Basic Tableau Tutorial

Presentation and Visualization, 2023

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1   BASIC CAPABILITIES OF TABLEAU PUBLIC TOOL. EXPLANATION THROUGH A VISUALIZATION

1.1   SOFTWARE AND USER ACCOUNT

1.1.1   Tableau versions

Tableau is one of the visual analytics platforms currently most popular. It has incorporated good practices in visualization in its algorithms, it is powerful and versatile.

Alternatives to Tableau are PowerBI, by Microsoft, Qlikview… Qlikview is free. PowerBI offers partial access from the Microsoft Office but is not sharable without a commercial licence. As students (or maybe future researchers) you have access to Tableau Desktop for free for one year (renewable).

Tableau is available in several flavours: Tableau Desktop, Tableau Online and Tableau Server are paid options, and they are intended for big companies working with big data. Tableau Public is a free version, and it is used in several press media, public organizations, and NGOs. In this course we will learn to use Tableau Public, but the learning could be applied to other versions of Tableau. New in the family is Tableau Prep, a tool that provides facilities to combine and redefine data.

Tableau Public offers all the functionalities of the other versions, but it has 2 important restrictions:

1. You have to publish a visualization in order to save it to your local drive. Once visualized you can make it private.

2. Your data will be publicly available to anyone viewing your visualization

Tableau Public is available for Windows and Mac, and its browser version can be also used in Linux (although the performance is not fantastic!).

1.1.2   Download and installation. Configuration

Tableau is a high demanding software. Try to use it without many programs running at the same time.

Download the software from:

https://public.tableau.com/en-us/s/download

If the language is not the desired one, you can change it in Help – Choose Language – Whatever

In our classes we will work with the English (UK) version

1.1.3   User account

We will need a user account in order to publish any visualization. To create one you musto go to:

https://public.tableau.com/en-us/s/

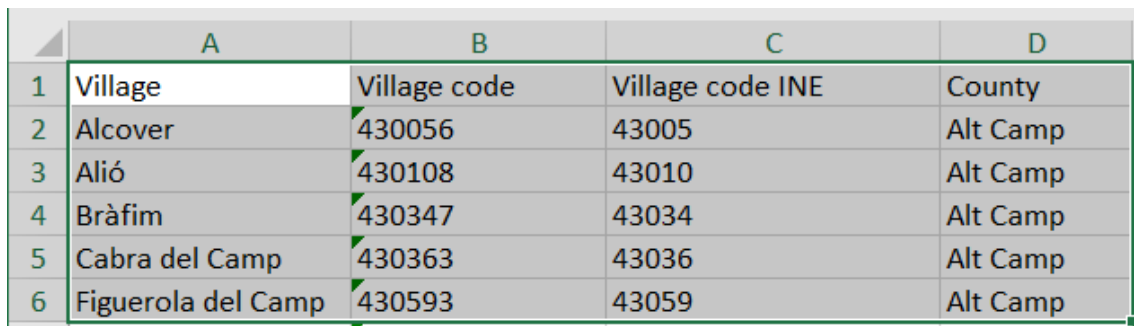## 1.2   DATA TYPES, CALCULATED VALUES AND TABLE LINKS

In data we distinguish between items and fields. For example, in Table 1 we can see 3 items with 4 fields each (Village, Village code, County, Region)

Village	Village code	County	Region
Alcover	430056	Alt Camp	Tarragona
Alió	430108	Alt Camp	Tarragona
Bràfim	430347	Alt Camp	Tarragona

Table 1. Sample of village information

Tableau is ready to be connected to many data sources, even dynamic data sources. In this course we will work with Excel files, very common.

As always, before going to the visualization we may need to do some data cleaning. Delete superfluous Excel sheets, delete unnecessary rows or columns…

Figure 1. Data in Excel file

Figure 2. We keep only one sheet, deleting empty ones

1.2.1   Example

We will demonstrate Tableau possibilities with data from the Statistics Institute at Catalona (INESCAT) about villages and hotels.

2

1.2.1.1   Source of the data

Our data comes from "Establiments hotelers per Municipis. 2019" and it is created by the Departament de Treball, Afers Socials i Famílies. Institut d'Estadística de Catalunya http://www.idescat.cat/pub/?id=turall&n=6030&by=mun&lang=es; location data for every village, comes also from Idescat. Institut d'Estadística de Catalunya http://www.idescat.cat/pub/?id=inddt&n=4699&by=mun

1.2.1.2   Excel preparation

Once we have downloaded the data, we will tweak them to our needs in the Excel. We will delete unnecessary fields, delete empty sheets, we will indicate the type of data: text, number… you have the final result of this cleaning in villages_cat.xlsx and hotels_cat.xlsx files.

1.2.1.3   Tableau introduction

When we open Tableau, the first screen is to connect the data. We will choose *To a file, Microsoft Excel*, in our case villages_cat.xlsx.
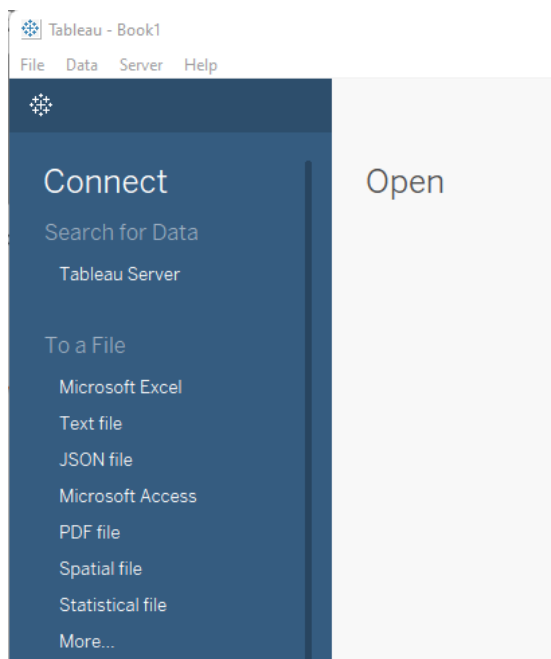

Tableau analyses the data and processes them. It is a good idea to review this process right now. To verify data types and to assign types not existing in Excel (like the geographic ones)

For example, with the field Village, we will select Abc as type and then geographic function. We will repeat similar steps with all geographic fields. Particularly important is to do so with longitude and latitude because they will allow us to create maps with the data.

Once everything is correct, we will put hotels. We will add a union and will connect both tables with Village Code field (when possible, prioritize code over textual fields)

Again, we will review data types and change any if necessary.

In this step we can also create calculated fields. For example: Total number of buildings summing up Hotels and Hostels.
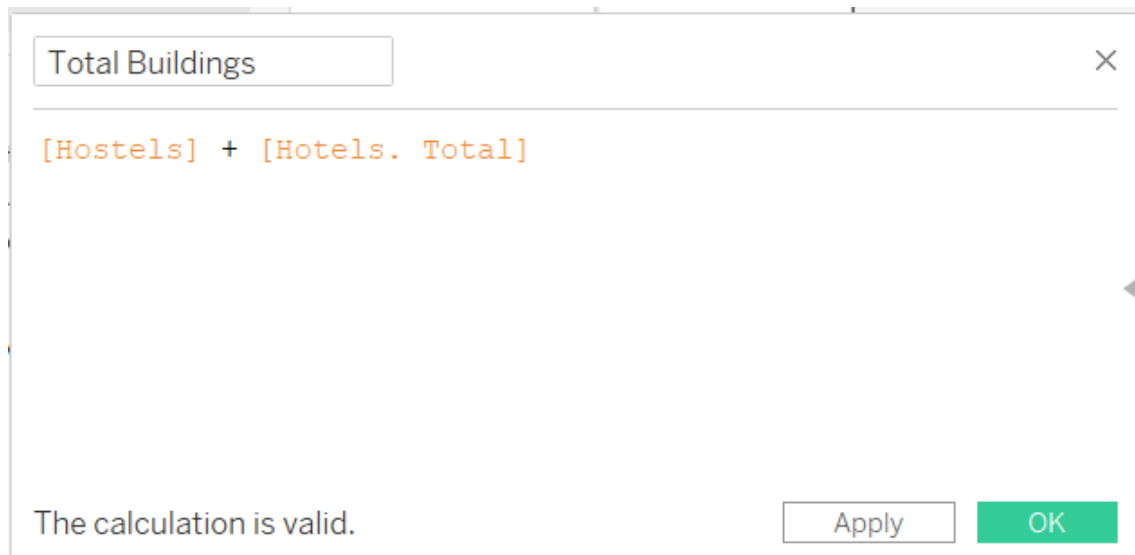
Figure 3. Calculated field creation

1.3   TABLEAU INTERFACE. PARTS AND ROLES

Once data is connected, we can start creating the visualization. To do so, we will choose Sheet 1, and if we need more, we will create them with New Worksheet option.
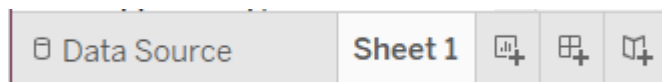

Figure 4. Sheet 1 link and options to create new worksheets

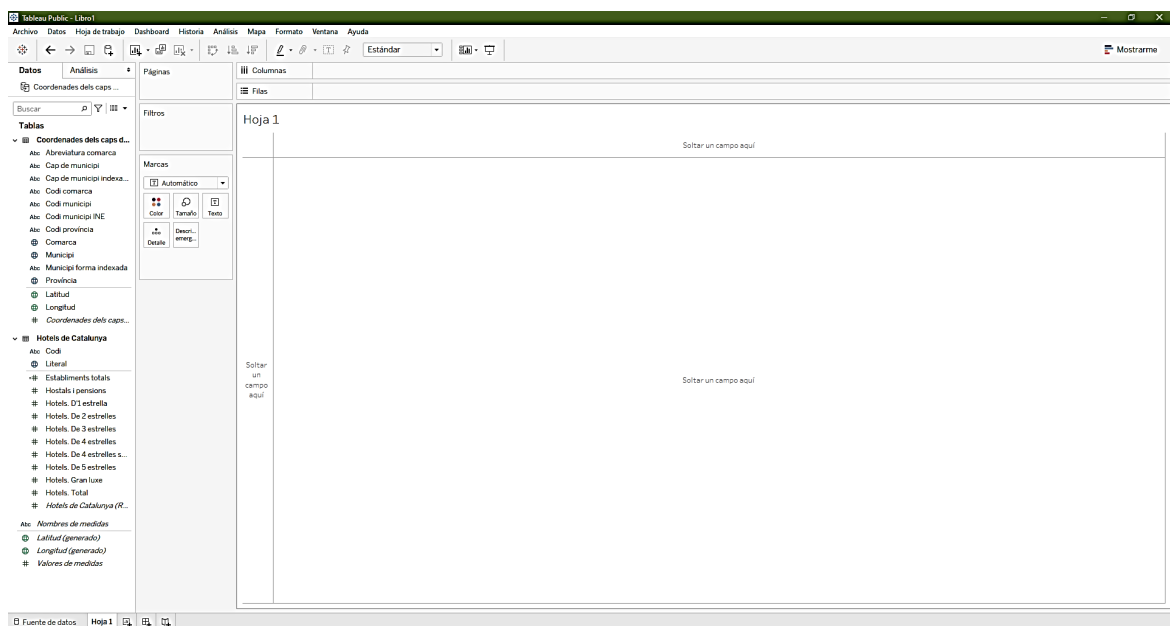Then, we will see Tableau main screen

Figure 5. Worksheet screen

5

There are 6 parts on this screen. From top to bottom and left to right: Menu, toolbar, Data in lateral panel, shelves, canvas and page bar.
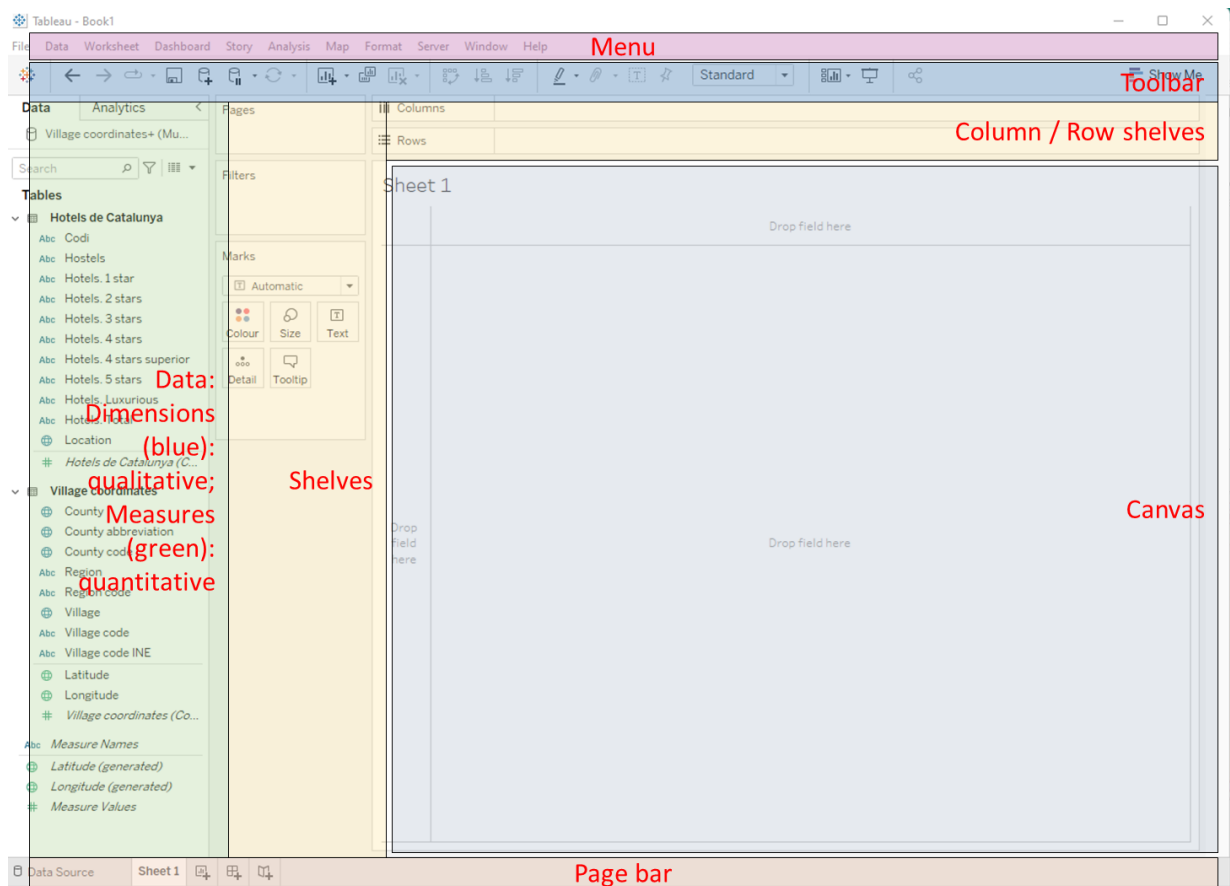

Figure 6. Work sheet screen parts

Dimensions contain qualitative values such as names, dates, and geographical data. They are used to categorize, segment, and reveal details in the data. Measures contain numeric, quantitative values that we can measure.

At the toolbar, we have a menu "Show Me" that we will often use to choose which graphic to visualize.

On the lateral panel we can see all the fields in our dataset, separated by source (Hotels and Village coordinates) and differentiating dimensions (categorical data, blue colour) and measures (quantitative values, green colour).

Here we can tweak again the data, for example to indicate hierarchies.

1.3.1   Hierarchy Region – County – Village
If we want to aggregate data by geographic criteria, we need to tell Tableau what the groupings are. We do so through a Hierarchy.

Figure 7. Hierarchy of fields

Afterwards we will choose what fields to visualize and drag them to the shelves.
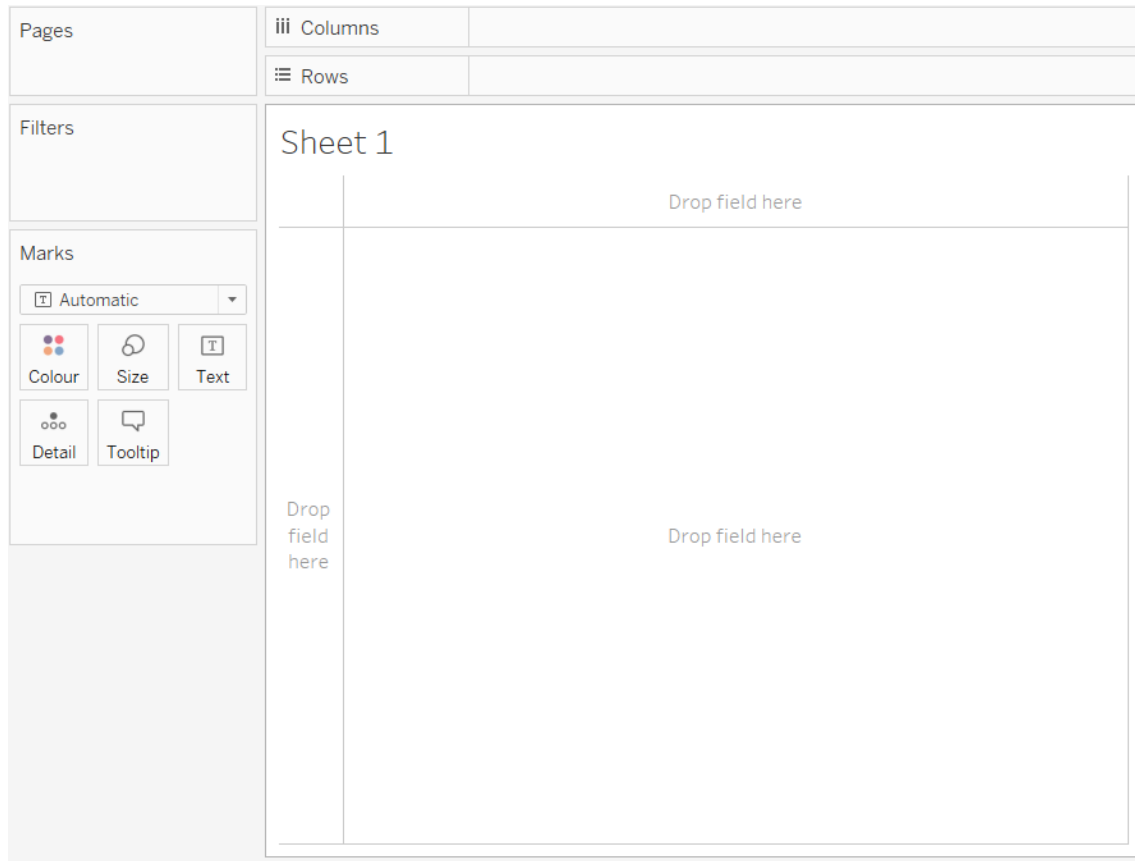

Figure 8. Available shelves

Rows and columns will feed the data table of the chart.

Filters will allow us to select which values to include. For example, for region we could choose only Tarragona.

Marks: The different icons represent visual properties of the chart marks. For example: the colour in a bar chart.

Sheet: Where the chart will be shown.

To get used to this interface, we will proceed with the creation of 3 simple charts.

1.3.2   Example 1: pie chart
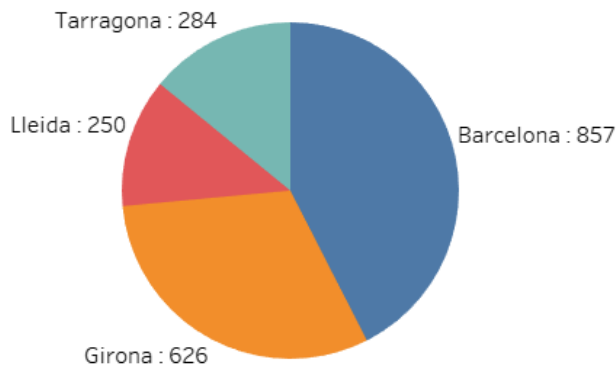
Total hotels by Region

Figure 9 Pie chart with the number of hotels by region

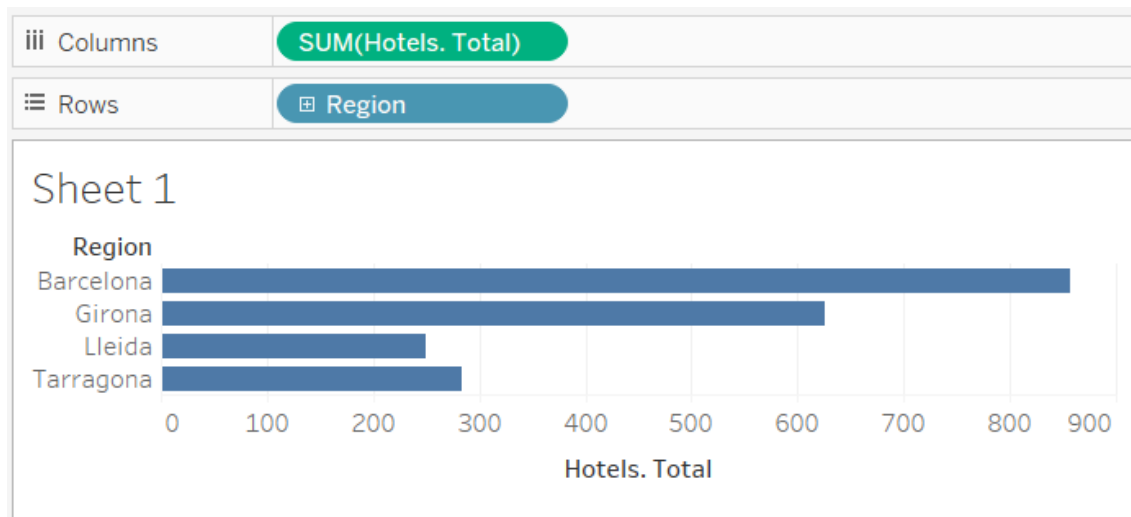We will create our chart based on the sum of hotels by region

Figure 10. Row and column definition, and automatic chart creation

When we have moved hotels to the columns, automatically Tableau changed to SUM(), because we need an aggregated value. If sum is not the aggregation you need, you can change it just selecting this field.
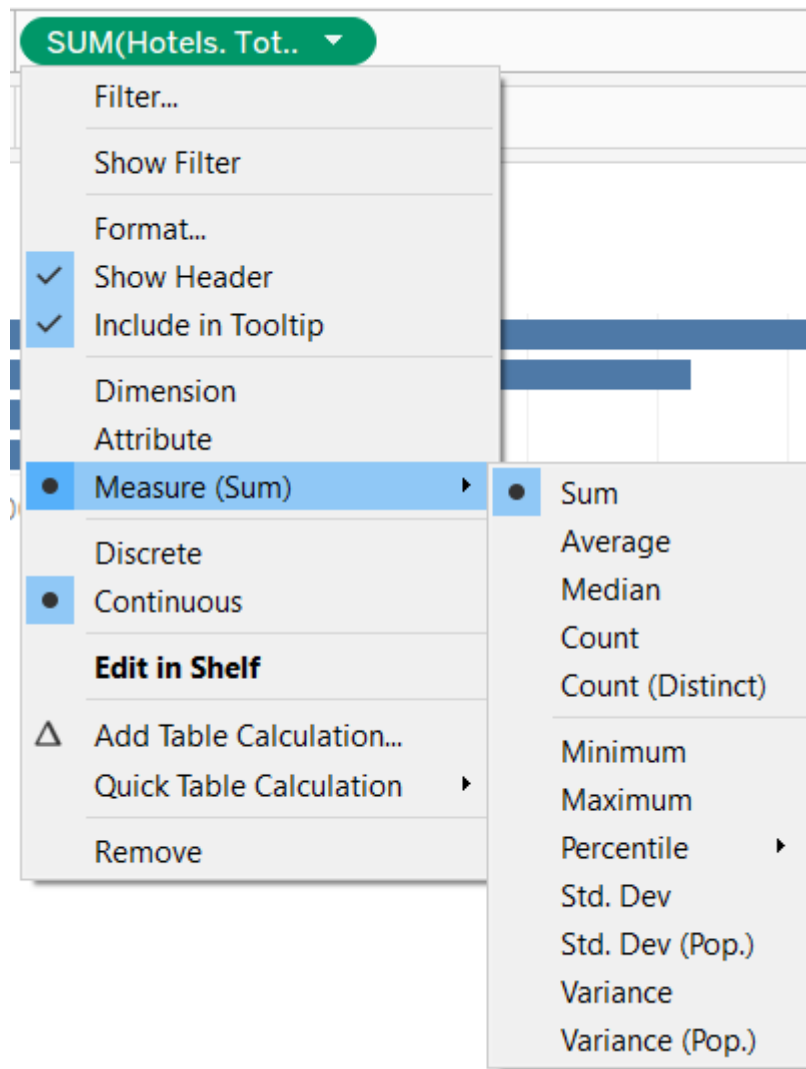
Figure 11. Aggregation options

We can now change the type of chart thanks to the Show Me menu.

And now we polish the view. We choose Entire view on [Standard ▾] dropdown menu. Then we will drag Region and Hotels.Total to the label icon. We also name the sheet.

1.3.3   Example 2: Symbol map
As a second example we will show on a map all villages having a hotel and with a mark proportional to the quantity of buildings.
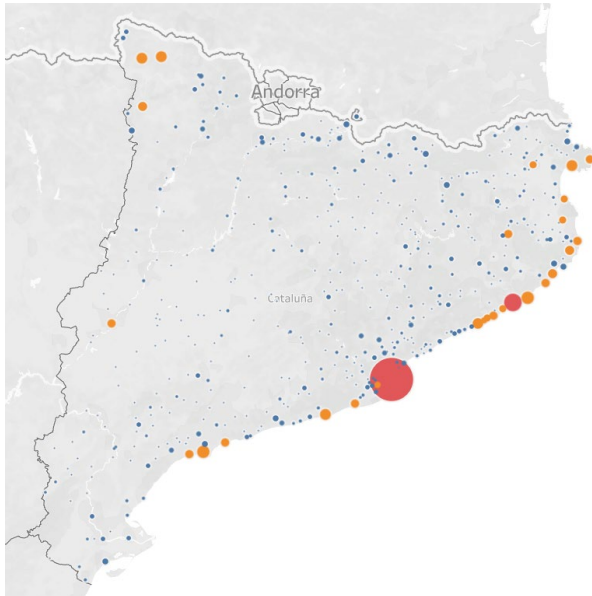
Figure 12. Symbol map with buildings per village

When working with geographic data, we must begin dragging latitude to the row shelf, and longitude to the column shelf. When moving them we must indicate they are dimensions.
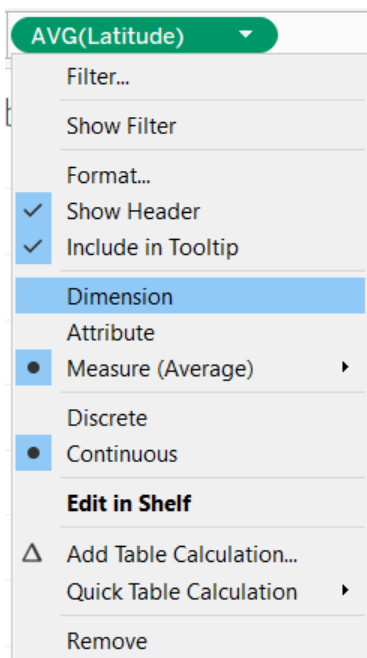

Figure 13. Latitude as dimension

We can do so, before moving them to the shelves, converting both to dimensions already in the data panel.
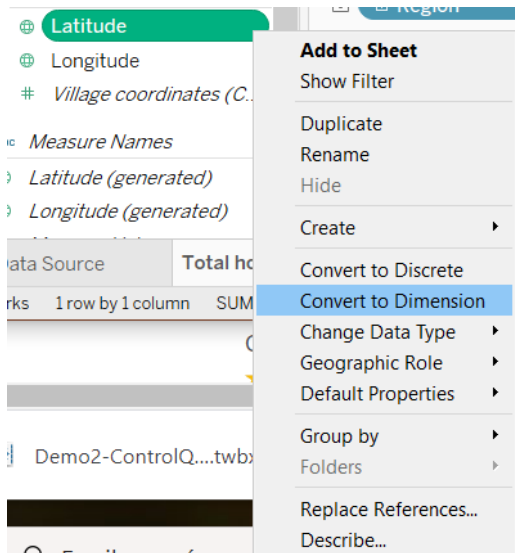
Figure 14. Indication of latitude as a dimension in the data panel

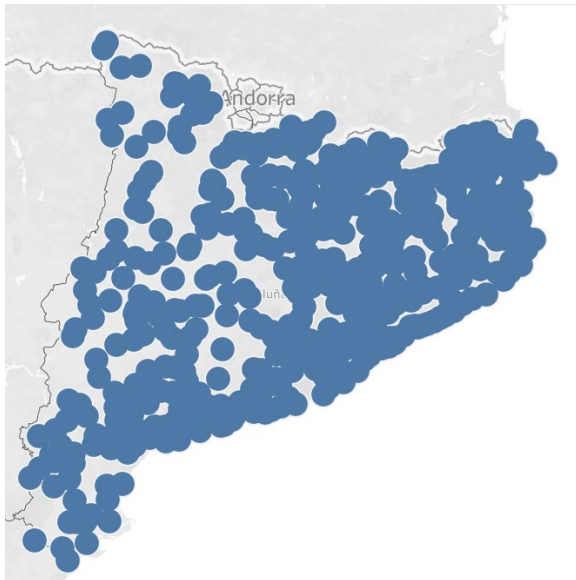The result will be something similar to this:

Figure 15. Initial map

We will polish the view with the marks. We will relate the size with the quantity of buildings. We will insert Total buildings and Village to the tooltip…
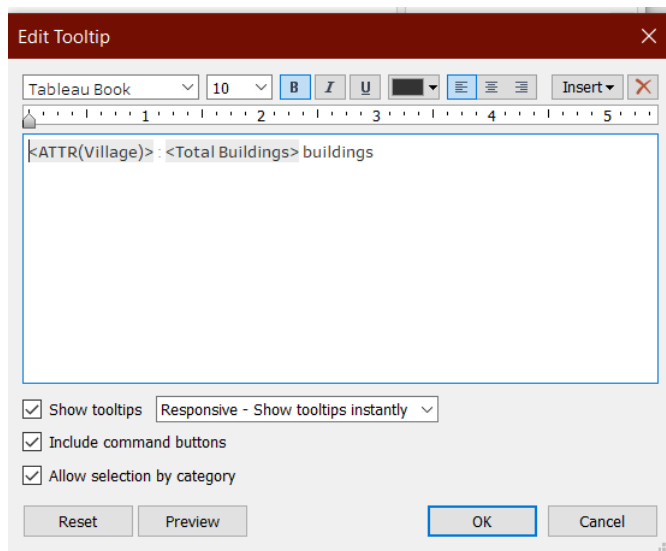
Figure 16. Configuration of tooltip

We will filter villages with 0 buildings, dragging Total buildings field to the filters shelf and configurating it.

Finally, we can create groups of villages, depending on the quantity of hotels, and associate each group with a colour.

We will create groups in Total Buildings field. Un group for values inferior to 10, another from 11 to 100, and a last group for villages with more than 100 buildings.

We will drag the new group field to colours and change the scale to differentiate it from the Region's classification.

1.3.4   Example 3: treemap

As a final chart, we will create the following treemap with the distribution of total buildings by county.
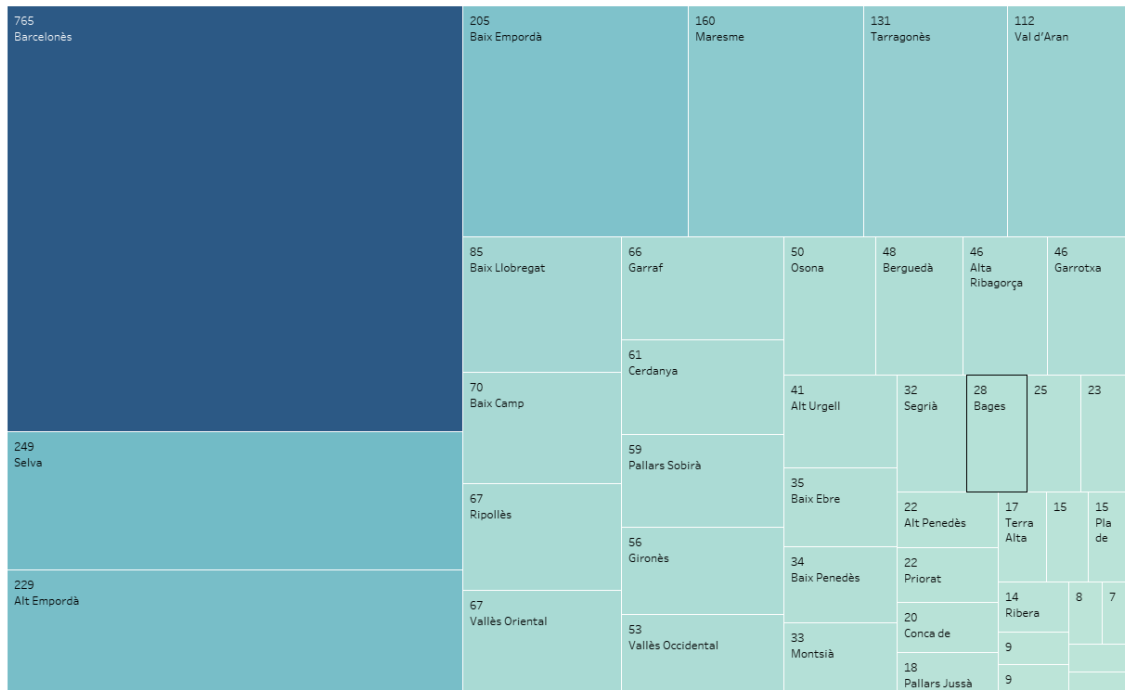
We will put County as rows, and Total buildings as columns. We will select Treemap on the Show me menu.

From there we will tweak colour scales, labels…

Finally, we can play with the hierarchy Region-County-City to provide levels on the chart.

1.4   COMBINING THE CHARTS AND PUBLISHING THEM

If we have not done it yet now is the moment to rename all the sheets.

Tableau offers two combined visualizations thinking on the final view for users:

- Dashboards: in only one screen several related charts are shown to provide a global view of a topic
- Storyline: the different charts are ordered in sequence to articulate a story

1.4.1   Dashboard

We start with a new Dashboard and then decide which sheets to include in it.

We start working with the default device configuring the size thinking in our audience.

From there we can select the Dashboard option in the menu bar and add new devices (desktop, tablet) and customize the view for each.
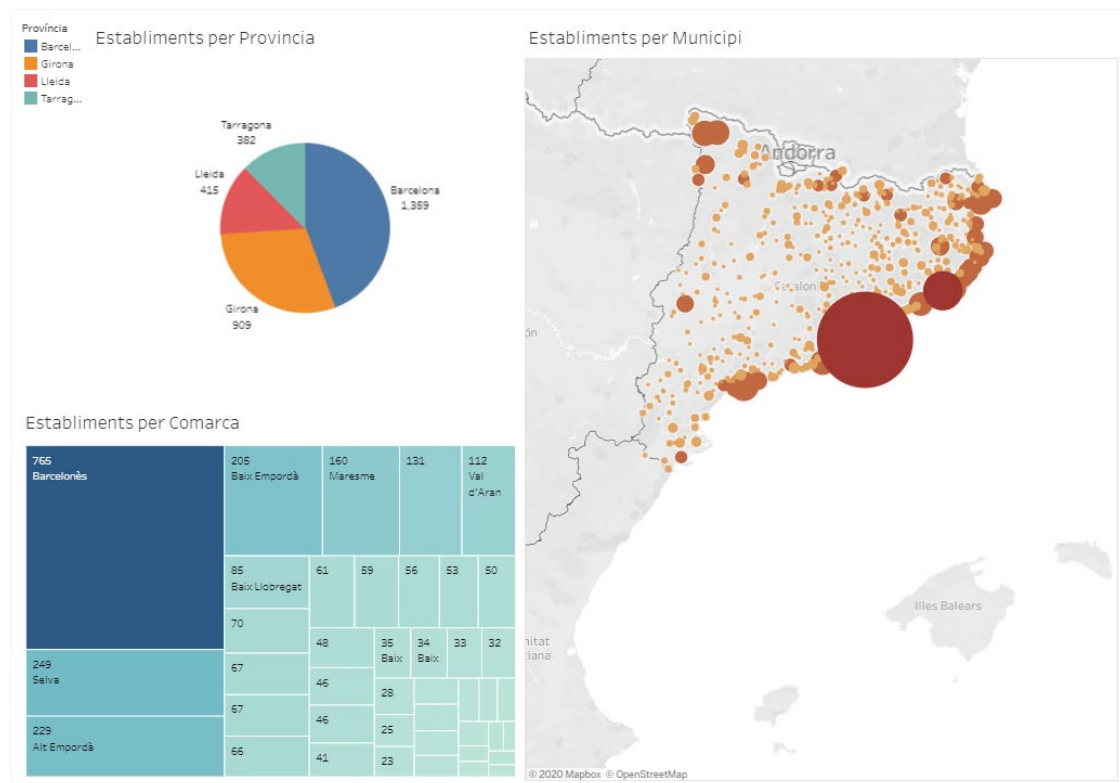

Figure 17 Dashboard with the three created charts

One interesting option is to use one of the charts as a filter for the other charts domain. In this example we can use the pie chart to choose which region to visualize in the other charts.

To do so we must choose the funnel icon on the toolbar

Figure 18. Chart toolbar. The funnel will convert this chart as a filter for the other two
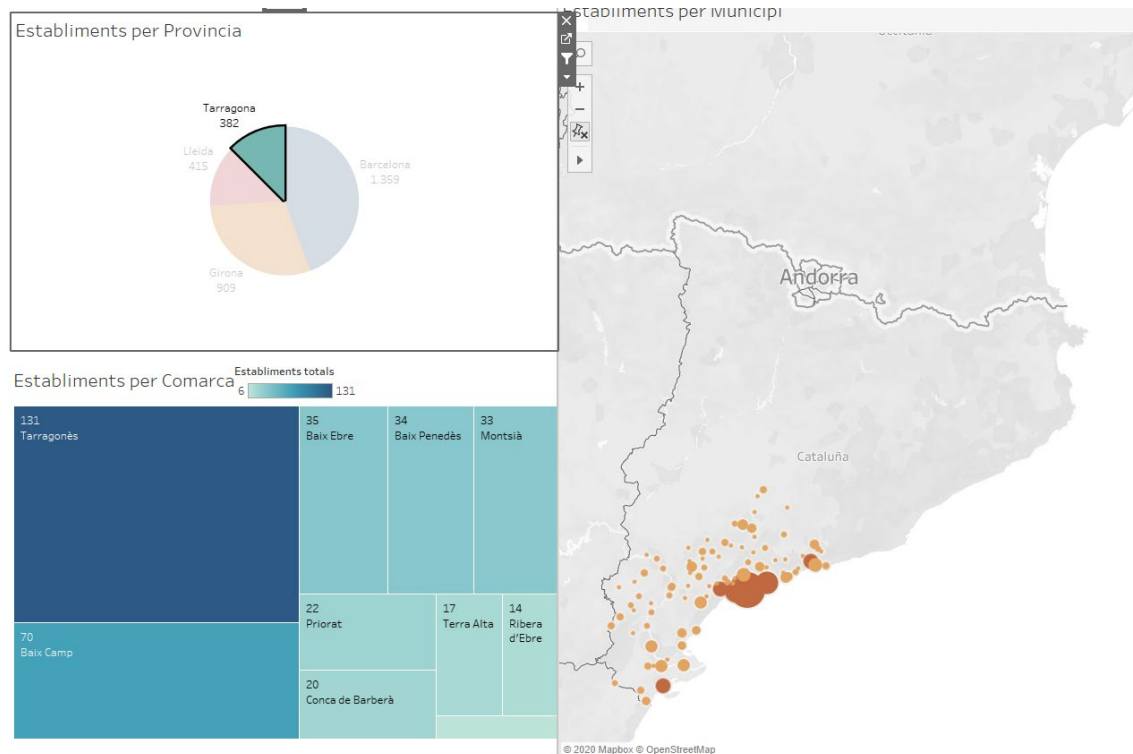

Figure 19. When Tarragona is selected in the pie chart, only hotels from this region are shown in the other charts.

1.4.2   Story

The narrative is a sequential list of charts related through a story. The current charts are not very good to create a story, but nevertheless we show the technique.

We choose new story, and we assign charts to each page and complement them with text or comments.

1.4.3   Publishing, embedding, and exporting the visualization

When the visualization is finished, we can publish it. File – Save to Tableau Public, we will need our username, and that's it. This is also the only option to save our work, we can't save it locally before publishing it.

The visualization will appear in our public profile, and there we can assign it a title, and some more details. Several share options are available.

Finally, we can export the visualization into a PowerPoint or an independent graphic.