

SAP Crystal Solutions
SAP Crystal Reports and SAP Crystal Server

Step by Step guide: Charts With SAP Crystal Reports 2020





It has been said that “A picture is worth a thousand words.” While SAP Crystal Reports pixel-perfect design options permit an unlimited variety of font, color, shading, and image options, newer data visualization directions in Business Intelligence make use of various types of static and interactive charts. Depending on your reporting requirements, you may prefer more textual information, more graphical information, or a combination.

When your report will benefit from newer visual data analysis, Crystal Reports group and advanced charts are at your disposal. When considering how to create Crystal Reports charts, you will approach charting from a combination of two high-level directions.

Group or Advanced Chart: If your report makes use of one or more report groups (chart grouping is discussed on other white papers from CrystalReports.com), you may create a chart that matches fields used in an existing group. The benefit of this type of chart is drill-down – a viewer can interact with the chart to drill-down to an inner group or report details. Advanced charts don’t require an existing report group. As long as a field is available in the underlying data source, you may use it on a chart. However, chart drill-down is not available with an Advanced chart (although, you can create a hyperlink to navigate to if the chart is clicked on).

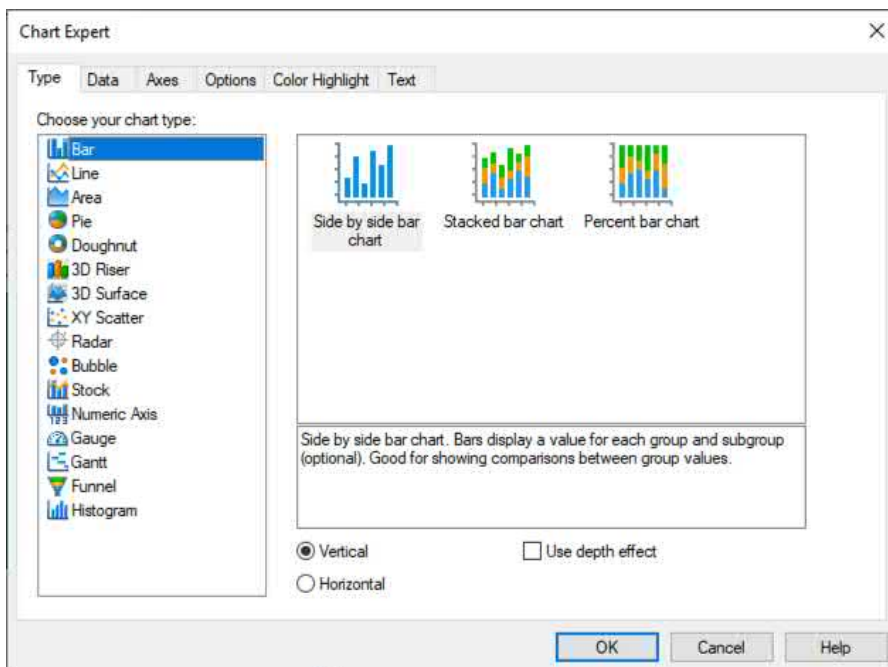
Chart Type: The data you decide to include in your chart, as well as the “data story” that your chart needs to tell, will determine the type of chart you create. While bar, line, and pie charts are often thought of as default go-to chart types, Crystal Reports offers other types that you may want to use to more properly reveal a useful data message.

GROUP CHARTS

Group Charts are based on existing report groups, automatically displaying chart elements (bars, pie wedges, and so forth) for each group level with the size of the chart elements based on a group summary field. A big advantage of group charts is drill-down capability. A viewer can click on a chart element and drill down on that particular group value.

To create a group chart:

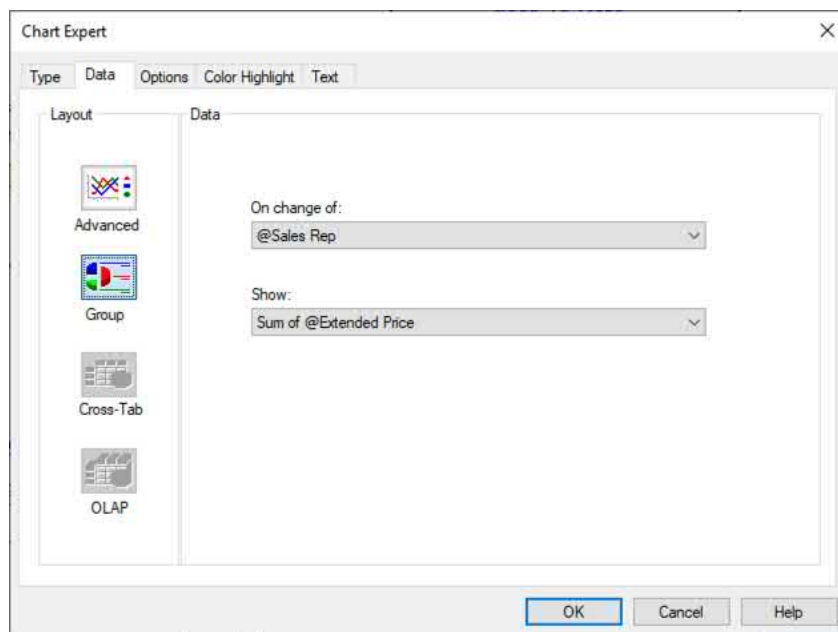
1. Ensure that groups have already been created on the report that you wish the chart to reflect. Drill-down behavior can be tested with group name and group summaries prior to creating the group chart.
2. Select Insert | Chart from the drop-down menus, or click the Insert Chart  toolbar button.
3. An outline of the chart will be placed on the mouse cursor. Drop the chart in a report section one level higher than the group you wish the chart to represent. As an example, consider a report that contains three groups in a State-City-Zip Code hierarchy. If you wish the group chart to show a bar for each state, drop the chart in the report header. Or, if you wish a chart to appear within a state drill-down tab showing a pie wedge for each city within the state, drop the chart in the State Group Header #1.
4. RIGHT-CLICK on the chart and select Chart Expert from the context menu.
 - a. On the Type tab, select the most appropriate type of chart based on the data the chart's group represents. Remember visual best practices!





Group

b. On the Data tab, make sure the  button is selected (it should be if you dropped the chart in a group or report header). Then, select the group field you wish to base chart elements (bars, pie wedges, and so forth) on from the On change of drop-down list (you may only have one option here, depending on where you dropped the chart). Select the numeric value you wish to use to determine chart element size from the Show drop-down list (if you don't see the desired value in this list, return to the report and Insert Summary using the desired field and re-display the Chart Expert).



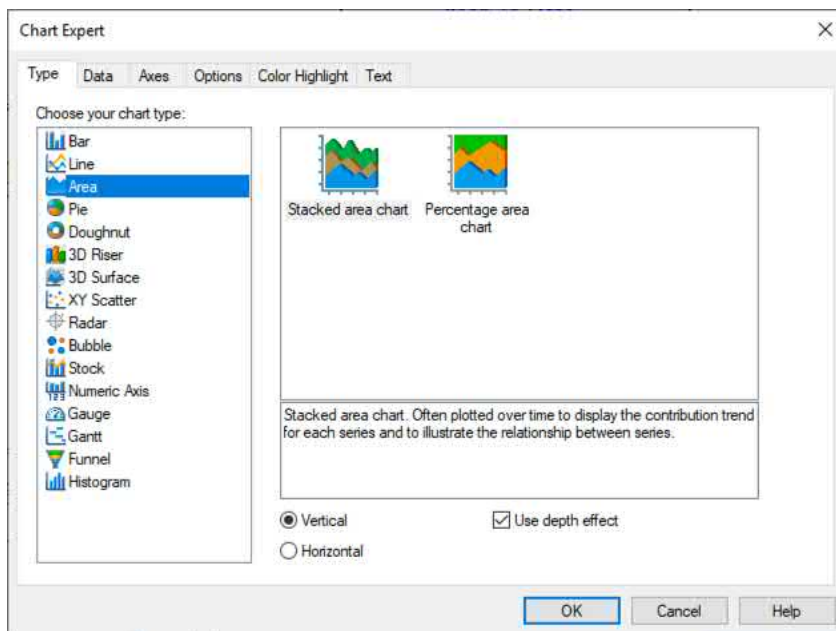
c. Use Options, Color Highlight, Axes, and Text tabs to further customize chart appearance.

ADVANCED CHARTS

Advanced Charts can be designed around any field in the underlying data source, regardless of any other design elements on the report. When the chart is designed, you may select any field you wish to create elements (bars, pie wedges, and so forth). The size of the chart element can be based on any appropriate field in the data source. Note that you cannot drill down on an advanced chart.

To create an advanced chart:

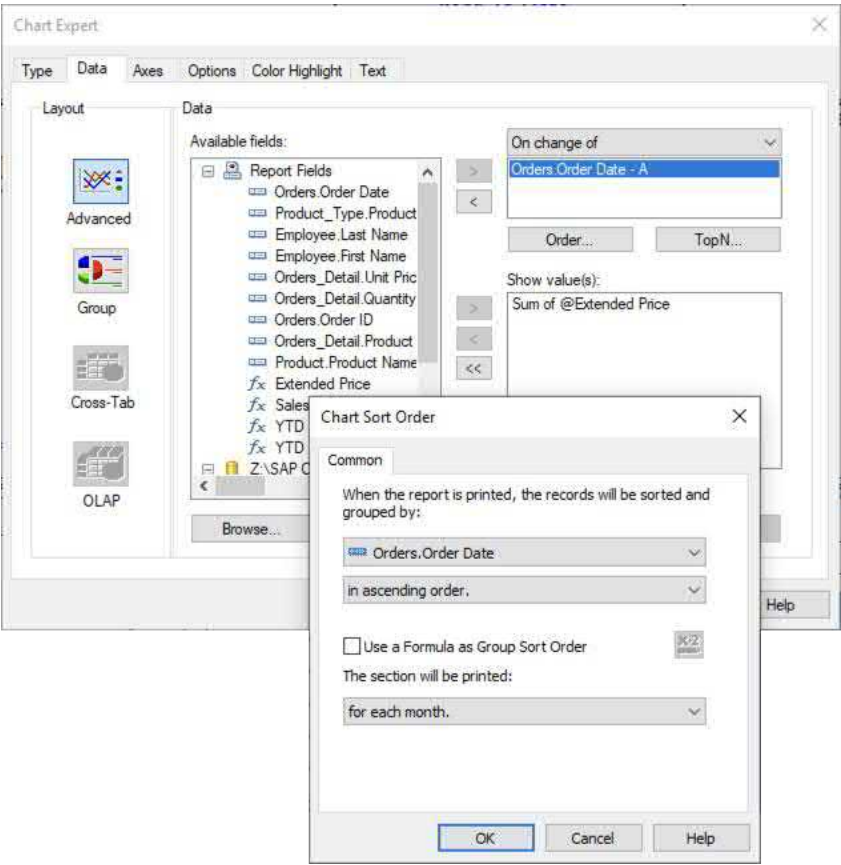
1. Select Insert | Chart from the drop-down menus, or click the Insert Chart  toolbar button.
2. Drop the chart in the desired report section, depending on the number of times you wish the chart to appear and the underlying data you wish the chart to summarize. For example, if you place the chart in the report footer, it will appear only once at the bottom of your dashboard and will summarize all the data on the report. If you place the chart in a State group header, the chart will appear at the top of each state group, and will summarize underlying data only for the particular state being displayed.
3. RIGHT-CLICK on the chart and select Chart Expert from the context menu.
 - a. On the Type tab, select the most appropriate type of chart based on the data the chart's group represents. Remember visual best practices!



- b. On the Data tab, make sure the  Advanced button is selected (if you dropped the chart in a report that contains groups, a group chart may be selected by default). Then, select the database field you wish to base chart elements (bars, pie wedges, and so forth) on from the Available Fields list. Click the  button to add the field to the On change of box. Depending on the type of chart you selected in the Type tab, you may add more than one field to the On change of box. Additional options are available with the  Order... and  TopN... buttons, such as the ability to choose the date level for date field, or to chart only the top or bottom N chart elements.



c. Select the database field you wish to determine chart element size from the Available Fields list. Click the  button to add the field to the Show value(s) box. Depending on the type of chart you selected in the Type tab, you may add more than one field to the Show value(s) box. If you wish to modify the type of aggregation the chart will use with the selected field (sum, average, distinct count, and so forth) make desired choices with ☐ Don't summarize options.



d. Use Options, Color Highlight, Axes, and Text tabs to further customize chart appearance.

TIP: Whether you create a group or advanced chart, chart appearance and formatting fine points may be modified by RIGHT-CLICKING on the desired chart and selecting Chart Options from the context menu. Even finer control is available by selecting a particular chart element (wedge, bar, label, and so forth) and selecting options from the RIGHT-CLICK context menu.

CHOOSING THE PROPER CHART TYPE

If you're like many other Crystal Reports designers, you'll probably find yourself tempted to use more common chart types, such as bar, line, and pie charts. These are the most common chart types for two reasons:

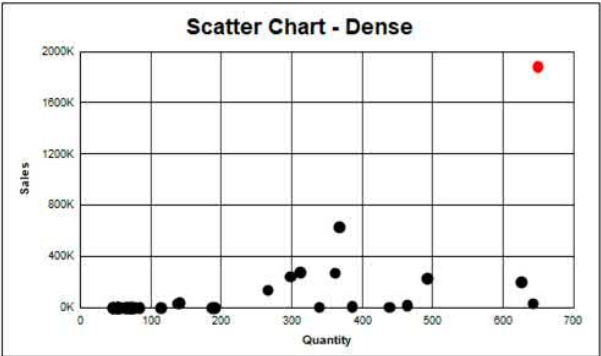
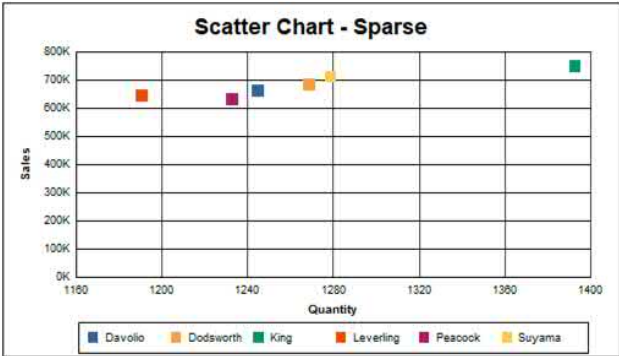
- 1. They are available in virtually all charting and visualization packages.
- 2. They are used often, so there's a tendency to use them "because we've always done it that way."

Remember that SAP Crystal Reports offers many other types of charts that may be more appropriate for your particular data story. Don't hesitate to investigate the full gamut of charts and experiment with other chart types that may more appropriately convey your data's message.

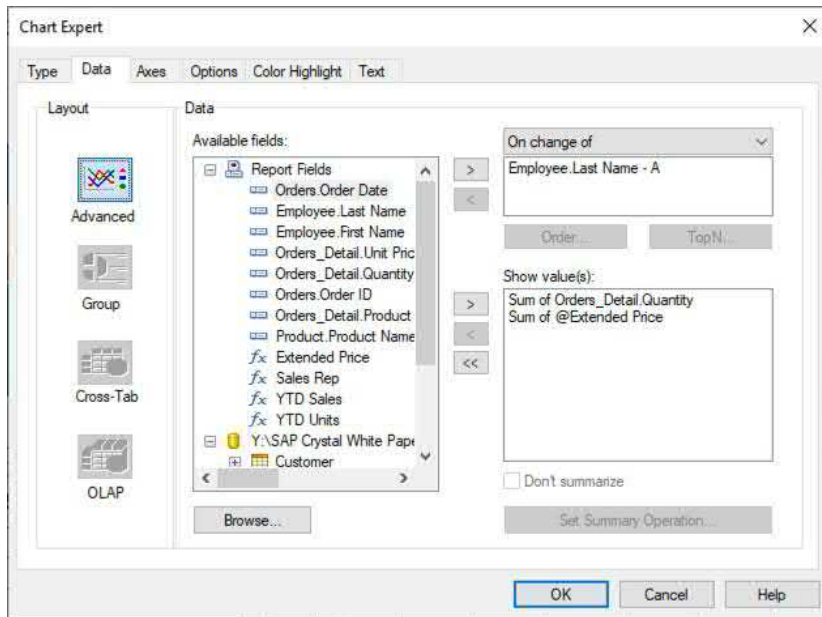
X/Y Scatter

A scatter chart is used to compare two numeric values, each on its own axis (the x axis being the left-to-right axis and the y axis being the bottom-to-top axis). A chart point may be added for any number of non-numeric field values, such as sales person, country, or product name. By plotting a point at the intersection of the x/y value, a scatter chart may be used for correlation analysis (how does the point's position on one axis correlate to the position on the other?).

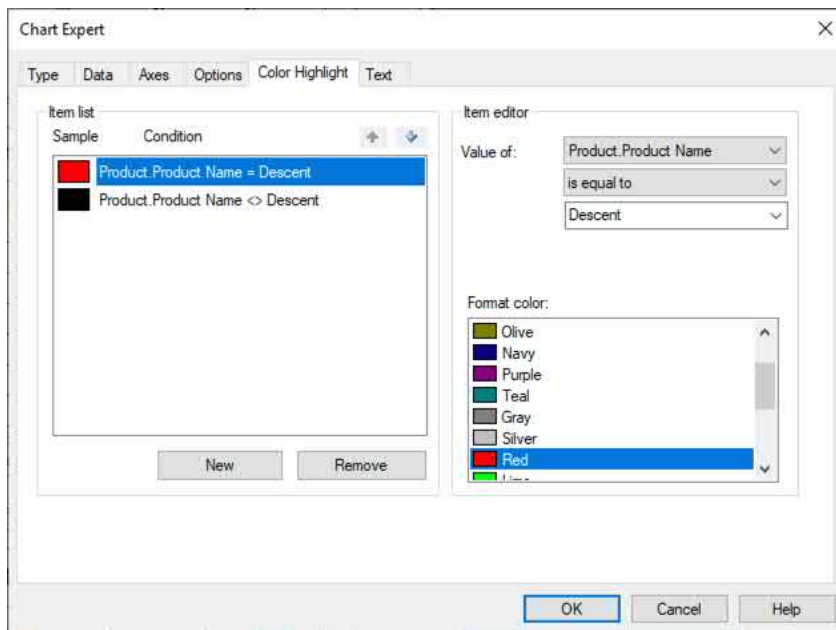
Scatter charts may be designed to display a small number of points (sometimes referred to as a sparse chart) or a large number of points (sometimes referred to as a dense chart). Sparse scatter charts can be helpful when analyzing individual field values for correlation comparison. Outliers (chart points that sit far away from the rest) can also be easily identified. Dense charts are helpful for analyzing overall correlation, as well as data concentration, a determination of where the large majority of the points appear within the two axes. Outlier analysis is also easily accomplished with a dense scatter chart.



You'll probably create a scatter chart as an advanced chart in many cases. The key to creating a useful scatter chart is assigning two numeric fields to the Show value(s) list, one to create the x axis and the other the y axis. Then, add one or more non-numeric fields to the On change of list to determine how many points appear on the chart.

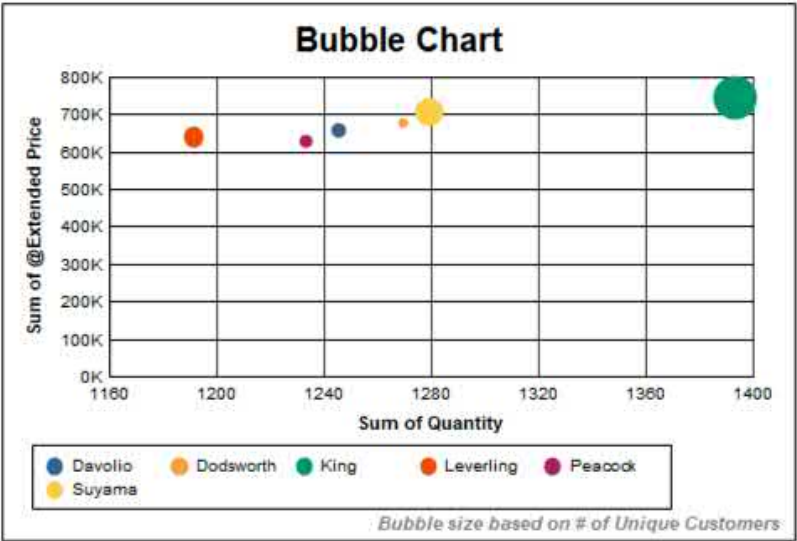


Depending on the data you use for your scatter chart (or any chart type, for that matter), you may wish to set chart color options based on some data condition. For example, to color all circles in a chart in black, with the exception of one product type that far outsells others, use the Chart Expert Color Highlighting tab.

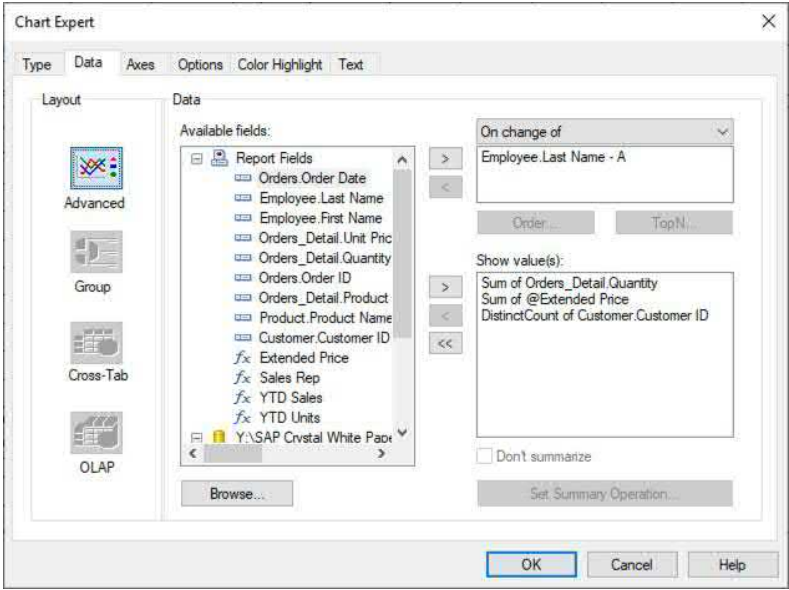


Bubble

A variation on the scatter chart is a bubble chart. While plotting points on two axes like a scatter chart, a bubble chart requires a third number to be used to vary the size of the points. This permits additional analysis for correlation and comparison.

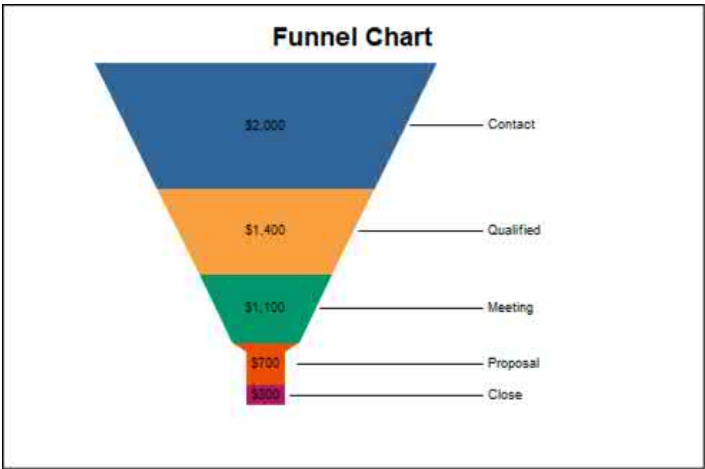


The key to effective use of a bubble chart is the addition of a third numeric value to the Show value(s) list to determine point size (including the setting of the proper summary operation – a sum will not always be the appropriate summary choice).

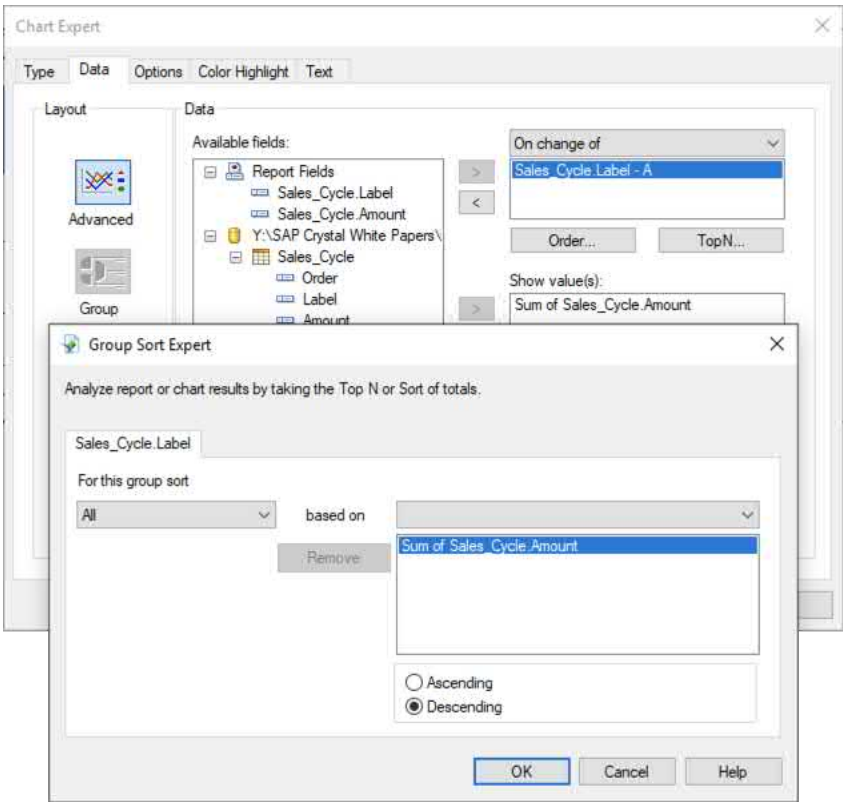


Funnel

A funnel chart is primarily used to analyze “sales over the funnel,” breaking potential sales numbers into progressive progress categories (lead, qualified lead, prospect, contract, and so forth). However, a funnel chart can analyze any numeric value broken into categories, much as a single stacked bar does. Like a stacked bar chart, the funnel represents 100 percent of the total categories plotted. However, by design, a funnel chart displays smaller widths as categories “progress down the funnel.” Because of this, a funnel chart will only make sense if the values represented by each funnel category are sorted in high-to-low order as they progress from top to bottom.



Sorting a funnel chart properly may require use of the TopN... button under the On change of list, with the All sort option selected and the numeric value sorted in descending order.

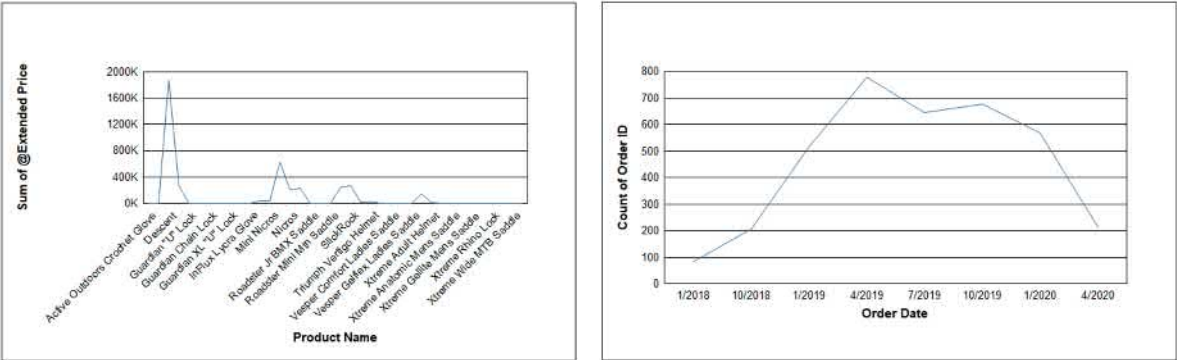


CHARTING BEST PRACTICES

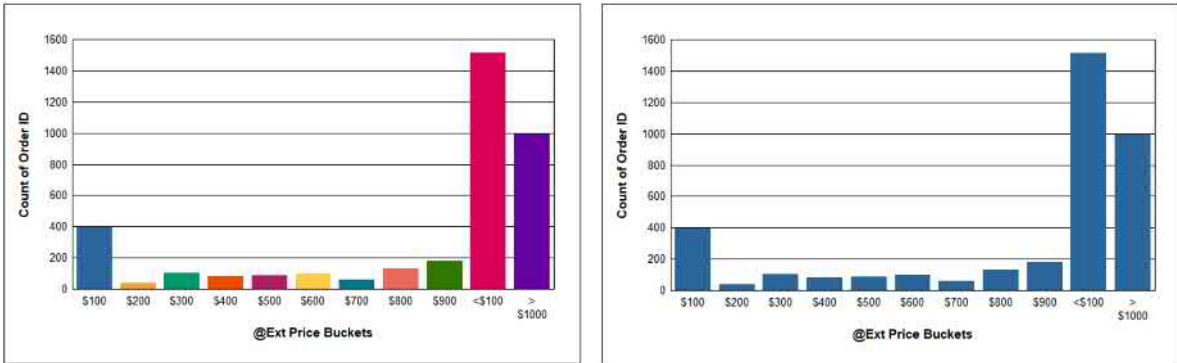
SAP Crystal Reports provides rich charting options, including 3-D formatting capabilities and flexible color choices. However, be judicious in using these features. Remember that the purpose of a report chart is to convey a “data story” – only use charting features that contribute to that story. Too many extraneous “pretty” features may detract from the actual data being conveyed.

Here are some bad, and corrected, examples of Crystal Reports charting practices:

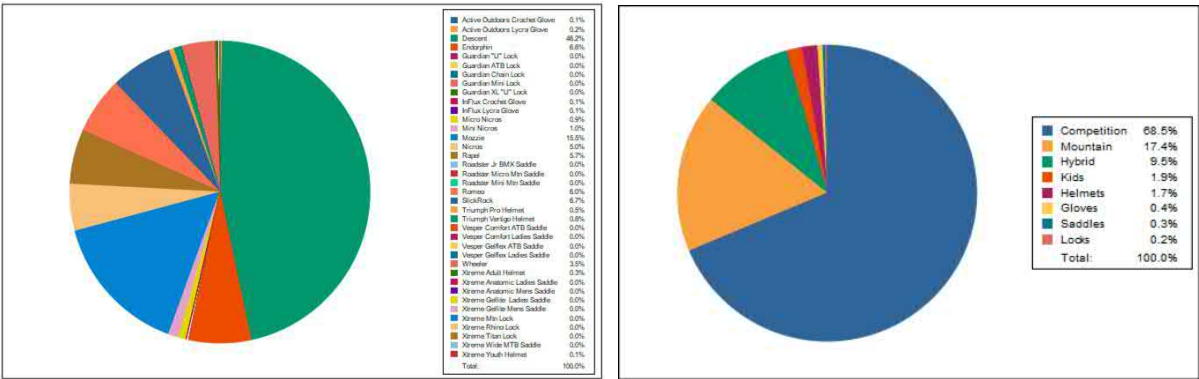
- Use the correct chart type: While SAP Crystal Reports will create many types of charts, ensure that you are using a chart type that makes sense for the data that you are conveying. For example, line and area charts are designed to show trends over time. Using a non-date field in a line chart rarely makes sense.



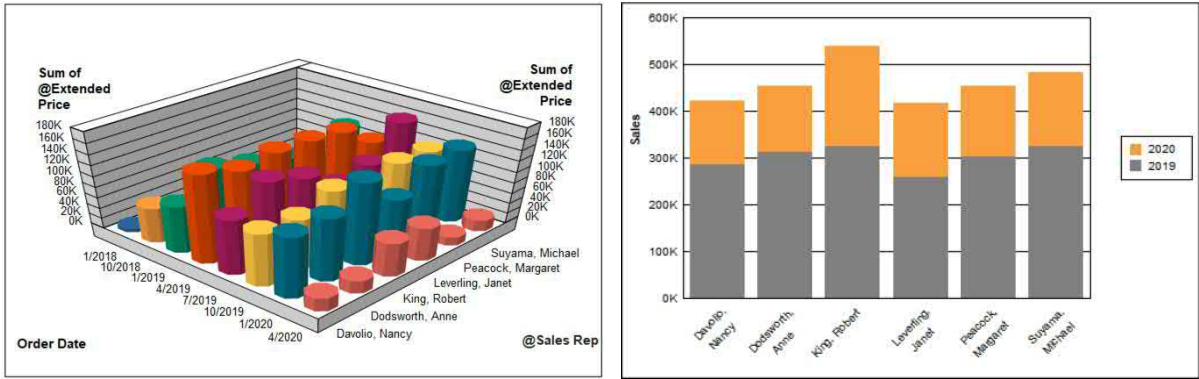
- Use color judiciously: It’s tempting to make charts “pretty” by using a different color for every chart element. But consider that, in many cases, many different colors may confuse the view more than enlighten them if the only reason for color coding is “for each value.”



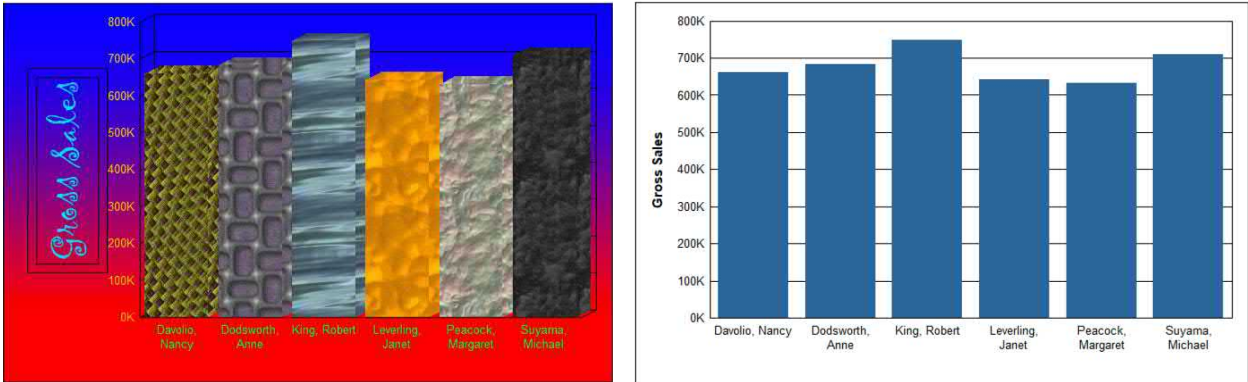
- Don't create too many chart points: Some types of charts (such as x/y scatter plots) are designed to show a large number of chart points. Others are not. Pie charts are notorious for being designed with too many pie wedges. No more than 10 or 12 are generally recommended.



- Limit use of 3D effects: While adding a 3D effect to charts is tempting when going for a “wow factor,” remember that 3D can distort or hide data that the chart is meant to convey. Don't reduce the actual usefulness of the chart by overdoing “wow.”



- Don't create “chart junk”: Noted data visualization author and lecturer, Edward R. Tufte, coined the term chart junk to refer to data visualization that uses an excessive amount of “ink” or pixels to add prettiness to a chart without contributing to the actual display of the underlying chart data. SAP Crystal Reports contains many rich charting features to augment and customize charts. Be careful – remember that the purpose of a chart is to convey a data story. Only use effects and “ink” necessary to effectively tell that story.



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