Modul 2

tableau

Tableau

Data Science Program

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What is Tableau

“**Tableau** is a trending and market-leading BI (Business Intelligence) tool used to visualize and analyze data in an easily digestible format. It allows user to work on live data-set and spend more time on data analysis rather than data wrangling.”

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Advantages

- Access to Multiple Data Connection
- Live Analysis
- Interactive visual by drag and drop
- ShowMe (Graph Recommendation)
- Maps

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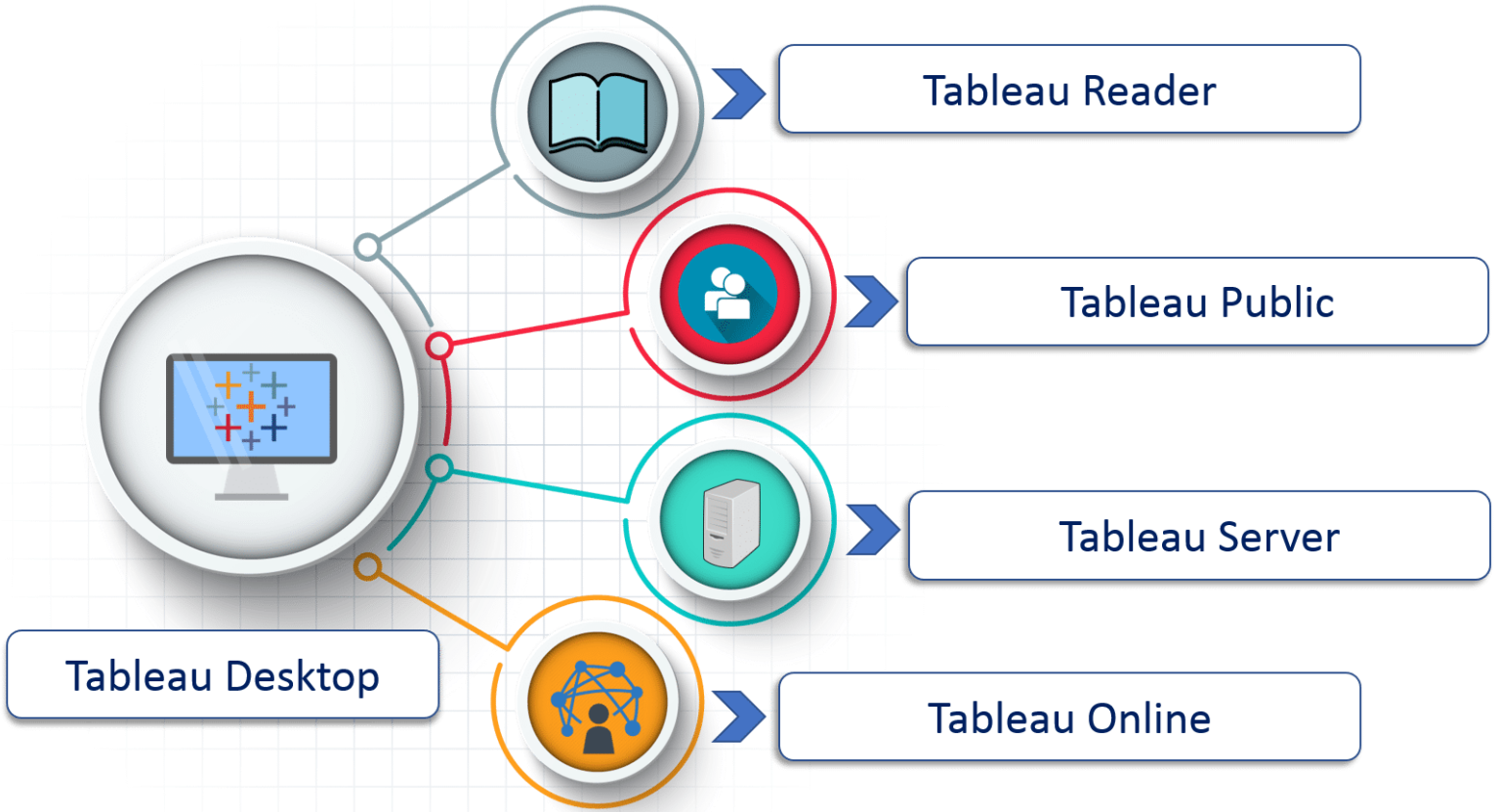
Tableau Family Products



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Installing Public Tableau

- As a For learning purpose, we would use the **Public Tableau** version which is free for public. The website could be visited here at public.tableau.com
- student, there is a possibility to gain free 1-year access for the tableau at www.tableau.com/academic/students, but this slide would be based on the Public Tableau. Do not worry, as the overall feature would have no difference between the public Tableau and paid one.

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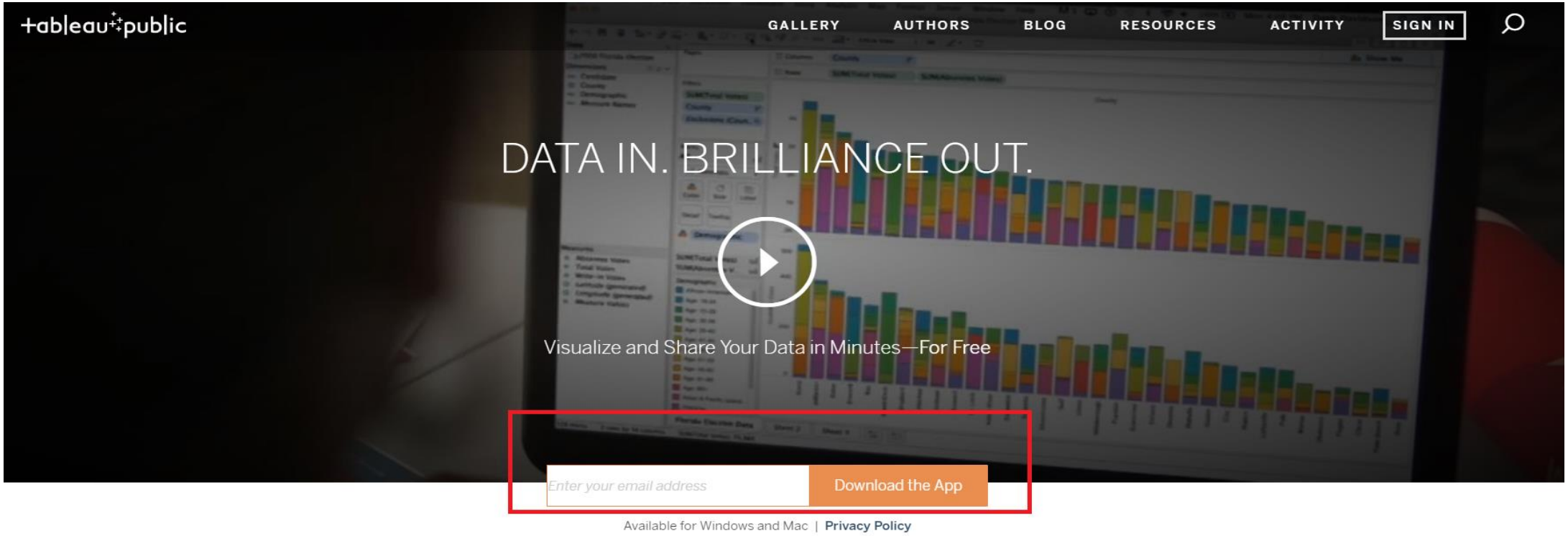
Installing Public Tableau

Enter the E-mail address to gain access to download the software. After putting the E-mail, the application would be automatically downloaded.



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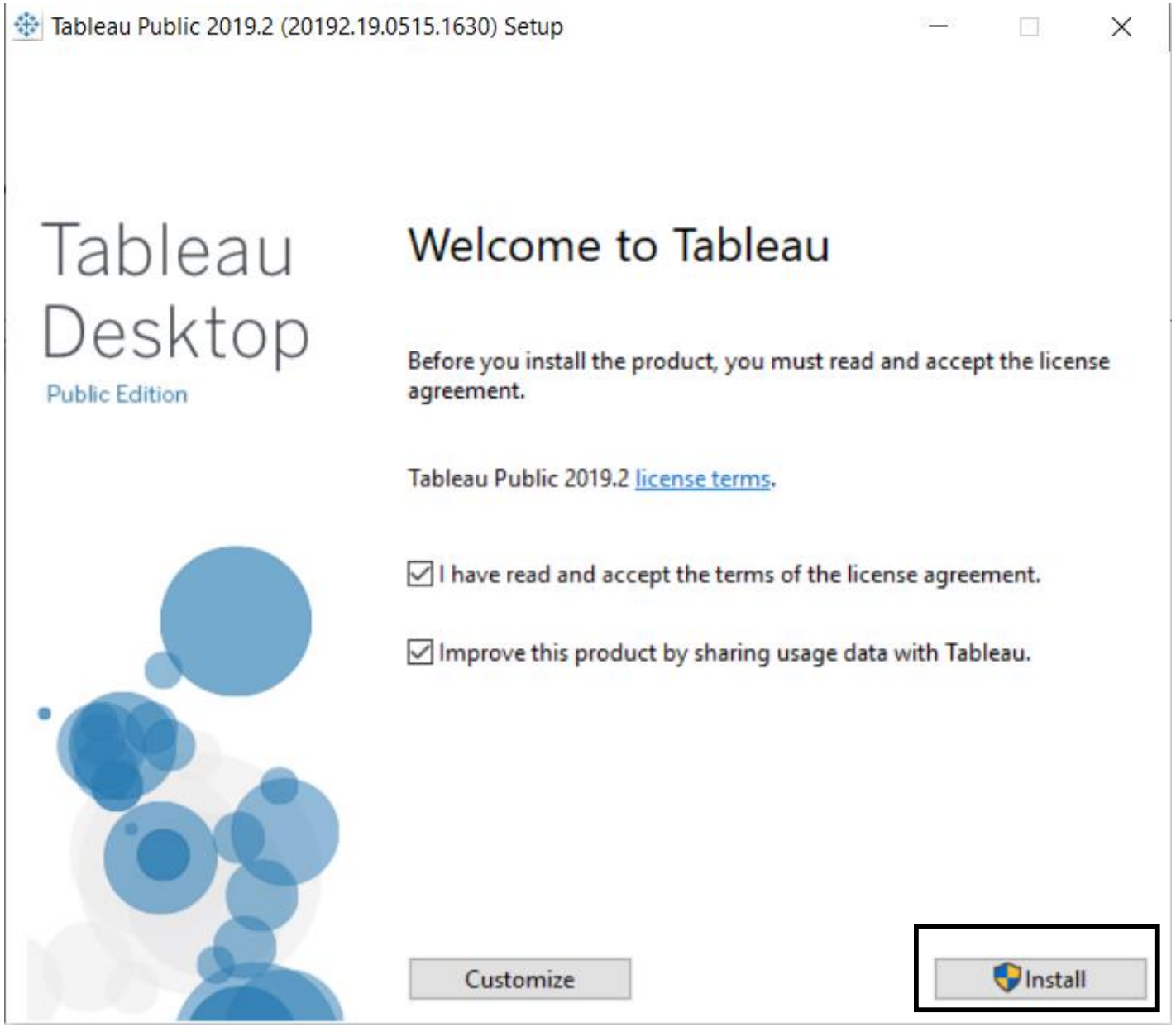
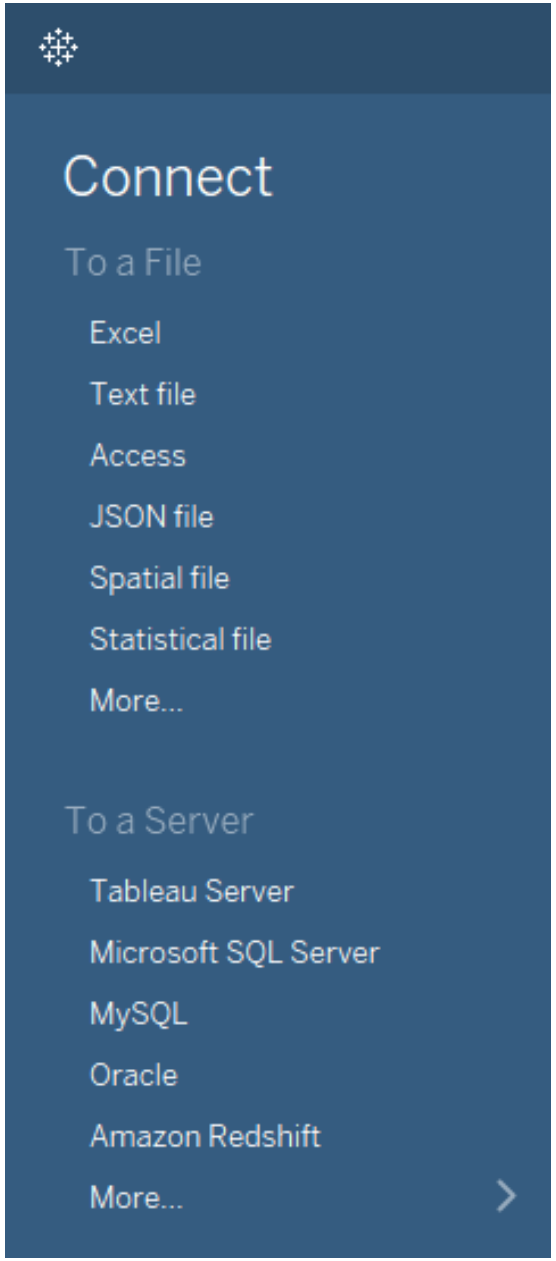
Installing Public Tableau

Select Install and accept the license agreement. The process would automatically install the software. Use the customize if user want to change where the application is installed



Using Tableau

- To use tableau, first the data need to be open or in Tableau term it is called Connected
- Mainly there are 2 types of connections:
  - Local Server (From file)
  - Data Server



tableau

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Multiple Data Connection

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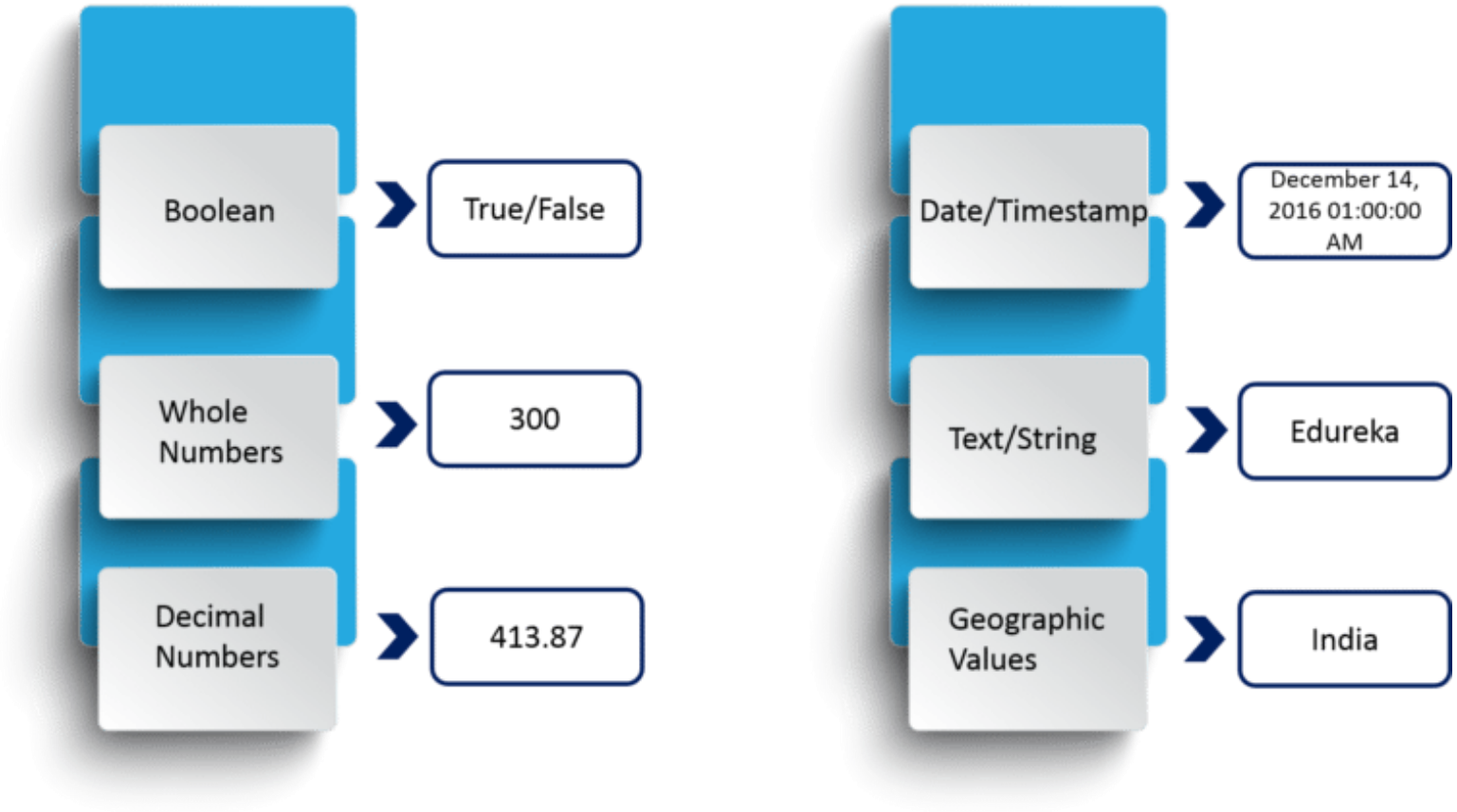
Tableau data types



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Dataset

Sort fields: Data source order | Show aliases | Show hidden fields | 1,000 rows

WC Squads Type	WC Squads Team	WC Squads Group	WC Squads Position	WC Squads Name	WC Squads DOB	WC Squads Caps	WC Squads Goals	WC Squads Country and C...	World Cu... Year	World Cup - T... Game #	World Cup - ... Date	World Cup - ... Time	World Cup - Ta... Round	World Cup - T... Stadium
Caps	France	C	MF	Thomas Lemar	1995-11-12	10	3	France Monaco	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	MF	Steven Nzonzi	1988-12-15	2	0	Spain Sevilla	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	MF	Paul Pogba	1993-03-15	51	9	England Manche...	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	MF	N'Golo Kanté	1991-03-29	22	1	England Chelsea	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	MF	Corentin Tolisso	1994-08-03	6	0	Germany Bayern ...	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	MF	Blaise Matuidi	1987-04-09	64	9	Italy Juventus	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	GK	Steve Mandanda	1985-03-28	26	0	France Marseille	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	GK	Hugo Lloris (capt...	1986-12-26	96	0	England Tottenh...	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	GK	Alphonse Areola	1993-02-27	0	0	France Paris Sain...	1930	1	7/13/1930	15:00	Group 1	Pocitos
Caps	France	C	FW	Ousmane Dembélé	1997-05-15	9	1	Spain Barcelona	1930	1	7/13/1930	15:00	Group 1	Pocitos

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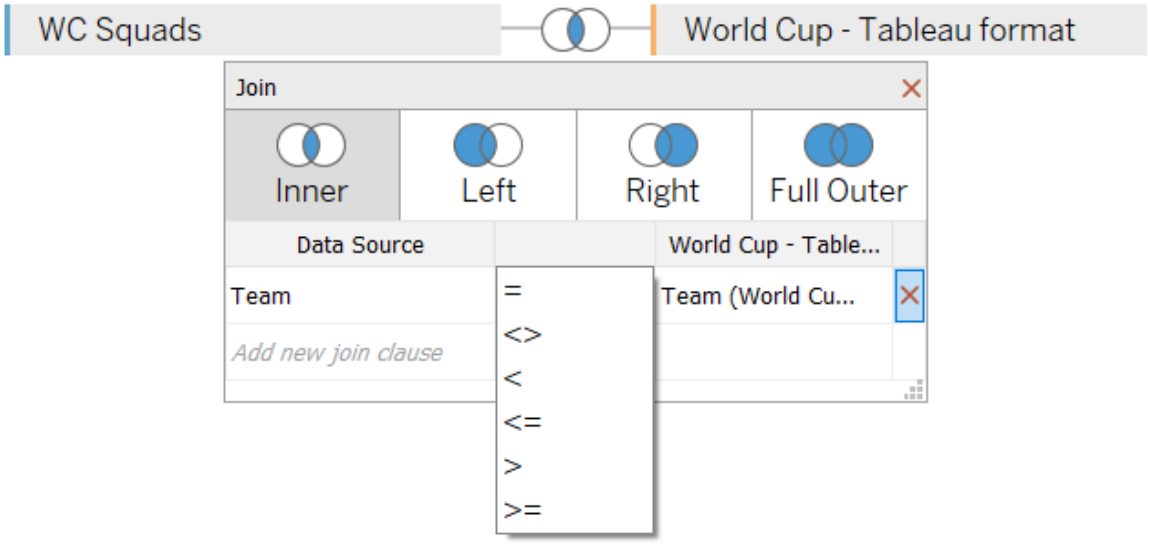
Data Joins



- Multiple datasets could be joined in various ways to produce better insights

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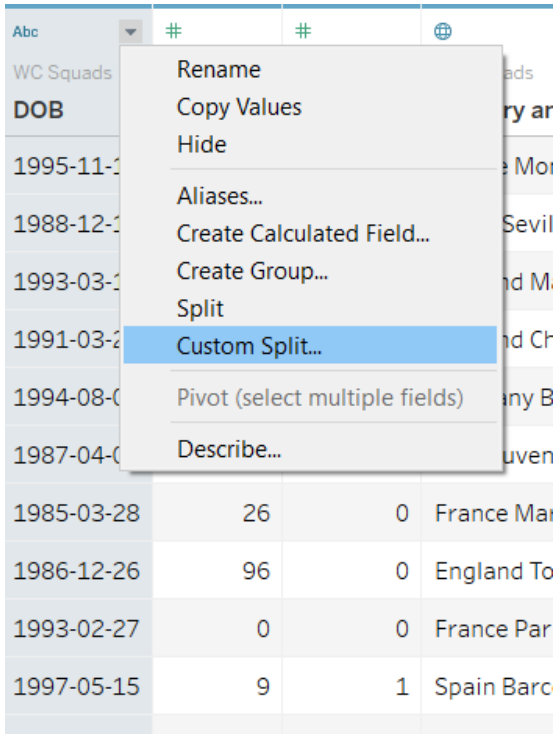
Data Split



Abc WC Squads DOB	=# Calculation DOB - Split 1	=# Calculation DOB - Split 2	=# Calculation DOB - Split 3
1995-11-12	1995	11	12
1988-12-15	1988	12	15
1993-03-15	1993	3	15
1991-03-29	1991	3	29
1994-08-03	1994	8	3
1987-04-09	1987	4	9
1985-03-28	1985	3	28
1986-12-26	1986	12	26
1993-02-27	1993	2	27
1997-05-15	1997	5	15

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Data Calculation

- Tableau support the data calculation with similar syntax to SQL or Excel
- The calculation function is useful to manipulate the data in order to get better insight
- Types of operator supported at Tableau are:
  - General Operators
  - Arithmetic Operators
  - Relational Operators
  - Logical Operators
- Different Categories of function at Tableau are:
  - Number Functions
  - String Functions
  - Date Functions
  - Logical Functions
  - Aggregate Functions

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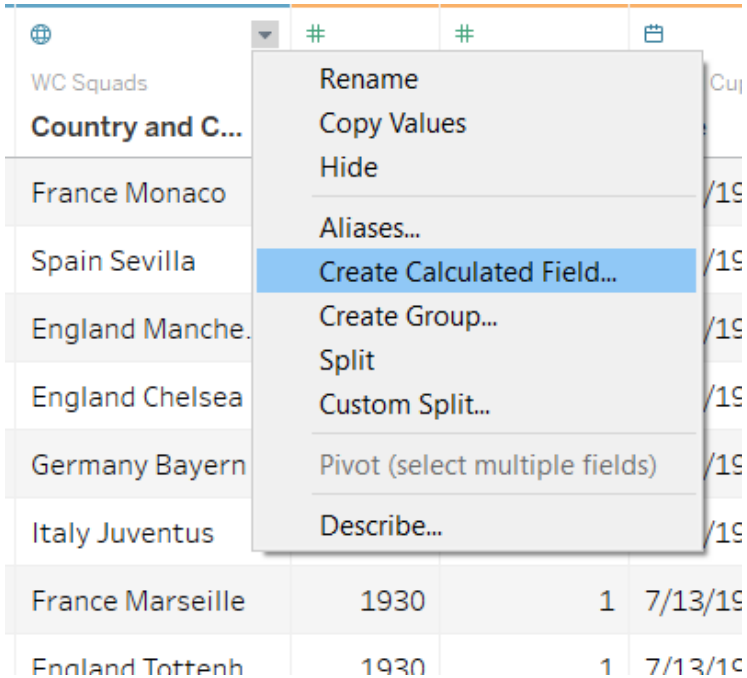
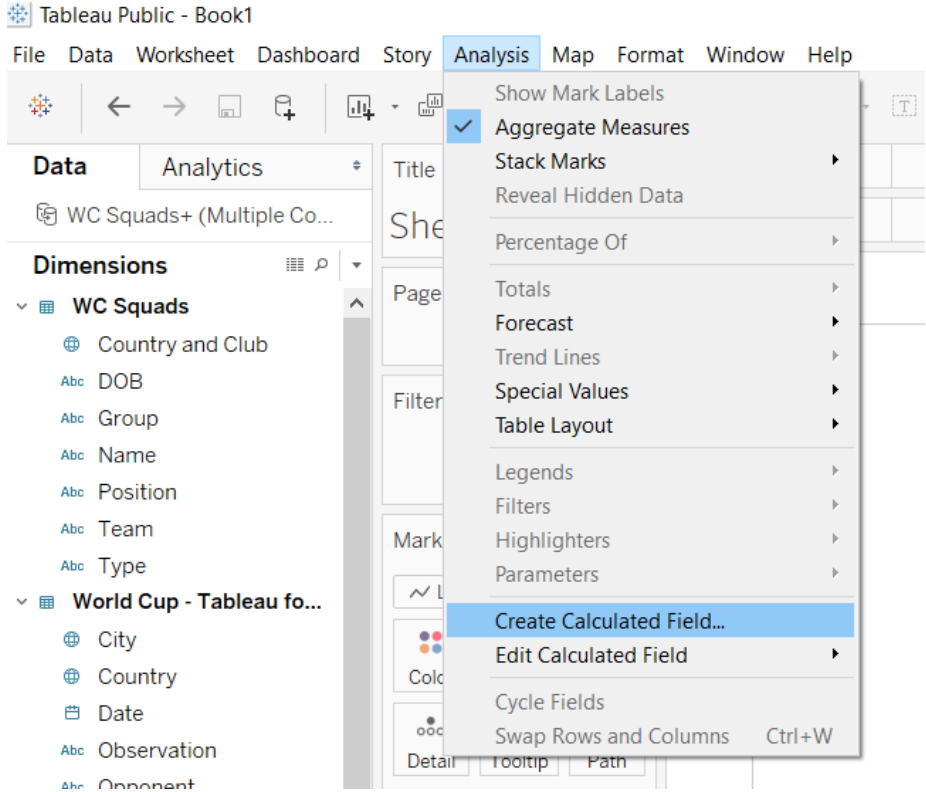
Data Calculation

There are few ways to open the calculation field. The field could be opened from the column or the worksheet





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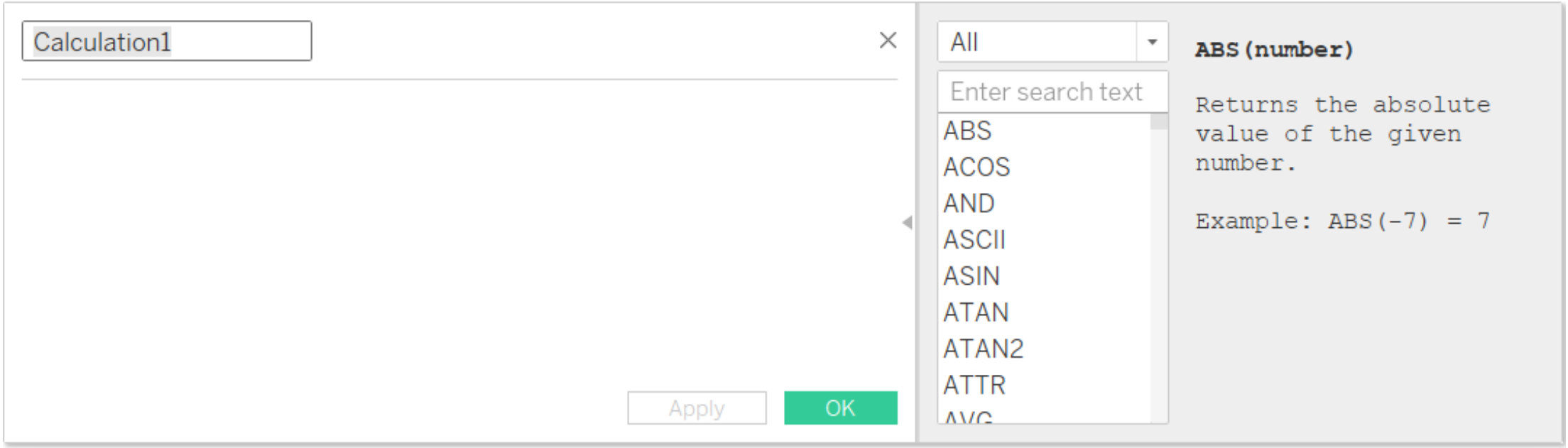
Data Calculation

The calculation field should be shown up like this. If the calculation opened from the column, the column name would be shown in the calculation field



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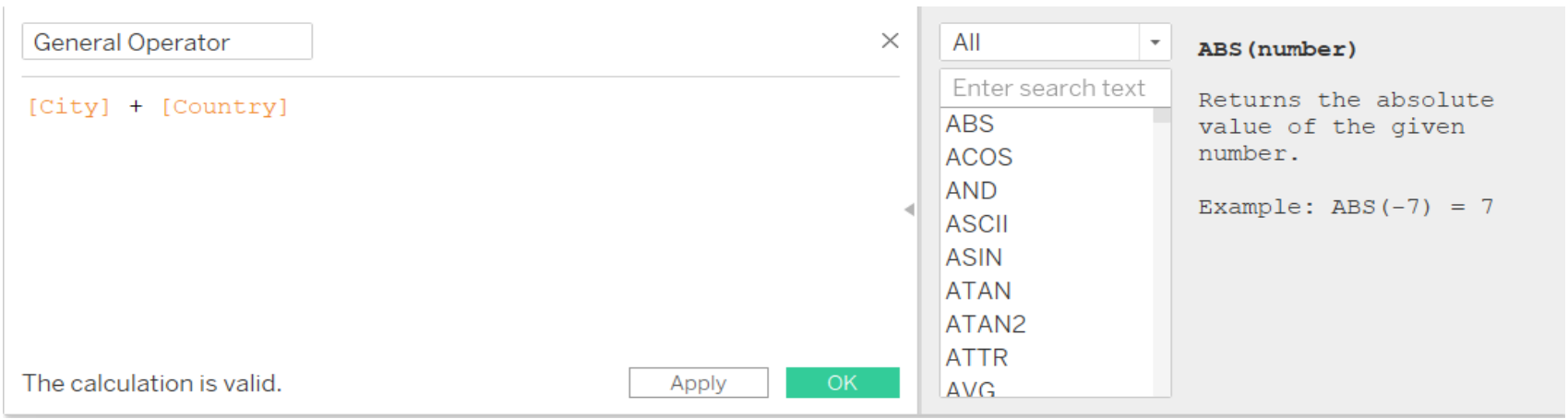
General Operators

Following table shows the general operators supported by Tableau. These operators act on numeric, character, and date data types.

Operator	Description
+	Adds two numbers. Concatenates two strings. Adds days to dates.
–	Subtracts two numbers. Subtracts days from dates.



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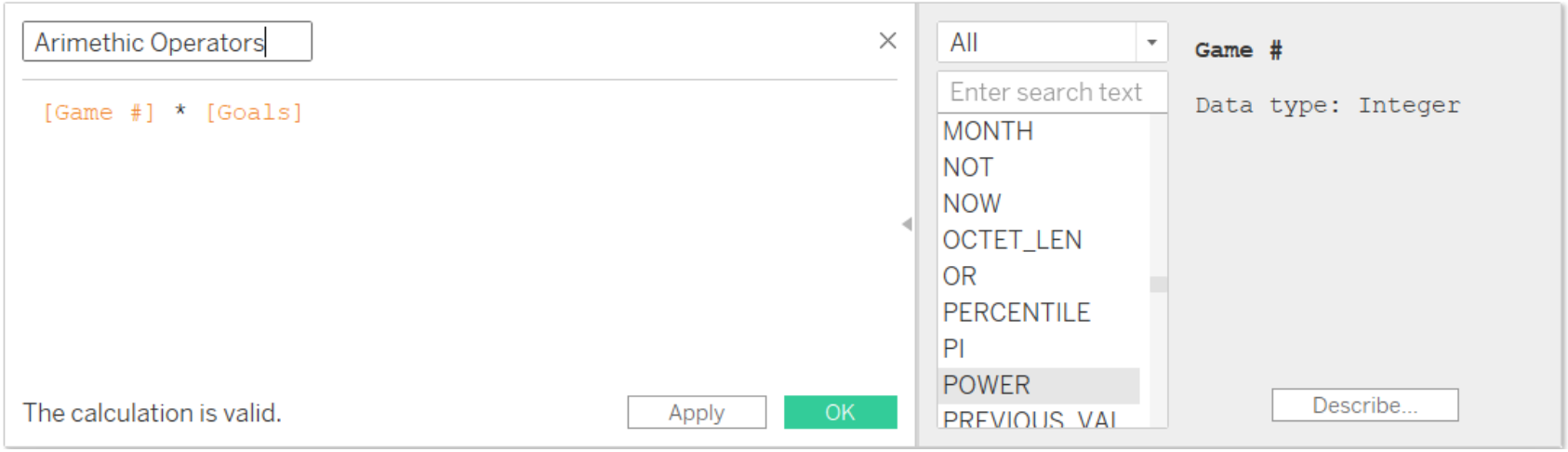
Arithmetic Operators

These operators act only on numeric data types.

Operator	Description
*	Numeric multiplication
/	Numeric division
%	Reminder of numeric division
^	Raised to the power



Both of the columns are numeric; This made the arithmetic operation work

Relational Operators

These operators are used in expressions. Each operator compares two numbers, dates, or strings and returns a Boolean (TRUE or FALSE). Booleans themselves, however, cannot be compared using these operators.

Operator	Description
= = or = (Equal to)	Compares two numbers or two strings or two dates to be equal. Returns the Boolean value TRUE if they are, else returns false.
!= or <> (Not equal to)	Compares two numbers or two strings or two dates to be unequal. Returns the Boolean value TRUE if they are, else returns false.
> (Greater than)	Compares two numbers or two strings or two dates where the first argument is greater than second. Returns the Boolean value TRUE if it is the case, else returns false.
< (Less than)	Compares two numbers or two strings or two dates where the first argument is smaller than second. Returns the Boolean value TRUE if it is the case, else returns false.

Logical Operators

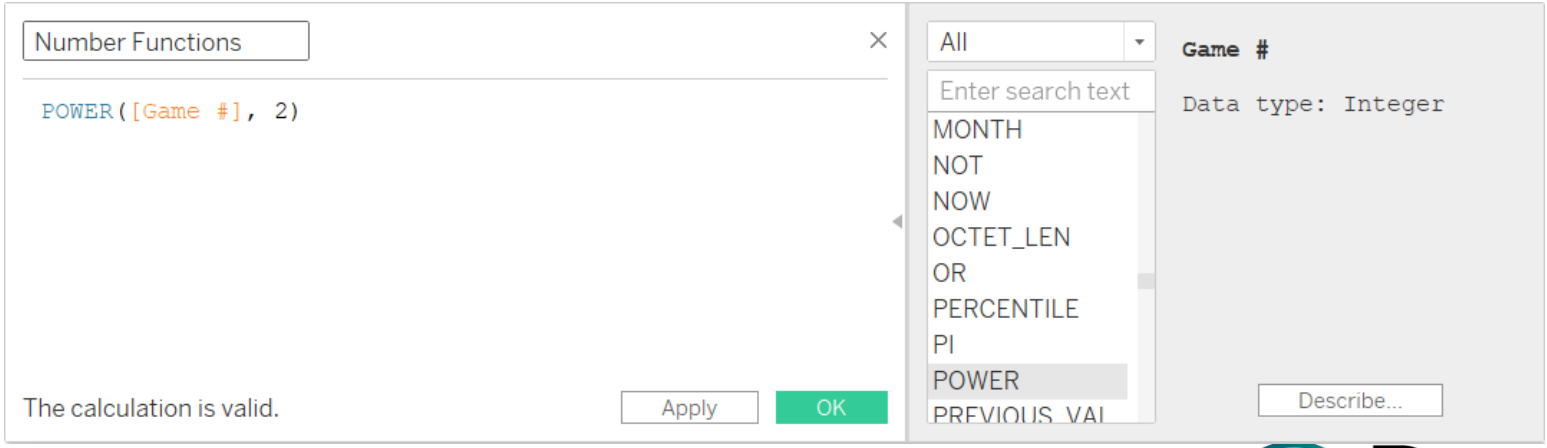
These operators are used in expressions whose result is a Boolean giving the output as TRUE or FALSE.

Operator	Description
AND	If the expressions or Boolean values present on both sides of AND operator is evaluated to be TRUE, then the result is TRUE. Else the result is FALSE.
OR	If any one or both of the expressions or Boolean values present on both sides of AND operator is evaluated to be TRUE, then the result is TRUE. Else the result is FALSE.
NOT	This operator negates the Boolean value of the expression present after it.

Number Functions

These are the functions used for numeric calculations. They only take numbers as inputs. Following are some examples of important number functions.

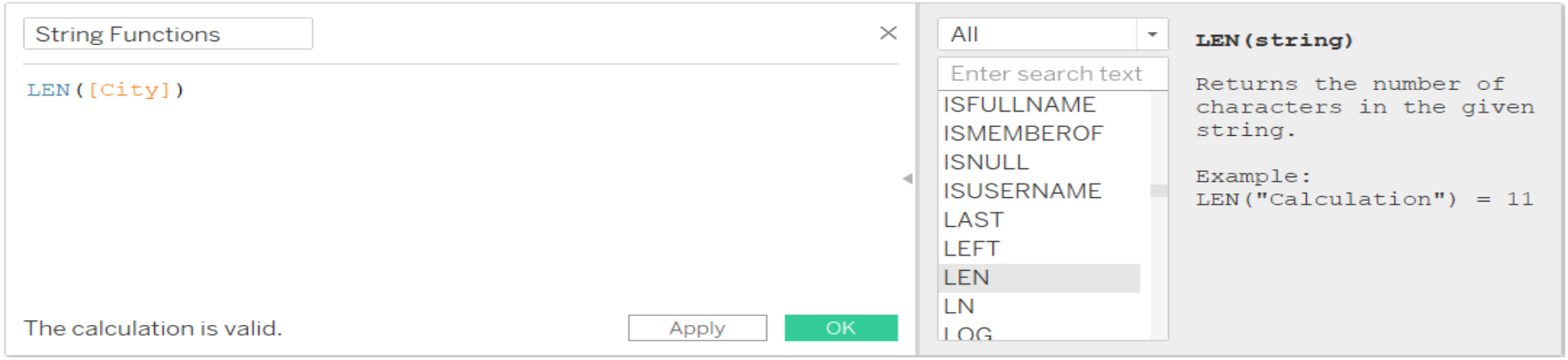
Function	Description
CEILING (number)	Rounds a number to the nearest integer of equal or greater value.
POWER (number, power)	Raises the number to the specified power.
ROUND (number, [decimals])	Rounds the numbers to a specified number of digits.



String Functions

String Functions are used for string manipulation. Following are some important string functions with examples

Function	Description
LEN (string)	Returns the length of the string.
LTRIM (string)	Returns the string with any leading spaces removed.
REPLACE (string, substring, replacement)	Searches the string for substring and replaces it with a replacement. If the substring is not found, the string is not changed.
UPPER (string)	Returns string, with all character's uppercase.



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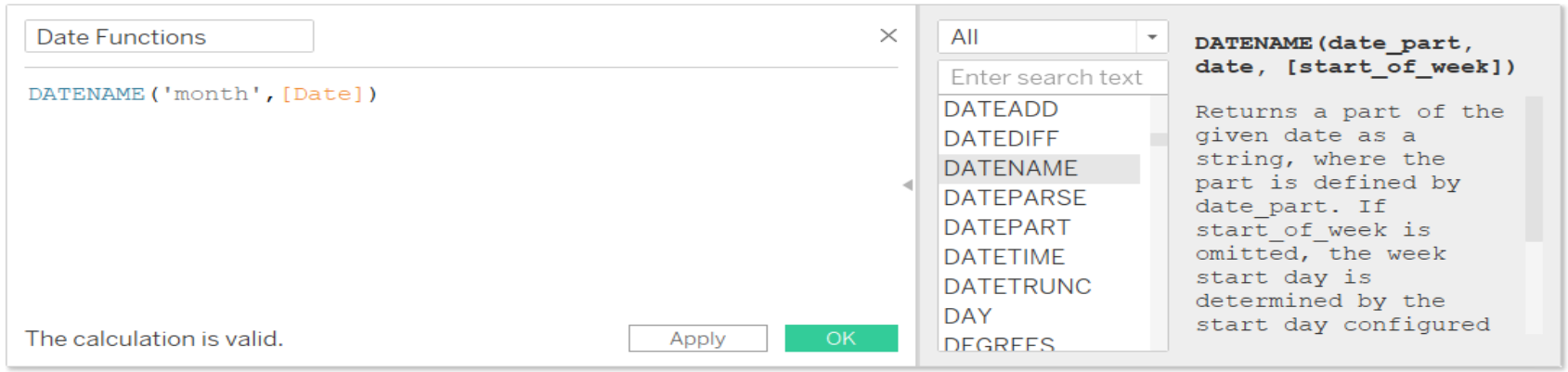
Date Functions

All the date functions use the **date_part** which is a string indicating the part of the date such as - month, day, or year. Following table lists some examples of important date functions.

Function	Description
DATEADD (date_part, increment, date)	Returns an increment added to the date. The type of increment is specified in **date_part**.
DATENAME (date_part, date, [start_of_week])	Returns **date_part** of date as a string. The **start_of_week**parameter is optional.
DAY (date)	Returns the day of the given date as an integer.
NOW( )	Returns the current date and time.



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Logical Functions

These functions evaluate some single value or the result of an expression and produce a Boolean output.

Function	Description
IFNULL (expression1, expression2)	The IFNULL function returns the first expression if the result is not null, and returns the second expression if it is null.
ISDATE (string)	The ISDATE function returns TRUE if the string argument can be converted to a date, and FALSE if it cannot.
MIN(expression)	The MIN function returns the minimum of an expression across all records or the minimum of two expressions for each record.

Aggregate Functions

Aggregate Functions are a type of function where values of multiple rows are grouped together as the input to form a single value of more significant meaning, such as a set or list. Following table are some examples of the Aggregate function.

Function	Description
AVG(expression)	Returns the average of all the values in the expression. AVG can be used with numeric fields only. Null values are ignored.
COUNT (expression)	Returns the number of items in a group. Null values are not counted.
MEDIAN (expression)	Returns the median of an expression across all records. Median can only be used with numeric fields. Null values are ignored.
STDEV (expression)	Returns the statistical standard deviation of all values in the given expression based on a sample of the population.

Data Visualization

Tableau main feature is the Data Visualization tool that is widely used for Business Intelligence. It helps create interactive graphs and charts in the form of dashboards and worksheets to gain business insights. And all of this is made possible with gestures as simple as drag and drop!

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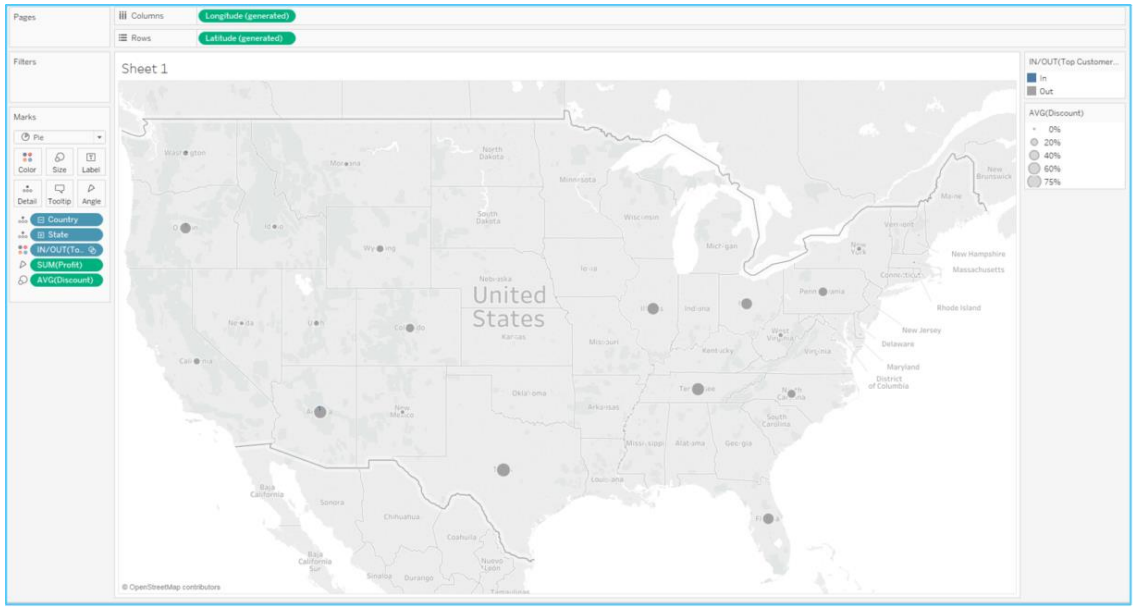
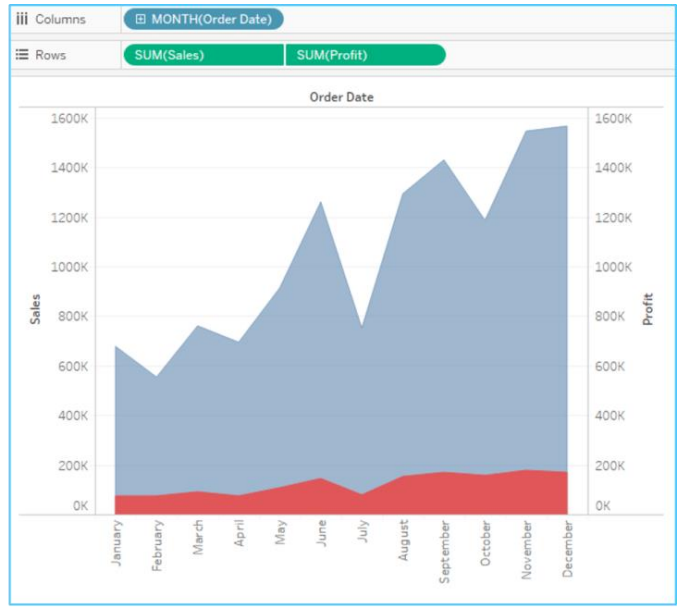
Graph Examples

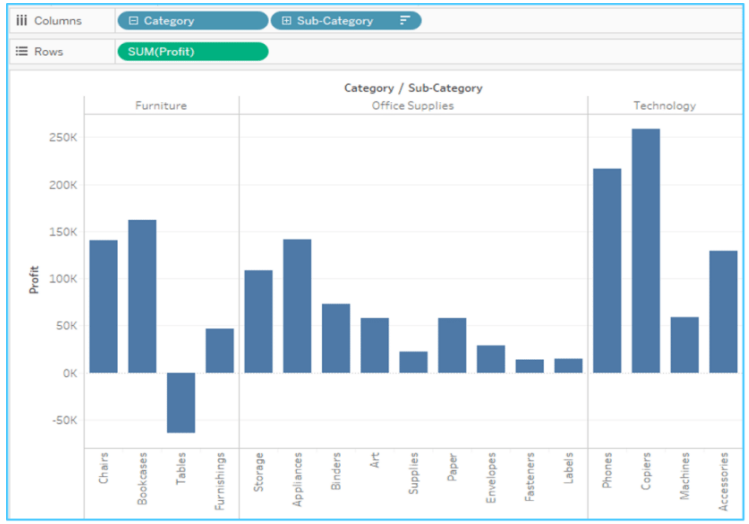
Visualization	Application
Bar Graph	Used when Dimension is discontinuous
Line Graph	Preferred for continuous Dimensions
Dual Axis Graph	Used to represent two Measures together
Geographical Graph	Used to plot Measures on geographical map
Area Graph – Dual Axes	Provides better comparison amongst Measures
Heat Map	Used to visualize variations across categories
Tree Map	Used to represent quantity in nested rectangles



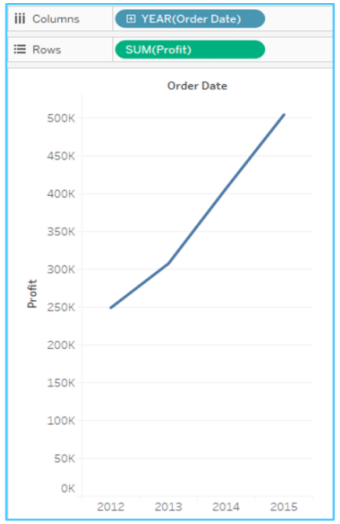
Geographical Graph



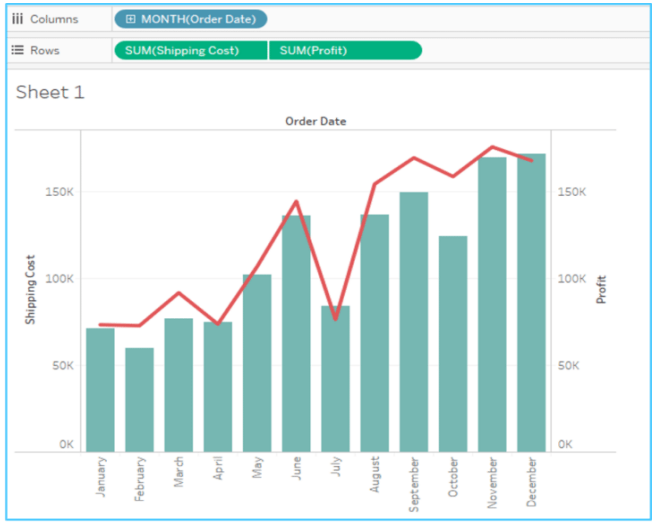
Area Graph with Dual Axes



Bar Graph



Line Graph



Dual Axis Graph

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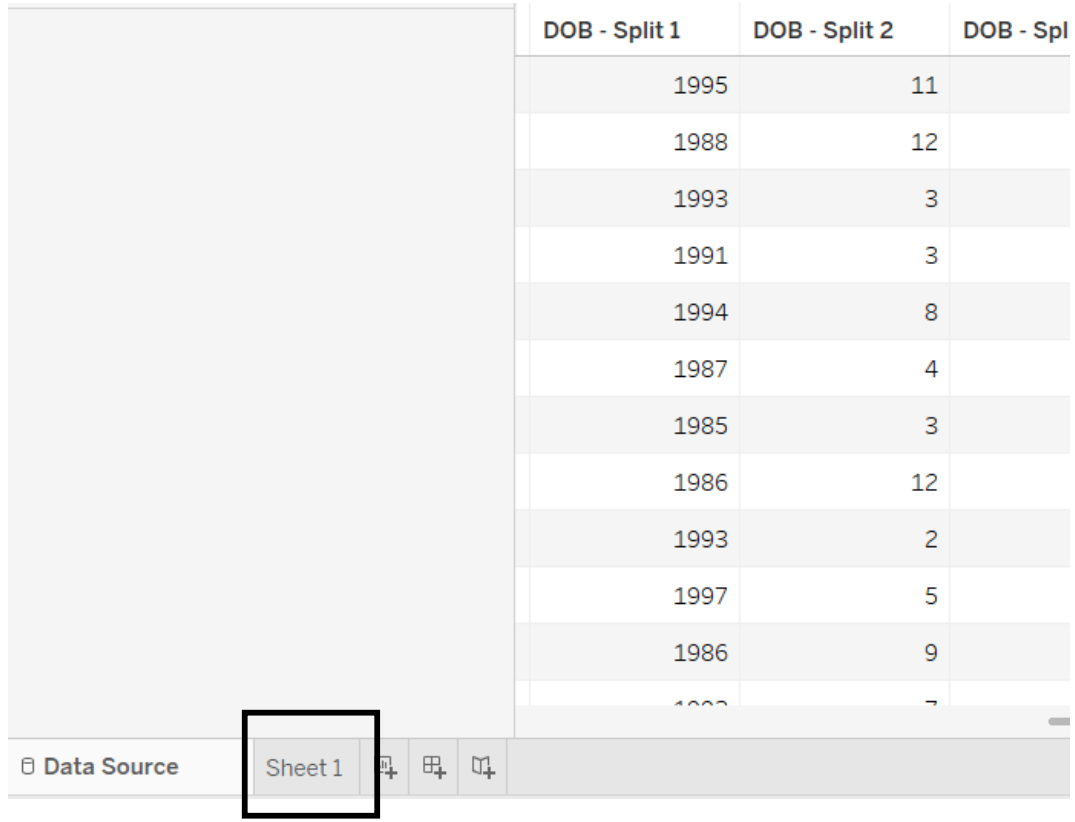
Data Visualization

As soon as data imported, select worksheet to create data visualization



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Worksheet Interfaces

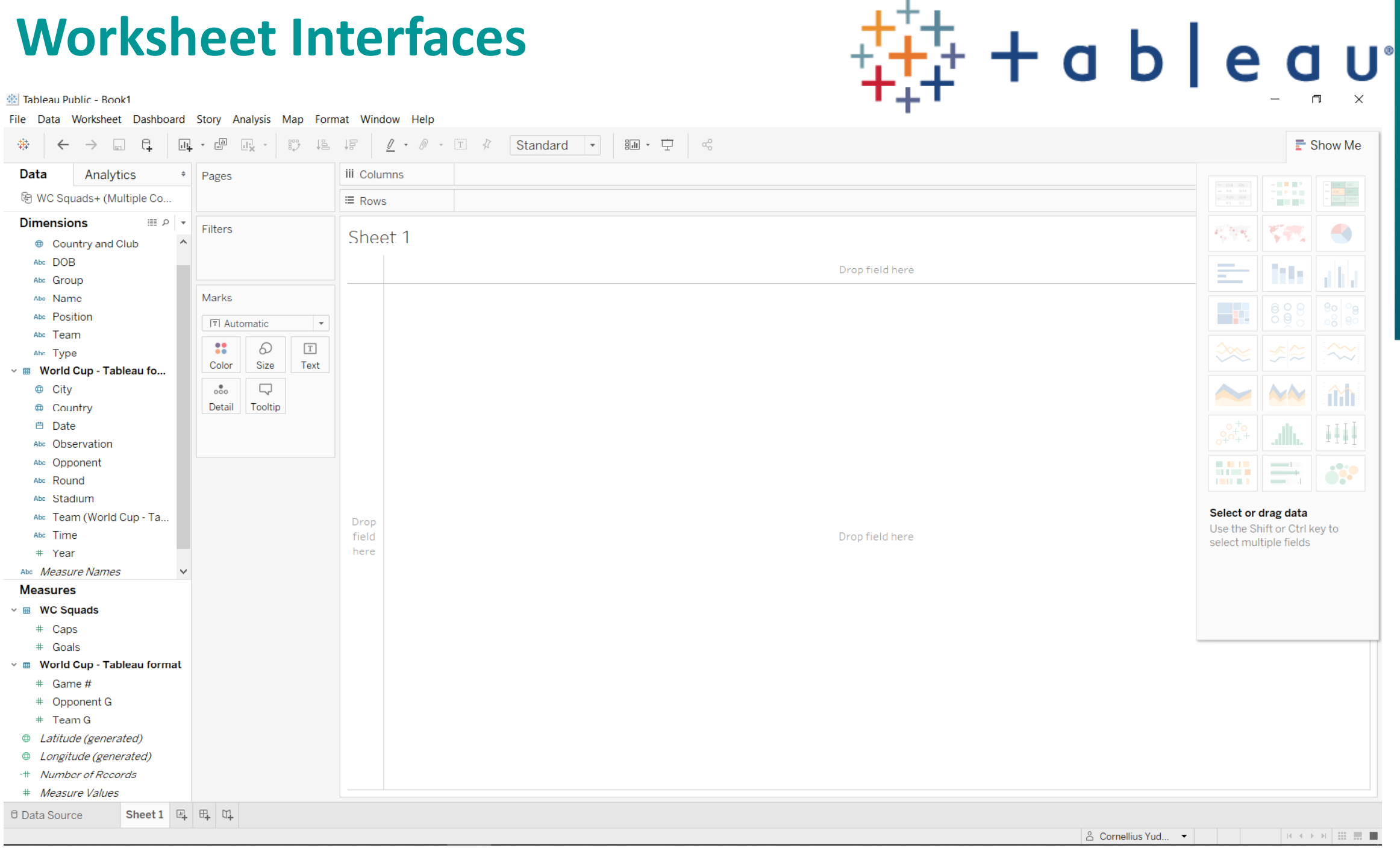

Tableau data type term

Dimensions

Abc

A Dimension is a field that is an independent variable.

A dimension is usually text

Measures

A Measure is a field that is a Dependent Variable and its value is a function of one or more Dimensions.

A measure is usually a number

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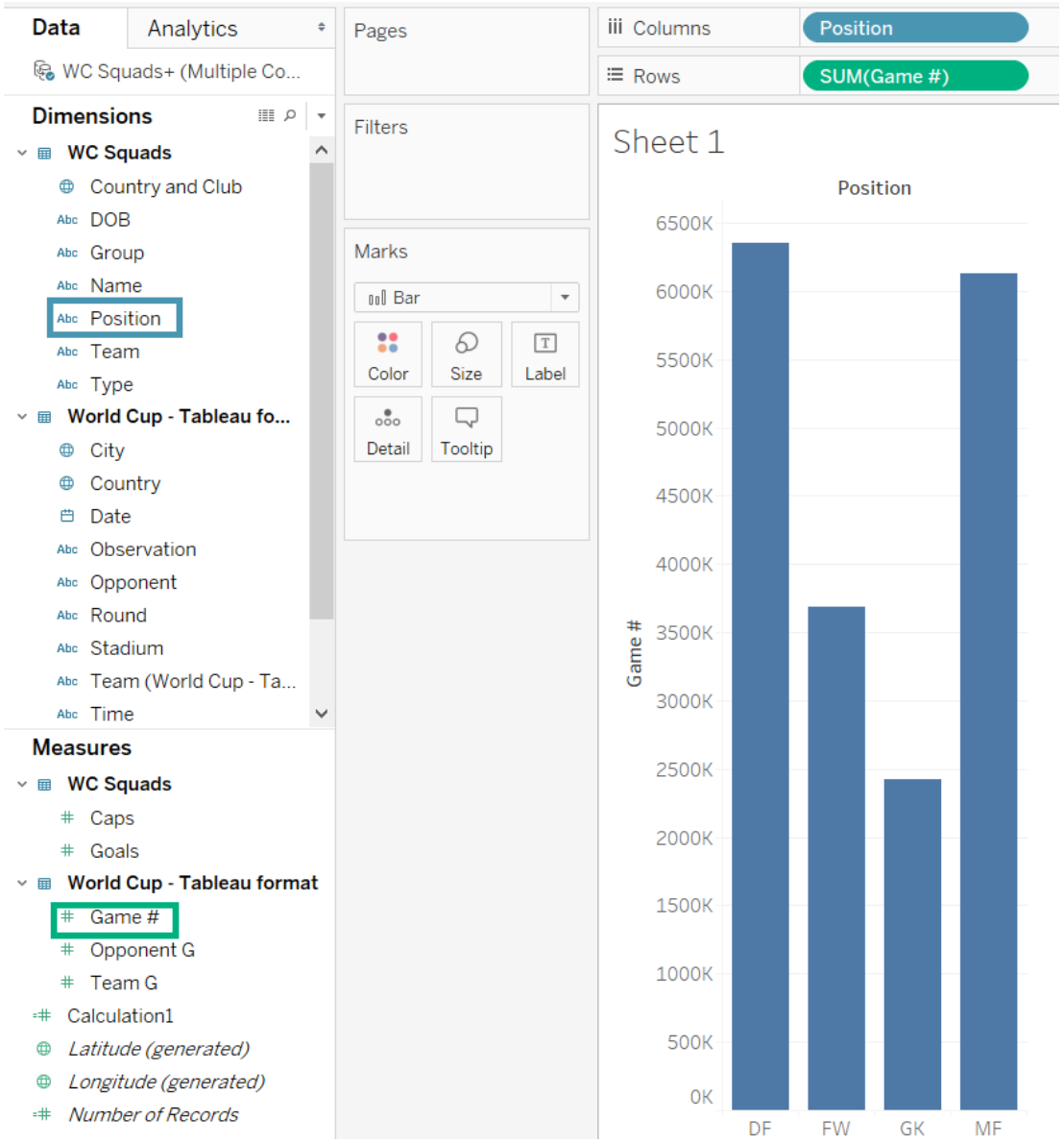
Bar Graph

- Drag the Position into columns, and Game# into the rows
- The bar graph would be created automatically. If it is not, go to the Marks and select the Bar graph



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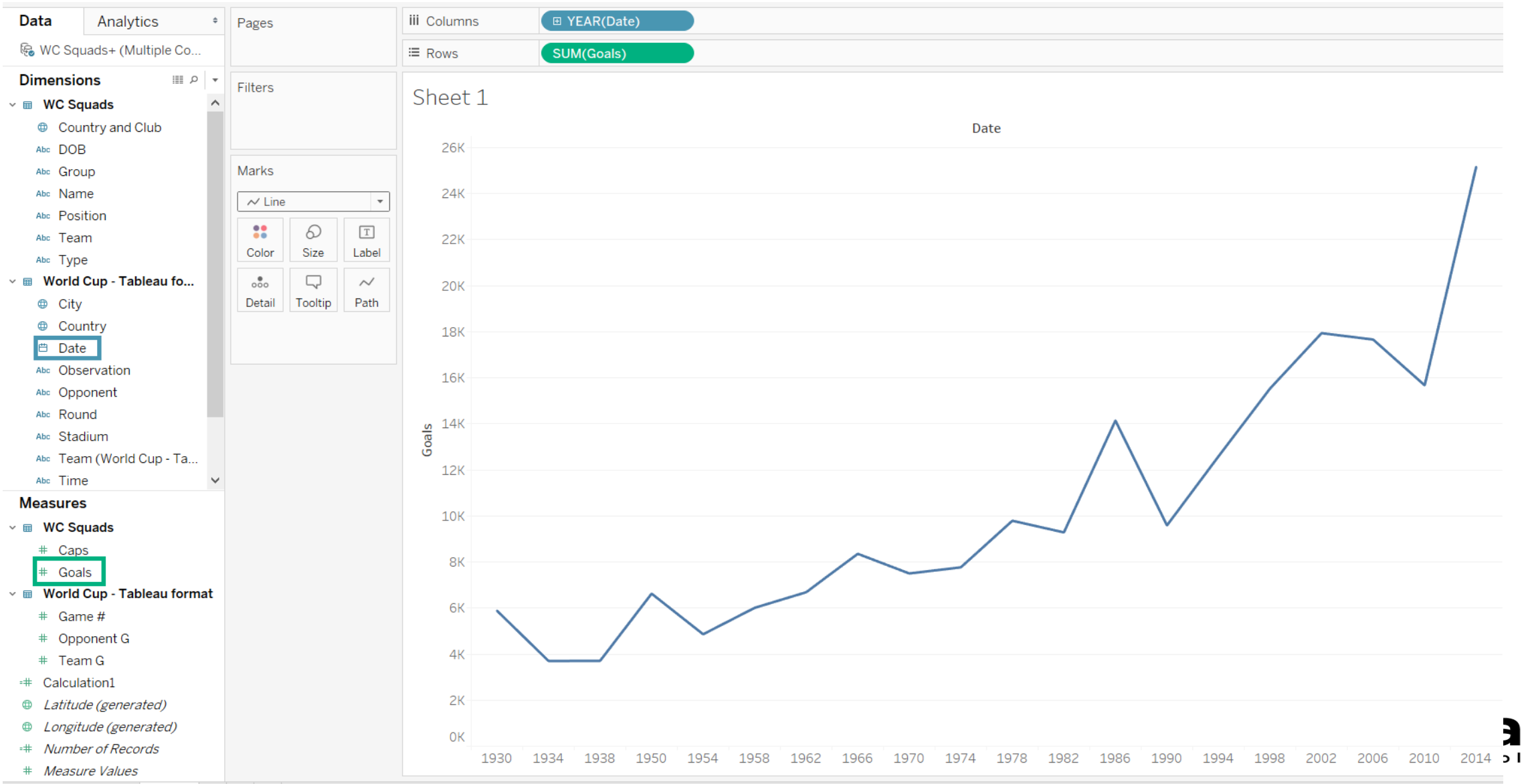
Line Graph


Data
Analytics
WC Squads+ (Multiple Co...
Dimensions
WC Squads
Country and Club
DOB
Group
Name
Position
Team
Type
World Cup - Tableau fo...
City
Country
Date
Observation
Opponent
Round
Stadium
Team (World Cup - Ta...
Time
Measures
WC Squads
Caps
Goals
World Cup - Tableau format
Game #
Opponent G
Team G
Calculation1
Latitude (generated)
Longitude (generated)
Number of Records
Measure Values
Pages
Filters
Marks
Line
Color
Size
Label
Detail
Tooltip
Path
Columns
YEAR(Date)
Rows
SUM(Goals)
Sheet 1
Date
Goals
26K
24K
22K
20K
18K
16K
14K
12K
10K
8K
6K
4K
2K
0K
1930
1934
1938
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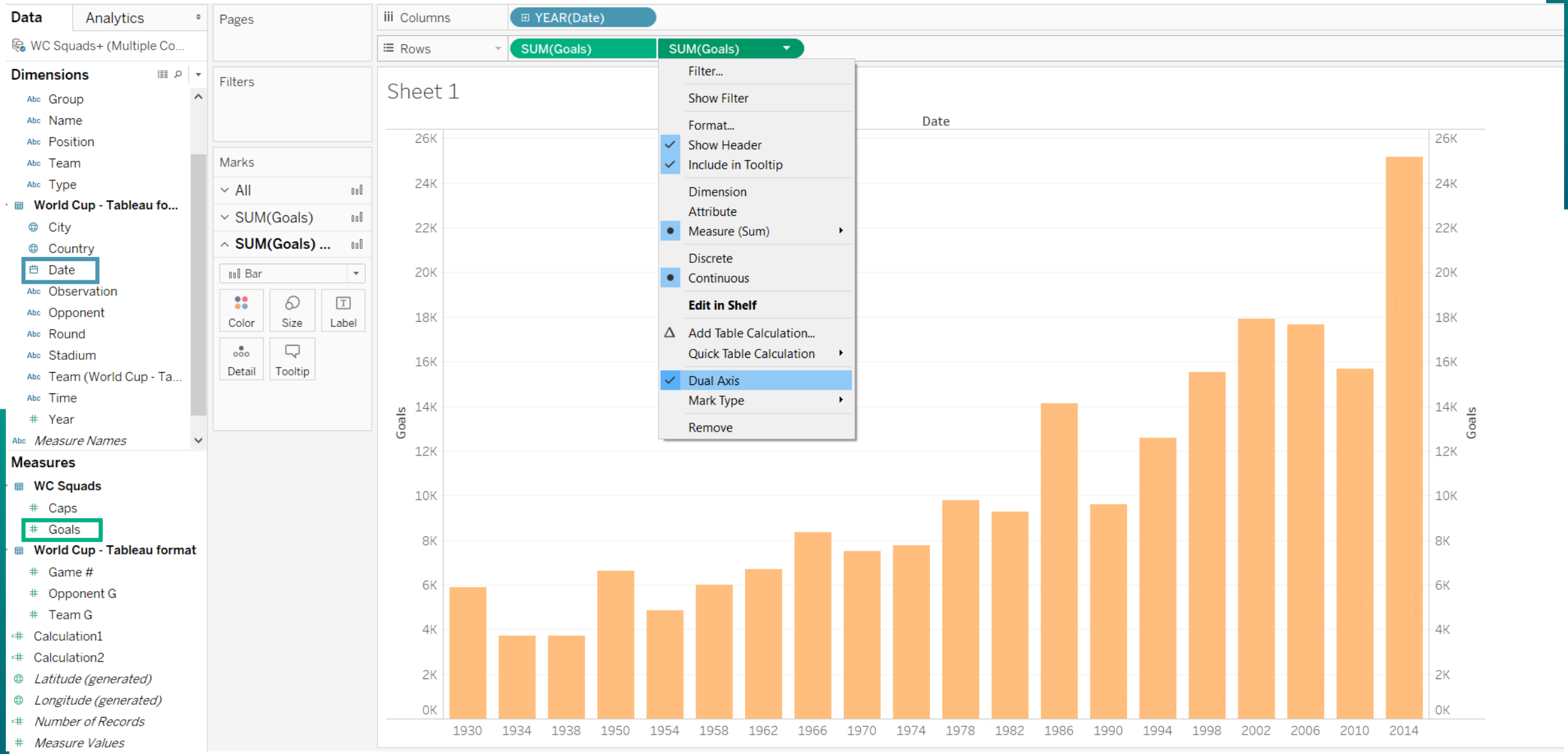
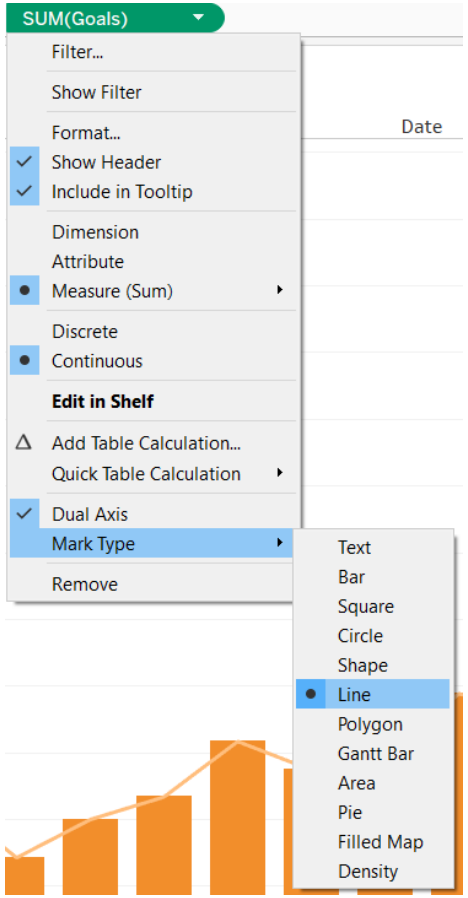
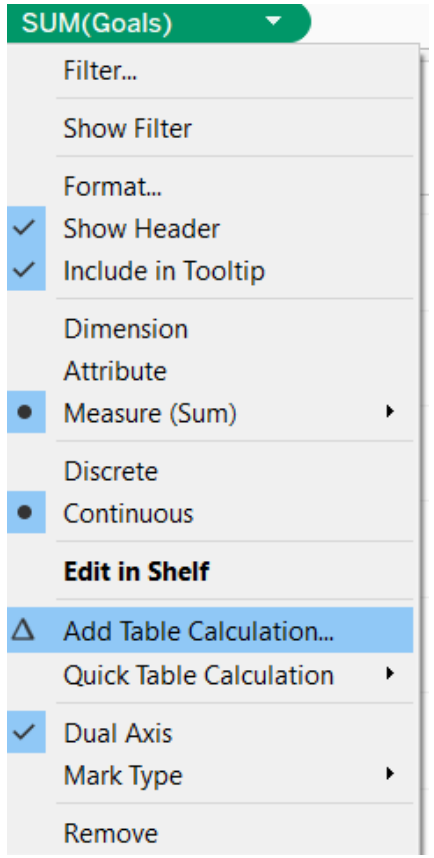
2010
2014

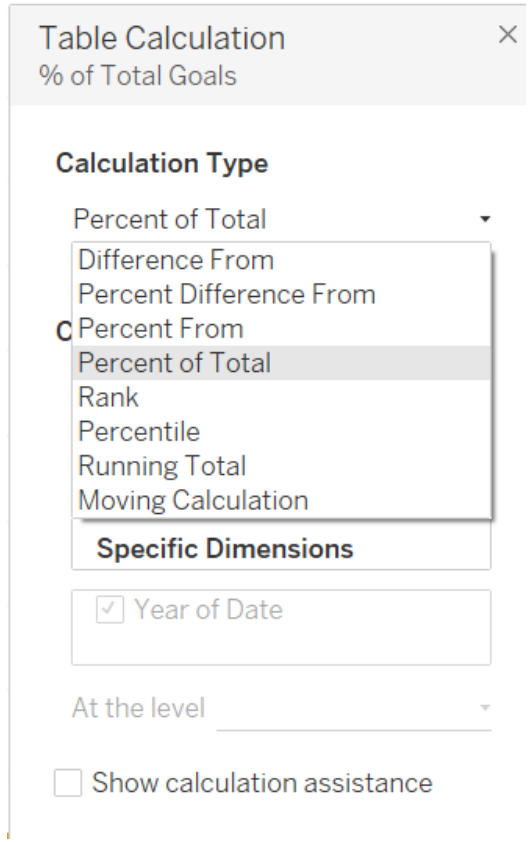
Dual Axis Graph



Dual axis graph







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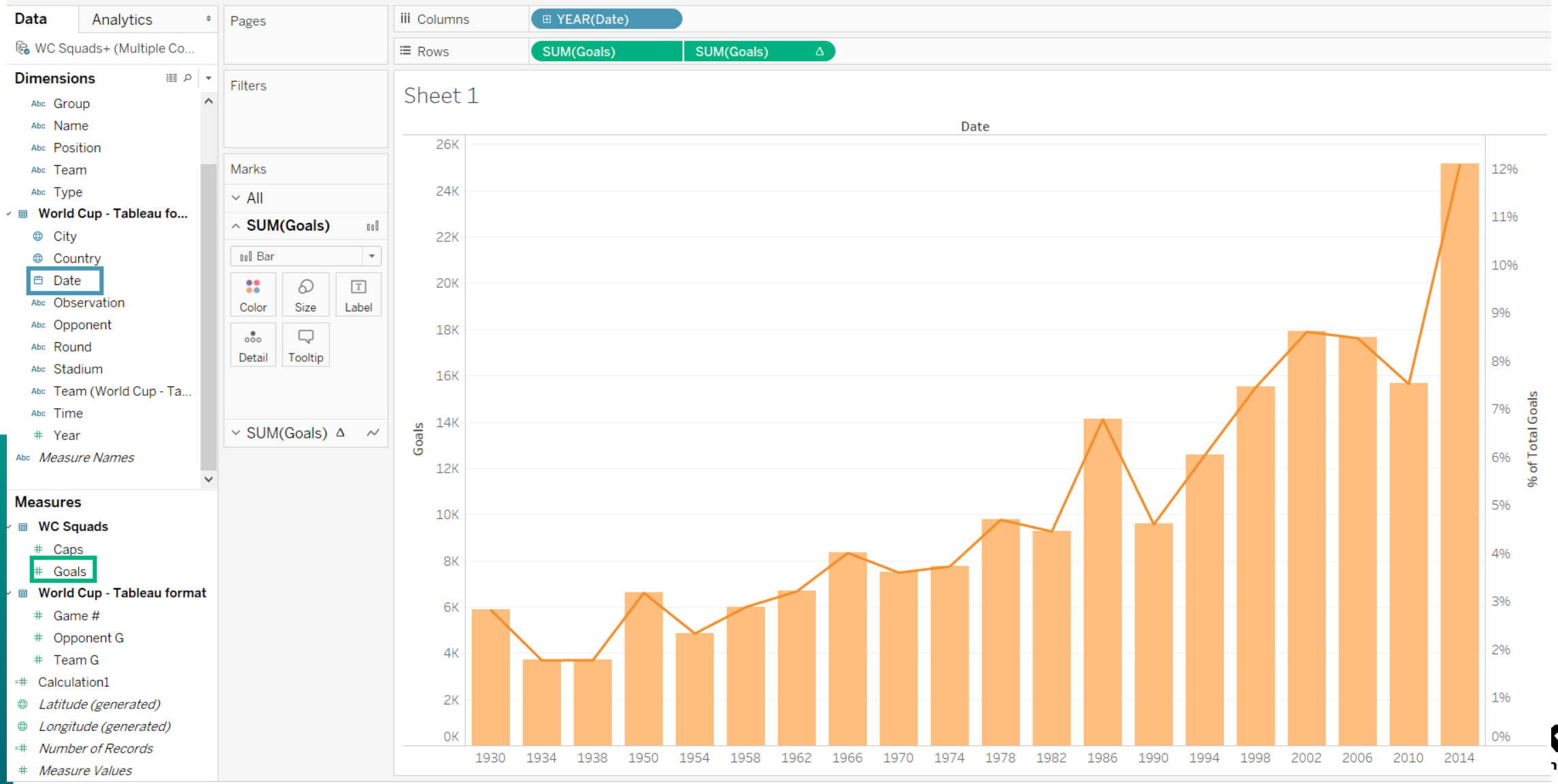
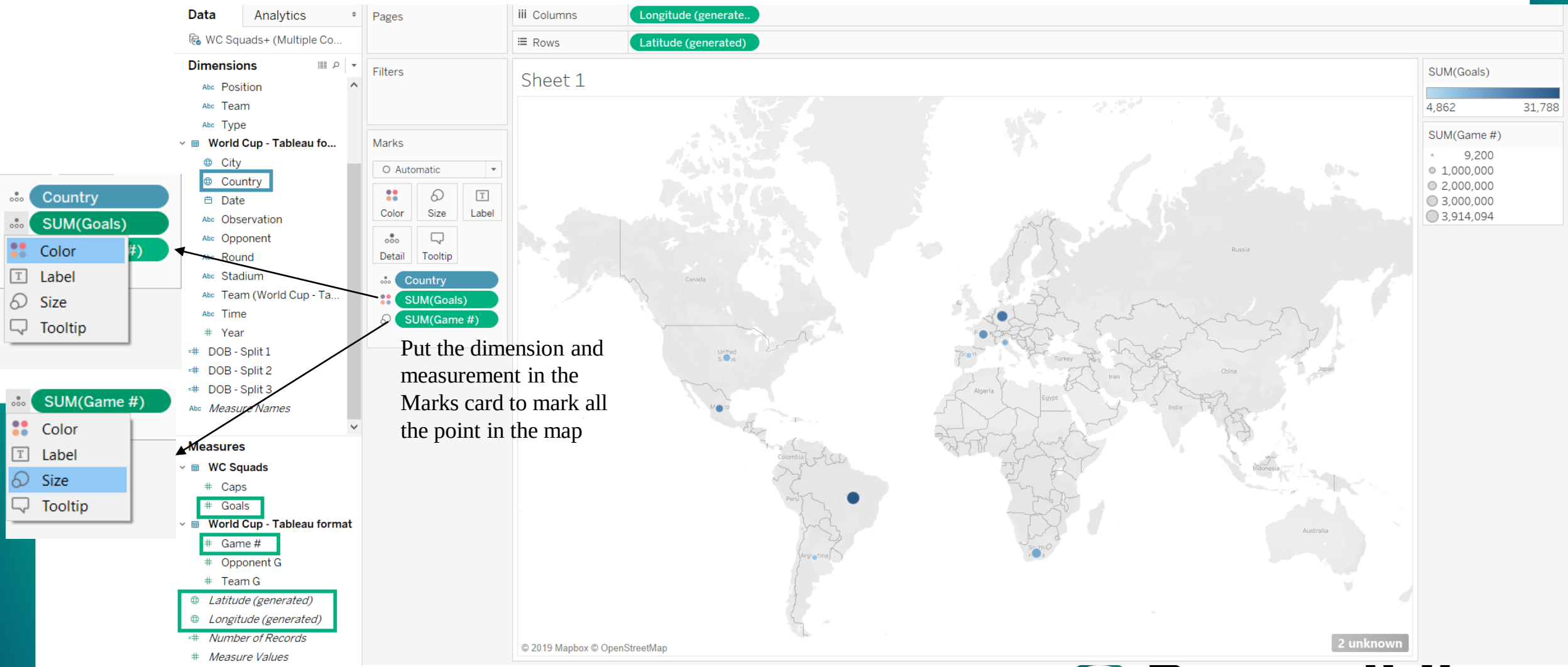
Dual axis graph



Geographical graph



Put the dimension and measurement in the Marks card to mark all the point in the map

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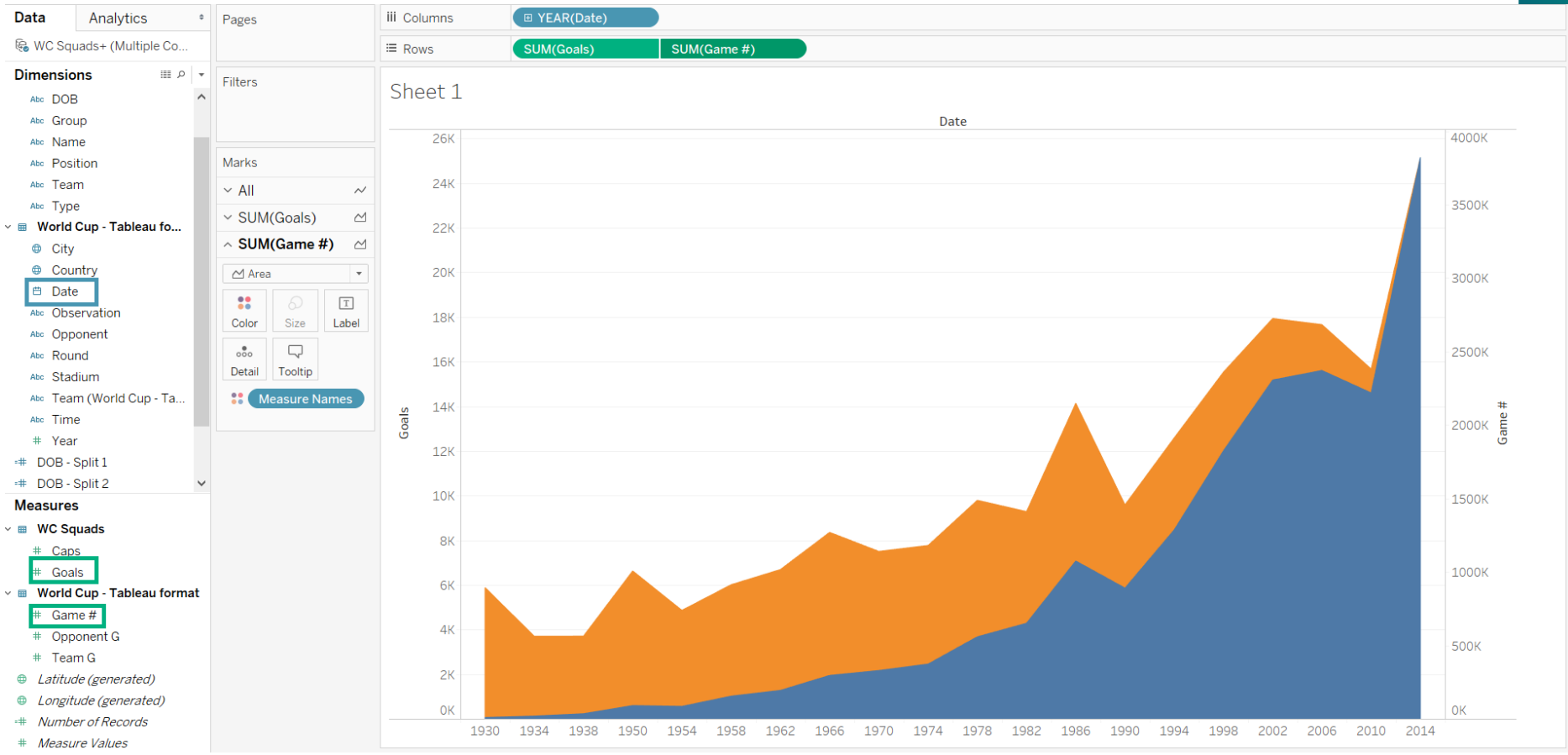
Area Graph – Dual Axes

- Produced similarly like dual axis graph
- The rows would have different measurements
- Select the mark type as Area



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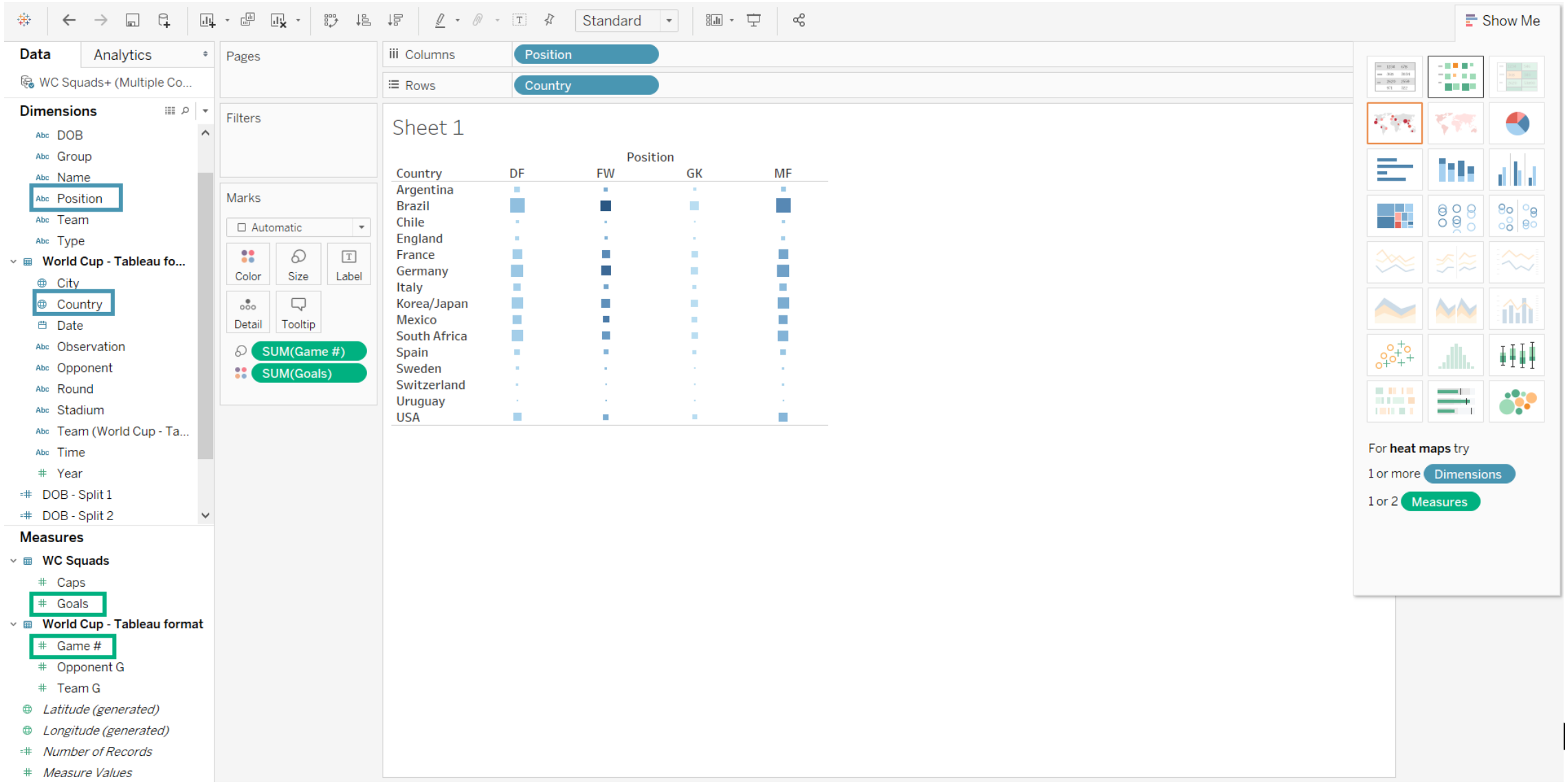
Heat map


Standard
Show Me
Data
Analytics
WC Squads+ (Multiple Co...
Dimensions
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World Cup - Tableau fo...
City
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Measures
WC Squads
Caps
Goals
World Cup - Tableau format
Game #
Opponent G
Team G
Latitude (generated)
Longitude (generated)
Number of Records
Measure Values
Pages
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Marks
Automatic
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Size
Label
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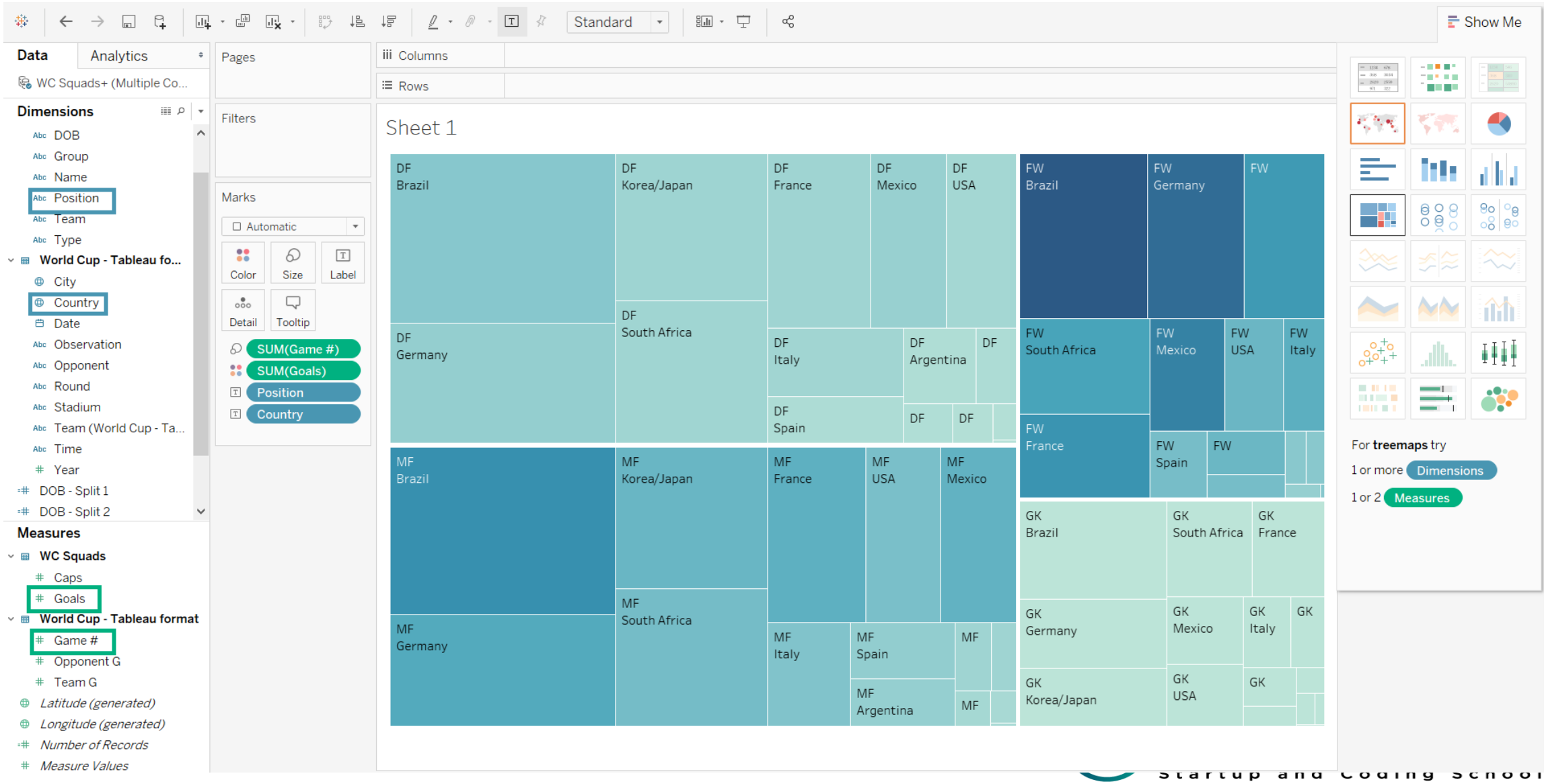
Tooltip
SUM(Game #)
SUM(Goals)
Columns
Position
Rows
Country
Sheet 1
Position
Country
DF
FW
GK
MF
Argentina
Brazil
Chile
England
France
Germany
Italy
Korea/Japan
Mexico
South Africa
Spain
Sweden
Switzerland
Uruguay
USA
For heat maps try
1 or more
Dimensions
1 or 2
Measures

Tree map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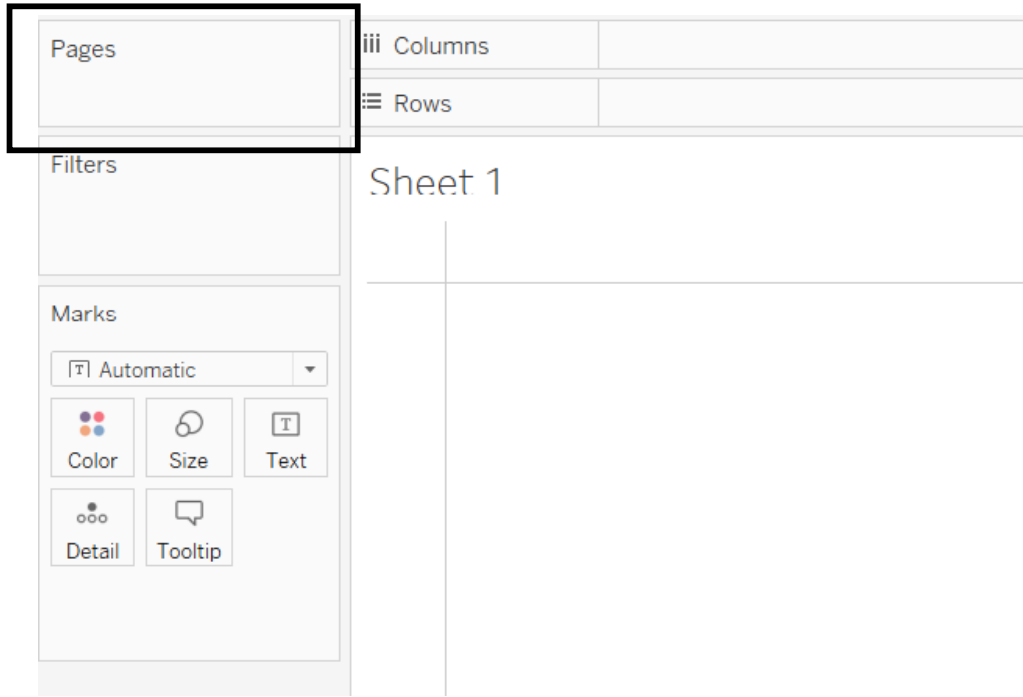
Color
Size
Label
Detail
Tooltip
SUM(Game #)
SUM(Goals)
Position
Country
Columns
Rows
Sheet 1
DF Brazil
DF Korea/Japan
DF France
DF Mexico
DF USA
DF Germany
DF South Africa
DF Italy
DF Argentina
DF
DF Spain
DF
DF
MF Brazil
MF Korea/Japan
MF France
MF USA
MF Mexico
MF Germany
MF South Africa
MF Italy
MF Spain
MF
MF Argentina
MF
FW Brazil
FW Germany
FW
FW South Africa
FW Mexico
FW USA
FW Italy
FW France
FW Spain
FW
GK Brazil
GK South Africa
GK France
GK Germany
GK Mexico
GK Italy
GK
GK Korea/Japan
GK USA
GK
For treemaps try
1 or more Dimensions
1 or 2 Measures

Worksheet - Pages

Tableau allows you to analyze your data with the Pages shelf. Sometimes you may want to analyze your data based on the individual values contained within a field. This type of analysis can help you determine whether you're doing better over time.



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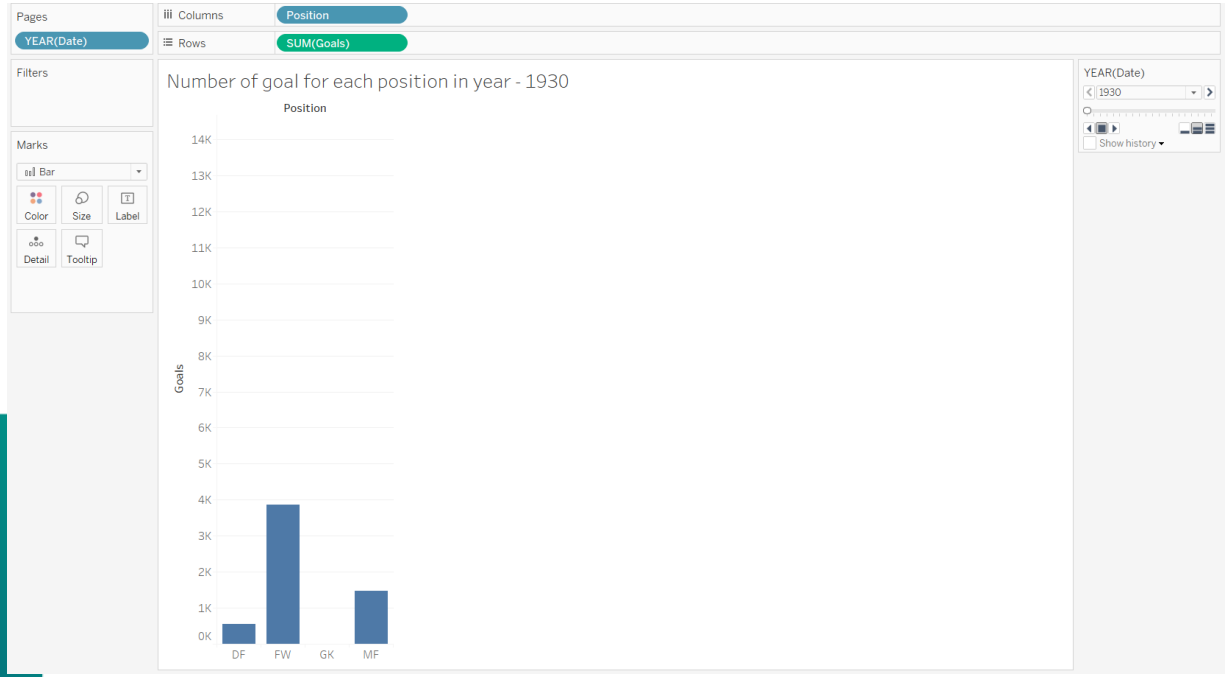
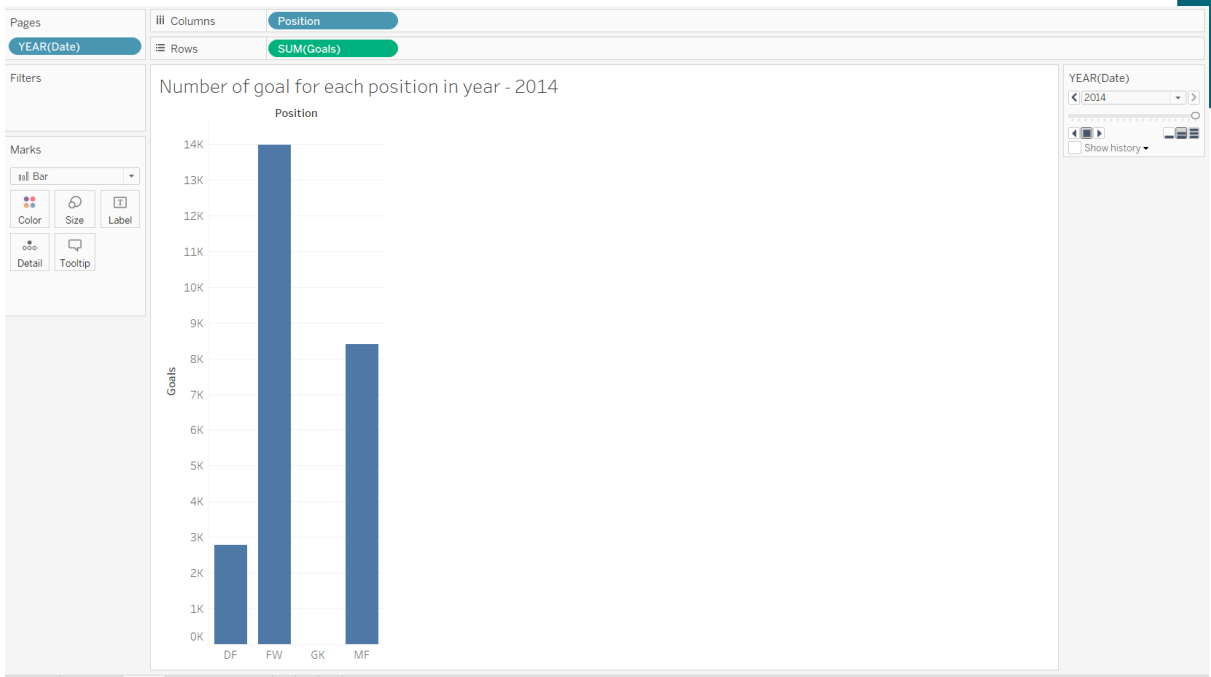
Worksheet - Pages

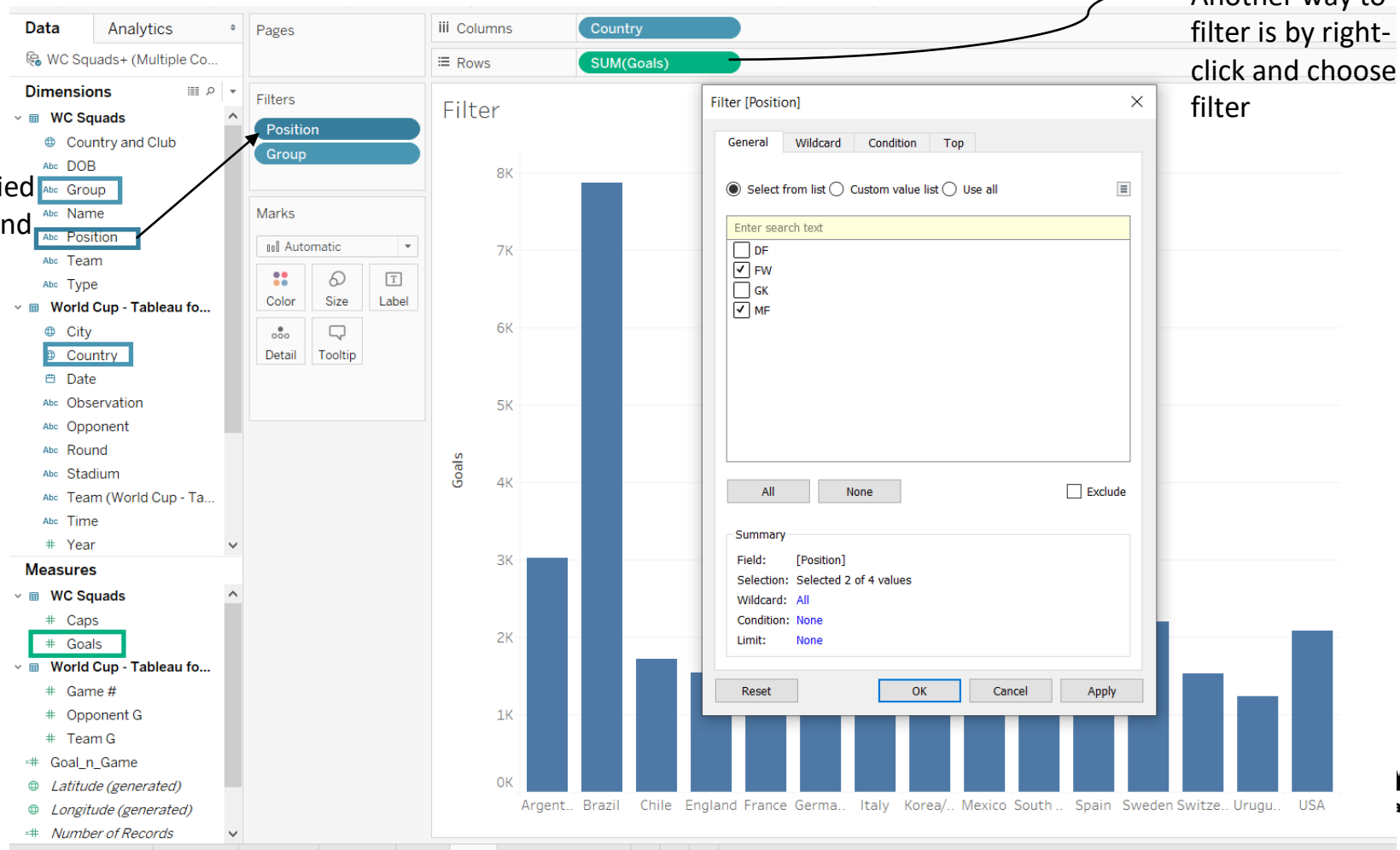




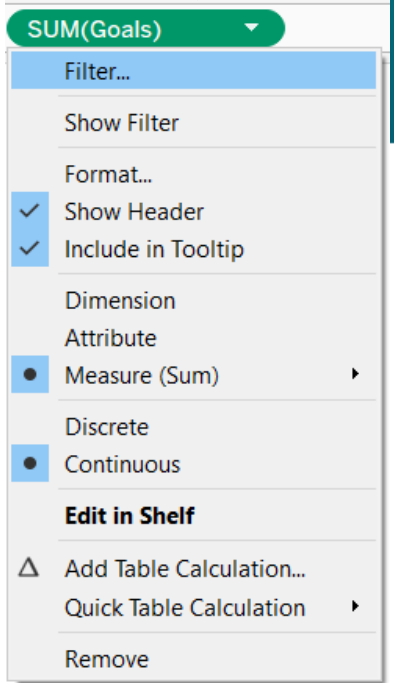
Worksheet - Filter

The filters can be applied in a worksheet to restrict the number of records present in a dataset. There are various way to filtering the data in the worksheets, depend on the user intention.

One way to applied filter is by drag and drop. This would open the filter interfaces

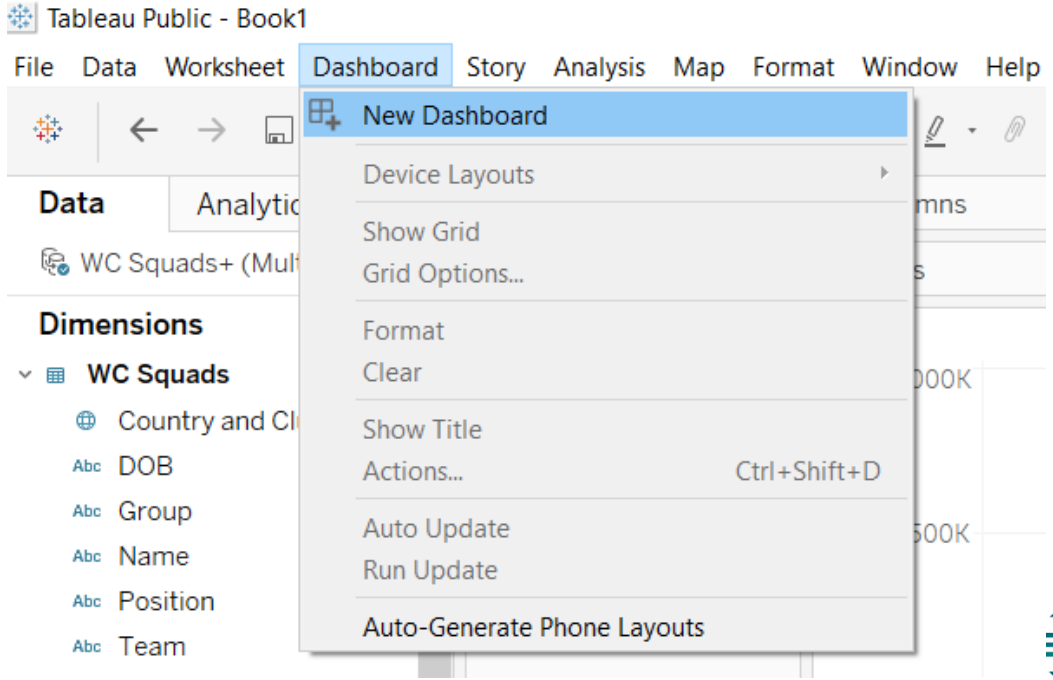


Another way to filter is by right-click and choose filter



Dashboard

- A dashboard is a consolidated display of many worksheets and related information in a single place. It is used to compare and monitor a variety of data simultaneously.
- Each view you add to the dashboard is connected to its corresponding worksheet. So when you modify the worksheet, the dashboard is updated and when you modify the view in the dashboard, the worksheet is updated.



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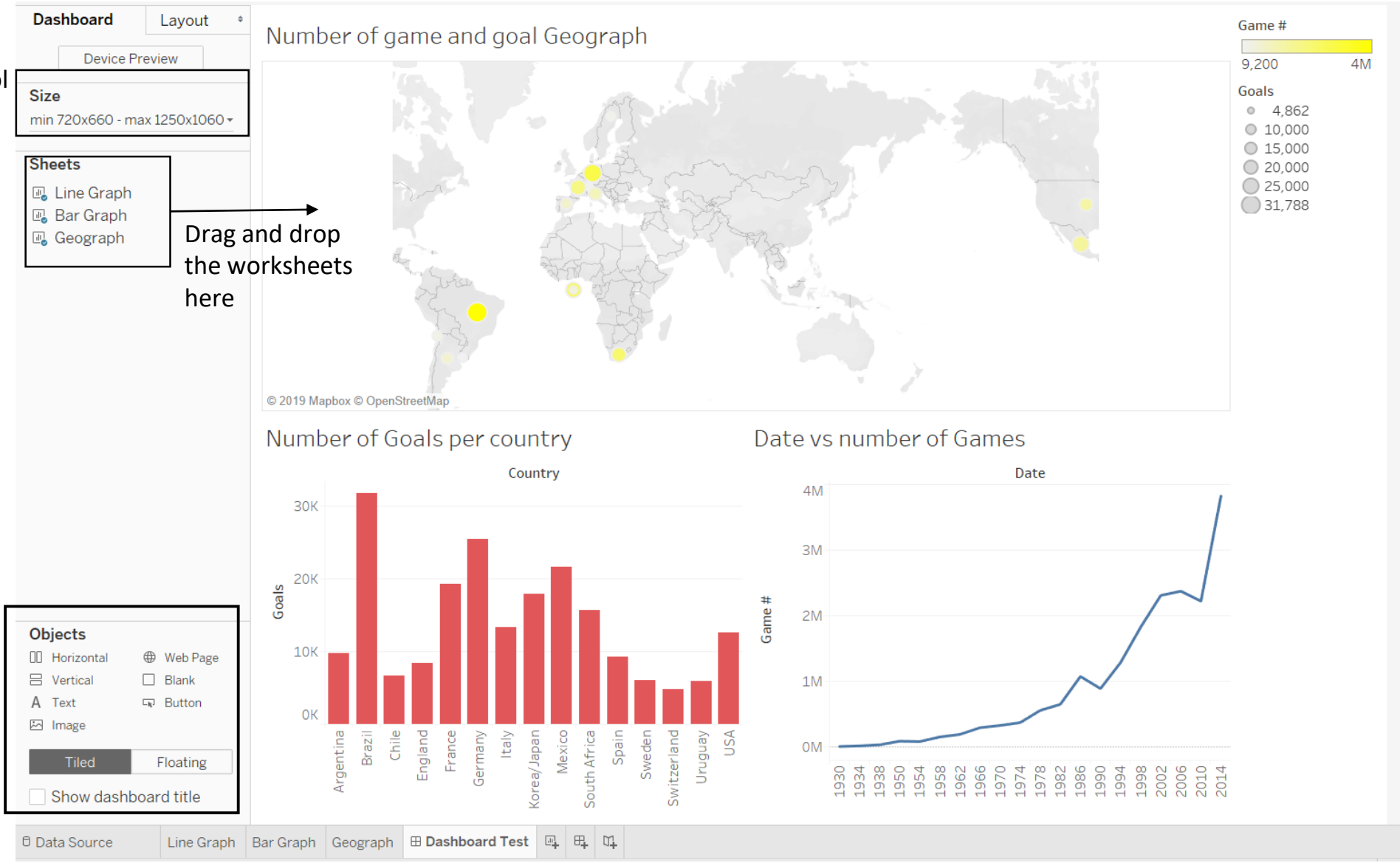
Dashboard

Use size to control the dashboard size

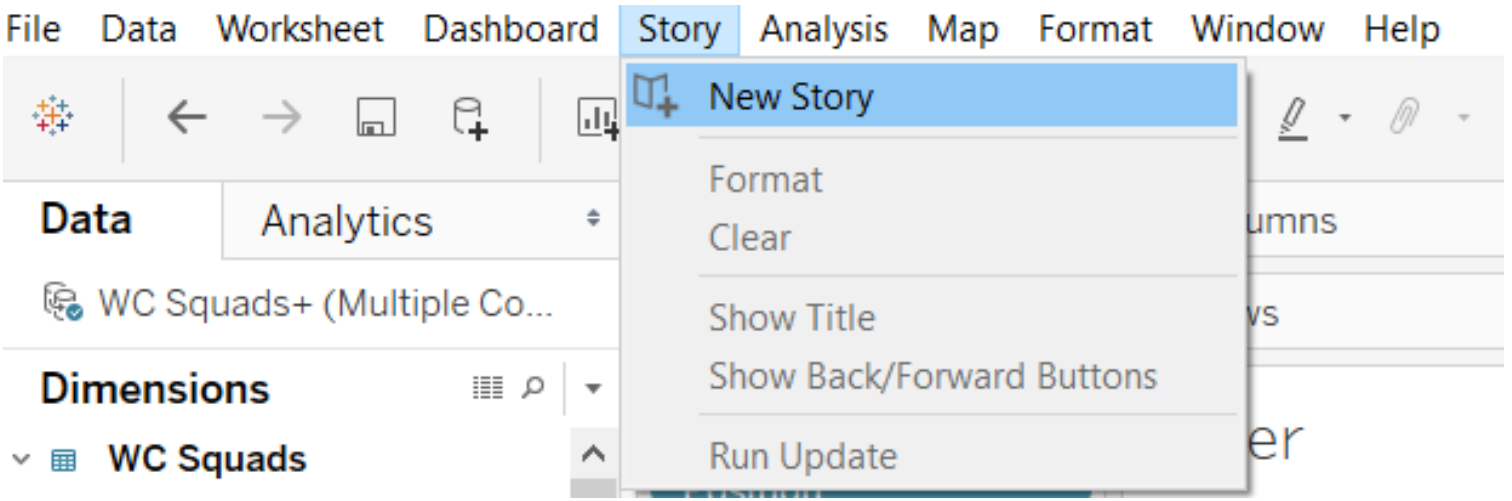
Drag and drop the worksheets here

Use objects to add more objects other than the worksheets



Story

In Tableau, a story is a sequence of visualizations that work together to convey information. A story is a sheet, so the methods to create, name, and manage worksheets and dashboards also apply to stories. At the same time, a story is also a collection of sheets, arranged in a sequence. Each individual sheet in a story is called a story point.



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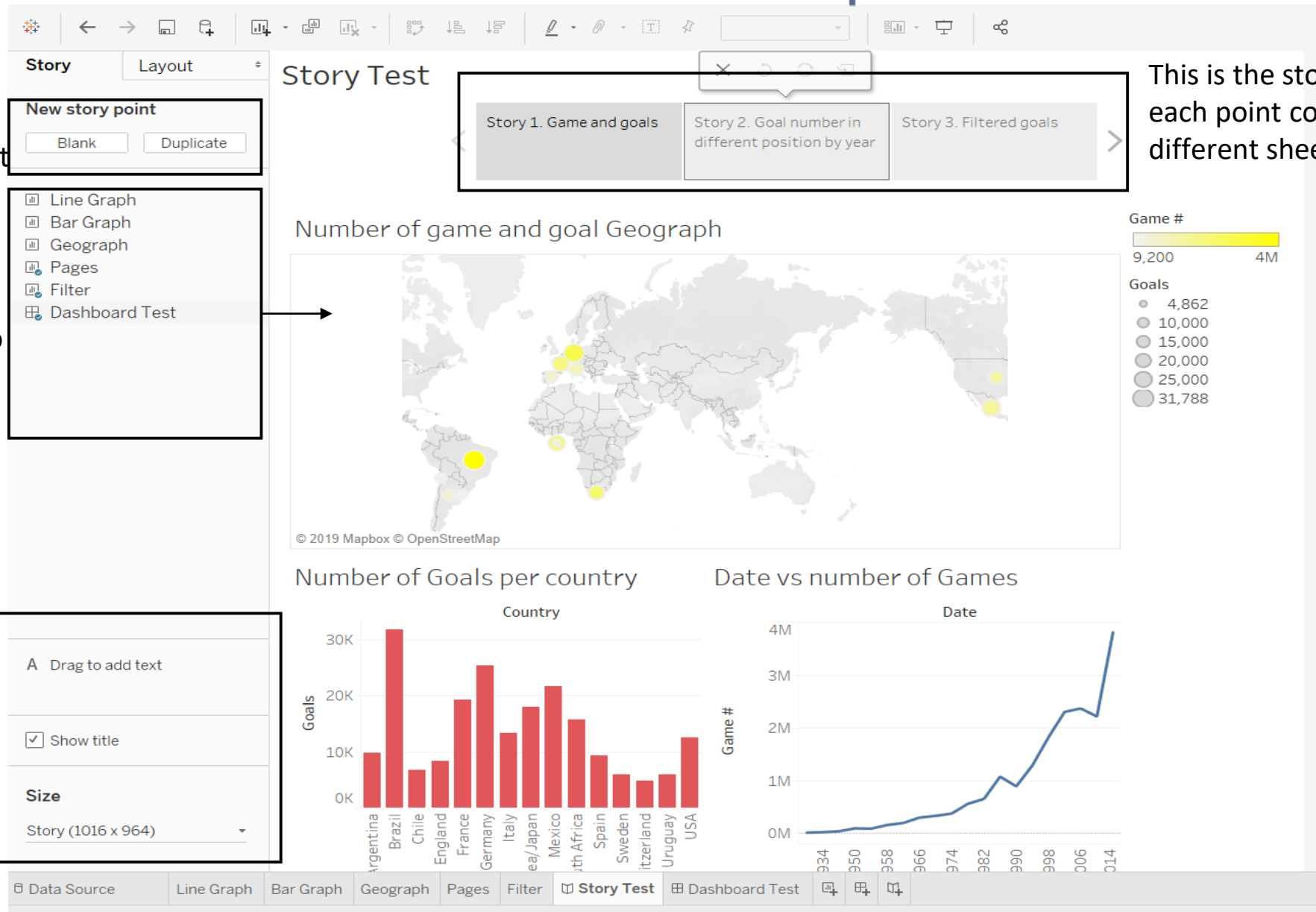
Story



Use this to add more story point

All the sheet and dashboard created would be listed here. Just drag and drop to create the story

This is the story point, each point consist of different sheet

Use this option to tweak the story size or adding text