Excel 2016: New charts

Microsoft add a number of new chart type when Office 2016 was released. We shall look briefly at three of these: histogram, box-and-whisker, and waterfall. The quickest way to begin a histogram or box-and-whisker chart is it open the new Statistical Charts tool in the Insert | Chart group; see Figure 1.

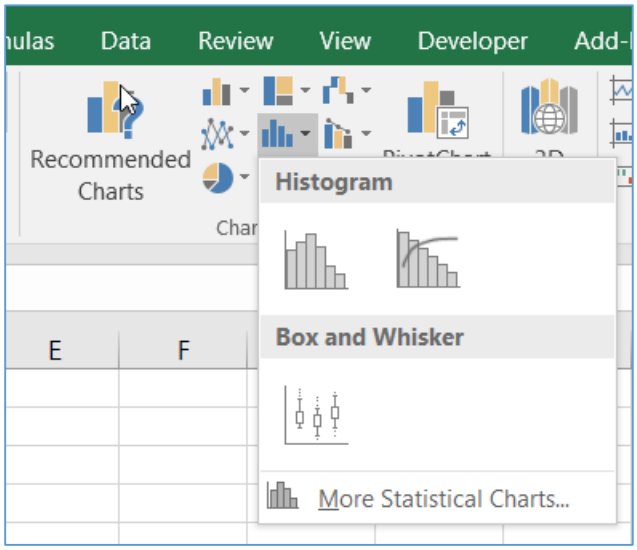


Figure 1

Histogram

[File Histogram.xlsx] Prior to Excel 2016 a user wishing to create a histogram began by setting up a range called the *bin*. Then one could either call upon the Histogram tool in Data Analysis[1] or use the FREQUENCY function[2] to count the number of occurrences for each bin value. The worksheet OldWay shows an example of this.

Generally, one uses bin values based on one's needs. But for those with statically sophistication may wish use Scott's formula for the bin width:

$$Bin\ width = \frac{3.5 \times \sigma}{\sqrt[3]{n}}$$

The first bin item will the be the minimum of the data set plus this bin value. Subsequent bin values will equal the previous bin value plus the bin width. An example is show on the OldWay worksheet. Note that the column chart one makes (or the one made by the data analysis histogram tool) need to be modifies to close the gaps between the columns as traditionally histogram have no gaps.

The built-in histogram chart type in Excel 2016 makes live a little easier. It automatically works out an appropriate set of bin values without actually showing them on the worksheet. By default, it uses Scott's formula to compute the bin width. Using the same data set as in OldWay, the worksheet Numbers shows the new histogram chart -- see the left chart in Figure 2. Note the values in category

[1] See for example: http://www.excel-easy.com/examples/histogram.html
[2] See for example: http://www.geos.ed.ac.uk/it/howto/Excel/g3histogram.html

axis; these make the meaning of the histogram much clearer. To the right is the corresponding Pareto chart which is one of the choices when making a histogram in Excel 2016. By opening the Format Axis (for the category axis) the band width or the number of bins may be altered to suit personal needs.

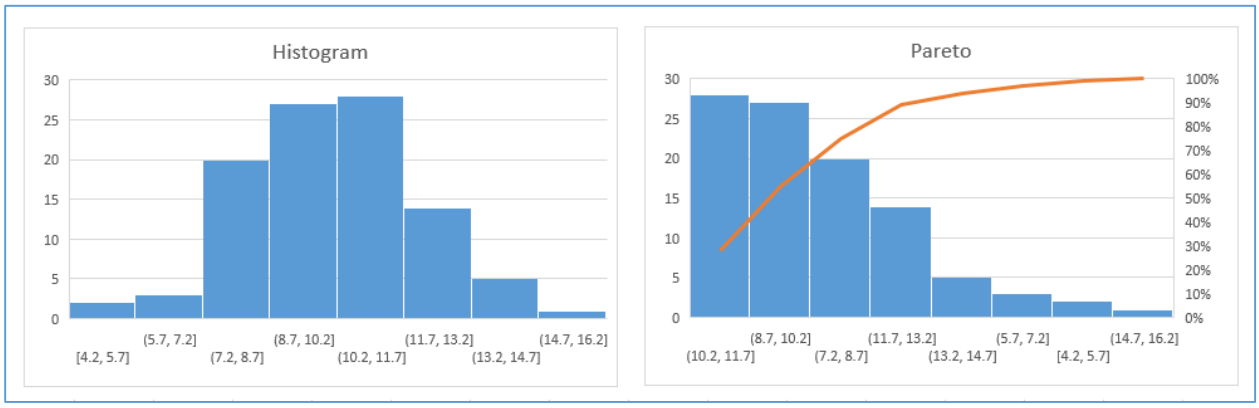


Figure 2

Figure 3 shows a category histogram – see the worksheet Category. One begins by making an Excel 2016 histogram and then formatting the x-axis to Category. Unfortunately, the categories appear in the chart in the order of first appearance in the data. To correct for this one would need to sort the data. The alternative is to make a column chart from a pivot table.

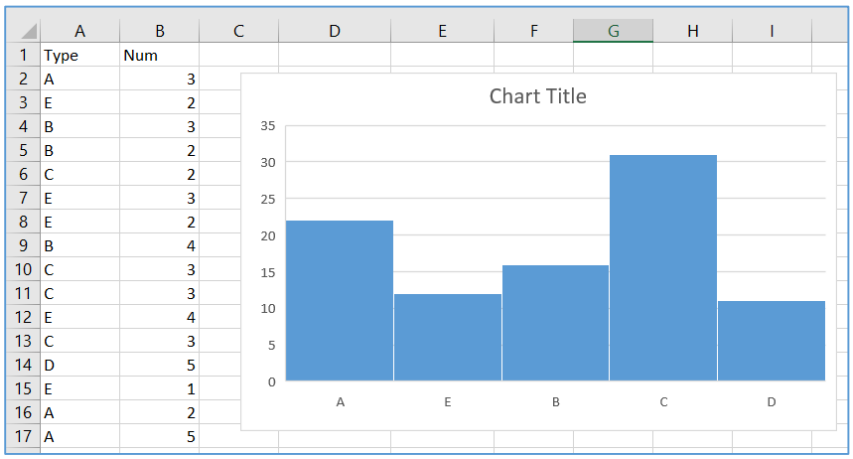


Figure 3

Box-and-whisker chart

[File BoxPlot.xlsx] To quote from Wikipedia[3]: "In descriptive statistics, a **box plot** or **boxplot** [or box-and-whiskers plot] is a convenient way of graphically depicting groups of numerical data through their quartiles." Prior to Excel 2016, making such a plot in Excel was a rather lengthy business; see for example as shown in the clear webpage from Nathan Brixius[4]. Figure 4 shows a

[3] https://en.wikipedia.org/wiki/Box_plot
[4] https://nathanbrixius.wordpress.com/2014/03/10/beautiful-box-plots-in-excel-2013/

box plot make in Excel 2016; this in on the Worksheet MM. Just click within the data and use the Insert | Charts group. The only modifications made were: (1) a legend was added, (2) the meaningless x-axis text was removed, (3)to make it easier to see the mean X and median line, the fill in some data items was changed to a lighter colour, and (4) after selecting on data point on the chart, the gap was adjusted. Interestingly there are many things one cannot do with a box plot; these include: the legend cannot be dragged around the chart area and the y-axis limits cannot be changed.

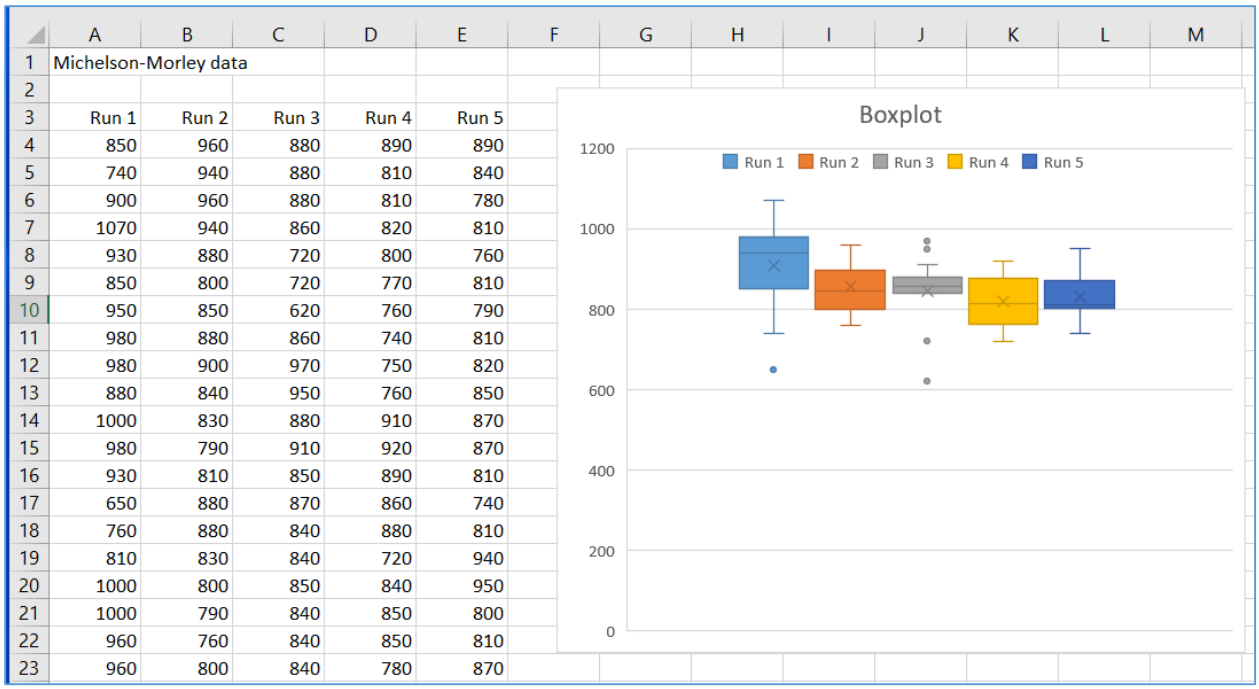


Figure 4

Figure 5 shows another boxplot--- see worksheet Ore.

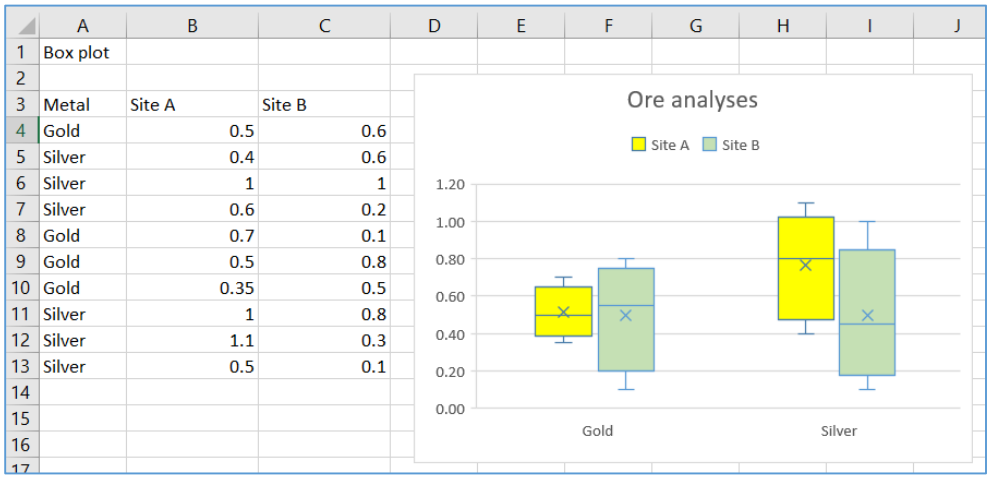
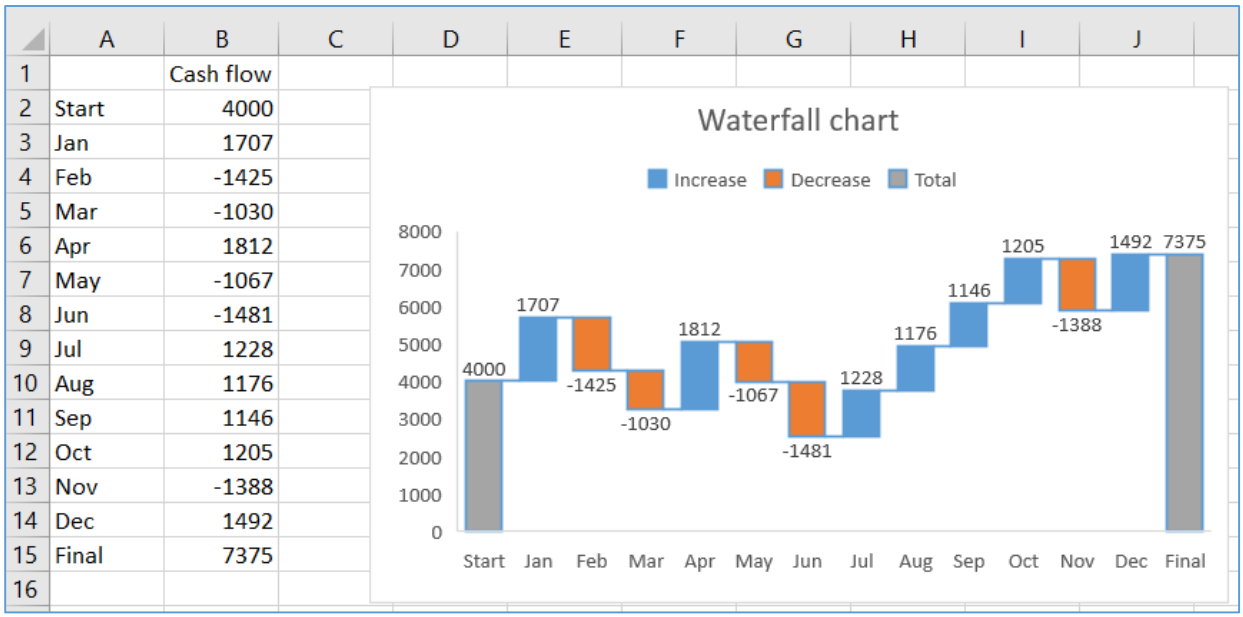


Figure 5

Waterfall or Bridge Chart

[File Waterfall.xlsx] On the AbleBits site[5], Ekaterina Bespalaya shows how one made a waterfall chart in Excel 2013 and earlier versions. Using Ekaterina's data, a waterfall chart was made within a few minutes in Excel 2016 as shown in Figure 6.



	A	B
1		Cash flow
2	Start	4000
3	Jan	1707
4	Feb	-1425
5	Mar	-1030
6	Apr	1812
7	May	-1067
8	Jun	-1481
9	Jul	1228
10	Aug	1176
11	Sep	1146
12	Oct	1205
13	Nov	-1388
14	Dec	1492
15	Final	7375
16		

Figure 6

Just click within the data, open Recommended Chart for the Insert | Charts group and select Waterfall. Some minor modifications can help: (1) click on the data series, open the Format dialog and check the Show Connectors box, (2) to make these a little more visible, click and delete the gridlines and open the Format Data Series dialog and increase the weight of the borders , (3) in turn click, on the first and last data point (Start and Final[6]) and in the Format Data Point dialog check the Set as Total box.

Radar charts

[File RadarPlot.xlsx] This note is not specific to Excel 2016 but presents a workaround for a bug in the Excel chart engine. The user wishes to make the chart shown on the right in Figure 7. The problem is getting the category axis lines (the blue line running from the centre to the circumference); if you begin with a radar chart with no markers it seems impossible to do!

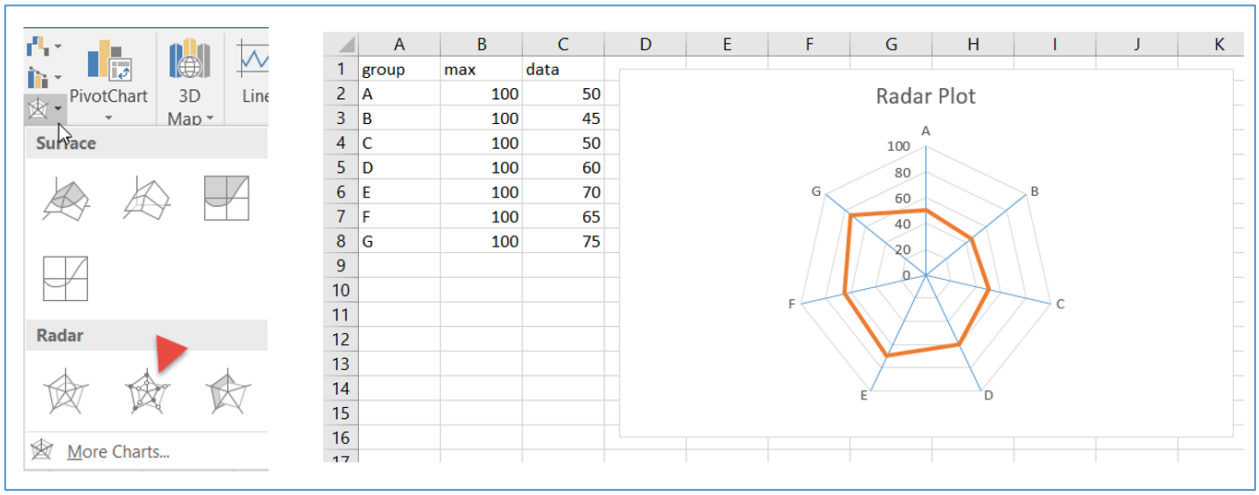
The trick is to first make a chart with markers (marked with a red arrow in the left of Figure 7) and then immediately right click on the chart, select Change Chart Type and select the no maker type (to the left of the one with the red arrow in Figure 7). Then you can click on the chart's value axis (the numbers 0 to 100), open the format dialog and specify a Line.

---

[5] https://www.ablebits.com/office-addins-blog/2014/07/25/waterfall-chart-in-excel/#create-waterfall-chart

[6] All cells but B15 hold values; in B15 the formula =SUM(B2:B14) is used.

Note that in the chart, the max data series was given no line and no makers to make it invisible.



	A	B	C
1	group	max	data
2	A	100	50
3	B	100	45
4	C	100	50
5	D	100	60
6	E	100	70
7	F	100	65
8	G	100	75

Figure 7