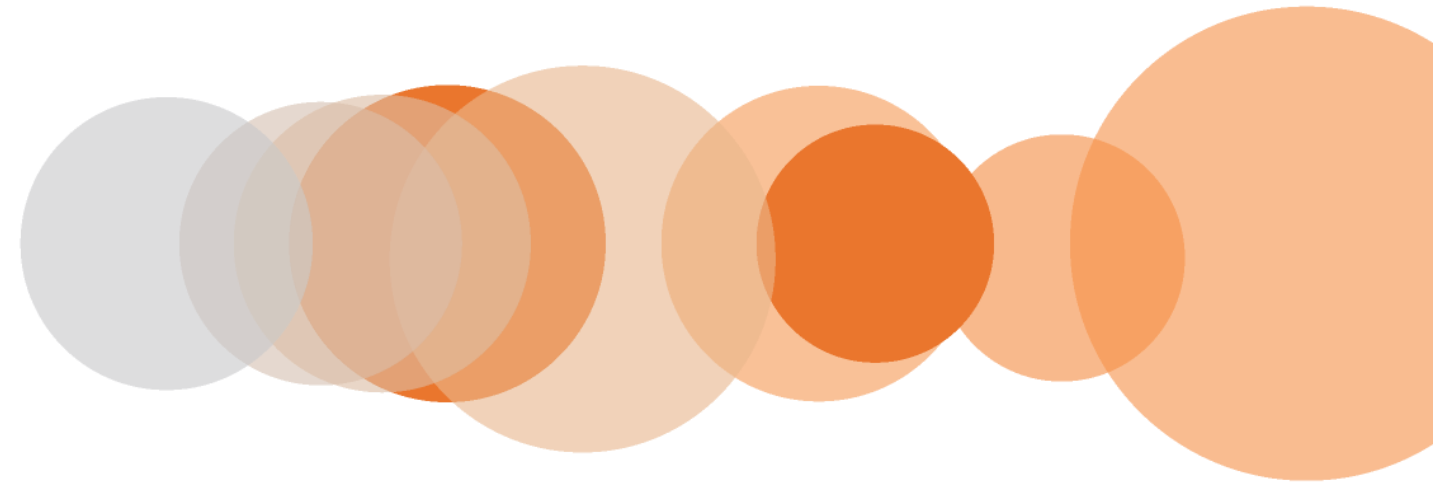
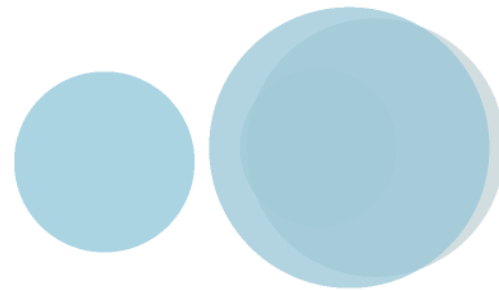
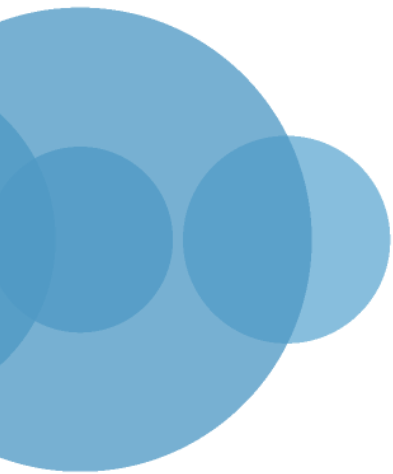




# Connecting to Data in Tableau

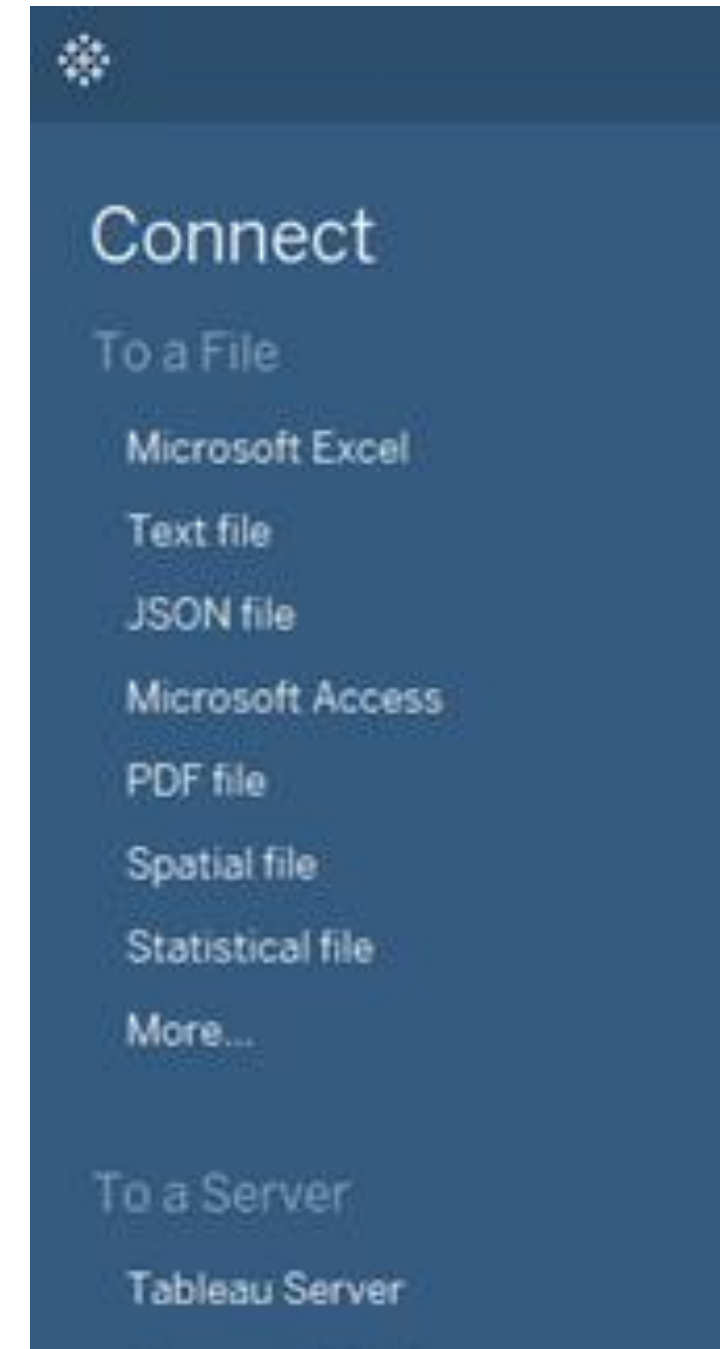


# Connect to Data



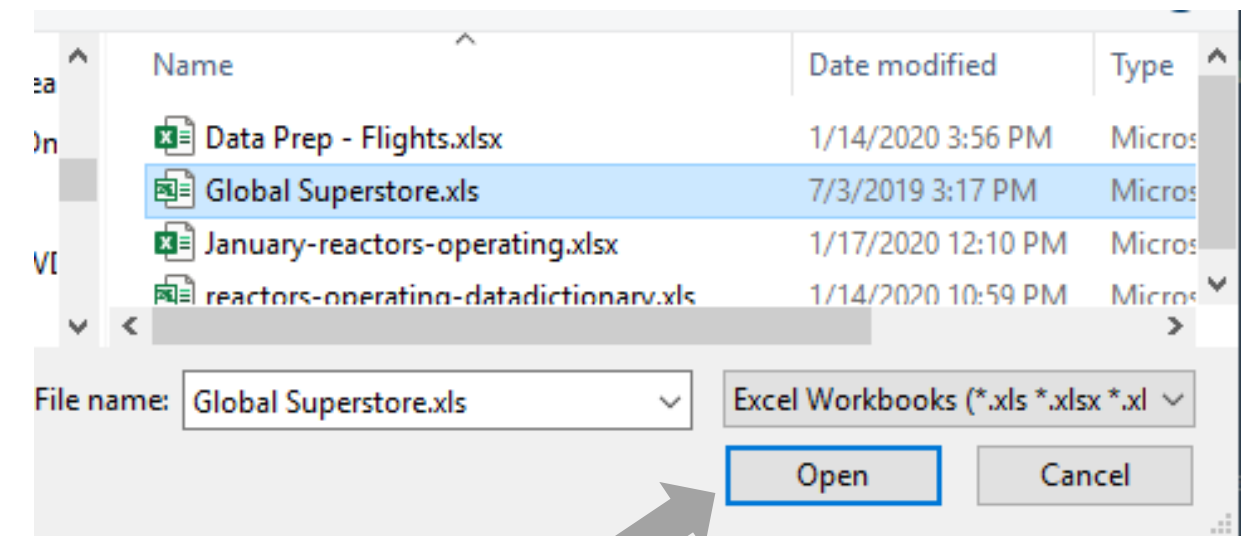
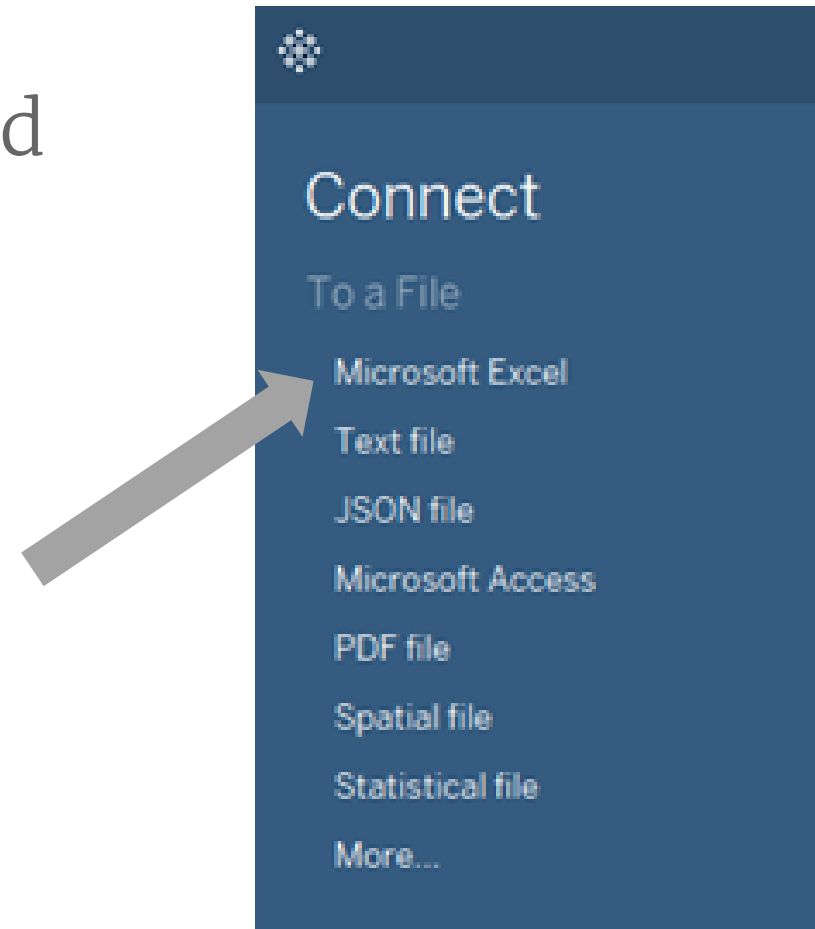
# Connect to Data Screen

- Tableau can connect to many file types
  - Excel
  - Delimited text files (\*.txt, \*.csv, \*.tab, \*.tsv)
  - PDF
  - Many more



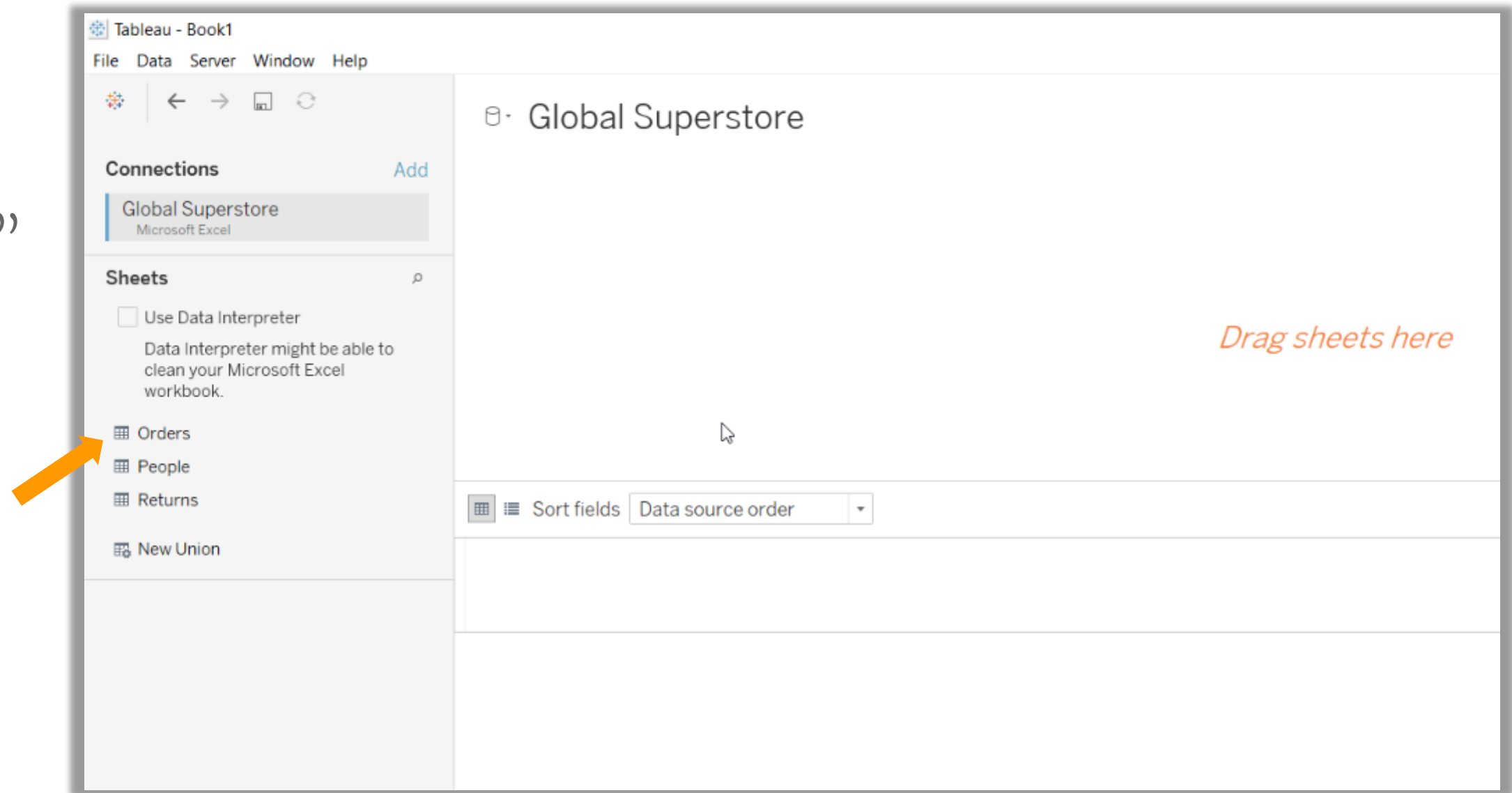
# Connect to Global Superstore file

- Click on Excel
- Navigate to saved file
- Click open



# The Data Source Window

- Drag Orders to “Drag sheets here” space



# The Data Source Window

The screenshot shows the Tableau Data Source Window for a Microsoft Excel connection named 'Global Superstore'. The 'Connections' pane on the left shows the connection name, which is highlighted with a red box and an annotation: 'File Name (right-click to rename the connection, if desired)'. Below it, the 'Sheets' pane lists 'Orders', 'People', and 'Returns', with 'Orders' highlighted by a red box and an annotation: 'Sheets in the Excel File (treated as database tables; connect to a single table or join multiple tables)'. The 'Orders' sheet is also selected in the 'Orders (Global Superstore)' pane, highlighted by a red box with an annotation: 'Sheet that was dragged to the data connection canvas.'. The 'Preview pane' on the right shows a table of data, highlighted by a red box with an annotation: 'Preview pane shows row level data of the sheet in the canvas.'. The table has columns: Category, City, Country, Customer Name, Market, and Customer ID. The data is sorted by 'Data source order'.

**File Name (right-click to rename the connection, if desired)**

**Sheets in the Excel File (treated as database tables; connect to a single table or join multiple tables)**

**Sheet that was dragged to the data connection canvas.**

**Preview pane shows row level data of the sheet in the canvas.**

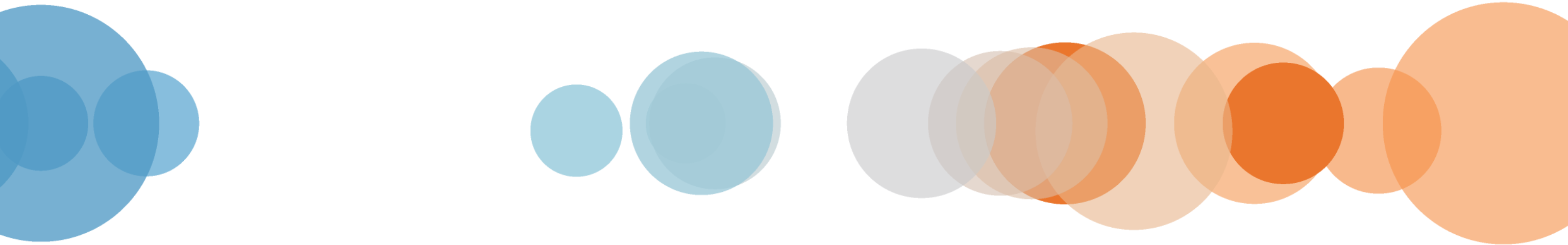
Category	City	Country	Customer Name	Market	Customer ID
Office Supplies	Budapest	Hungary	Annie Thurman	EMEA	AT-7352
Office Supplies	Constantine	Algeria	Toby Braunhardt	EMEA	TB-112801
Furniture	Wagga Wagga	Australia	Joseph Holt	APAC	JH-159851
Office Supplies	Wagga Wagga	Australia	Joseph Holt	APAC	JH-159851

## A decorative graphic consisting of a horizontal row of overlapping circles. The circles are in various shades of orange, grey, and blue, with some overlapping each other. The orange circles are on the left, followed by grey, and then blue on the right. The circles vary in size and opacity, creating a layered effect.



+	a	b		e	a	u
---	---	---	--	---	---	---

# Live versus Extract





# Live versus Extract

Before analyzing data consider connecting live or extracting data.

- Connecting live leaves the data in the database or source file.
  - This is best when leveraging a high performance database's capabilities, or to get up-to-the-second changes in data visualized in Tableau.
- Sometimes connecting live can result in a slow experience, depending on the database.



# Live versus Extract

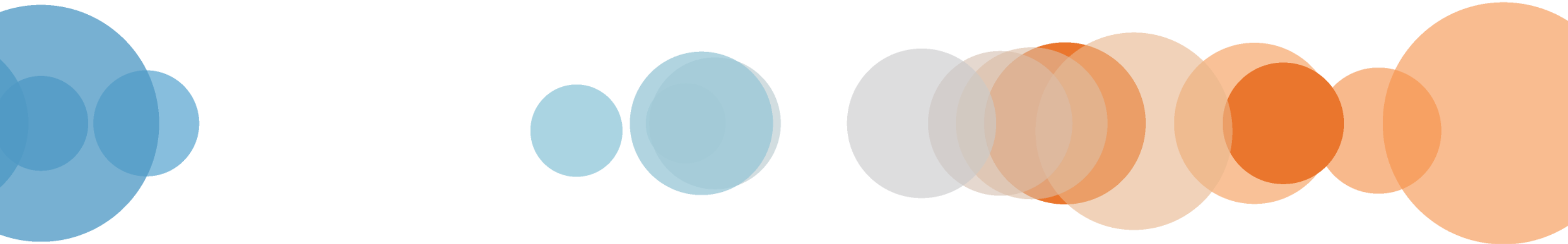
Alternatively, you can extract the data into Tableau's high performance in-memory data engine.

- Helps when connecting to a slow database or to take query load off critical systems.
- Can import only some of the data and bring in specific elements (to access those options, click Edit)

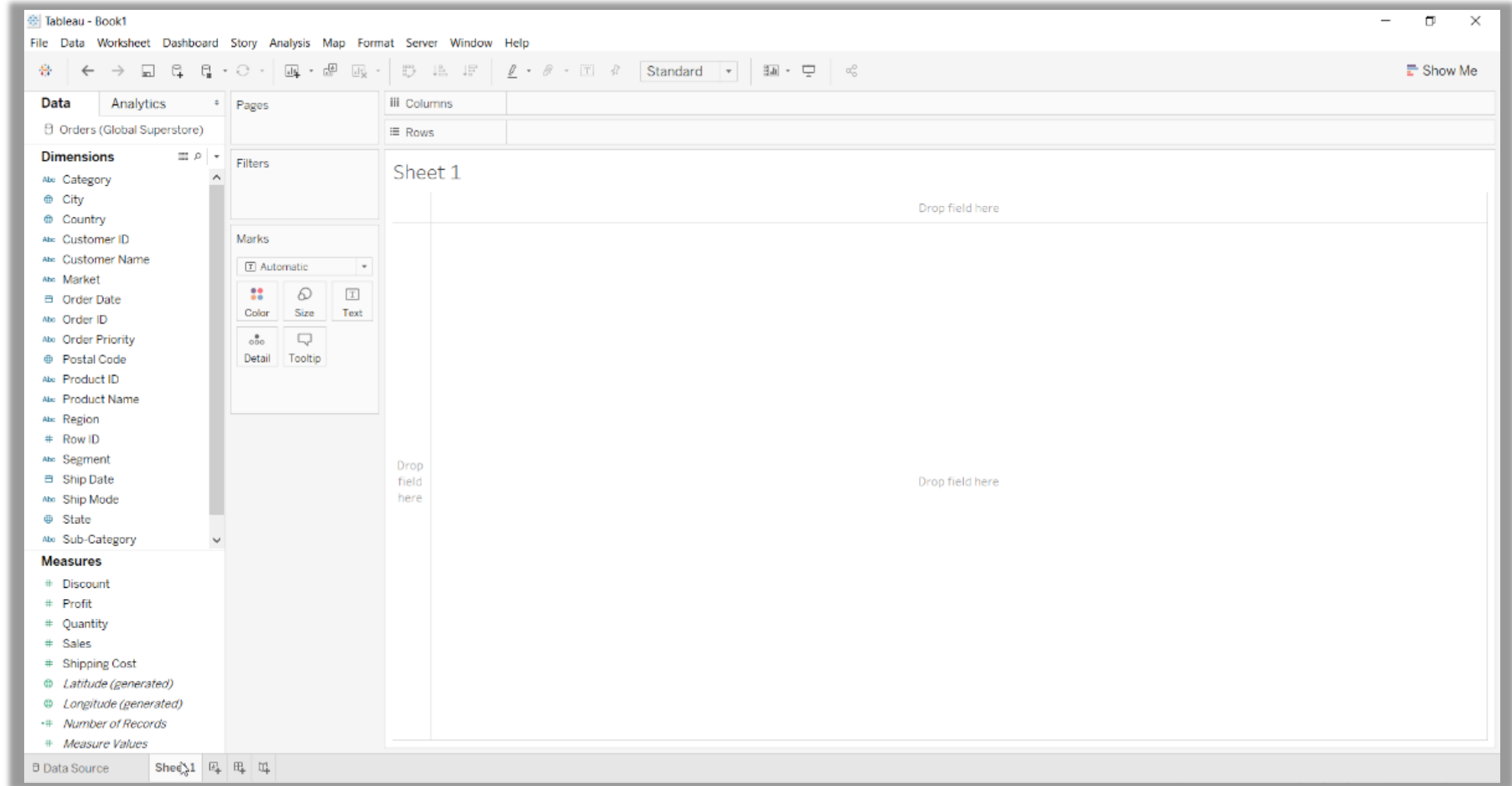
For now, we'll **connect live**.



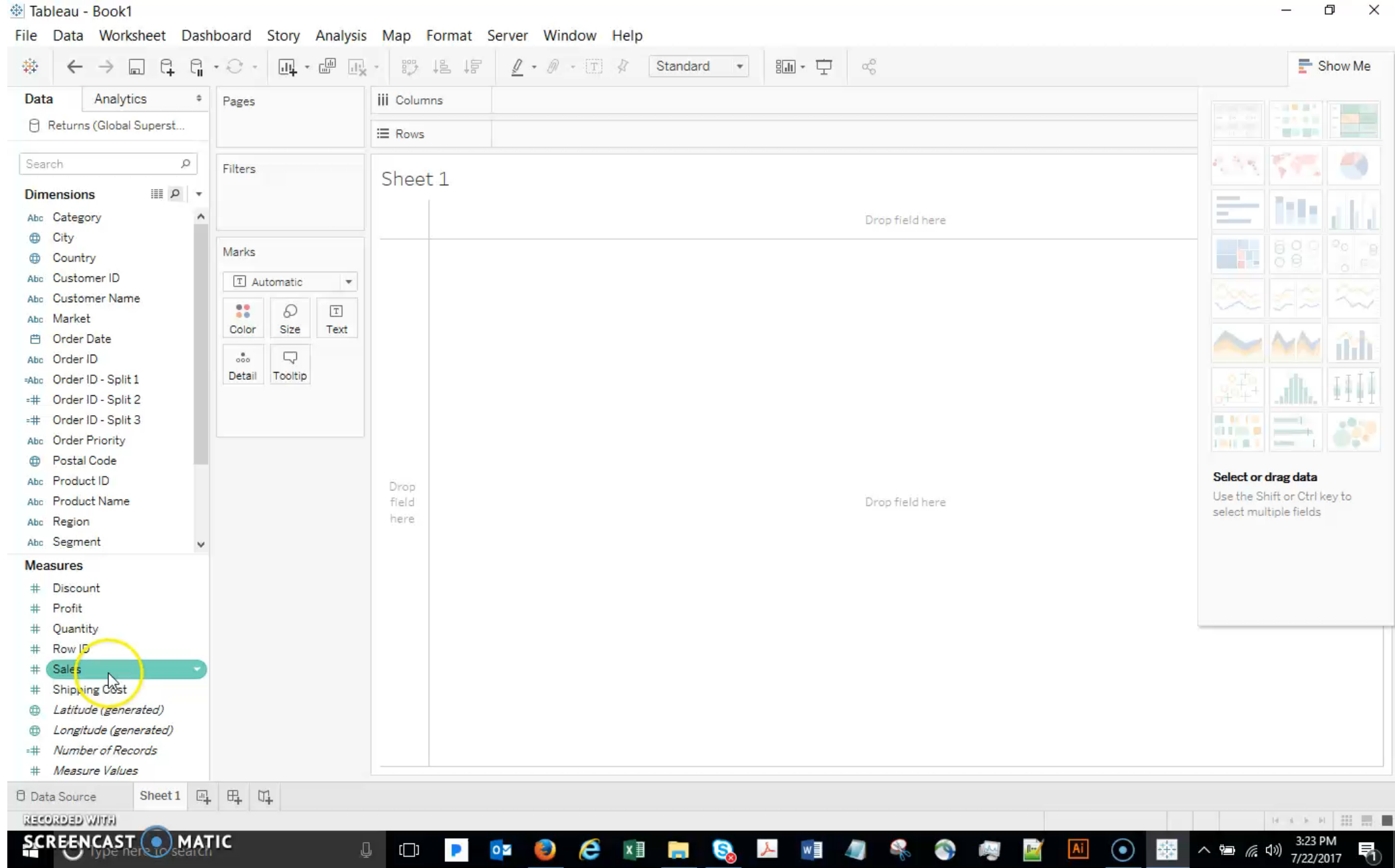
# Quick Viz Example



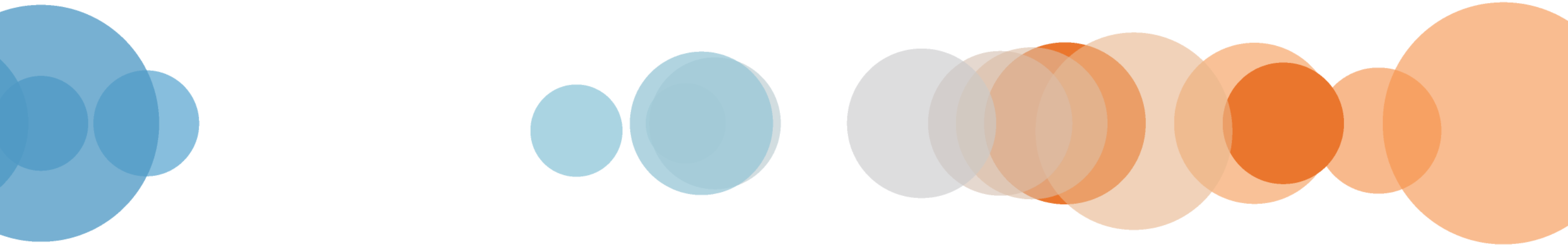
# Worksheet canvas



# Quick Viz Example



# Connecting to Multiple Tables



# Joins

Joins relate two or more tables from one database into a single result set

- Tables require a common field to define the relationship between the rows
- Usually a key field or indexed field

In the tables below, **Product** is the common field:

**Sales Table**

Product	Customer	Sales
1	A	\$5
2	B	\$10
3	C	\$15

**Product Table**

Product	Detail
1	Binder Clips
2	Rubber Bands
4	Colored Pencils

Changing the join logic changes the results.



# Inner Join

Returns only transactions that occur in both tables

- Inner join is the default join in Tableau

In the example (Sales Table and Product Table), only matches for Product numbers that appear in **both** tables are returned

## Not returned:

- Unsold products (no corresponding row in Sales table)
- Sales transactions with no matching records in Product table (for example, Product 3 to Customer C doesn't exist in the Product table)

INNER JOIN			
Product	Customer	Sales	Detail
1	A	\$5	Binder Clips
2	B	\$10	Rubber Bands





# Left and Right Joins

Left join returns all rows from the left table and only matching rows from the right table

- In the example, the left join relationship more accurately reflects the actual sales transactions that have occurred
- The sale of Product 3 to Customer C is included in the result because the record was in the table on the left

LEFT JOIN

Product	Customer	Sales	Detail
1	A	\$5	Binder Clips
2	B	\$10	Rubber Bands
3	C	\$15	

Right join changes the direction of the join

- In the example, a right join could help identify products that have not sold



# Full Outer Join

Full outer join returns all records from both tables

- Leaves nulls where no matches exist
- In the example, a full outer join could help discover where details are missing about a transaction, or where products are not being sold

OUTER JOIN			
Product	Customer	Sales	Detail
1	A	\$5	Binder Clips
2	B	\$10	Rubber Bands
3	C	\$15	
4			Colored Pencils



# Connecting to Multiple Tables

File Data Server Window Help

Connections [Add](#)

Global Superstore  
Microsoft Excel

Sheets

☐ Use Data Interpreter  
Data Interpreter might be able to clean your Microsoft Excel workbook.

Orders  
People  
Returns  
New Union

Orders (Global Superstore)

Orders — [Join Icon] — Returns

Join

Inner Left Right Full Outer

Data Source

Market = Market (Returns)

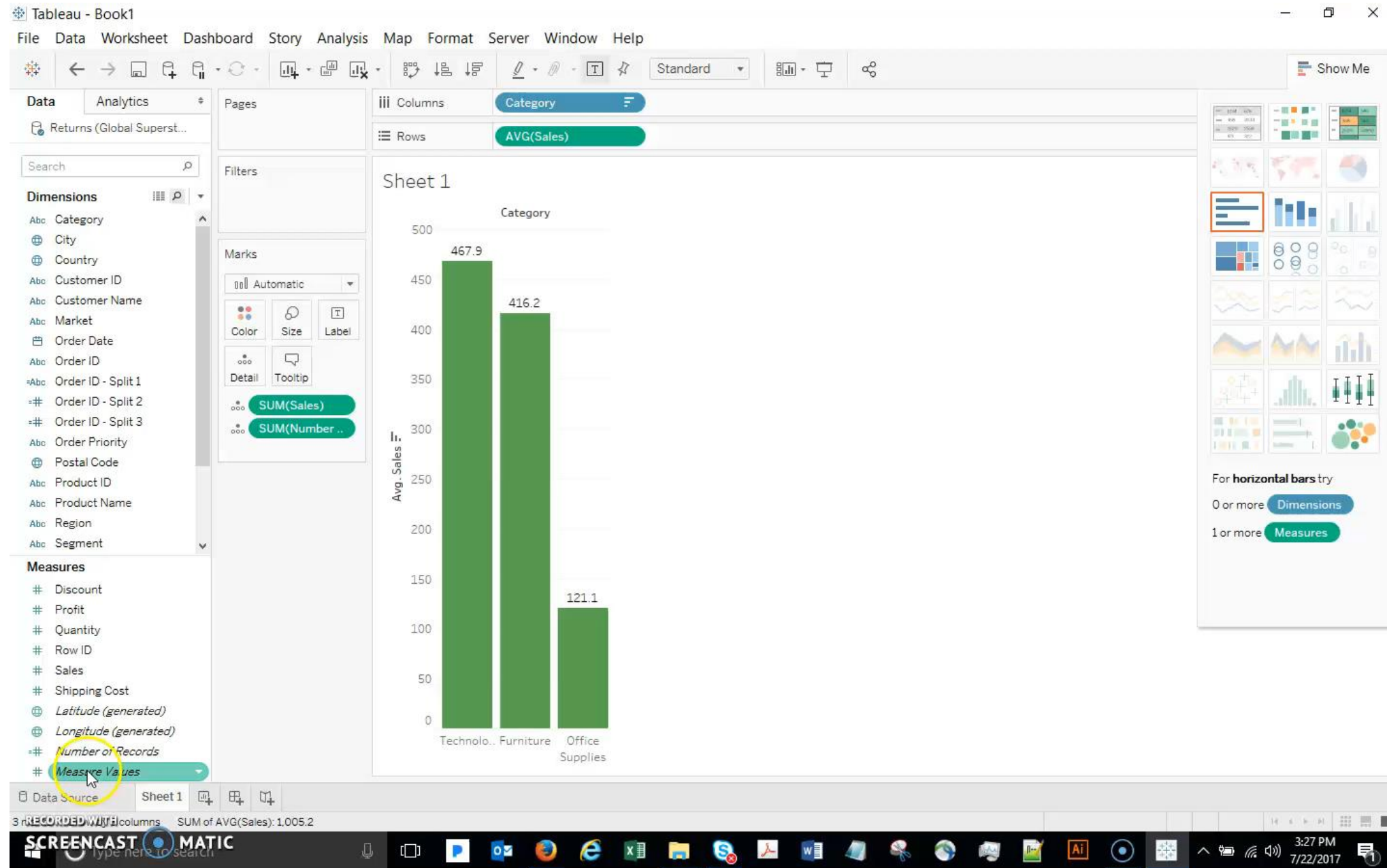
Add new join clause

Sort fields Data source order

#	Abc	Abc	Abc	Abc	Abc	Abc	A
Orders	Orders	Orders	Orders	Orders	Orders	Orders	O
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Na...	S
24651	IN-2011-49129	3/21/2011	3/25/2011	Standard Class	MV-18190	Mike Vittorini	C
24651	IN-2011-49129	3/21/2011	3/25/2011	Standard Class	MV-18190	Mike Vittorini	C

Note: for Tableau versions after 2020.2, Tableau will perform relationships instead of joins. To perform joins, double-click on the Orders table before beginning.

# Connecting to Multiple Tables



# Connecting to Multiple Tables

## Relationships (introduced in Tableau 2020.2)

- Related tables remain separate and distinct; they are not merged into a single table
- Relationships use joins, but they are automatic
- [https://help.tableau.com/current/pro/desktop/en-us/relate\\_tables.htm](https://help.tableau.com/current/pro/desktop/en-us/relate_tables.htm)

The screenshot shows the Tableau interface with a connection to 'Edition+ (Bookshop)' via a 'Live' connection. The 'Connections' pane on the left lists 'Bookshop' as a 'Microsoft Excel' source. The 'Sheets' pane on the left lists various tables: Author, Award, Book, Checkouts, Edition, Info, Publisher, Ratings, and New Union. The main view displays a relationship diagram with 'Edition' and 'Publisher' tables connected by a line. Below the diagram, a table of data is shown with columns: PubID (Publisher), Publishing House, City, State, Country, and Year Established. The table contains four rows of data.

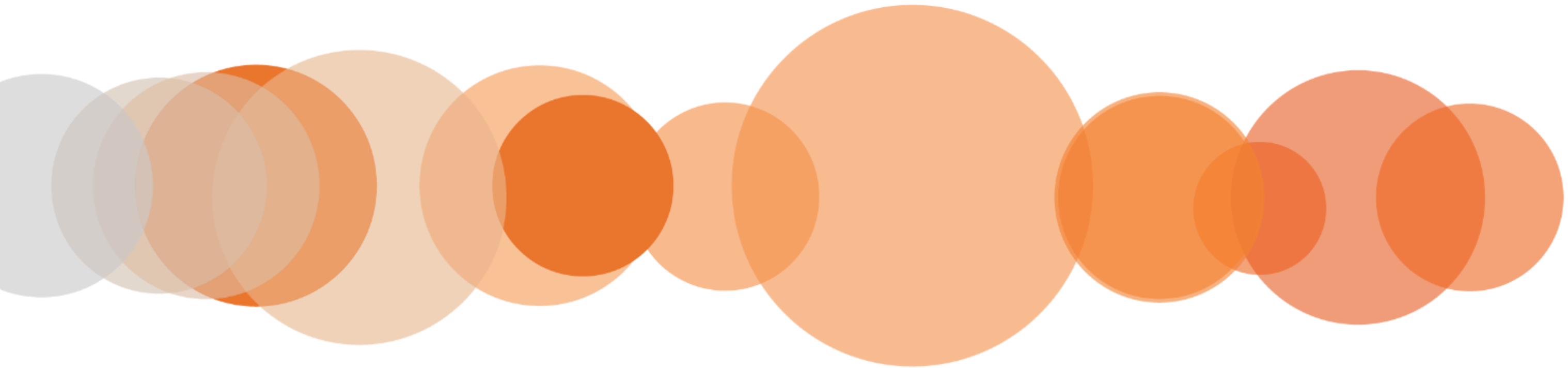
PubID (Publisher)	Publishing House	City	State	Country	Year Established
CHP	Cedar House Publishers	Friday Harbor	Washington	USA	208
SSC	Sound & Seas Co.	Dunedin	Otago	New Zealand	215
PP	Palimpsest Printing	Edinburgh	Scotland	UK	198
ESP	Etaoin Shrdlu Press	Seattle	Washington	USA	206



# Preparing Data in Tableau



# Poorly Formatted Data



# Poorly Formatted Data

- Use “Data Prep – Flights” Excel file

	A	B	C	D	E	F	G	H	I	J	K
1		Flights Data Summary									
2		This report was generated on 1-1-15									
3											
4		Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014	6/1/2014	7/1/2014	8/1/2014	9/1/2014
5		B-002	4	1	5	2	3	0	3	1	
6		E-055	1	2	1	3	4	1	4	0	
7		E-075	14	17	16	15	18	16	14	17	1
8		B-066	4	4	5	2	5	0	0	2	
		Resolved Incidents	Tiers	Ideal	Irregular Delimiter		⊕	:	◀		



# Poorly Formatted Data

- Click on the “Ideal” tab
- Example of proper format

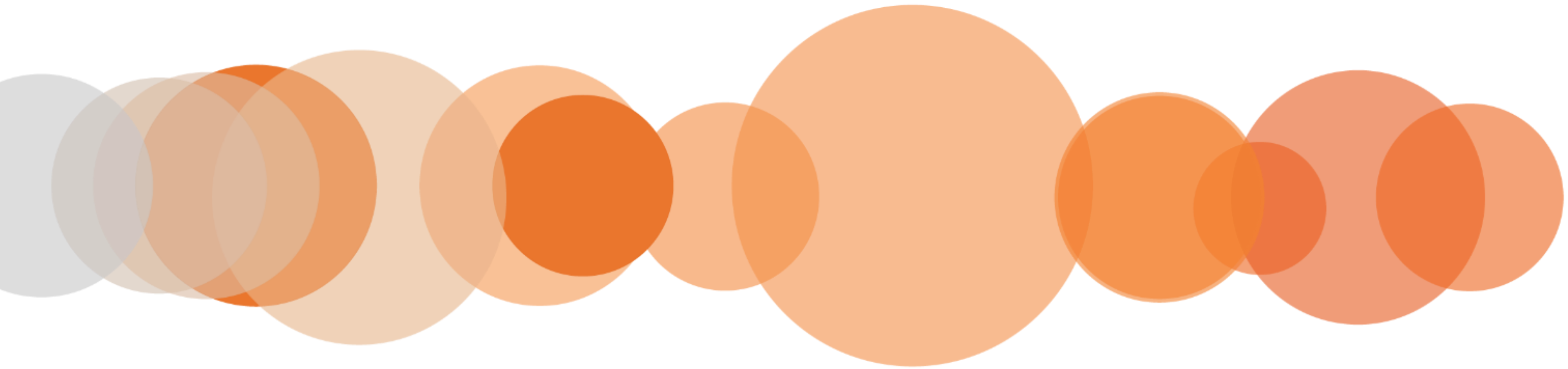
	A	B	C	D	E	F	G	H
1	Date	Employee	Resolved Incidents					
2	1/1/2014	B-002	4					
3	1/1/2014	E-055	1					
4	1/1/2014	E-075	14					
5	1/1/2014	B-066	4					
6	1/1/2014	C-025	17					
7	1/1/2014	E-030	2					
8	1/1/2014	C-001	14					
9	1/1/2014	E-038	4					
10	1/1/2014	C-054	2					
11	1/1/2014	A-001	7					
			Resolved Incidents	Tiers	Ideal	Irregular Delimiter		

# Poorly Formatted Data

- Use “Data Prep – Flights” Excel file

	A	B	C	D	E	F	G	H	I	J	K
1		Flights Data Summary									
2		This report was generated on 1-1-15									
3											
4		Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014	6/1/2014	7/1/2014	8/1/2014	9/1/2014
5		B-002	4	1	5	2	3	0	3	1	
6		E-055	1	2	1	3	4	1	4	0	
7		E-075	14	17	16	15	18	16	14	17	1
8		B-066	4	4	5	2	5	0	0	2	
		Resolved Incidents	Tiers	Ideal	Irregular Delimiter		+	:			

# Data Interpreter



# Data Interpreter

- Open Tableau Desktop
- Click on Excel
- Navigate to saved file
- Click open
- Drag “Resolved Incidents” to the canvas

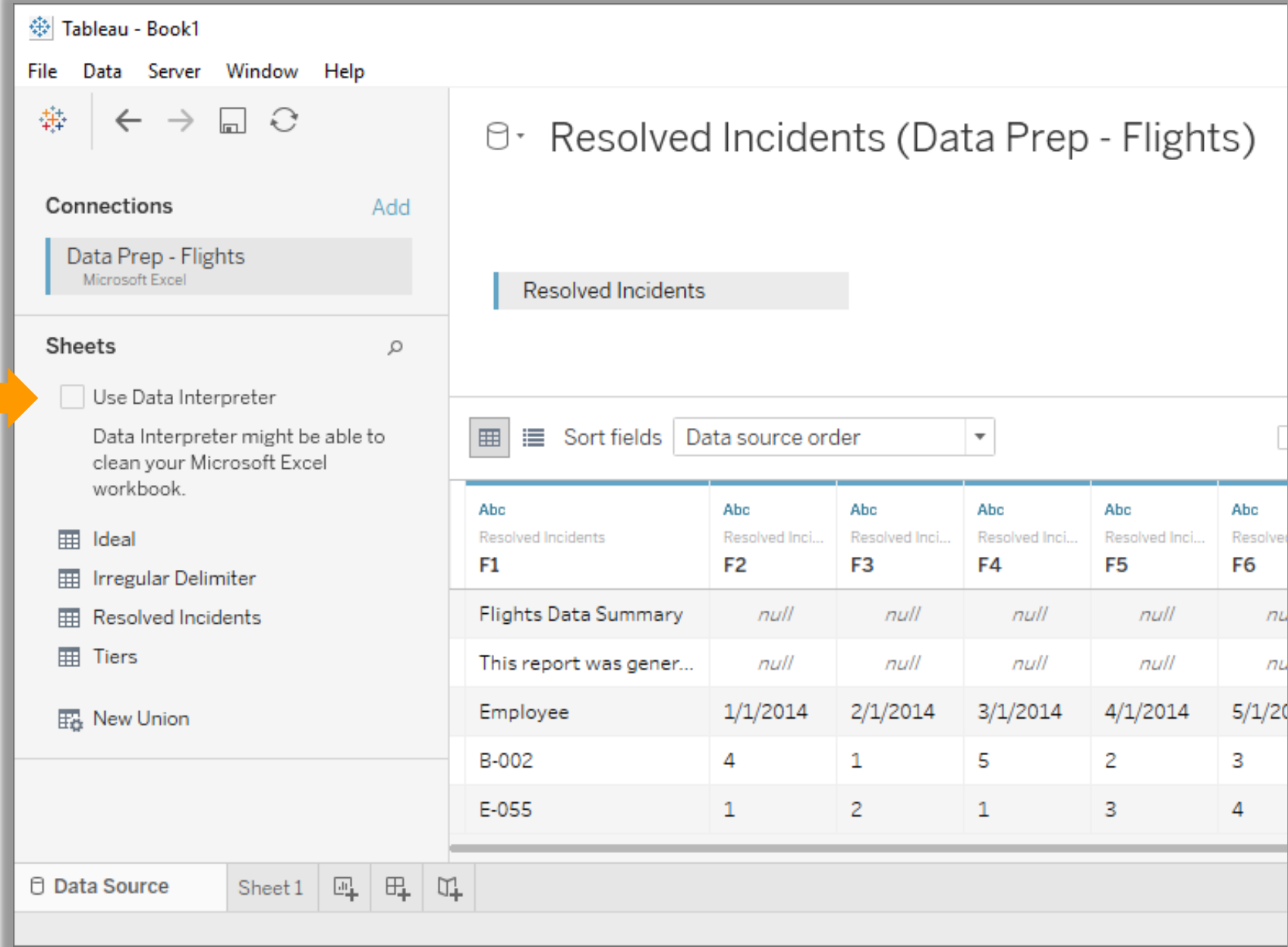
The screenshot shows the Tableau Desktop interface with the 'Data Interpreter' pane on the left. The 'Connections' pane shows 'Data Prep - Flights' as a Microsoft Excel connection. The 'Sheets' pane lists several sheets, including 'Resolved Incidents'. The 'Data Source' pane at the bottom shows 'Sheet 1'.

The main view displays a preview of the 'Resolved Incidents' data source. The table has 6 columns (F1 to F6) and 5 rows of data. The first row contains flight IDs (F1-F6). The second row contains the text 'Flights Data Summary'. The third row contains the text 'This report was gener...'. The fourth and fifth rows contain numerical data for 'Employee' and 'B-002'.

Resolved Incidents	Resolved Inci...	Resolved Inci...	Resolved Inci...	Resolved Inci...	Resolved Inci...
F1	F2	F3	F4	F5	F6
Flights Data Summary	null	null	null	null	null
This report was gener...	null	null	null	null	null
Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014
B-002	4	1	5	2	3
E-055	1	2	1	3	4

# Data Interpreter

- Open Tableau Desktop
- Click on Excel
- Navigate to saved file
- Click open
- Drag “Resolved Incidents” to the canvas



The screenshot shows the Tableau Desktop interface with the 'Data Prep - Flights' Microsoft Excel connection selected. An orange arrow points to the 'Use Data Interpreter' checkbox in the 'Sheets' pane, which is currently unchecked. The main view displays a table titled 'Resolved Incidents (Data Prep - Flights)' with columns F1 through F6. The table contains data for 'Flights Data Summary', 'This report was gener...', 'Employee', and flight numbers 'B-002' and 'E-055'.

Abc Resolved Incidents F1	Abc Resolved Inci... F2	Abc Resolved Inci... F3	Abc Resolved Inci... F4	Abc Resolved Inci... F5	Abc Resolved Inci... F6
Flights Data Summary	null	null	null	null	null
This report was gener...	null	null	null	null	null
Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014
B-002	4	1	5	2	3
E-055	1	2	1	3	4

# Data Interpreter

- Click the Run Interpreter Box

The screenshot shows the Tableau Data Interpreter interface. On the left, the 'Connections' pane lists 'Data Prep - Flights' (Microsoft Excel). Below it, the 'Sheets' pane shows a list of sheets: 'Ideal', 'Irregular Delimiter', 'Resolved Incidents', 'Tiers', and 'New Union'. The 'Resolved Incidents' sheet is selected. The main area displays a table titled 'Resolved Incidents (Data Prep - Flights)'. The table has columns for 'Employee' and 'Resolved Incidents' for each month from 1/1/2014 to 8/1/2014. The table is sorted by 'Data source order'. The bottom status bar shows 'Data Source' and 'Sheet 1'.

Tableau - Book1

File Data Server Window Help

Connections Add

Data Prep - Flights  
Microsoft Excel

Sheets

☒ Cleaned with Data Interpreter  
[Review the results.](#) (To undo changes, clear the check box.)

☐ Ideal  
☐ Irregular Delimiter  
☐ Resolved Incidents  
☐ Tiers  
☐ New Union

Resolved Incidents (Data Prep - Flights)

Connection ☒ Live ☐ Extract

Filters 0 | Add

Resolved Incidents

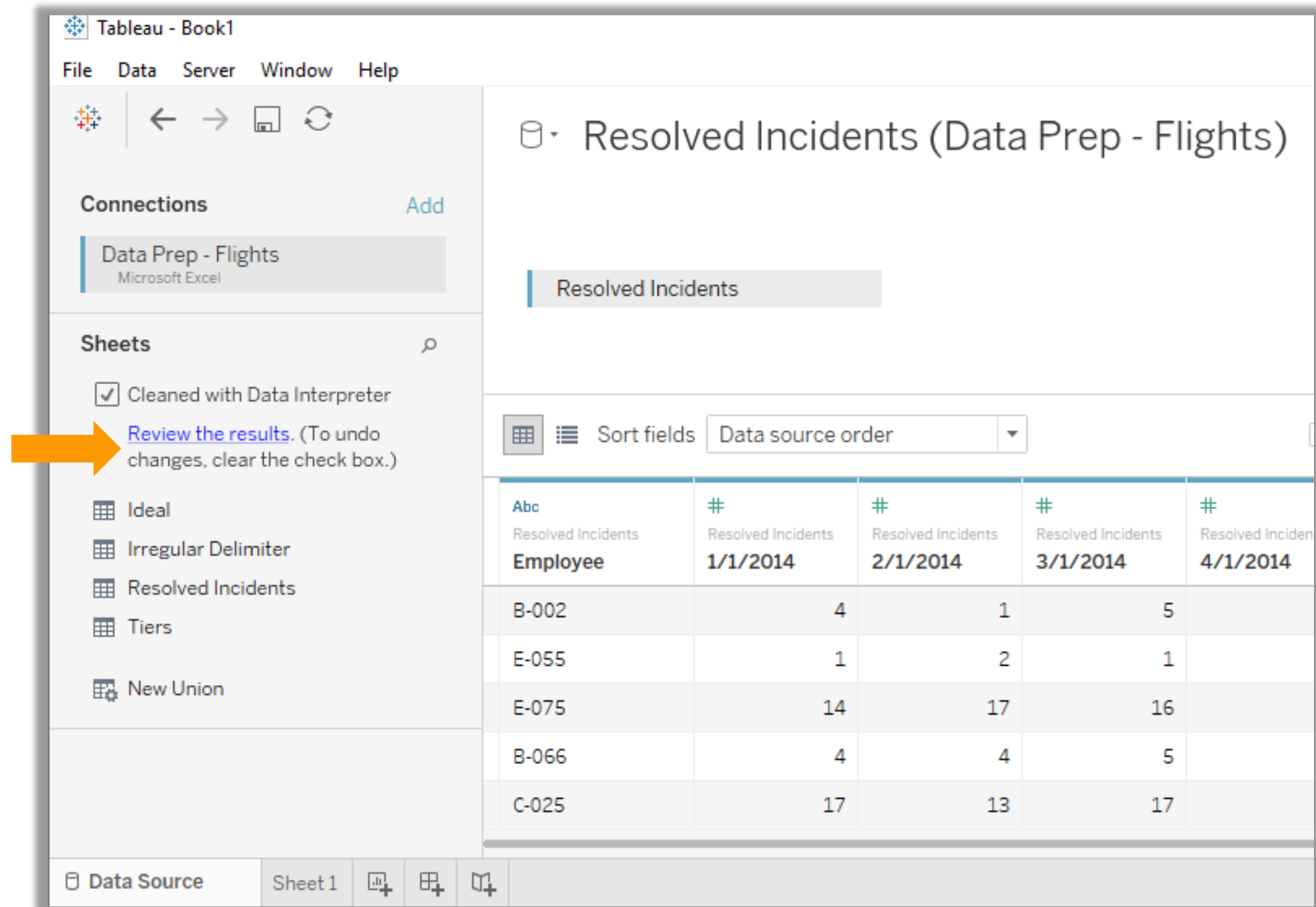
Sort fields Data source order

☐ Show aliases ☐ Show hidden fields 26 rows

Employee	Resolved Incidents 1/1/2014	Resolved Incidents 2/1/2014	Resolved Incidents 3/1/2014	Resolved Incidents 4/1/2014	Resolved Incidents 5/1/2014	Resolved Incidents 6/1/2014	Resolved Incidents 7/1/2014	Resolved Incidents 8/1/2014
B-002	4	1	5	2	3	0	3	
E-055	1	2	1	3	4	1	4	
E-075	14	17	16	15	18	16	14	
B-066	4	4	5	2	5	0	0	
C-025	17	13	17	18	17	17	12	

Data Source Sheet 1

# Data Interpreter



The screenshot shows the Tableau Data Interpreter interface. On the left, the 'Connections' pane lists 'Data Prep - Flights' (Microsoft Excel). Below it, the 'Sheets' pane shows a list of sheets: 'Cleaned with Data Interpreter' (checked), 'Review the results. (To undo changes, clear the check box.)', 'Ideal', 'Irregular Delimiter', 'Resolved Incidents', 'Tiers', and 'New Union'. An orange arrow points to the 'Review the results...' link. The main area displays a table titled 'Resolved Incidents (Data Prep - Flights)' with a sub-header 'Resolved Incidents'. The table has 5 columns: 'Employee', '# Resolved Incidents 1/1/2014', '# Resolved Incidents 2/1/2014', '# Resolved Incidents 3/1/2014', and '# Resolved Incidents 4/1/2014'. The table contains 6 rows of data.






Employee	# Resolved Incidents 1/1/2014	# Resolved Incidents 2/1/2014	# Resolved Incidents 3/1/2014	# Resolved Incidents 4/1/2014
B-002	4	1	5	
E-055	1	2	1	
E-075	14	17	16	
B-066	4	4	5	
C-025	17	13	17	

# Data Interpreter Results Key

**Key for Understanding the Data Interpreter Results**

Use the key to understand how your data source has been interpreted.  
To view the results, click a worksheet tab.  
Note: Tableau never makes changes to your underlying data source.

**Key:**

-  Data is interpreted as column headers (field names).
-  Data is interpreted as values in your data source.
-  Data derived from an Excel merged cell is interpreted as value in your data source.
-  Data is ignored and not included as part of your data source.
-  Data has been excluded from your data source.

Note: To search for all excluded data, use CTRL +F on Windows or Command F on the Mac, and then type '\*\*\*DATA REMOVED\*\*\*'.

If the Data Interpreter has interpreted the Tableau data source incorrectly, close the spreadsheet, and then clear the Cleaned with Data Interpreter check box from the Data Source page.



If the Tableau data source continues to be interpreted incorrectly or for general information about why some data was removed by the Data Interpreter, refer to [Resolving Common Issues with Data Interpreter Results](#)

Help Tableau improve the Data Interpreter by emailing your file to [support@tableau.com](mailto:support@tableau.com)

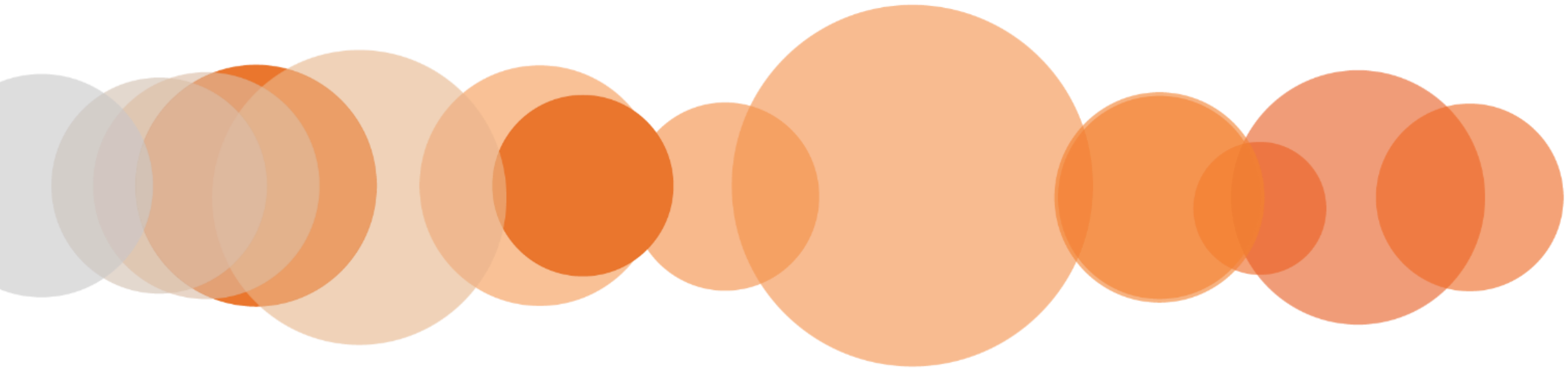
**Key for the Data Interpreter** | Resolved Incidents | ... (+) : ◀



# Data Interpreter Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Flights Data Summary													
2	This report was generated on 1-1-15													
3														
4	Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014	6/1/2014	7/1/2014	8/1/2014	9/1/2014	#####	#####	#####	Header
5	B-002	4	1	5	2	3	0	3	1	2	0	2	5	Data
6	E-055	1	2	1	3	4	1	4	0	2	1	4	0	Data
7	E-075	14	17	16	15	18	16	14	17	12	13	14	12	Data
8	B-066	4	4	5	2	5	0	0	2	0	1	0	3	Data
9	C-025	17	13	17	18	17	17	12	15	17	17	14	15	Data
10	E-030	2	2	1	1	0	3	5	5	0	2	4	1	Data
11	C-001	14	14	14	14	13	18	17	14	13	18	15	14	Data
12	E-038	4	1	0	4	0	2	5	0	2	2	2	2	Data
13	C-054	2	5	4	4	2	3	0	5	5	5	3	5	Data
Key for the Data Interpreter <b>Resolved Incidents</b> Resolved Incidents_su ...   <input type="text"/>														

Pivot



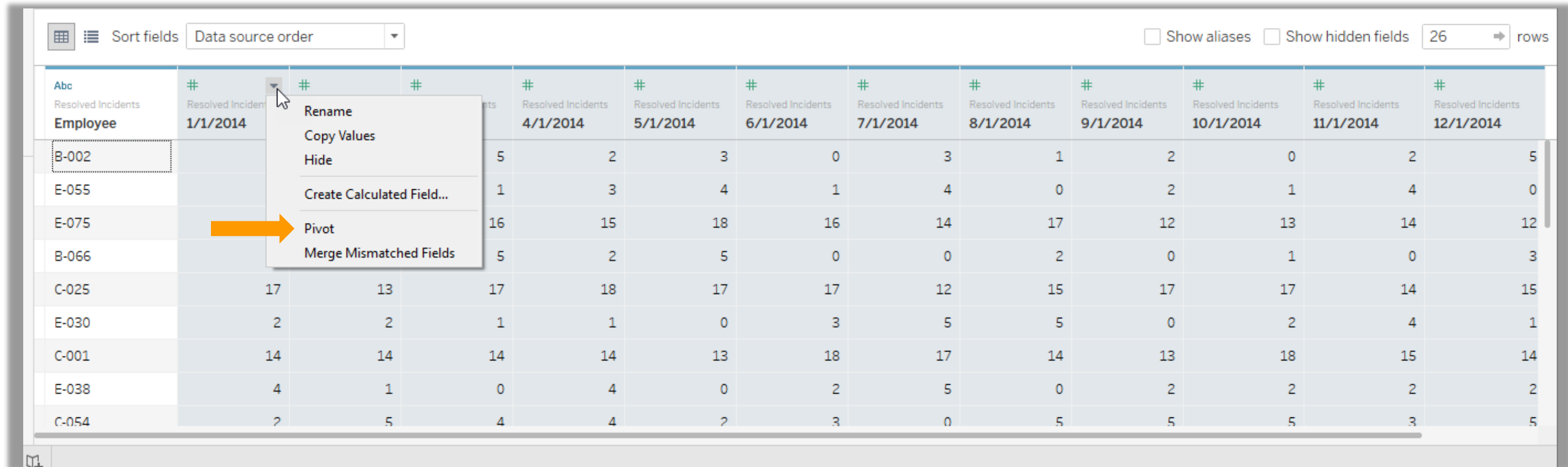
# Review Ideal Data

	A	B	C	D	E	F	G	H	
1	Date	Employee	Resolved Incidents						
2	1/1/2014	B-002	4						
3	1/1/2014	E-055	1						
4	1/1/2014	E-075	14						
5	1/1/2014	B-066	4						
6	1/1/2014	C-025	17						
7	1/1/2014	E-030	2						
8	1/1/2014	C-001	14						
9	1/1/2014	E-038	4						
10	1/1/2014	C-054	2						
11	1/1/2014	A-001	2						
			Resolved Incidents	Tiers	Ideal	Irregular Delimiter			



# Pivot

- Select all date columns
- Click carat and select Pivot

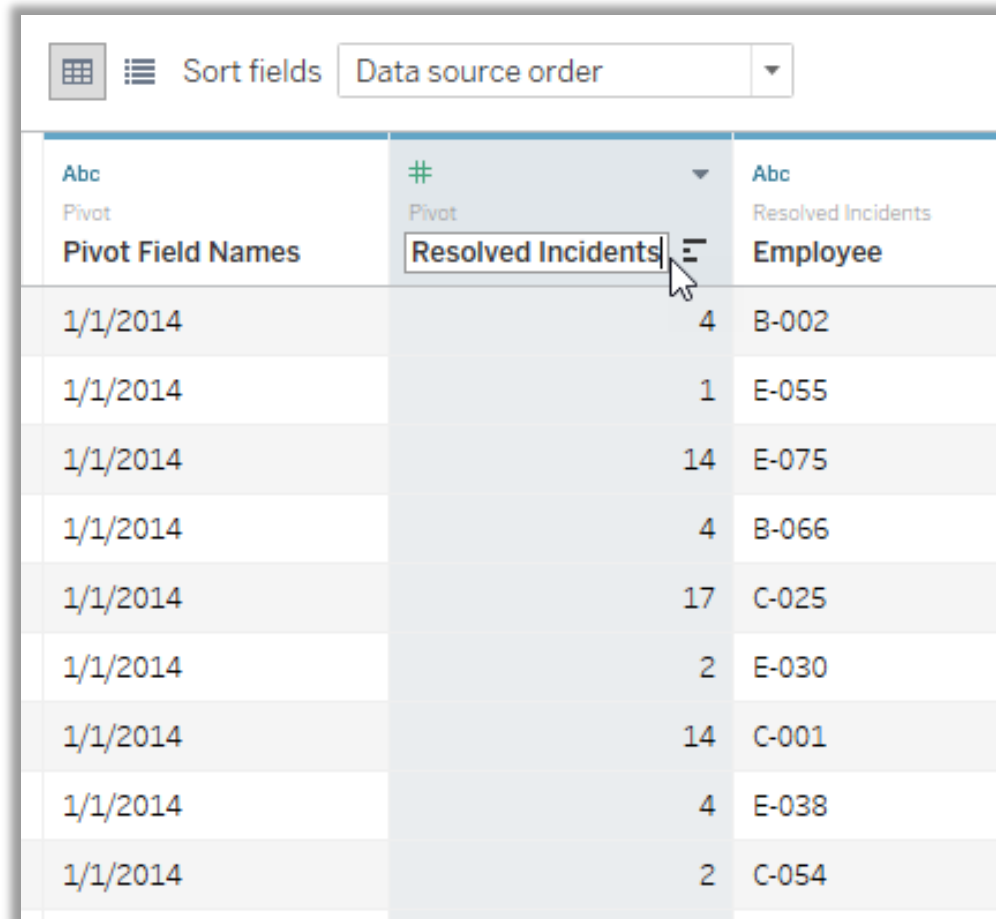


The screenshot shows the Tableau Desktop interface. At the top, there are controls for 'Sort fields' (set to 'Data source order') and checkboxes for 'Show aliases' and 'Show hidden fields'. A '26 rows' indicator is on the right. The main view is a data table with columns for 'Employee' and 'Resolved Incidents' for each month from 1/1/2014 to 12/1/2014. A context menu is open over the 'Resolved Incidents 1/1/2014' column header, with an orange arrow pointing to the 'Pivot' option. The table data is as follows:

Employee	Resolved Incidents 1/1/2014	Resolved Incidents 2/1/2014	Resolved Incidents 3/1/2014	Resolved Incidents 4/1/2014	Resolved Incidents 5/1/2014	Resolved Incidents 6/1/2014	Resolved Incidents 7/1/2014	Resolved Incidents 8/1/2014	Resolved Incidents 9/1/2014	Resolved Incidents 10/1/2014	Resolved Incidents 11/1/2014	Resolved Incidents 12/1/2014
B-002			5	2	3	0	3	1	2	0	2	5
E-055		1	3	4	1	4	0	2	1	4	0	
E-075	16	15	18	16	14	17	12	13	14	12		
B-066	5	2	5	0	0	2	0	1	0	3		
C-025	17	13	17	18	17	17	12	15	17	17	14	15
E-030	2	2	1	1	0	3	5	5	0	2	4	1
C-001	14	14	14	14	13	18	17	14	13	18	15	14
E-038	4	1	0	4	0	2	5	0	2	2	2	2
C-054	2	5	4	4	2	3	0	5	5	5	3	5

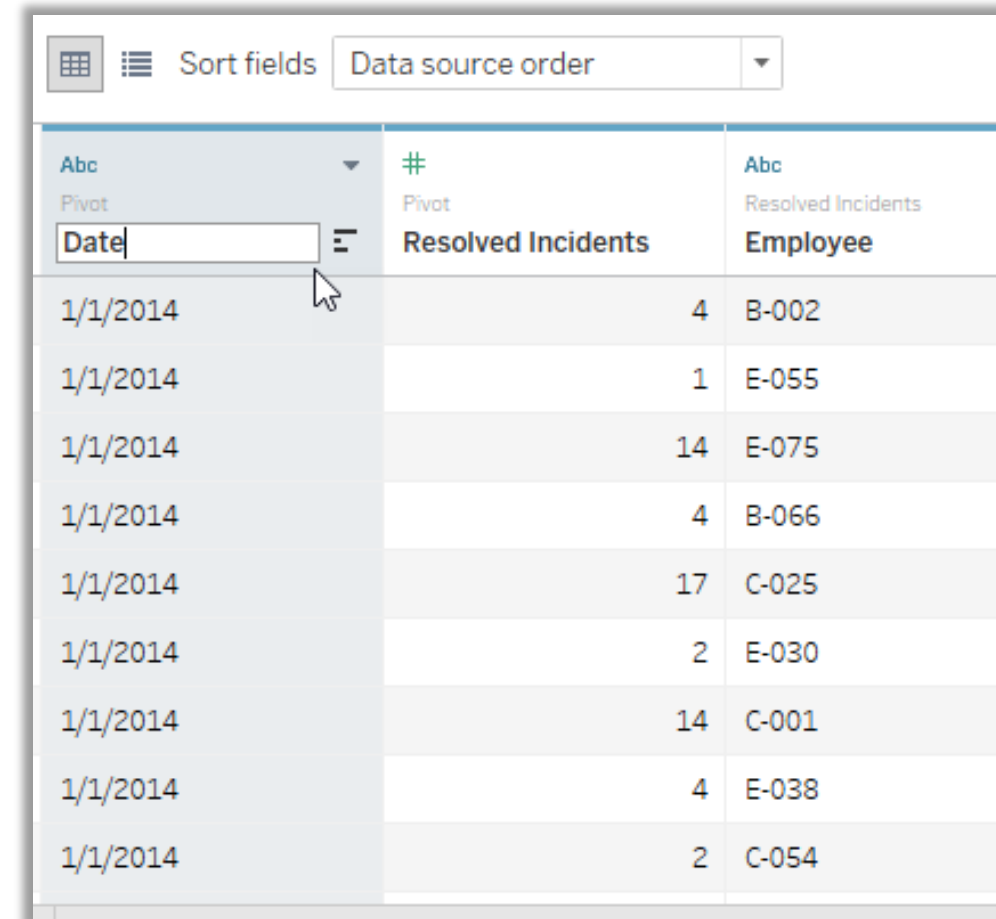
# Pivot

- Click on Pivot Field Values and rename to Resolved Incidents
- Click on Pivot Field Names and rename to Date



Sort fields: Data source order

Abc Pivot Pivot Field Names	# Pivot Resolved Incidents	Abc Resolved Incidents Employee
1/1/2014	4	B-002
1/1/2014	1	E-055
1/1/2014	14	E-075
1/1/2014	4	B-066
1/1/2014	17	C-025
1/1/2014	2	E-030
1/1/2014	14	C-001
1/1/2014	4	E-038
1/1/2014	2	C-054



Sort fields: Data source order

Abc Pivot Date	# Pivot Resolved Incidents	Abc Resolved Incidents Employee
1/1/2014	4	B-002
1/1/2014	1	E-055
1/1/2014	14	E-075
1/1/2014	4	B-066
1/1/2014	17	C-025
1/1/2014	2	E-030
1/1/2014	14	C-001
1/1/2014	4	E-038
1/1/2014	2	C-054

# Pivot

FileDataServerWindowHelp

←→↺↻

Connections

Copy of Data Prep - Flights  
Excel

Sheets

☒ Cleaned with Data Interpreter  
[Review the results.](#) (To undo changes, clear the check box.)

☐ Ideal

☐ Irregular Delimiter

☐ Resolved Incidents

☐ Tiers

☐ New Union

Resolved Incidents (Copy of Data Prep - Flights)

Connection

☒ Live☐ Extract

Filters

0Add

Resolved Incidents

Sort fieldsData source order

☐ Show aliases☐ Show hidden fields26

Abc	#	#	#	#	#	#	#	#	#
Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved Incidents	Resolved In
Employee	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014	6/1/2014	7/1/2014	8/1/2014	9/1/201
B-002	4	1	5	2	3	0	3	1	
E-055	1	2	1	3	4	1	4	0	
E-075	14	17	16	15	18	16	14	17	
B-066	4	4	5	2	5	0	0	2	
C-025	17	13	17	18	17	17	12	15	
E-030	2	2	1	1	0	3	5	5	
C-001	14	14	14	14	13	18	17	14	
E-038	4	1	0	4	0	2	5	0	
C-054	2	5	4	4	2	3	0	5	

RECORDED WITH

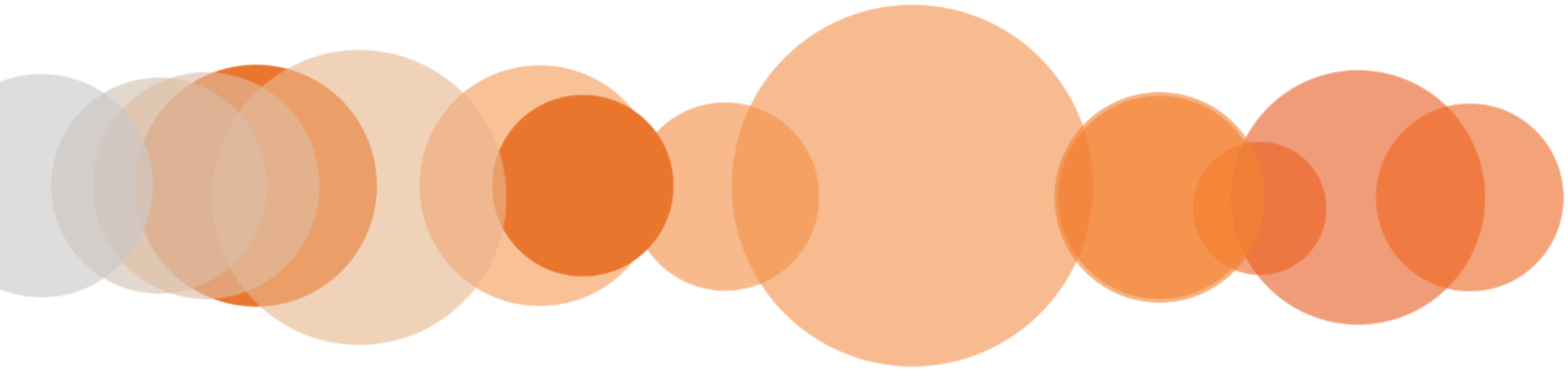
SCREENCAST MATIC

Go to Worksheet

Sheet 1



Split



# Split

- Click carat and open menu of Employee field
- Select Split

Sort fields Data source order		
Abc Pivot Pivot Field Names	# Pivot Pivot Field Values	Abc Resolved Incidents Employee
1/1/2014	4	B-002
1/1/2014	1	E-055
1/1/2014	14	E-075
1/1/2014	4	B-066
1/1/2014	17	C-025
1/1/2014	2	E-030
1/1/2014	14	C-001
1/1/2014	4	E-038
1/1/2014	2	C-054

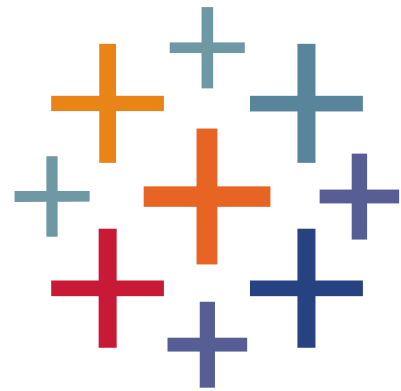
Sort fields Data source order				
Abc Pivot Pivot Field Names	# Pivot Pivot Field Values	Abc Resolved Incidents Employee	=Abc Calculation Employee - Split 1	=# Calculation Employee - Split 2
1/1/2014	4	B-002	B	2
1/1/2014	1	E-055	E	55
1/1/2014	14	E-075	E	75
1/1/2014	4	B-066	B	66
1/1/2014	17	C-025	C	25
1/1/2014	2	E-030	E	30
1/1/2014	14	C-001	C	1
1/1/2014	4	E-038	E	38
1/1/2014	2	C-054	C	54



# Split

- Rename fields as Location and Employee ID

Sort fields Data source order ▼					
Abc Pivot Pivot Field Names	# Pivot Pivot Field Values	Abc Resolved Incidents Employee	=Abc Calculation Location	=# Calculation Employee ID	
1/1/2014	4	B-002	B		2
1/1/2014	1	E-055	E		55
1/1/2014	14	E-075	E		75
1/1/2014	4	B-066	B		66
1/1/2014	17	C-025	C		25
1/1/2014	2	E-030	E		30
1/1/2014	14	C-001	C		1
1/1/2014	4	E-038	E		38
1/1/2014	2	C-054	C		54



+ able au<sup>®</sup>