



Free Training Transcript:
Control Charts

Welcome to this How-to video on creating Control Charts. You can download the Exercise workbook to follow along in your own copy of Tableau.

What is a Control Chart?

A control chart is used to establish if variation in a measurement is within acceptable bounds, usually determined by the standard deviation. Control charts are most often done with time-series data.

Building a Control Chart – the calculations

Control charts are more complex than some other chart types in Tableau because we have to write a couple calculations. To start, we need to establish the upper bound and lower bound for what is considered “in control”. This will be determined by the standard deviation and a parameter, which will allow the end user to select how many standard deviations from average they’d like the cutoff to be.

First, we’ll build the parameter. Right click and select Create Parameter. We’ll name it “Standard Deviations”. And for data type, we’ll choose Integer. Allowable values will be List, and enter 1, 2, and 3.

Second, we’ll build a calculation for the lower bound. Right click and create calculated field, we’ll name it “Lower Bound”. And enter our calculation: $WINDOW_AVG(SUM([Profit])) - (WINDOW_STDEV(SUM([Profit])) * [Standard Deviations])$. This says take the average of the marks in the view (that’s the window average of the sum of profit part) and subtract the standard deviation (calculated by the window standard deviation of sum of profit) times whatever multiplier is selected in the parameter. A quick note on the WINDOW functions: we use these because we want to capture the average profit and average standard deviation in the view, not in the underlying data.

We’ll repeat this for the upper bound. Right click and create calculated field. Name it “Upper Bound”. And enter a very similar calculation: $WINDOW_AVG(SUM([Profit])) + (WINDOW_STDEV(SUM([Profit])) * [Standard Deviations])$. Note it’s now average plus the standard deviation

Third, we’ll create a calculation to tell us if a given mark is outside the bounds, which is out of control. Right click and select create calculated field. And we’ll name it “Outliers”. We’ll enter our formula: $SUM([Profit]) < [Lower Bound] OR SUM([Profit]) > [Upper Bound]$.

This will determine, for each mark in the view (which is the monthly sum of profit) if it's below the lower bound or above the upper bound.

Building a Control Chart – the view

Now that we have all the pieces, let's assemble the view and build our control chart! We'll bring Measure Values to rows and keep only the Lower and Upper Bounds. We see our nice lines. Right click on the Measure Values pill and select Dual Axis. Right click on the right-hand axis and select synchronize axis. Then again and uncheck show header.

Next, click on the SUM(Profit) marks card and bring Outliers to color. Finally, right click on the parameter and Show the parameter control. If we want to do some formatting, we can edit the colors so false is grey and true is red. Click Color again and chose the option to show the marks themselves.

If we play with the parameter, we can see that for 2 standard deviations, only three marks are out of control.

Summary of Steps

To build a control chart, establish the upper and lower bounds and a calculation to determine if a mark is outside of those bounds.

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WINDOW_AVG(SUM([Profit]))-( WINDOW_STDEV( SUM([Profit])) * [Standard Deviations] )
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WINDOW_AVG(SUM([Profit]))+( WINDOW_STDEV( SUM([Profit])) * [Standard Deviations] )
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SUM([Profit]) < [Lower Bound] OR SUM([Profit]) > [Upper Bound]
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Conclusion

Thank you for watching this How to video on Control Charts. We invite you to continue with the Free Training videos to learn more about using Tableau.