London Fire Station analysis in Tableau

In this exercise we use Excel to explore a dataset with the aim of helping inform policy.

This exercise has been built and tested in Tableau Public (2018.2.0 64 Bit).

In this exercise we are going to analyse the performance of the London Fire Service before and after the closures on the 9th January 2014.

The Data

The data has been prepared already for you an in available in a Tableau project.

The tableau project with the data already in can be downloaded here.

https://public.tableau.com/profile/david7767#!/vizhome/LFB_All_Data/LondonBoroughMap

The data has been sourced from
https://data.london.gov.uk/dataset/london-fire-brigade-incident-records

Step 2 - Load the project

Open the project in Tableau Public, note that with the free version of Tableau public you can only save to the public cloud, thus data MUST be anonymised.

For this exercise we will not be saving the project as it is too big to save back regularly.

In order to help you get started with the exercise the workbook has already been joined to a dataset that will allows us to plot the data on a map. The first sheet you see is a London Borough Map where each borough is shaded a different colour.

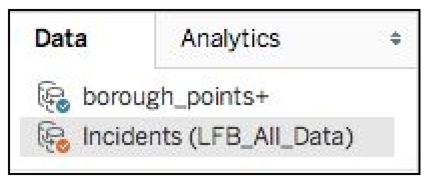
Step 3 - Calculate average response time

You will need to start each exercise from the London Borough Map as this links all your analysis back to the complete dataset. Without doing this the dashboard we build later will not work properly. The advice on the Tableau forums currently is to start with the map and work from here. In this workbook the map has been pre-built for you and we shall see how in a later step.

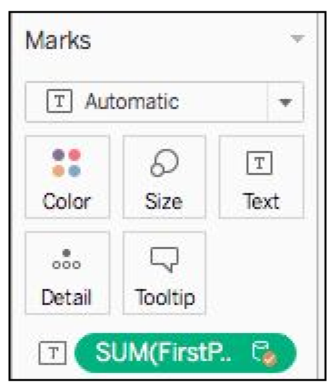
1. Right click the “London Borough Map” and click **duplicate**.
2. Name your new sheet “Average Attendance Time”

3. One this new sheet, click **show me** in the top right corner and click the first icon (the **table** icon).

4. Ensure you have selected the incidents records dataset from the panel on the top left.



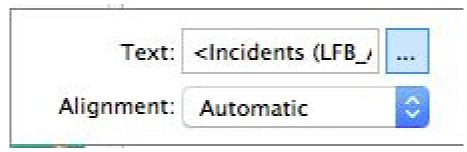
5. Drag “FirstPumpArrivingAttendanceTime” from Measures into the “Marks” panel and drop it on “Text”.



6. Right click the new green box you have just created in Marks. From the drop down menu click **Measure (sum)** and change this to the **average**.

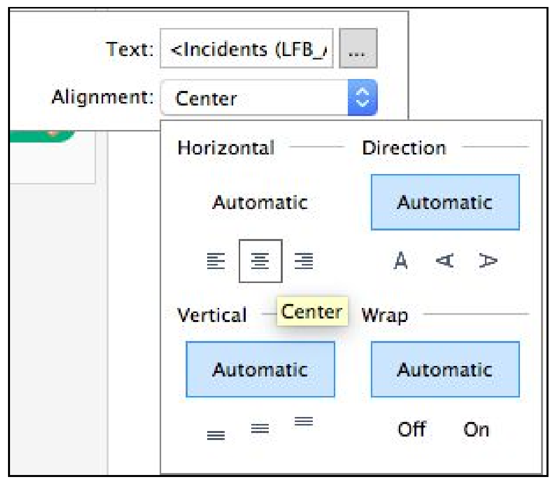
7. **Remove latitude and longitude** from the marks panel by right clicking on each and selecting remove.
8. Also **remove all columns and rows** from the top of the screen. This should leave just the “FirstPumpArrivingAttendanceTime” in Marks.

9. In the **marks** box, click **text** and click the three dots **...**

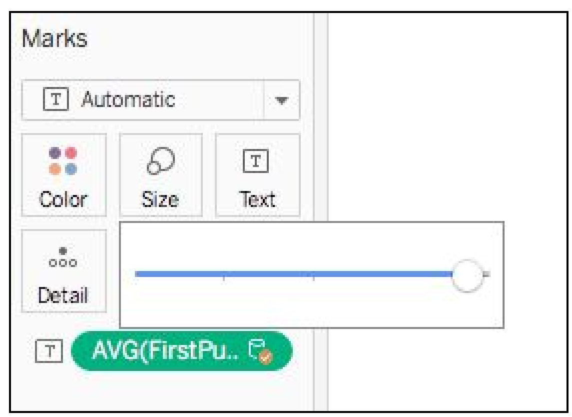


10. In the box that pops up add “s” to the end after the “>”, click OK

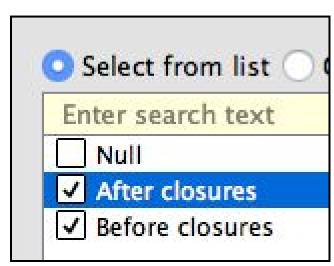
11. Set the Alignment to Center



12. Click “Size” and set it to maximum and drag the box to ensure it is big enough to display the value.



13. Drag “Before/After” from Dimensions in the “Filters” panel
14. Select both options in the pop up box and click OK



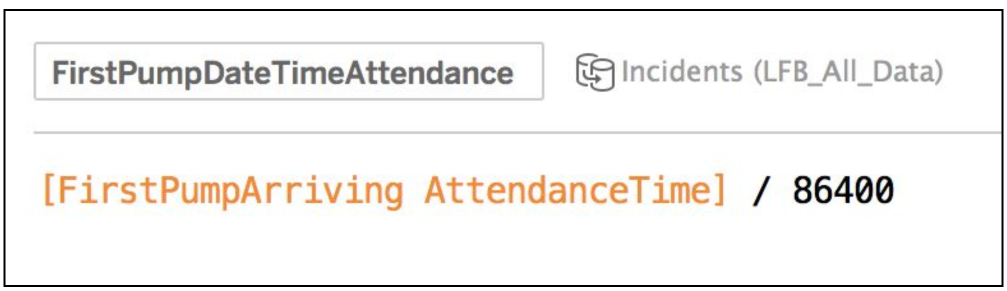
15. Click the drop down next to the new filter and click “Show Filter”
16. Click the drop down in the new filter on the right and click **single value (list)**

At this point you should have a sheet that is showing the average response time of the first appliance to incidents attended by the London Fire Brigade between 2010 and 2018. You can also apply the filter this to show the average response time before and after the closures to 10 fire stations.

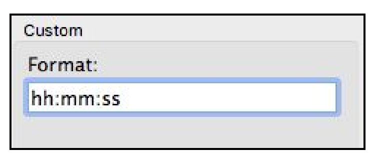
The time displayed is in seconds, not very human friendly.

Step 3 - Show times in human readable format.

17. Right click “FirstPumpArrivingAttendanceTime” in the “Measures” sidebar
18. Click “Create” and then “Calculated Field”
19. In the box that comes up name the field “FirstPumpDateTimeAttendance”
20. Add “/ 86400” after the last “]” in the box below.



21. Ensure the calculation is valid at the bottom and press “OK”
22. Right click “FirstPumpDateTimeAttendance” (the new field) in the Measures sidebar and select “**Default Properties**” and then “**Number Format**”
23. Click “Custom” and enter “hh:mm:ss” in the box and click OK



24. Now remove the existing calculation from the “Marks” panel of your Sheet and repeat steps 1-6 from this exercise with the new field you have just created.

Step 4 - Distribution of response times

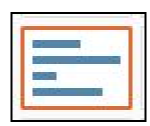
25. Add a new sheet called “Distribution per borough” (remember to do this by duplicating the “London Borough Map”).

26. Drag the “Name” column from the “Dimensions” panel (it is in the **borough points** dataset) into “Rows”

27. Drag your new “FirstPumpDateTimeAttendance” (in the **Incidents** dataset) column from “Measures” panel into “Columns”, make sure this is calculation is taking the **average** from the drop down.

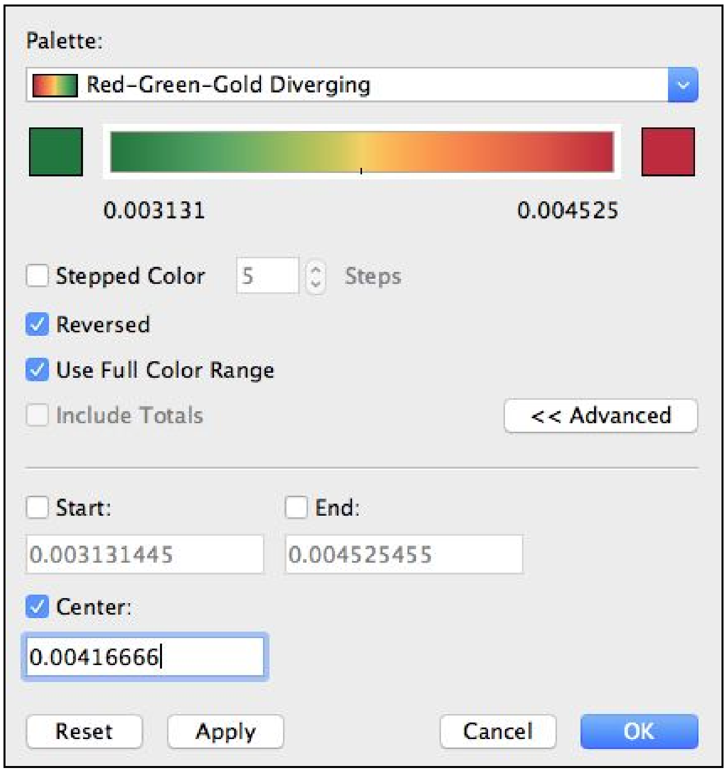
28. Remove all the values from the **marks** panel as well as the others from **rows and columns** that are not the borough name or attendance time.

29. From the “Show Me” panel click the icon for **horizontal bar**.



30. On the left click “Analytics” and doubleclick “Constant Line”. In the box the comes up enter the value “0.0041466666” (This is 6 minutes, the London target response time, in seconds divided by 86400)
31. In the “Analytics” pane double click “Median with Quartiles” to add this to your chart, this will now show where the majority of response times across the whole of London are as well as the quartiles. You can now see which quartile each borough fits into, thus the spread of the data.

32. Drag your new “FirstPumpDateTimeAttendance” column from “Measures” into the “Marks” panel and drop it on the “Color” box.
33. Ensure that the calculation for this column in the “Marks” for your new column is the average.
34. Click “Color” in the Marks panel, then click “edit colors”.
35. From the panel that comes up select “Red-Green-Gold Diverging” from the drop down, tick “reversed” and “Use Full Color Range”. Finally click Advanced and enter “0.004166666” in the “Center:” box and click “Apply” followed by “OK”

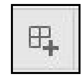


36. From the top bar, click the sort icon to order the chart with the highest average response time shown first. 

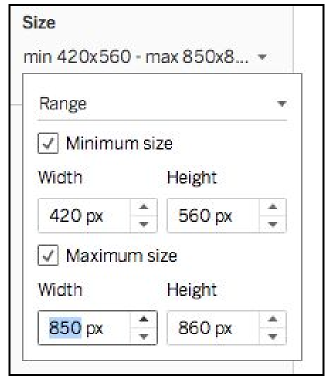
The result will be the distribution of response times per borough in london showing the distance from the target time of 6 minutes in both width of bar and also colour.

EXTENSION In this chart you could also drag “Number of Records” from measures to the Size icon in the Marks panel in order to size the bars by the number of records in each borough.

Step 5 - Create your first dashboard

37. Click the “new dashboard” icon at the bottom of Tableau 

38. On the left select the drop down for size and expand the maximum size to make it fit on your screen.



39. Double click each of the two sheets from steps 3 and 4 to add them to the dashboard. You can resize and move them to design your dashboard.

40. You should have the filter from step 3 included in your dashboard. Before you can use it you need to right click the filter and select “Apply to worksheets” and then “All using this data source”

41. You can now use this filter and both of your other elements in the dashboard should change.

42. It is also possible to use the bar chart as a filter as well. To do this right click the bar chart and click “use as filter”.

You will now be able to filter and explore the data, for example by clicking on a borough in the bar chart and looking at performance before and after closures. To remove filters, press escape on your keyboard.

Step 5 - Adding a map

The map was the first sheet you looked at. This sheet has been pre-created for you and so we just need to add the data to the map.

43. Select the **London Borough Map** sheet from the bottom of the screen.
44. Select the **London Fire Incidents** dataset from the left hand panel.
45. Drag your **FirstPumpDateTimeAttendance** column from **measures** into the **marks** box and drop it on **color**.
46. From the drop down of this column in **measures** click **measure (sum)** and change this to **average**.
47. Click the **Color** box and then click **edit colors**. From the pop up select **Red-Green-Gold Diverging** from the drop down, tick **reversed** and **Use Full Color Range**. Finally click Advanced and enter **0.004166666** in the **Center:** box and click **Apply** followed by **OK**. (this is the same as in step 35)

You can now name this sheet and add it to your dashboard, and even use it as a filter.

Extension exercises

Try adding more filters to your dashboard?

Add a new sheet showing another chart that you can filter on?

Remove the map and have more freedom in what you can do with the single dataset?

Make a new map for map it at the borough level?

Step 5 - Adding a map - appendix

To add a map we will need to add mapping data to our project. The following mapping files are available to you:

Borough_points+.csv

This file contains boundary information for the London boroughs that we have already explored in Step 4.

The datafile can be downloaded from:

http://russiansphinx.blogspot.com/2014/08/tableau-mapping-template-for-london_6.html

ward_points+.csv

This file contains boundary information for wards within a borough, this could allow more fine grain analysis if you should so choose.

http://russiansphinx.blogspot.com/2014/08/tableau-mapping-template-for-london.html

From these files, this is how the map was created.

1. From the data menu, select **New Data Source**.
2. From the pop-up box select **Text file** and and then load the **borough_points+.csv** file
3. Add a new sheet to your project
4. Before we continue we need to tell Tableau how to use the two datasets alongside each other.
5. Select the **borough_points+** data as the data source from the top of the panel on the left.
6. From the **dimensions** panel, click the dropdown of the **Name** column and select **create** and **calculate field**.
7. In the box that pops up enter the column name **lower(BoroughName)** and make the value in the box below read "**lower([Name])**". Ensure this calculation is valid and click OK.
8. Select the **London Fire Incidents** dataset from the left hand panel and repeat the same process for the **IncGeo BoroughName** column, also naming it **lower(BoroughName)**.
9. To tie the two columns together, from the panel on the left select the incidents dataset then find the lower(BoroughName) column and click the chain link icon so that it goes red and ties the two datasets together. (This is then the dataset for the start of the exercise in Step 1)
10. Back on the sheet we can now plot the map, to do this first select the **borough_points+** data as the data source from the top of the panel on the left.
11. Drag **Point Order** and **Sub Polygon Id** from **Measures** to **Dimensions**.
12. Drag **Longitude** from the **measures** panel into the **columns** box.
13. Drag **Latitude** from the **measures** panel into the **rows** box.
14. Click the **show me** panel in the top right and select **map**.
15. In the **marks** panel drop down select **polygon**
16. Now drag **Point Order** from **Dimensions** into the **Marks** panel and drop it on the **Path** box.
17. Drag **Sub Polygon Id** from **Dimensions** into the **Marks** panel and drop it on the **detail** box.
18. Drag **Gss Code** from **Dimensions** into the **Marks** panel and drop it on the **detail** box. This should now give you a map of the london boroughs all in the same colour.
19. Drag **Name** from **Dimensions** into the **Marks** panel and drop it on the **Tooltip** box.