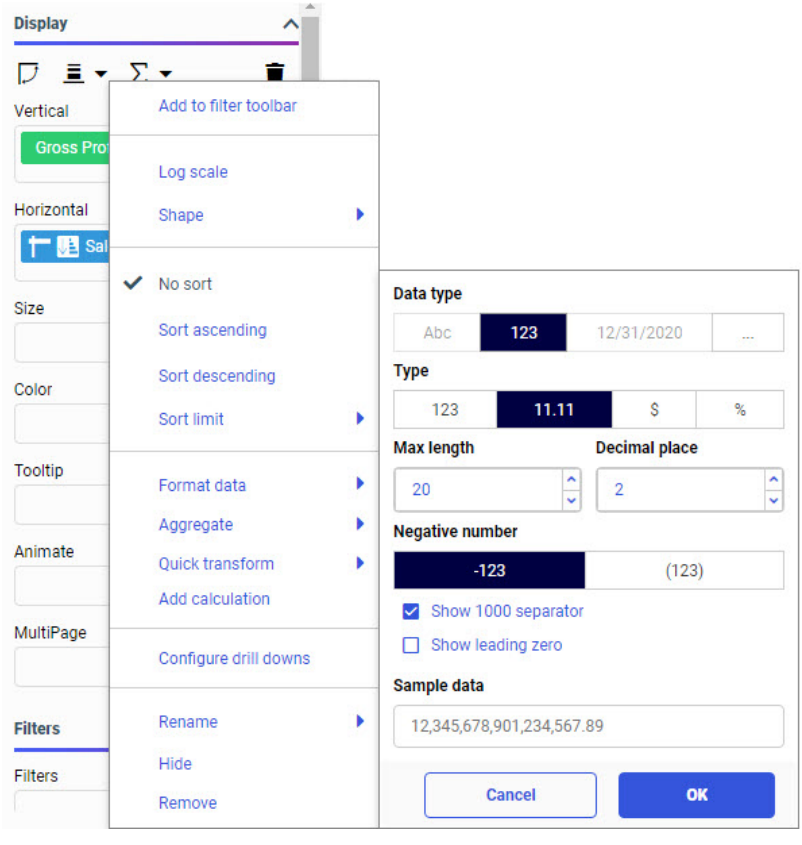
Changing the display or output format of fields that have been placed on the canvas or in field containers allows you to control how values in a field are interpreted and the styling that they use when displayed. This feature allows for field display formatting, which is essential for any data-based content design tool.

In a report, the field format is reflected in the format of data values. In a chart, the field format may be reflected in data values in the chart, if they are displayed, or in the tooltip. Note that series based data labels in a chart are formatted independently from the field itself.

Note: These formatting options are applied when the Db2 Web Query Server retrieves data from the data source. When that data is passed to the JavaScript chart engine to generate a chart, some formatting information may not be included and replaced with default settings. For reports, the selected field formatting options are passed directly.

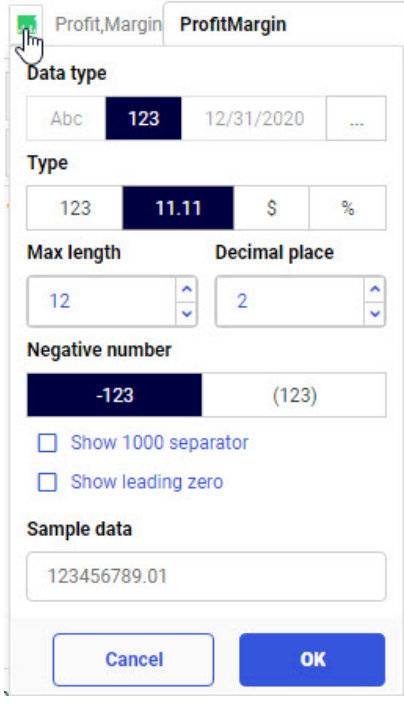
When you change the field format, a new calculated field is created with the new format, replacing the original field. The calculated field is also added to the field list. The new field is identified by the number 1 appended to the field name and title. Additional format changes can be applied directly to the new, reformatted field, without creating additional calculated fields. The original field is still available in the field list if you want to restore the original format without using the field format options.

To change the format of a field in a bucket on the Properties panel, right-click the field and point to *Format data*, as shown in the following image.

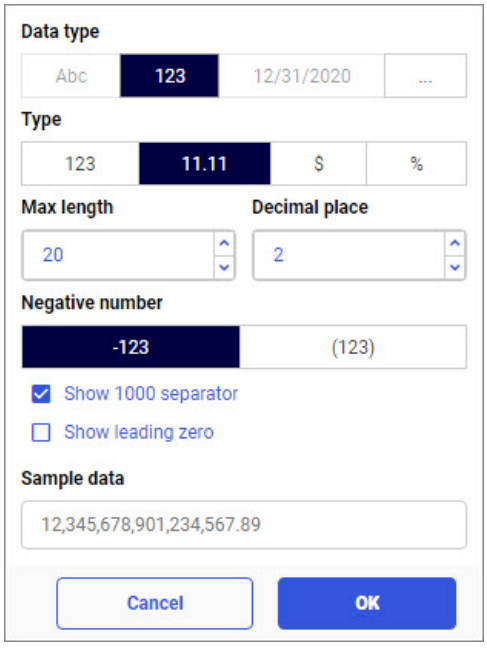


Note: When editing the format of a field, the only options available are those that are relevant to the selected field.

When creating or editing a calculated field, you can access Data Format options by clicking the Edit Format button, which appears with a different icon depending on whether the field is a number , character , or date field , and which is located above the Operator Selection pane next to the field name, as shown in the following image.



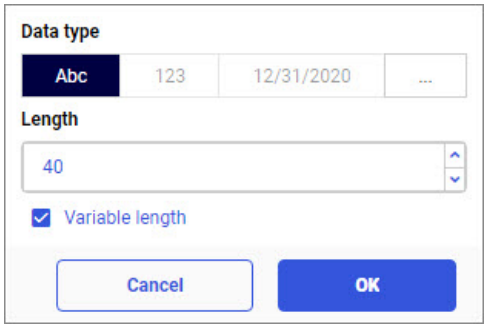
To edit the format of a field, first select the data type, then set details specific to that data type. In the following image, the numeric data type is selected, providing options for numeric fields.



You can select one of the following data types:

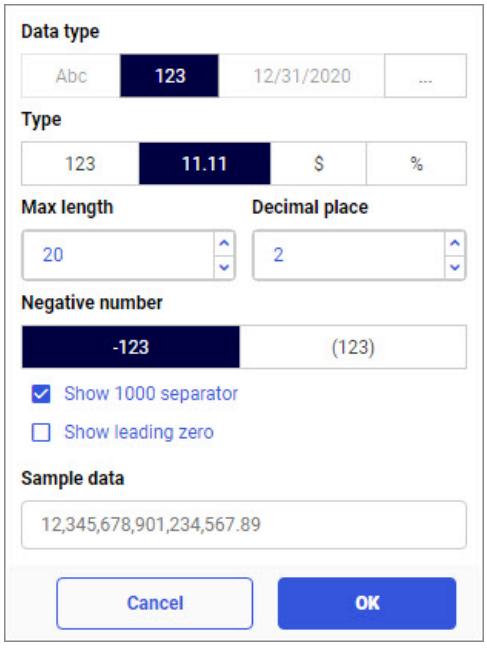
- Character format, for fields containing letters and numbers.
- Number format, for fields containing numbers that you want to sum or aggregate.
- Date format, for fields containing dates.
- Other format, for fields that have values that do not match one of the other formats, such as date-time fields or string fields, or are a variety of another type of field, such as packed decimal fields or Julian date fields.

When you select the character data type, you can specify character-specific formatting, as shown in the following image.



You can use the Length option to select the number of characters to display in the field, and enable variable length. Variable length indicates that the number of characters can vary depending on the data that is stored in the field.

When you select the numeric data type, you can specify number-specific formatting, as shown in the following image.

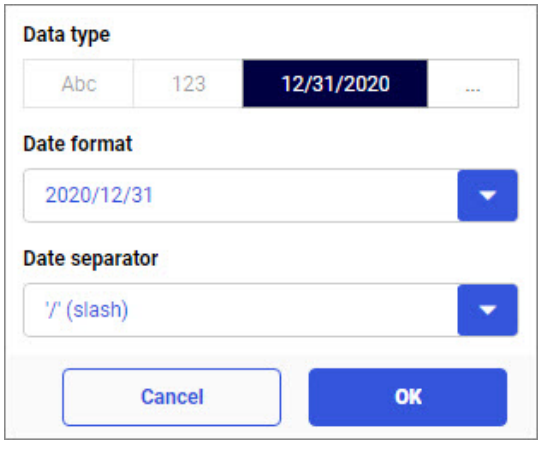


You can choose whether or not to display decimals, and set the maximum number of digits to show before and after the decimal point. You can also choose how to format negative numbers, whether to show thousands separators, and whether to show a zero before the decimal point when the value is less than one.

You can also specify currency and percent variations, such as a different currency symbol or a change in the use of a percentage value. When you select the currency option under Type, the Currency symbol and Symbol position options appear, allowing you to select the currency symbol and how it displays. When changing the format of a numeric field, a preview shows an example of what data values may look like based on the current field format settings.

Note: The Percent data format option automatically multiplies the field value by 100 so that decimal values are accurately converted to percentages. If your data values do not need to be multiplied by 100 and only need the percent symbol (%) added, select the custom format data type and manually enter a field format followed by %. For example, *D12.2%*.

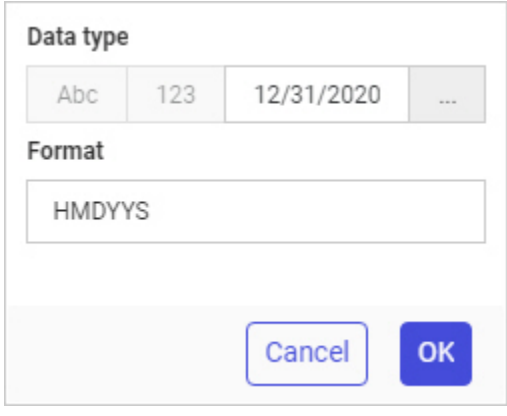
When your data type is a date field, you can make a selection from the supported date formats that are available for selection. The options for a date field are shown in the following image.



The Date format menu shows a list of date formats as applied to December 31 of the current year. You can select date formats that use separators or month names, or show a single date component.

When you select a date format that uses a separator, the Date separator menu is available. You can choose to use a slash (/), dash (-), dot (.), or space.

If you want to use a format not available in the character, number, or date sections, you can select the Other data type. Type a valid Db2 Web Query field format into the Format text box. For example, the following image shows a field using the format HMDYYS, which is a date-time format.



The Other data type, like all of the other data types, does not allow field transformations, which prevents invalid formats. If the field was originally alphanumeric, you can enter a custom alphanumeric format. If the field was originally numeric, you can enter a custom numeric format. If the field was a originally a date field, you can enter a custom date format.

Procedure: How to Change the Number of Decimal Places in a Field

You can change the number of decimal places that display for a numeric field to show fewer or more decimal values. Showing more decimal values allows you to analyze your data with greater precision, while showing fewer decimal values may help make information more immediately digestible.

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

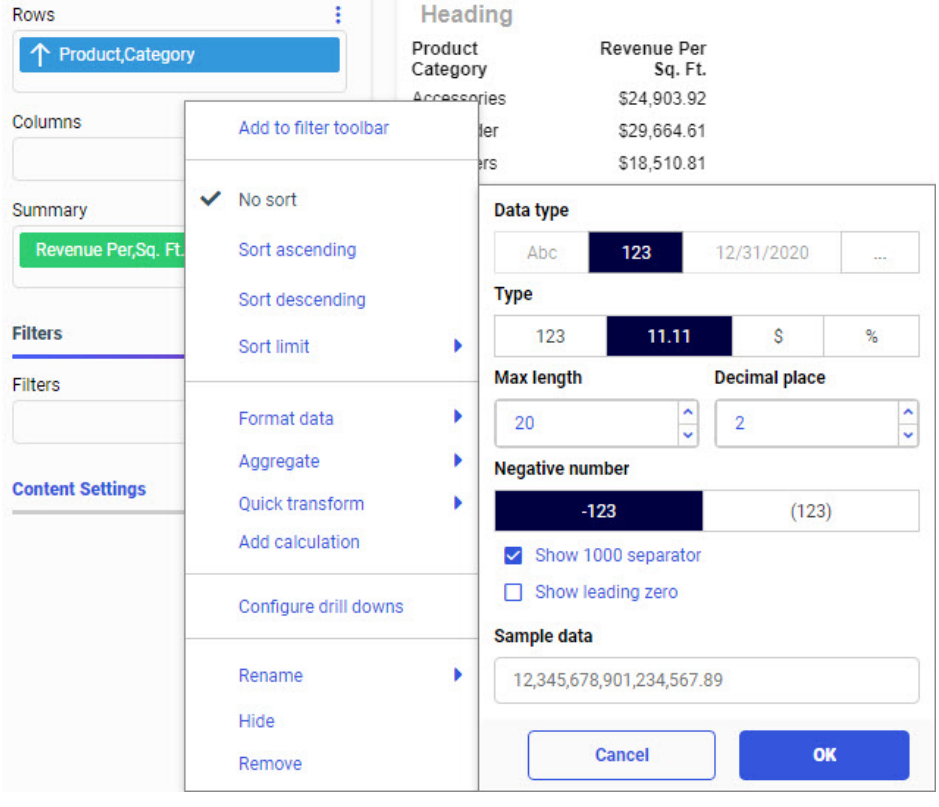
2. Select a workspace with access to the wf_retail sample data, and select *wf_retail_lite.mas* as the data source.

   Db2 Web Query Designer loads with options to create a single content item.

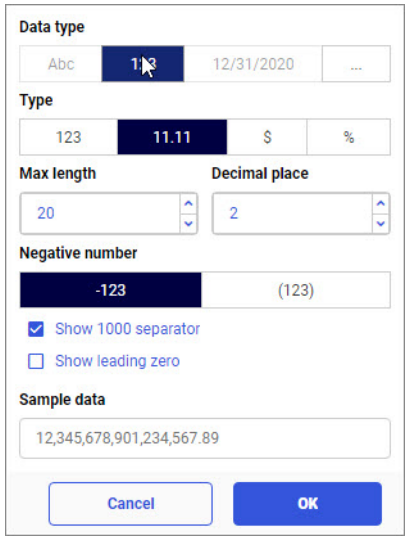
3. Change the content type to a report. In the Content picker, select one of the report layouts.

   Using a report makes it easy to see all data values directly on the canvas. If you are creating a chart, you can see exact data values when you point to a section of the chart to display a tooltip.

4. Add a sort field, for example, Product Category, to the Row bucket and a measure field, for example, Revenue Per Sq. Ft., to the Measure bucket.
5. Change the format of the measure field to show four digits after the decimal point, by doing the following:
   a. In the Measure bucket, right-click a field and point to *Format data*, as shown in the following image.



b. If the field is not already in a numeric format, change the data type to numeric by clicking the number button in the Data type section, as shown in the following image.



c. To display decimals, ensure that the integer option is not selected in the Type section. You can select the decimal, currency, or percent option depending on how you want the field to display.

d. To change the number of digits after the decimal, use the arrow control to increase or decrease the Decimal place value, or type a number in the text box.

e. Check the data preview in the Sample data text box. If it shows the symbols and the number of values that you want to display in your content, click *OK* to accept your format changes.

The field whose format you modified is replaced with a new version that shows the specified number of decimal points, as shown in the following image.

The field whose format you modified now shows the specified number of decimal points, as shown in the following image.

Product Category	Revenue Per Sq. Ft. 1
Accessories	24,903.9186
Camcorder	29,664.6065
Computers	18,510.8106
Media Player	47,720.1179
Stereo Systems	55,985.4263
Televisions	15,276.0628
Video Production	11,110.4634

Product Category	Revenue Per Sq. Ft.
Accessories	24,903.9186
Camcorder	29,664.6065
Computers	18,510.8106
Media Player	47,720.1179
Stereo Systems	55,985.4263
Televisions	15,276.0628
Video Production	11,110.4634

Creating Calculations

When you create content, you are not restricted to the fields that exist directly in your data source. You can add calculations to automate summations and other mathematical tasks related to your data fields. You can specify operators, fields, variables, and functions when creating a calculation. If you can generate the information you want from the existing data, you can create a temporary field to evaluate and display it. A temporary field is a field whose value is not stored in the data source, but can be calculated from the data that is there. A temporary field takes up no storage space in the data source, and is created only when needed.

You can create two types of temporary fields, which differ in how they are evaluated:

- A pre-aggregation calculated field, or DEFINE, is evaluated as each record that meets the selection criteria is retrieved from the data source. The result of the expression is treated as though it were a real field stored in the data source.
- A post-aggregation calculated field, or COMPUTE, is evaluated after all the data that meets the selection criteria is retrieved, sorted, and summed. Therefore, the calculation is performed using the aggregated values of the fields.

Performing Basic Calculations

You can use the calculator to perform basic calculations on fields in your data hierarchy. When you create a calculated field, a new, unique field is created. It incorporates all of the data fields and expressions that you added to the calculation.

Once the calculation is complete, a new data field is created which can subsequently be used in your content. This field is placed on the Data pane, using the label of the originating field on which you created the initial calculation. For example, you can perform an addition operation on two fields. This action sums the values of the fields, displaying the total of the two when the field is used in a chart. You can also perform more advanced calculations that can result in different outcomes.

Calculated fields include DEFINEs, COMPUTEs, quick transforms, and more. You also have access to Db2 Web Query functions that can be used in a calculation to perform specific operations on character and numeric fields. These display in a list of available functions fx. They are separated into categories, listed in alphabetical order, and are case-insensitive.

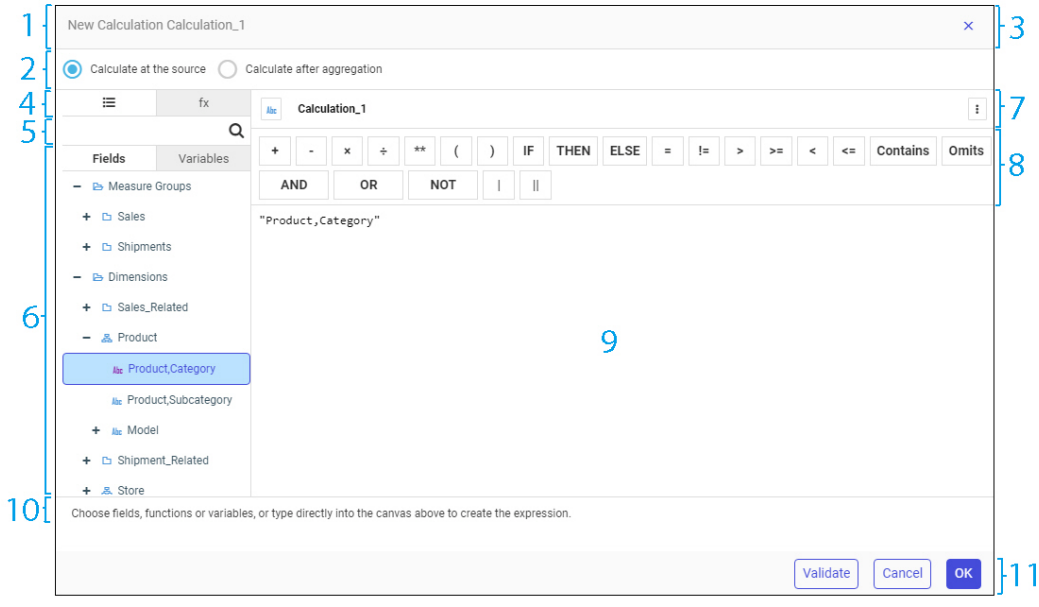
A DEFINE field is evaluated before data aggregation, while a COMPUTE field is evaluated after data aggregation. This means that DEFINE fields are especially useful to sort the data in a chart or report, while a COMPUTE field is especially useful as a measure field.

You can determine whether a calculation will be created as a DEFINE or COMPUTE by selecting *Calculate at the source* or *Calculate after aggregation* in the calculator. When you select *Calculate at the source*, a DEFINE field is created, and when you select *Calculate after aggregation*, a COMPUTE field is created. When you create a DEFINE field, it is added to the field list, from where you can add it to your content. When you create a COMPUTE field, it is added to your content automatically, in the default measure bucket if it was created from the field list, or in the bucket from where you created the COMPUTE.

Access the calculation feature in one of the following ways:

- Right-click a field in the Resources panel and click *Add calculation*. This creates a DEFINE, by default, with the selected field added automatically to the calculation. If you create a DEFINE, it is added to the Resources panel, from where you can add it to your content. If you create a COMPUTE, it is added to the default measure bucket.
- Right-click a measure field in a bucket and click *Add calculation*. This creates a COMPUTE, with the selected field automatically added to the calculation. The calculated field is added to the bucket from where you accessed the calculator.
- Click the menu in the Dimensions area or Measures area of the Resources panel, and click *Add calculation*. This creates a DEFINE, by default. If you create a DEFINE, it is added to the Resources panel, from where you can add it to your content. If you create a COMPUTE, it is added to the default measure bucket.
- When creating a report, click the menu for the Rows bucket or the Summary, Count, Detail, or Detail with counter bucket, and click *Add calculation*. This creates a COMPUTE. The calculated field is added to the bucket from where you accessed the calculator.
- Right-click a calculated field that you created previously and click *Edit calculation*. This allows you to modify an existing calculated field. This option is available from the field list for DEFINE fields, and from a bucket in the Properties panel to which a calculated field has been added.

When you perform one of these actions, the calculator opens, as shown in the following image.



The numbering in this image points out the different areas of the interface, as a guide.

1. **Title bar.** Shows context information about the current calculation. For example, New Calculation or Edit Calculation, along with the field name.
2. **Evaluation options.** Determines the type of calculation. Select *Calculate at the source* to create a pre-aggregation, DEFINE field, or select *Calculate after aggregation* to create a post-aggregation, COMPUTE field.
3. **Close button.** Closes the Calculator. Clicking this button performs the same function as the Cancel button.
4. **List chooser.** Allows you to select which list should be displayed in the Calculator. For example, functions.
5. **Search box.** Allows you to search for components across all subjects (Fields, Functions, and Variables). The search will find matches on contiguous text and performs a case-insensitive search. A flat list of matches is returned.

   - For Fields, matches are performed on Name, Title, and Positional (folder or segment) information in the hierarchy.
   - For Functions, matches are performed on Name, Category, Parameters, and Help text.

- For Variables, matches are performed on Name.

6. **Field/Function/Variable list.** Lists the fields, functions, or variables that are available for selection and on which you can perform a calculation.

   The following considerations apply to Field/Function/Variable lists.

   - A Field list will always present with Single-list mode. It operates the same way as the Field List tab in the Field Tree.
   - The Function list displays a categorized list of Db2 Web Query functions, sorted case-insensitive in alpha order (ascending or descending). You can use the drop-down menu to select the category of the function that you want to use, or you can search for a function. Double-click or drag and drop a function into the Canvas and then supply parameter values to use it.

     You can still use a function, even if it is not listed, by typing it into the calculator canvas. See the *Using Functions* technical content for a complete list of available functions, including legacy functions.
   - A Variable list displays a list of system variables in Db2 Web Query. The Variable list tab operates the same way as the Variable list tab in the Field Tree.

7. **Calculated field definition area.** Displays the field name for which an expression is being created. It displays an icon (separate) to allow its format to be set with the Data Format Selector.

   - **Format icon.** You can use the Format icon to change the target field format for the calculation.
   - **Properties icon.** Enables you to change the target field properties for the calculation, such as the field name and title, and whether to allow missing values.

8. **Operator Selection pane.** This pane displays a full, contextualized list of operators that are available in calculations. It also displays mathematical and logical operators. Additional statements (IF, THEN, ELSE) are also included.
9. **Canvas/typing surface.** This is where you build your calculation. It shows fields, aggregations, and other items related to the calculation you are creating. It also supports functions, variables, operators, values, and placeholders.
10. **Function Help.** When working with Functions, you may receive help messages, such as a description of the selected function and the values that you must supply.
11. **Actions.** Includes a Validate button that allows you to check whether the syntax that you have provided for the DEFINE or COMPUTE is structured correctly, and options to cancel or commit the calculated field.

Procedure: How to Create a DEFINE Field Using a Db2 Web Query Function

A DEFINE is a virtual field that is evaluated as each record that meets the selection criteria is retrieved from the data source. The result of the expression is treated as though it were a real field stored in the data source. It is added to the field list in the Resources panel, from which you can add it to multiple content items.

You can use a Db2 Web Query function in a DEFINE or in a COMPUTE to transform data from an existing field to create a new field. Each function accepts a different set of arguments that are added in parentheses after the function name.

DEFINEs are built from the field list in the Resources panel.

DEFINEs can be created in the following ways:

- **In a Master File.** These virtual fields are available whenever the data source is used.
- **In a procedure.** A virtual field that is created in a procedure lasts only for that procedure.

In this example, a new DEFINE field will be created that uses the DTRUNC function to supply the first day of the week for each sale date.

1. Create a new visualization in Db2 Web Query Designer, using wf_retail_lite.mas as the data source.
2. With the Fields tab selected from the sidebar, in the Resources panel, right-click a field or click the menu next to the Dimensions area or Measures area, and then click *Add calculation*.

   The calculator opens to create a new DEFINE field, by default. Notice that the *Create at the source* radio button is selected.

3. In the Calculator dialog box, click the Functions tab fx.

   The Function list appears, and displays the first available function category.

   Note: If you create the new calculation by right-clicking a field, that field is automatically added to the calculator text area. For the present example, delete this text before continuing.

4. Navigate to the DTRUNC function using one of the following methods:

   - In the search box, type *DTRUNC*.
   - Expand the function category drop-down menu, and select *Date/Date-Time*.

   Double-click the *DTRUNC* function, or drag it into the Calculator text area.

The text area displays the function and identifies the required arguments, in this case, date and period. Notice that an example is provided in the space below the calculator text area.

5. In the text area, inside the parentheses after DTRUNC, select the word *date*.
6. In this space, specify the input date that will be used to provide the first day of the week. In this case, instead of a single date, provide an entire date field, so that the DEFINE field will generate a value for each input date value.

   Click the Fields tab to access the Field list. Under Dimensions, expand *Sales_Related*, *Transaction Date, Simple*, *Sale,Day*, and *Sale Date Details*, then double-click *Sale,Date*.

   The Sale Date field is added as the first argument in the DTRUNC function, as shown in the following image.

   ```
   DTRUNC( "Sale,Date" , period)
   ```

7. Replace the word *period* with the date component that you want the field to use as increments. In this case, it is the first day of each week. Type *WEEK* as the second argument in the DTRUNC function, in place of the *period* placeholder text. The completed function should resemble the following:

   ```
   DTRUNC("Sale,Date", WEEK)
   ```

8. Since the output of the DTRUNC function is a date field, the DEFINE field should use a date format.

   Click the *Edit format* button, change the Date type to a date format, and select an option of your choice from the Date format drop-down menu.

   Click *OK*.

9. Optionally, double-click the name of the DEFINE field to change it.
10. Click *Validate* to confirm that the DEFINE is set up correctly.
11. Click *OK* to return to the calculator.

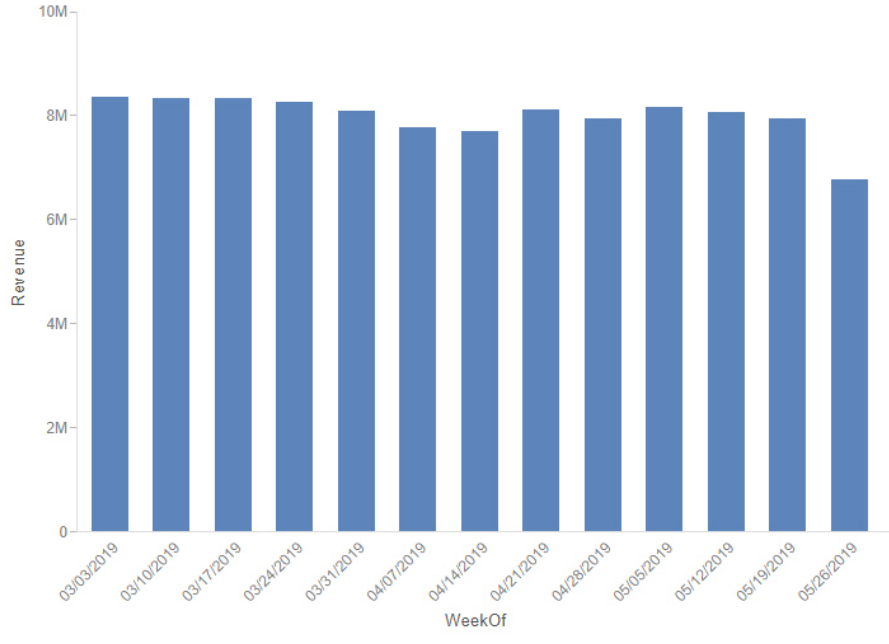
    If the validation indicated that there was an error, determine the cause of the issue and fix it.

12. Click *OK* to finish creating the DEFINE field.

    If you created the DEFINE by right-clicking a field in the Field panel, it displays at the bottom of the measure or dimension group where it was created from. If you have trouble locating your calculated field, type the name into the search box to find it.

13. Add the DEFINE to your content as a sort field.

You can use the calculated field from this example to create a chart or report that shows sales information for each week, as shown in the following image.



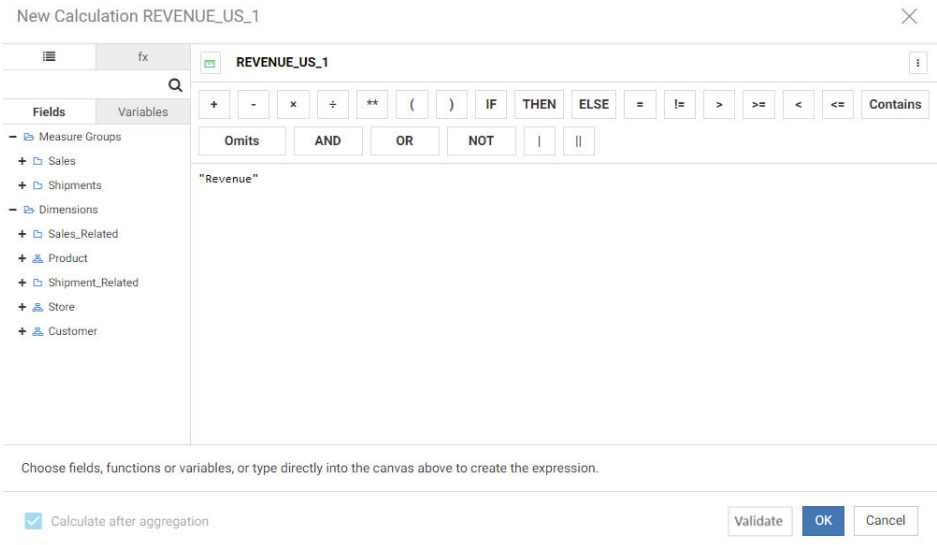
Procedure: How to Create a COMPUTE Field

COMPUTEs are calculated fields whose values are evaluated after all of the data that meets the selection criteria is retrieved, sorted, and summed. The calculation uses the aggregated (total) values of the fields. For example, based on the values of Revenue and MSRP fields in your data source, you could calculate the discount percentage.

Create a COMPUTE field by selecting *Calculate after aggregation* in the calculator.

1. Create a new visualization in Db2 Web Query Designer, using wf_retail_lite.mas as the data source.
2. With the Fields tab selected on the sidebar, on the Resources panel, in the Measures area, expand the *Sales* folder, and double-click the *Revenue* field to add it to a measure bucket.
3. From the measure bucket, right-click the Revenue field and click *Add calculation*.
4. In the Calculator dialog box, build the COMPUTE.

Note: The field that you right-click to create the COMPUTE field is automatically added to the text area, as shown in the following image.



You can select another field, or add fields from the data source tree that display.

Note: For COMPUTEs, the Calculate after aggregation check box is selected, indicating that the field values are evaluated after the chart or report has been sorted.

5. Type the mathematical expression to create a COMPUTE field to evaluate the discount percentage using the Revenue and MSRP fields:

   a. Click to place your cursor before the Revenue field in the text area, and type *1 - (*.

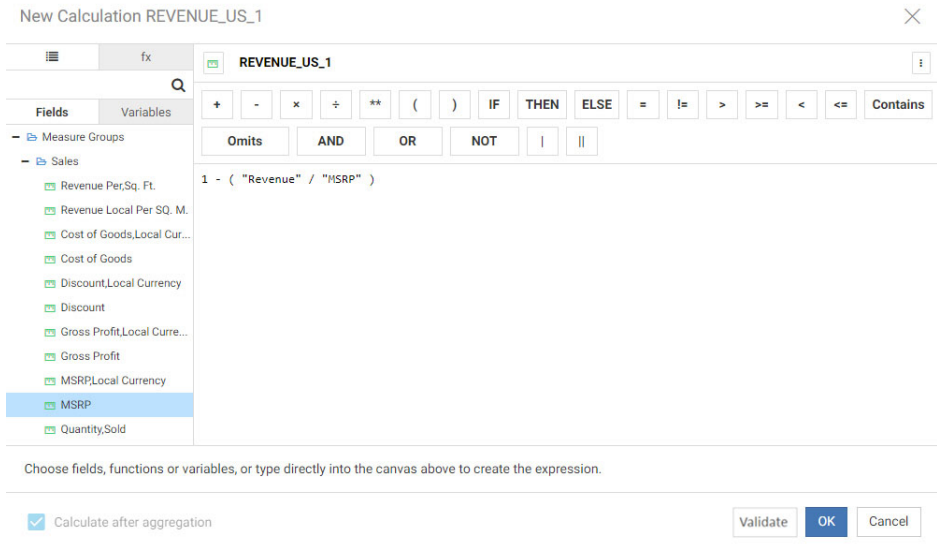
   b. Click to place your cursor after the Revenue field, and type */*.

   c. From the data tree, under Measure Groups, expand the *Sales* folder and double-click the *MSRP* field to add it to the expression.

   d. Type *)* to close the expression. The completed expression for the COMPUTE field should resemble the following:

   ```
   1 - ("Revenue"/"MSRP")
   ```

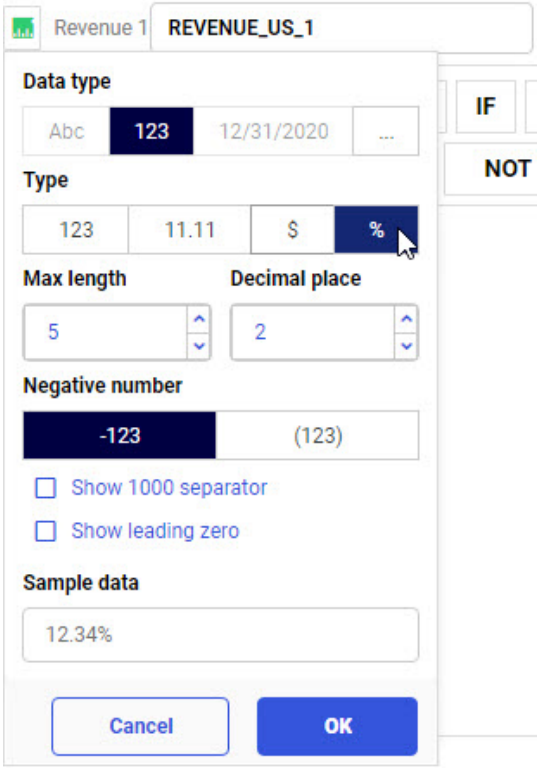
The following image shows this expression in the Calculator.



Note: You can use the buttons in the Operator Selection area instead of typing some mathematical operators.

6. To show the discount percentage as percentage values instead of as a decimal, change the format of the calculation.

Click the *Format* icon to open the Format dialog box. Click the *Percent* Type option to change the field format to a percentage, as shown in the following image.

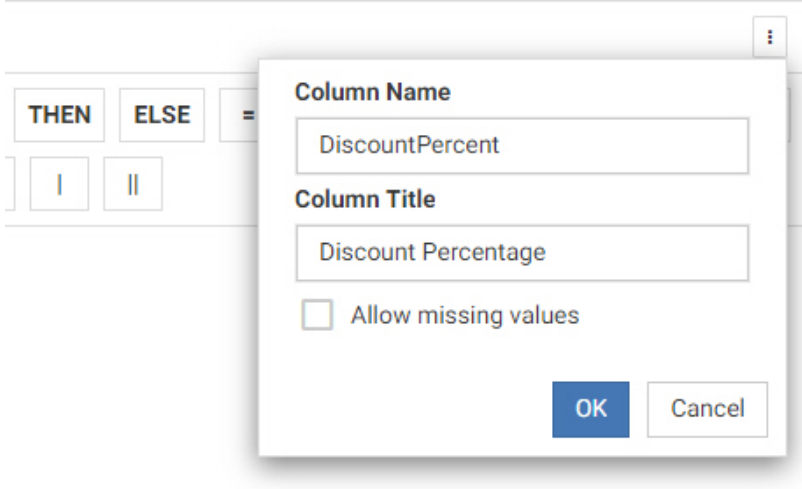


The percentage option automatically multiplies the values in the field by 100 to produce a percentage, so we do not need to perform this operation in the COMPUTE expression.

7. Click *OK* to accept the field format change.
8. Optionally, change the name of the COMPUTE field. It is assigned a default name based on where the COMPUTE field was created from. Unless you specify a different column title, this name appears in the bucket where the COMPUTE is used and in your content.

   Double-click the field name next to the Format icon, and type a new name for the field.
9. Optionally, change the column title that displays for the COMPUTE field when it appears in your content.

Click the *Field Properties* menu, and type a column title for the field, as shown in the following image.



10. Click *OK* to accept the new column title for the COMPUTE.
11. Click *Validate* to confirm that the COMPUTE is set up correctly.
12. Click *OK* to return to the calculator.

    If the validation indicated that there was an error, determine the cause of the issue and fix it.

13. Click *OK* to finish creating the new COMPUTE field.

    The field is added to the same bucket from which you created it. You can move it to a different bucket or delete the original field, Revenue, in this example, from which it was created.

The following image shows a data grid that displays the Revenue and the calculated Discount Percentage for different product models.

Model	Revenue	Discount Percentage
2100	$4,434,062.45	4.56%
4200	$1,957,114.64	4.75%
Audio Technica ATHW5000	$9,341,397.65	4.50%
AudioVox D1788PN	$148,343.05	4.21%
Audiovox VE727	$274,014.46	3.91%
B00D7MOHDO	$2,514,622.50	4.49%
BCG34HRE4KN	$1,508,212.41	4.39%
BOSE AM10IV	$15,009,325.65	4.50%
BOSE AM16II	$9,749,839.35	4.41%
BOSE V-S2	$14,194,157.90	4.47%
BOSE V-S2-P	$10,898,704.95	4.38%
C6506B	$8,159,907.03	4.41%
C6506S	$8,072,776.93	4.45%
C6506W	$8,095,460.35	4.47%
Canon FS300	$14,280,110.10	4.50%
Canon HFR11	$9,462,118.35	4.39%
Canon XHA1S	$10,676,938.80	4.52%
DC390/37	$6,091,014.89	4.45%

If you remove the COMPUTE field from your content, it is deleted permanently. COMPUTE fields are not stored in the Resources panel.

Procedure: How to Edit an Existing Calculation

Once you have created a calculated field (DEFINE or COMPUTE), you can edit it. This allows you to revise the calculation and in the field so that you can achieve the results you expect.

Note: You cannot edit a calculated field that is already being used in a static or prompted filter. You may, however, delete the filter, edit the calculated field, then recreate the filter using the edited field.

1. On the Db2 Web Query Home Page, locate a visualization with new content that uses a calculated field. Right-click it and click *Edit*.

   Db2 Web Query Designer opens.

2. If you created a DEFINE field, the calculated field was added to the Field panel. Right-click the calculated field and click *Edit calculation*. If you created a COMPUTE field, or already added the DEFINE field to your content, you can also edit it from the bucket to which it was added.
3. Modify the calculated field using the calculator.
4. Click *Validate* to confirm that the calculated field is set up correctly.
5. If the validation indicated that there was an error, determine the cause of the issue and fix it.
6. Click *OK*.

   The revised field displays in the location from which you edited it.

Using Prefix Operator Aggregation Functions

You can use prefix operator aggregation functions to instantly apply a number of different aggregation operations to fields, unlocking significant insight into your data without writing your own calculations.

To apply a prefix operator, right-click a field in a measure bucket in a chart or report, point to *Aggregate*, and select one of the following options:

- **None.** Does not explicitly apply a prefix operator. When the Summary display option is selected, the Sum aggregation is used. When the Count display option is selected, the Count aggregation is used. When the Detail or Detail with counter display options are used, no aggregation is applied.
- **Sum.** Adds record values together for the selected field within each sort value.
- **Average.** Calculates the average of record values for the selected field within each sort value.
- **Count.** Provides the number of record values for the selected field within each sort value. If there are no missing values in the data source, the count aggregation returns the same value for every field.

- **Count distinct.** Provides the number of distinct record values for the selected field within each sort value.
- **Percent.** Calculates a percentage for each sort value based on the summed total value for the selected field.
- **Percent of count.** Calculates a percentage for each sort value based on total record count for the selected field.
- **Minimum.** Provides the minimum value for the field within each sort value.
- **Maximum.** Provides the maximum value for the field within each sort value.
- **Median.** Provides the median field value with each sort value.
- **Mode.** Provides the most common value of the field within each sort value.
- **Standard Deviation, Sample.** Provides the standard deviation of the field, within each sort value. Sample standard deviation uses Bessel's correction of *n-1* to calculate the standard deviation.
- **Standard Deviation, Population.** Provides the standard deviation of the field, within each sort value. Population standard deviation is calculated using *n* to represent the number of records in the request.
- **Distinct.** Available only when creating reports with the Detail and Detail with counter display options. Displays only distinct values.
- **Total.** Available only when creating reports with the Detail and Detail with counter display options. Provides a grand total for the field. The Total operator (TOT.) can also be applied to a measure field in a header or footer to show the total value.

The operation is instantly applied to the field, indicated by a prefix in the measure bucket.

When you add an alphanumeric field to a measure bucket, the only available aggregations are Count, Count distinct, and Percent of count. These options allow you to understand the distribution of values in alphanumeric dimension fields. When you add an alphanumeric dimension field to a chart as a measure, the Count aggregation is applied automatically in order to generate aggregated values for the chart.

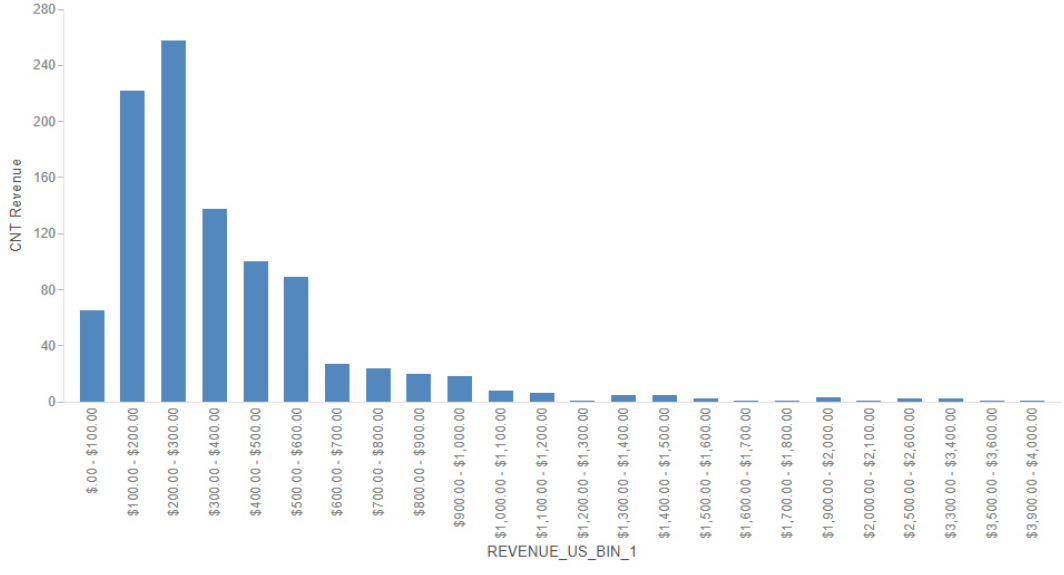
When using Count display option, the Count prefix operator is used by default, but other operators, including Sum, can also be applied. These operators behave the same as when using the Summary display option. When using the Detail and Detail with counter display options, measure values are not aggregated. As a result, Detail and Detail with counter fields can only use the Distinct, Total, and Percent prefix operators.

You can use the same field multiple times in a chart or report with different prefix operators to enhance your understanding of your data set. For example, the report in the following image shows columns for average revenue and median revenue, which helps to understand the skewness of the data.

Product Category	AVE Revenue	MEDIAN Revenue
Accessories	$231.90	$169.00
Camcorder	$415.82	$299.99
Computers	$301.13	$280.00
Media Player	$454.12	$382.49
Stereo Systems	$345.64	$251.99
Televisions	$1,227.71	$799.99
Video Production	$376.91	$299.00

Since the average revenue values for each product category are all greater than the median revenue values, we can see that the data is skewed to the right. This means there are a higher proportion of records with lower than average revenue, and that the average revenue is brought up by some outlying high revenue values.

Similarly, you can use the Count prefix operator in combination with the binning feature to see the distribution of your data, such as in a histogram. To create a histogram, create a new chart, right-click a measure field in the Resources panel, point to *Bin values*, set a bin size and labeling option, and click *OK*. The bins appear as a field in the Dimensions area of the Resources panel. Drag the bin field into the sort bucket of your chart, such as the Horizontal bucket in a bar chart. Next, drag the same field for which you created your bins from the Measures area into the bucket used to aggregate measure data in the chart, such as the Vertical bucket in a bar chart. Finally, right-click that measure field, point to *Aggregate*, and click *Count*. The result is a histogram showing the distribution of values for the selected field, as shown in the following image.



Using Quick Transforms to Apply Analytical Functions to Data Fields

With quick transforms, you can easily apply the most commonly used analytical functions to measure fields in your content. This allows you to quickly apply a function to a field as you create content, expanding your options for incorporating aggregated data.

Quick transforms are robust and support a variety of functions. For example, you can perform a rolling or moving aggregation or correlation (both COMPUTEs) on a measure field. This makes it easy to perform the calculations you need to understand the distribution and patterns in your data with just a few clicks. To access these options, right-click a measure field in your chart or report, point to *Quick transform*, and then point to one of the quick transform options. Each quick transform allows you to configure how the calculation is performed. The following options are available:

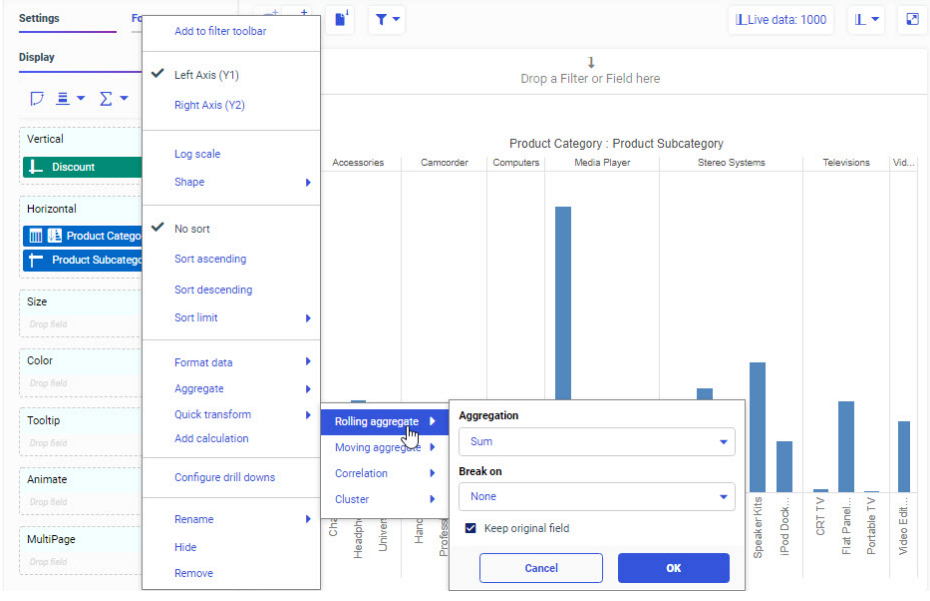
- **Rolling aggregate.** Reaggregates the total values in the request at each sort value.
- **Moving aggregate.** Reaggregates subtotal values in the request, for a fixed number of previous sort values, at each sort value.
- **Correlation.** Calculates the correlation coefficient between two numeric fields.
- **Cluster.** Partitions values into a specified number of clusters, based on the nearest mean value.

You can do this from the shortcut menu for a measure field added to a non-sorting bucket in a chart or report, such as the Vertical bucket in a bar chart. Placing a measure in the Horizontal bucket, which is used to sort a bar chart, creates entries for each underlying value. In this case, you do not have access to the Quick transform option.

Other examples include the use of the correlation function, which calculates the correlation between two numeric fields. This is often used to display how strongly two variables are related to each other. In addition, the cluster (KMEANS) function partitions observations into a specified number of clusters based on the nearest mean value. The goal of cluster analysis is to group, or cluster, observations into subsets based on their similarity of responses on multiple variables.

Quick transforms create post-aggregation (COMPUTE) virtual fields. A calculated value (COMPUTE) is evaluated after all of the data that meets the selection criteria is retrieved, sorted, and summed. This means that the quick transform calculation is performed using the aggregated values of the fields.

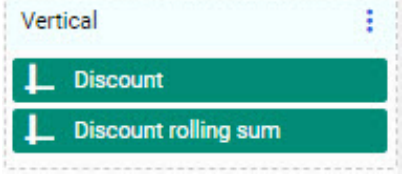
Performing a basic aggregation with a quick transform allows you to convert a field value from its raw state into a calculated field. With the Discount field, you can create a rolling sum that shows the cumulative sum of the field as it changes for each value in the chart. The Quick transform options are shown in the following image.



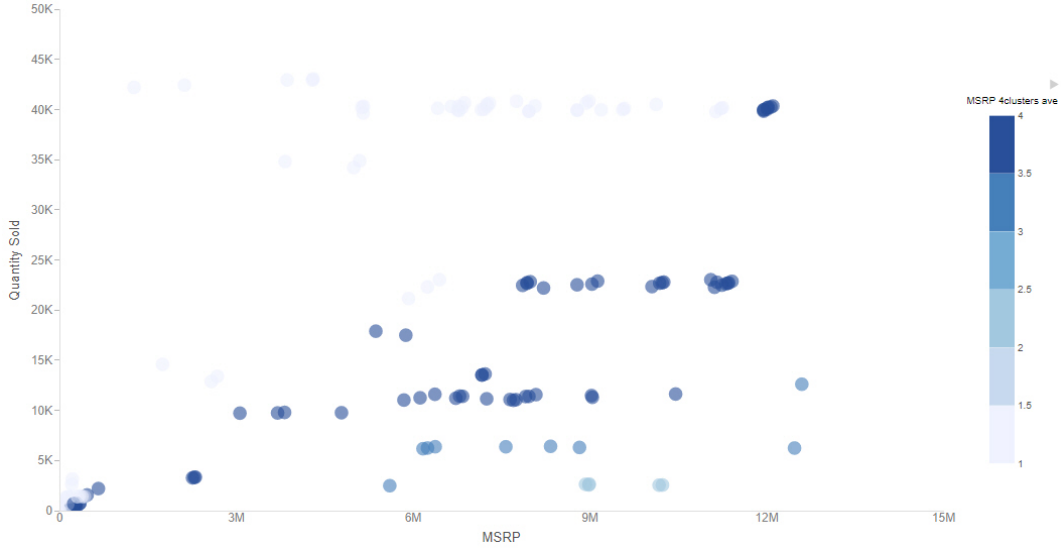
Note: You can perform multiple quick transforms using the same originating field.

Here, you can specify the type of aggregation (for example, Sum, Average, Count, and others) and indicate whether you want to keep the original field. The Keep original field option is selected, by default, if the bucket supports multiple measure fields, and serves the purpose of preserving the original field for other use in your chart. You can also choose to replace the field in favor of the transformed field, by deselecting this check box.

When you perform a quick transform on a field, a new, unique field is created and placed in the same bucket as the originating field, as shown in the following image.



The transformed field is now a COMPUTE, which is a post-aggregation calculated field. It is a separate field, labeled with the transformation that was applied. You can move the transformed field into a different measure bucket to make it easier to analyze your data. For example, the following image shows a scatter chart with Model values plotted based on Quantity Sold and MSRP values. The Cluster quick transform was performed on the MSRP field using the Average aggregation, creating four groups of models with similar average MSRP values. The cluster field has been moved into the Color bucket, making it easy to identify which cluster each model falls into.



Procedure: How to Apply a Rolling Aggregation to a Report Using Quick Transforms

A rolling aggregate, or cumulative moving aggregate, is a cumulative aggregation of values. The aggregation is recalculated for each data record, allowing you to see totaled or recomputed values at various points in a chart or report.

You can add a rolling sum to a report that is sorted by year, quarter, and month values, allowing you to see the total sales data for different points in time. You can also break the rolling sum on a lower-level sort field, allowing you to view a separate rolling sum for different categories.

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace with access to the wf_retail sample data, and select *wf_retail_lite.mas* as the data source.

Db2 Web Query Designer loads with options to create a single content item.

3. On the Content picker, select one of the report layouts as the content type.
4. With the Fields tab selected on the sidebar, on the Resources panel, in the Dimensions section, expand *Sales_Related* and *Transaction Date, Simple*, and double-click *Sale,Year*, *Sale,Quarter*, and *Sale,Month*, in order, to add them to the report in the Rows bucket.
5. On the Resources panel, in the Measures section, expand *Sales* and double-click *Revenue* to add it to the Summary bucket.

   The report now shows Revenue by Sale Year, Sale Quarter, and Sale Month.
6. To see how the total revenue increased over time, add a rolling sum quick transform on the Revenue field.
   a. In the Summary bucket, right-click the *Revenue* field, point to *Quick transform*, and then to *Rolling aggregate*.
   b. Leave the selected Aggregation option as *Sum*.

      You can select a different aggregation option to recalculate that aggregation at each row of the report.
   c. Leave the Break on option set to *None*. The rolling sum will continue accruing throughout the entire report, without resetting.
   d. Leave the *Keep original field* check box selected, so that you will still be able to see the Revenue values for each month.
   e. Click *OK*.

The quick transform field, called Revenue rolling sum, by default, is added to the report. It displays the total revenue that has been accrued up to each month, as shown in the following image

Sale Year	Sale Quarter	Sale Month	Revenue	Revenue rolling sum
2014	1	1	$3,874,651.96	$3,874,651.96
		2	$3,592,608.63	$7,467,260.59
		3	$3,977,546.75	$11,444,807.34
	2	4	$3,648,111.77	$15,092,919.11
		5	$3,704,586.77	$18,797,505.88
		6	$3,694,435.21	$22,491,941.09
	3	7	$4,020,855.35	$26,512,796.44
		8	$4,126,310.80	$30,639,107.24
		9	$3,688,054.34	$34,327,161.58
	4	10	$4,794,720.40	$39,121,881.98
		11	$4,574,636.32	$43,696,518.30
		12	$5,268,550.91	$48,965,069.21
2015	1	1	$4,857,824.42	$53,822,893.63
		2	$4,595,194.63	$58,418,088.26
		3	$4,923,408.26	$63,341,496.52
	2	4	$4,422,610.34	$67,764,106.86
		5	$4,586,992.98	$72,351,099.84
		6	$4,856,111.47	$77,207,211.31
	3	7	$5,075,337.19	$82,282,548.50
		8	$5,133,075.08	$87,415,623.58
		9	$5,031,634.54	$92,447,258.12
	4	10	$5,826,745.45	$98,274,003.57
		11	$5,788,867.16	$104,062,870.73
		12	$6,043,161.45	$110,106,032.18

7. Add a new rolling sum quick transform field that breaks on the Sale Year field, thereby showing the accrued revenue at different points within each year.

   a. In the Summary bucket, right-click the *Revenue* field, point to *Quick transform*, and then to *Rolling aggregate*.

   b. Open the Break on drop-down menu and select *Sale,Year*.

   c. Click *OK*.

A new quick transform field, called *Revenue rolling sum Sale Year*, by default, is added to the report. Notice that the values continue increasing until the end of each year, at which point they reset and start accruing again, as shown in the following image

Sale Year	Sale Quarter	Sale Month	Revenue	Revenue rolling sum	Revenue rolling sum Sale Year
2014	1	1	$3,874,651.96	$3,874,651.96	$3,874,651.96
		2	$3,592,608.63	$7,467,260.59	$7,467,260.59
		3	$3,977,546.75	$11,444,807.34	$11,444,807.34
	2	4	$3,648,111.77	$15,092,919.11	$15,092,919.11
		5	$3,704,586.77	$18,797,505.88	$18,797,505.88
		6	$3,694,435.21	$22,491,941.09	$22,491,941.09
	3	7	$4,020,855.35	$26,512,796.44	$26,512,796.44
		8	$4,126,310.80	$30,639,107.24	$30,639,107.24
		9	$3,688,054.34	$34,327,161.58	$34,327,161.58
	4	10	$4,794,720.40	$39,121,881.98	$39,121,881.98
		11	$4,574,636.32	$43,696,518.30	$43,696,518.30
		12	$5,268,550.91	$48,965,069.21	$48,965,069.21
2015	1	1	$4,857,824.42	$53,822,893.63	$4,857,824.42
		2	$4,595,194.63	$58,418,088.26	$9,453,019.05
		3	$4,923,408.26	$63,341,496.52	$14,376,427.31
	2	4	$4,422,610.34	$67,764,106.86	$18,799,037.65
		5	$4,586,992.98	$72,351,099.84	$23,386,030.63
		6	$4,856,111.47	$77,207,211.31	$28,242,142.10
	3	7	$5,075,337.19	$82,282,548.50	$33,317,479.29
		8	$5,133,075.08	$87,415,623.58	$38,450,554.37
		9	$5,031,634.54	$92,447,258.12	$43,482,188.91
	4	10	$5,826,745.45	$98,274,003.57	$49,308,934.36
		11	$5,788,867.16	$104,062,870.73	$55,097,801.52
		12	$6,043,161.45	$110,106,032.18	$61,140,962.97
2016	1	1	$7,528,276.32	$117,634,308.50	$7,528,276.32

Using this report, you can see when certain revenue goals and thresholds were met.

Procedure: How to Apply a Moving Average to a Chart Using Quick Transforms

You can use a rolling or moving average to smooth out the data in your chart or report, making it easier to identify trends and patterns.

While, a rolling aggregate is a cumulative aggregation of all of the values in a chart or report, a moving aggregate is a cumulative aggregation that is performed on a limited selection of the most recent values. As the moving aggregate proceeds through the sequence of values in your chart or report, earlier values are gradually discarded from the calculation as they fall outside the scope of the moving aggregation. A moving average, therefore, is an average that is recalculated at each value for that value and a specified number of prior values.

To create a moving average based on a measure field in your content:

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace with access to the wf_retail sample data, and select *wf_retail_lite.mas* as the data source.

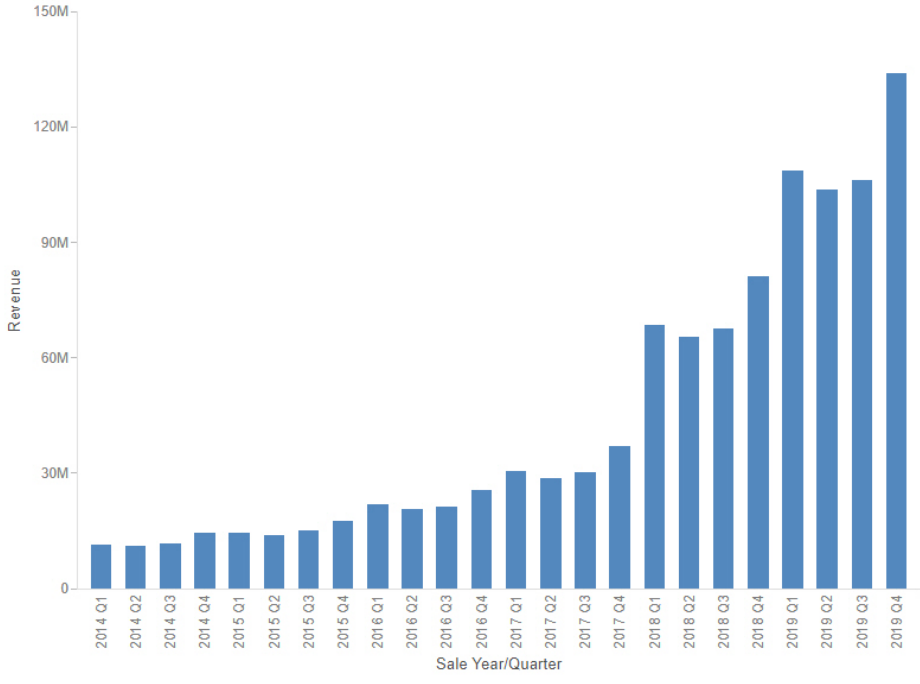
   Db2 Web Query Designer loads with options to create a single content item.

3. Use the Content picker to change the chart type to a vertical side-by-side bar chart.
   The moving average will be added to the chart as a second measure, and since we want to compare it directly to the non-transformed field, the bars should be aligned side-by-side instead of stacked.

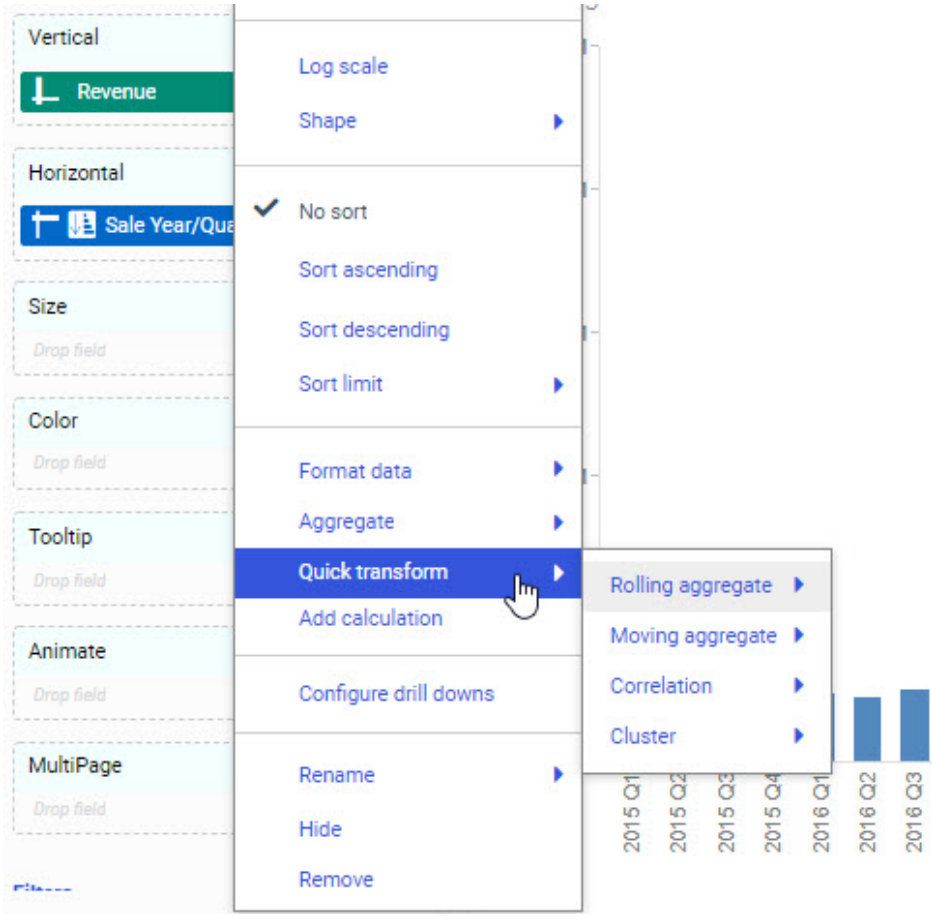
4. On the Resources panel, in the Dimensions section, expand *Sales_Related* and *Transaction Date, Components*, and double-click *Sale,Year/Quarter* to add the Sale Year/Quarter field to the chart in the Horizontal bucket.

5. On the Resources panel, in the Measures section, expand *Sales* and then double-click *Revenue* to add the Revenue field to the Vertical bucket.

The result is a bar chart showing revenue for each quarter of each year, as shown in the following image.



6. Right-click the measure field in the Vertical bucket, in this case, Revenue, and point to *Quick transform*, as shown in the following image.



7. To add a moving average to the chart, point to *Moving aggregate* and:

   a. From the Aggregation menu, select *Average*, which is the default. You can alternatively create a moving sum, moving count, and more.

   b. Since there is only one sort field in the chart, the Break on option is not available.

      If we had added a second field to the Horizontal bucket, you would be able to select a field on which to break the moving average.

The default selection is None. When *None* is selected, the moving aggregation continues for every value, and never resets. If you have multiple sort fields in the chart, and you select a field to break on, the aggregation starts over for each new value of that field. You cannot break on the lowest sort field or the only sort field, since this would cause the rolling aggregation to reset on each value.

c. Set the Look back value to *8*. The Look back value determines the number of past values to include when evaluating the moving aggregation. In this case, we will use the last two years of data to calculate the moving average.

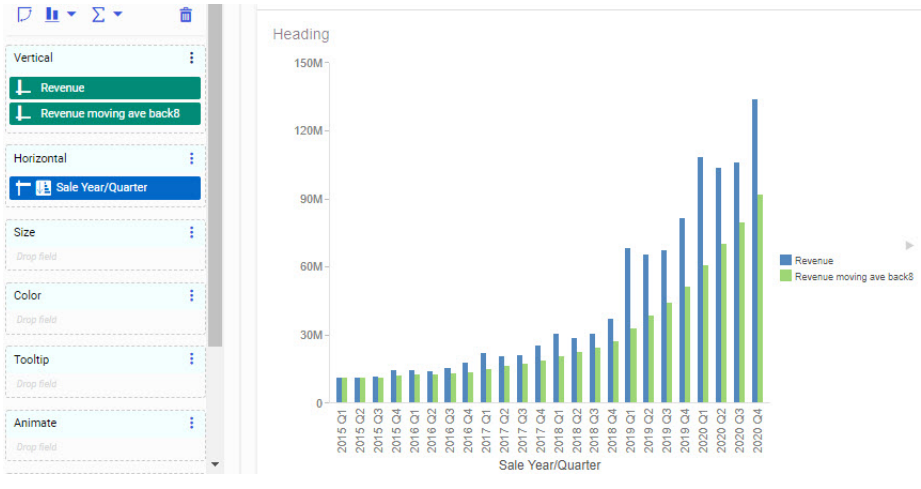
   Use a higher Look back value to make a smoother moving average. Using a lower value results in a less smooth moving average, but makes the moving average more responsive to changes to the data.

d. Leave the Keep original field check box selected. This check box controls if the original field on which you are basing the quick transform is retained in the bucket. This check box is selected, by default.

   If you leave it checked, both the original field and the new calculated field will share the bucket from which the quick transform was created, if possible. If you do not want to keep the original field, you can replace the field with the quick transform field by deselecting the box. Single-field buckets, such as Size or Color, always replace the original field, and do not provide this option.

8. Click *OK*.

The field is placed in the measure bucket and displays in your content, by default. The legend is also updated to reflect this new field, as shown in the following image.

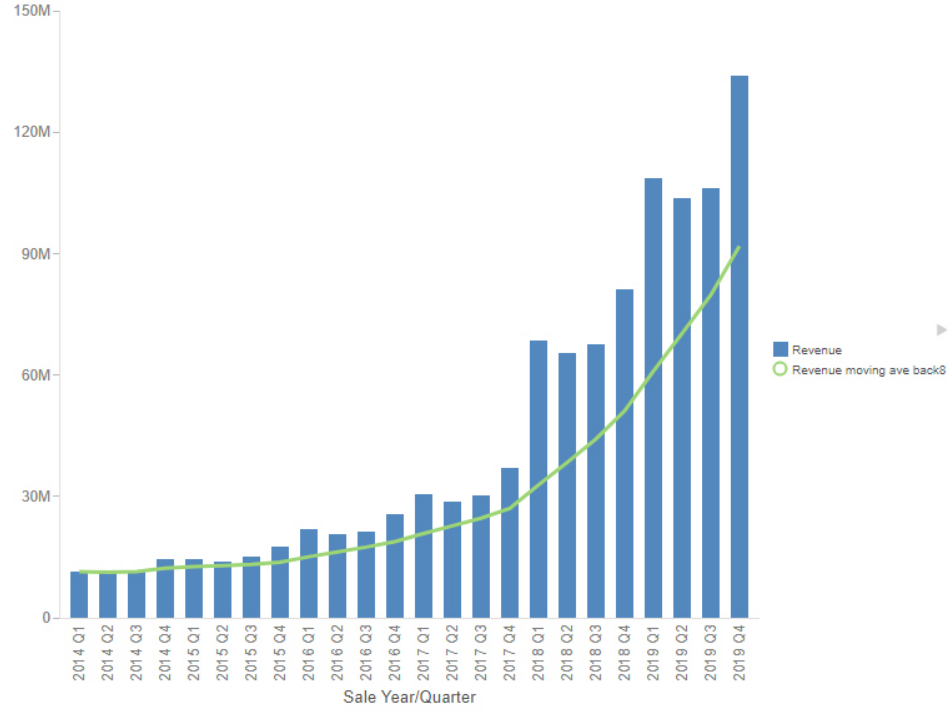


Notice that since we used a fairly high Look back value of 8, the moving average bars have a smooth growth that allows us easily identify a general pattern in the data, but do not increase quite as quickly as the actual revenue values.

9. Optionally, you can change the moving average fields to display as a line instead of bars, more clearly differentiating the moving average from the actual revenue values.

   In the Vertical bucket, right-click the moving average field, point to *Shape*, and click *Line*.

   The moving average now displays as a line, as shown in the following image.



Using Dynamic Grouping for Dimension Field Values

Dynamic grouping allows you to create groups of elements based on the field data type that you select. For example, you may have a field with US state names, but no field for US regions. Using the dynamic grouping functionality, you can create groups for different regions for use in a content item without editing the data source. You create one group that combines state name values like Maine, New Hampshire, and Massachusetts into a New England group, states such as New York, New Jersey, and Pennsylvania into a Mid-Atlantic group, and so on. You can even add the extraneous, remaining values into an Other group automatically, if you do not think they fit into another defined group.

Note: The Create Group option is only available for dimension fields of non-numeric format or attribute.

You can also specify multiple, unique groupings in the same session. For example, you might want to group the data to indicate groups or products, or specific regions.

Note: If you want to exclude a specific data element from your analysis, you can use the filter functionality.

The grouping that you specify is applied and this new group then replaces the original field that you selected in the Query pane. The name that you specify when creating the group is reflected in the Query pane.

The process of dynamic grouping creates a Define field, which can then be used in other reports or charts in the same visualization. When creating a single content item, dynamic grouping also supports Auto Drill, enabling you to drill through the hierarchy of your data just like any other data field.

Procedure: How to Create a Dynamic Group

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace and a data source available from that workspace.

   Once you select a data source, Db2 Web Query Designer loads with options to create a single content item.

3. On the Resources pane, with *Fields* selected on the sidebar, right-click the data field for which you want to apply dynamic grouping.

   Note: You can use the dynamic grouping functionality on non-numeric dimension fields only.

4. Click *Group values*.

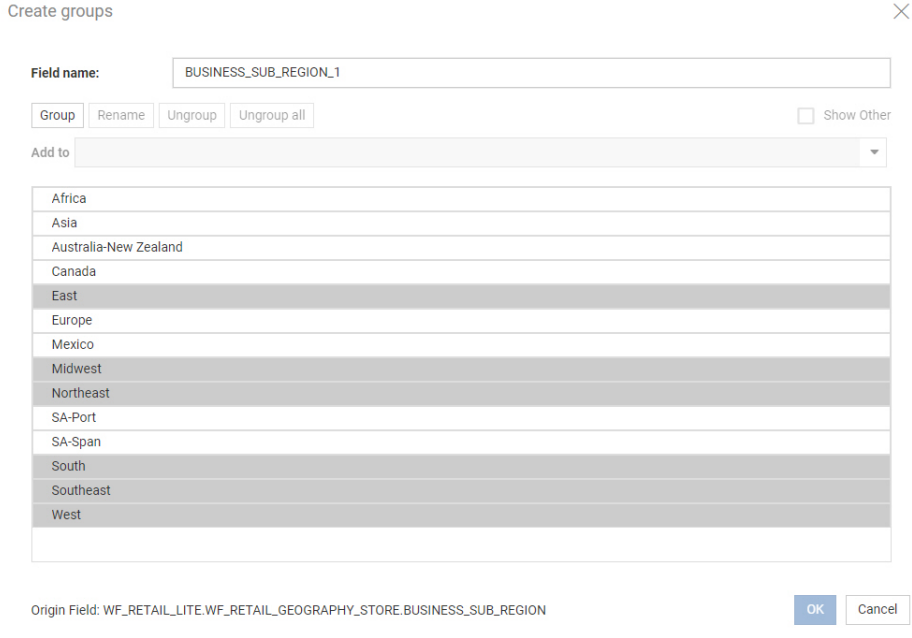
   The Create Groups dialog box displays.

5. In the Field text box, optionally type a name for the new group field.

   Note: The fully qualified field name is displayed as the Origin Field at the bottom of the Create Groups dialog box. The display of the fully qualified field name is particularly useful when renaming or editing a group, as it identifies the data source followed by the hierarchical location of the field within a data set. For example, WF_RETAIL_LITE.WF_RETAIL_PRODUCT.BRAND.

6. Create a group of values in one of the following ways:

   - Use Ctrl + click to select more than one value, as shown in the following image, then click *Group*.



   - Drag one value onto another value. The two values are grouped.

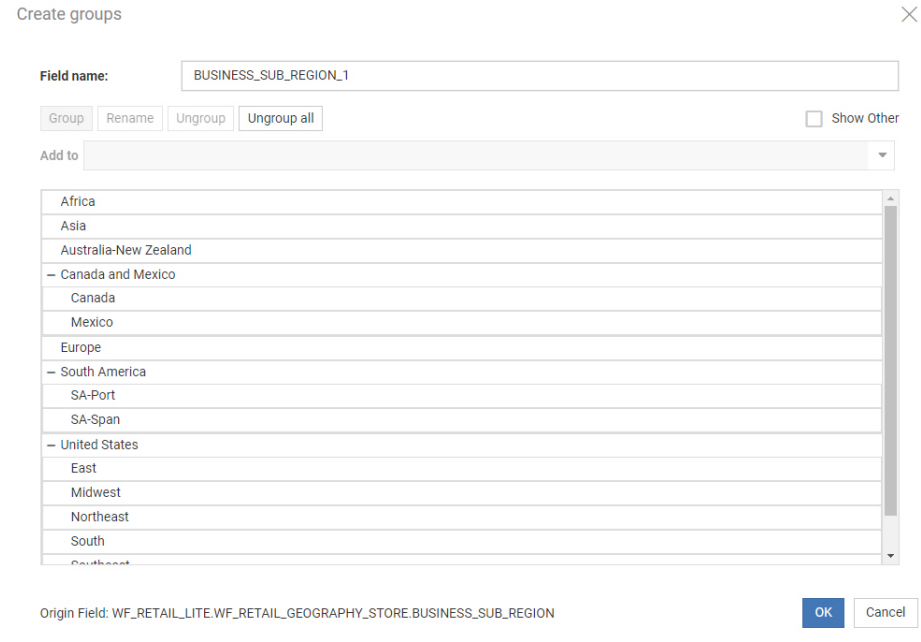
7. Optionally, double-click the group title or select a group and click *Rename*, and then type a new name for the group.

8. Optionally, add more values to the group that you just created using one of the following methods:

   - Select one or more values, open the Add to menu, and select a group to add the values to.
   - Select one or more values and drag them into a group.
   - Drag the group onto a single, ungrouped value. The value is added to the group.
   - If you have multiple groups, drag one group into another group to merge them. The name of the target group is retained for the merged group.

   These methods can also be used to move a value from one group to another group.

9. Optionally, create additional groups using the methods in step 7, as shown in the following image.

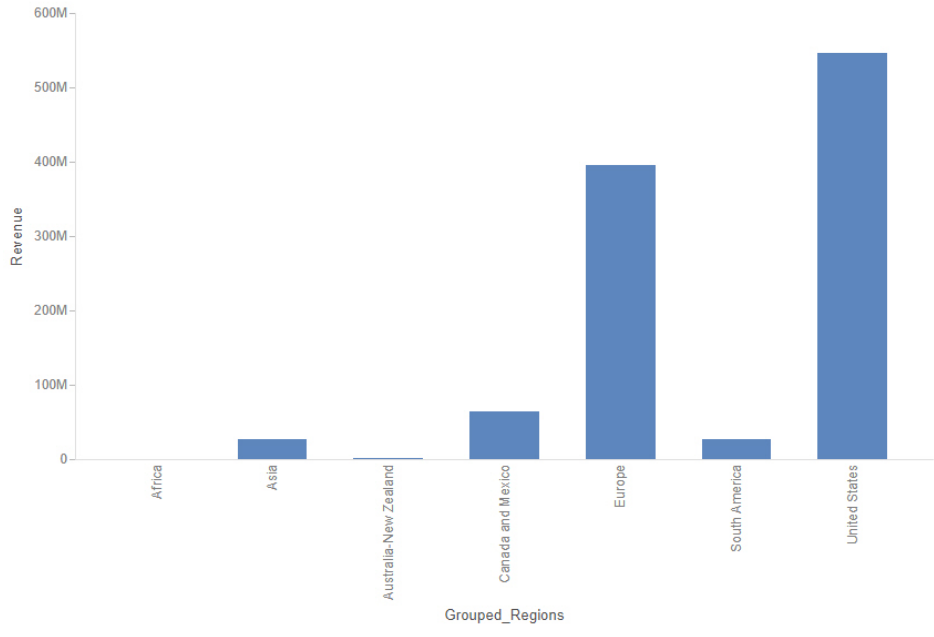


10. Optionally, to ungroup values, click a group and then click *Ungroup*. Click *Ungroup all* to disband all groups.
11. Optionally, click *Show other* to add all remaining non-grouped values to an Other group.

    Note: If you add all values to the Other group, all groups, including the Other group, are disbanded. You must have at least one group for the Other group to be available.

12. Click *OK*.

    Your grouped data will display as a new field in the Resources panel. If it is not immediately visible, you can use the search feature on the field list to find it. From there, you can add the grouped field to your content, as shown in the following image.

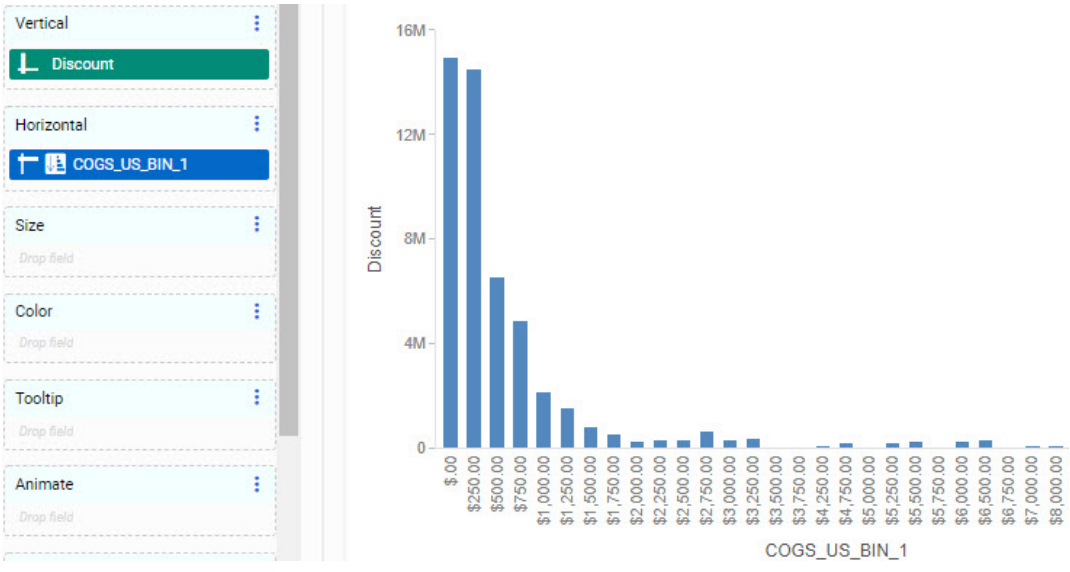


    To edit the grouped field, right-click it in the Resource panel and click *Edit group values*.

Creating Numeric Ranges With Binning

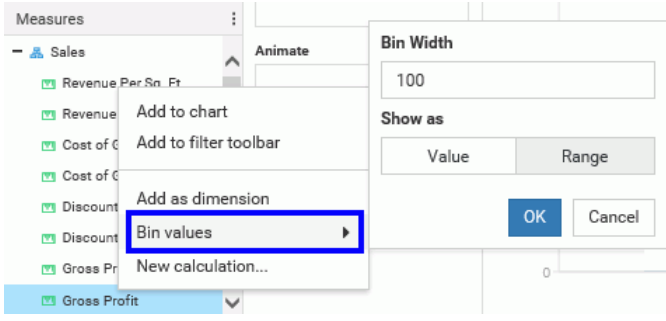
In Db2 Web Query Designer, bins are used to group numeric values by the increment you specify. This allows you to view large amounts of data across measures or calculated measures, enabling you to analyze trends and identify outliers. Data binning also allows you view your data as part of a larger group, displaying ranges of that data in manageable, visible bins.

For example, you might want to analyze Cost of Goods Sold against Discount to understand how discounts impact the cost of goods. First, you add the Discount measure to the Vertical field container. These values will be used as a guide for the comparative, grouped content in the bin. If you apply a bin width value of 250 to the Cost of Goods measure, your data values will be grouped into ranges of 250 (for example, 0 - 250, 250 - 500, 500 - 750). Finally, you add the new binned dimension field (generated by the bin process) to your chart. Your chart now displays the binned values against the Discount measure, as shown in the following image.



As you can see in this example, there is a direct correlation between Cost of Goods and Discount, with the smaller cost records values (0 - 250) constituting more of the discount amount. From this example, it is evident that a large portion of total discounts are given for lower cost items. In this case, binning has given you insight into the frequency distribution of values in your data.

Bins are created on a numeric measure field (for example, Gross Profit), as shown in the following image.



Examples of numeric measure fields include Gross Profit or Discount. Once you create a bin, a new dimension field is automatically created, allowing you to plot values based on your bin specifications.

You can create or edit bins using the same options. On the Resources panel, right-click a field and click *Bin values*, or right-click a binned field and click *Edit bin values*. This opens a shortcut menu with the following options:

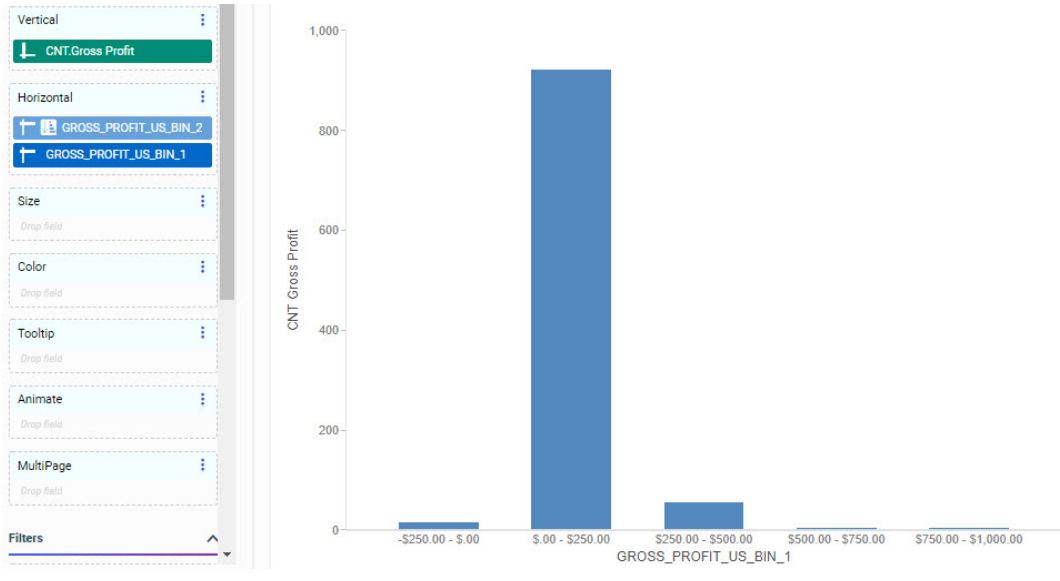
- **Bin width.** A standard text box that accepts any number greater than 0.
- **Show as.** Identifies the bin label type.
  - **Value.** Displays the alphanumeric representation of the numeric value containing the minimum value (FLOOR) of each bin. The format should be set to the data format of the source field.
  - **Range.** Displays the alphanumeric string representing the minimum and maximum range for each bin. The format should be set to the data format of the source field.
- **OK.** Creates a new dimension field based on the bin options that you selected. This dimension field is automatically added under your dimensions in the Fields tab.
- **Cancel.** Closes the shortcut menu and cancels the changes.

The following image displays bin values and bin ranges for the DEALER_COST field, using a bin width of 1000. It also shows how the data falls into the value and range properties.

PAGE 1		
DEALER_COST	BINVALUE	BINRANGE
2,626	2,000	2,000 - 2,999
2,886	2,000	2,000 - 2,999
4,292	4,000	4,000 - 4,999
4,631	4,000	4,000 - 4,999
4,915	4,000	4,000 - 4,999
5,063	5,000	5,000 - 5,999
5,660	5,000	5,000 - 5,999
	5,000	5,000 - 5,999
5,800	5,000	5,000 - 5,999
6,000	6,000	6,000 - 6,999
7,427	7,000	7,000 - 7,999
8,300	8,000	8,000 - 8,999
8,400	8,000	8,000 - 8,999
10,000	10,000	10,000 - 10,999
11,000	11,000	11,000 - 11,999
11,194	11,000	11,000 - 11,999
14,940	14,000	14,000 - 14,999
25,000	25,000	25,000 - 25,999

Note: Bin fields that display ranges, using the Show as Range option, use a character field format, while bin fields that display floor values, using the Show as Value option, use a numeric field format. As a result, when displaying ranges, bins with negative numbers display after bins with positive values. This is due to the sort sequence used for character fields. On the other hand, when displaying floor values, bins are sorted into numeric order, so negative value bins display before bins with positive values.

Therefore, if the measure field that you are binning includes negative values, it is recommended to select *Value* as the Show as option. Alternatively, you can display ranges in numeric order by using a bin with values as a hidden, higher-level sort field and adding the bin with ranges below it on the same axis. For example, if creating a vertical bar chart, create a value bin field and a range bin field, both with the same width. Add the value bin field and then the range bin field to the Horizontal bucket, then hide the value bin field. The ranges are now in the correct order, as shown in the following image.



Editing an Existing Bin

Once you have created a bin, you can edit it. This gives you the flexibility of changing the size of the bin or other related parameters. Changes to the bin values appear in real time.

You can edit an existing bin from the Data panel or if you have placed the bin in a bucket, by right-clicking the bin and selecting *Edit bin values*.

Note: If a bin field is being used in a calculated field or in a filter, you cannot change the bin label type.

Procedure: How to Create a Histogram Using Bins

A histogram is a chart, usually in a bar chart format, that displays the frequency distribution of values in your data by displaying the count of values in different ranges. The count aggregation and bins should be applied to the same field to show the frequency distribution effectively.

1. Open Db2 Web Query Designer. On the default Db2 Web Query Home Page, click *Visualize Data*.

   Db2 Web Query Designer opens in a new browser tab.

2. Select a workspace and a data source available from that workspace.

   Once you select a data source, Db2 Web Query Designer loads with options to create a single content item.

3. If the default content type is not a bar chart, select a vertical bar chart option from the Content picker.

4. With the Fields tab selected on the sidebar, on the Resources panel, under Measures, select a numeric measure field and place it in the Vertical bucket. You can also double-click the field, or right-click it and select *Add to chart*.

5. Right-click the measure field in the Vertical bucket, point to *Aggregate*, and click *Count*.

   The prefix CNT. is added to the front of the field name. The vertical axis now represents the frequency of values of the selected measure field, rather than summed values.

6. On the Resources panel, under Measures, right-click the same measure field and point to *Bin values*.

7. Specify a numeric value in the Bin width field. For example, using the numeric value 500 creates bins that group values of 500 together.

   Keep in mind the overall range of values in the field that you are binning. Fields with smaller variance work best with smaller bins, while fields with large variance work best with larger bins.

8. Optionally, select a Show as option. Range, which is the default, shows the minimum and maximum value for each range, while Value shows only the minimum value.

9. Click *OK* to generate the bins for the selected measure field.

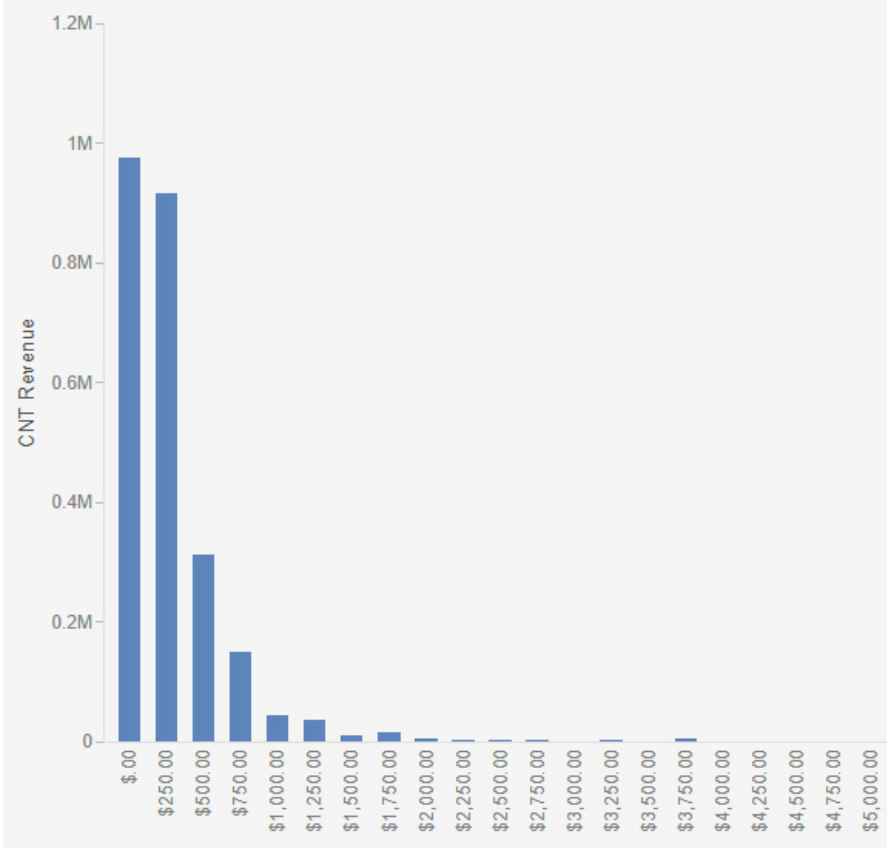
   Note: The binned measure is added to the Resources panel as a new dimension field that you can use in your chart.

10. From the list of dimension fields, locate the field that is suffixed by _BIN_1 (for example, REVENUE_US_BIN_1).

Note: The binned field is placed under Dimensions on the Resources panel. If you are viewing these fields using the Folder view, it will be available under a folder with the same name used under Measures. You can also use the search feature to locate the new dimension field if needed.

11. Add this new dimension field to the Horizontal field container.

    The bins display in your chart. Each bar represents a range of values, and the height of each bar represents the number of records that fall into each range, as shown in the following image.



    From the image above, we can see that sales falling into the first two bins, up to $500 in revenue, were the most frequent.

12. Optionally, to edit the bin width to produce more or fewer bins, or to toggle the bin label type between ranges and values, right-click the bin field in the Horizontal bucket and point to *Edit bin values*. You can then change the bin settings and click *OK* to apply them.