Lab 4: Data Aggregation

In this lab, we'll cover the following exercises:

- Determining granularity
- Aggregating values
- Using fixed LOD calculations for grouping data
- Grouping data

Technical requirements

To follow along with the exercises in this lab, you will require **Tableau Prep Builder** and **Tableau Desktop**. We'll use the sample data supplied in the course GitHub repository.

Determining granularity

One key consideration that is often overlooked is determining the granularity of the data that's needed. For example, when working with geographic data, you may have values for continent, region, country, state, city, ZIP code, street, and so on. But if you're only going to report on country data, you may not need all those other dimensions. Or perhaps you are processing order data; you may want to consider whether you need the details for each individual line item in each individual order -- maybe your analysis will be fine with just the total order amount per day. In this exercise, we'll look at a quick method to help reveal the data actually in use in a **Tableau Desktop** visualization.

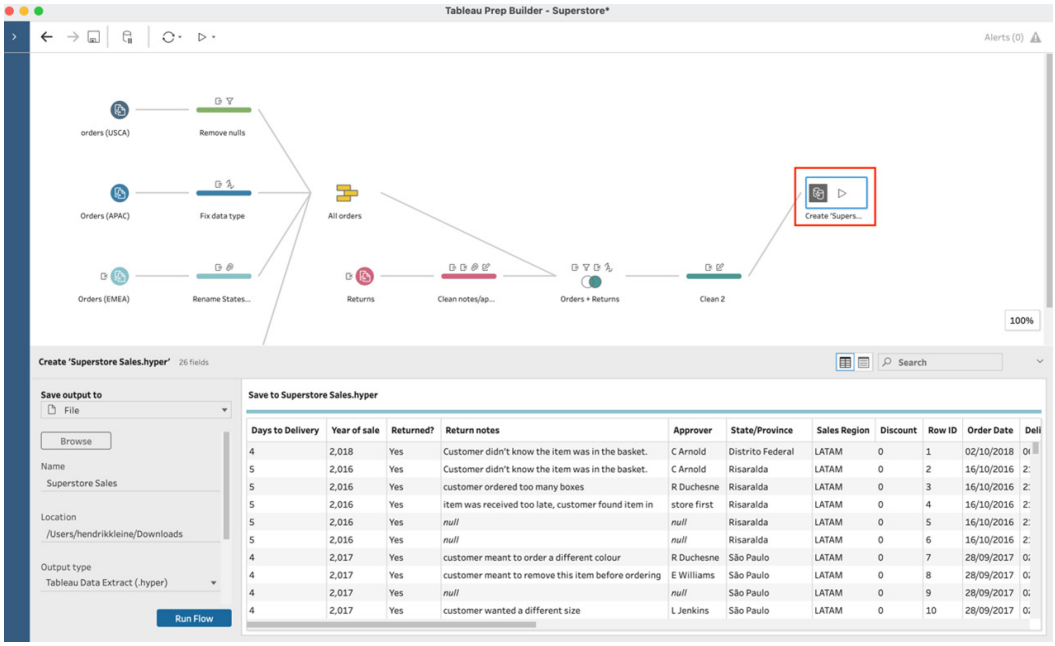
Getting ready

To follow along with this exercise, download the **Sample Files 4.1** folder from this course's GitHub repository.

How to do it...

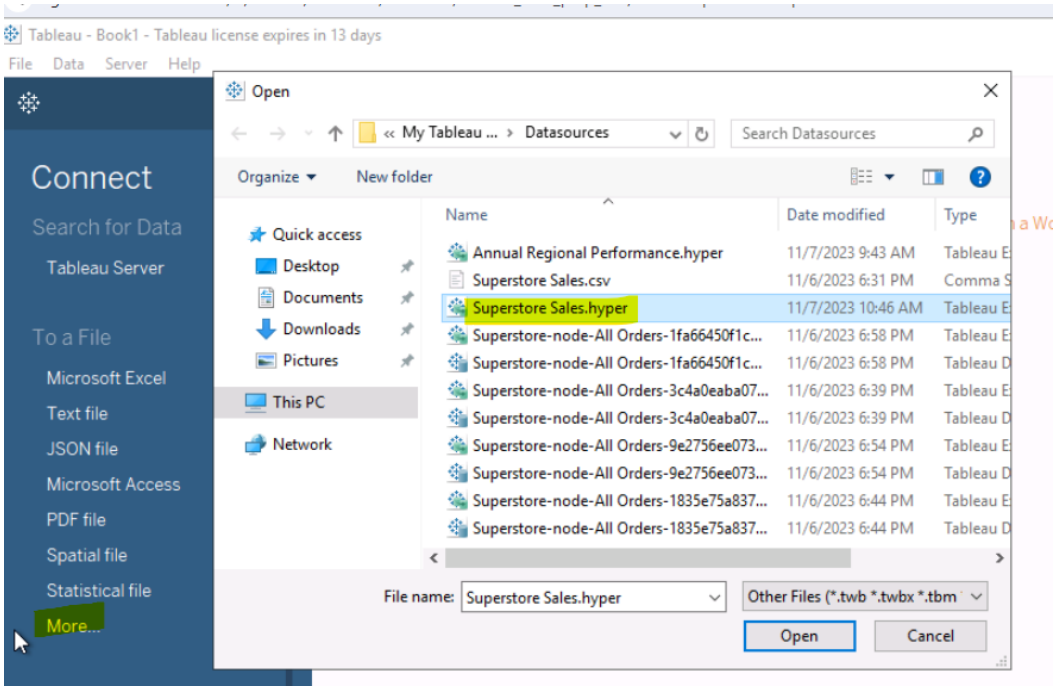
Start by opening the **Superstore.tflx** flow from the **Sample Files 4.1** folder in Tableau Prep, then follow these steps:

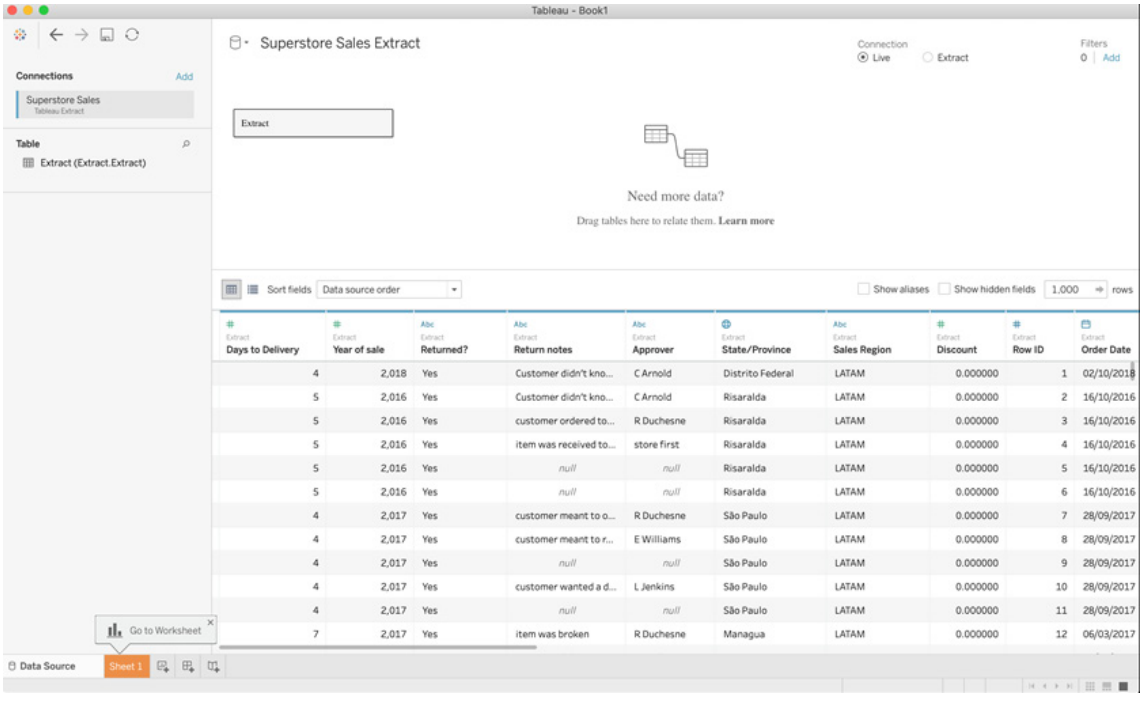
1. Click the **Create 'Superstore Sales.hyper'** output step in the flow and observe the number of fields shown in the profile pane at the bottom of the screen. These are all the fields that will be included in the hyper file when the flow runs:



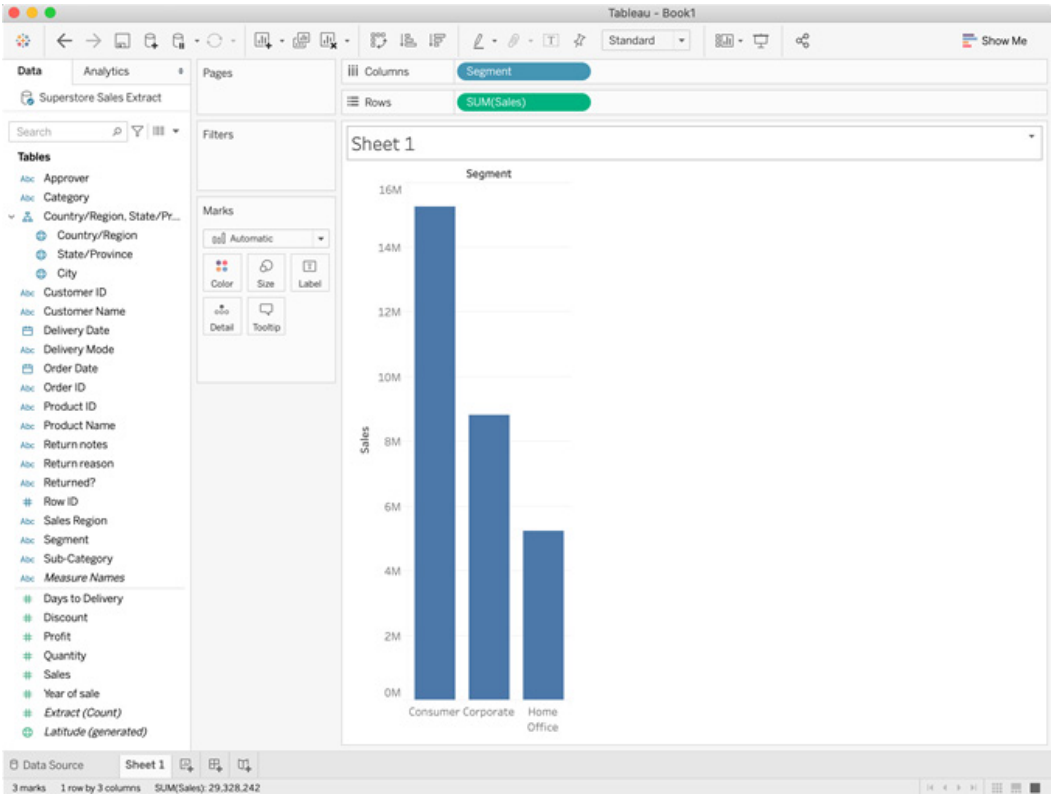
2. Click the play icon at the top of the screen to run your flow. If you've not altered the output settings, this will create the **Superstore Sales.hyper** file in your **My Tableau Prep Repository\Datasources** folder in your lab environment:

3. Leave Tableau Prep open and start up **Tableau Desktop**. In Tableau Desktop, connect to the **Superstore Sales.hyper** file you just created:

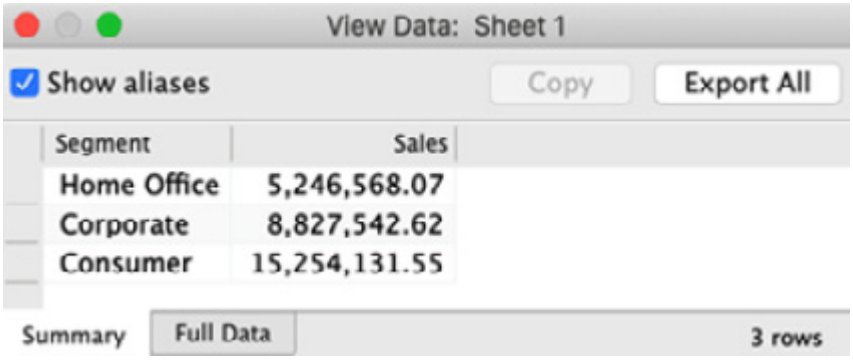




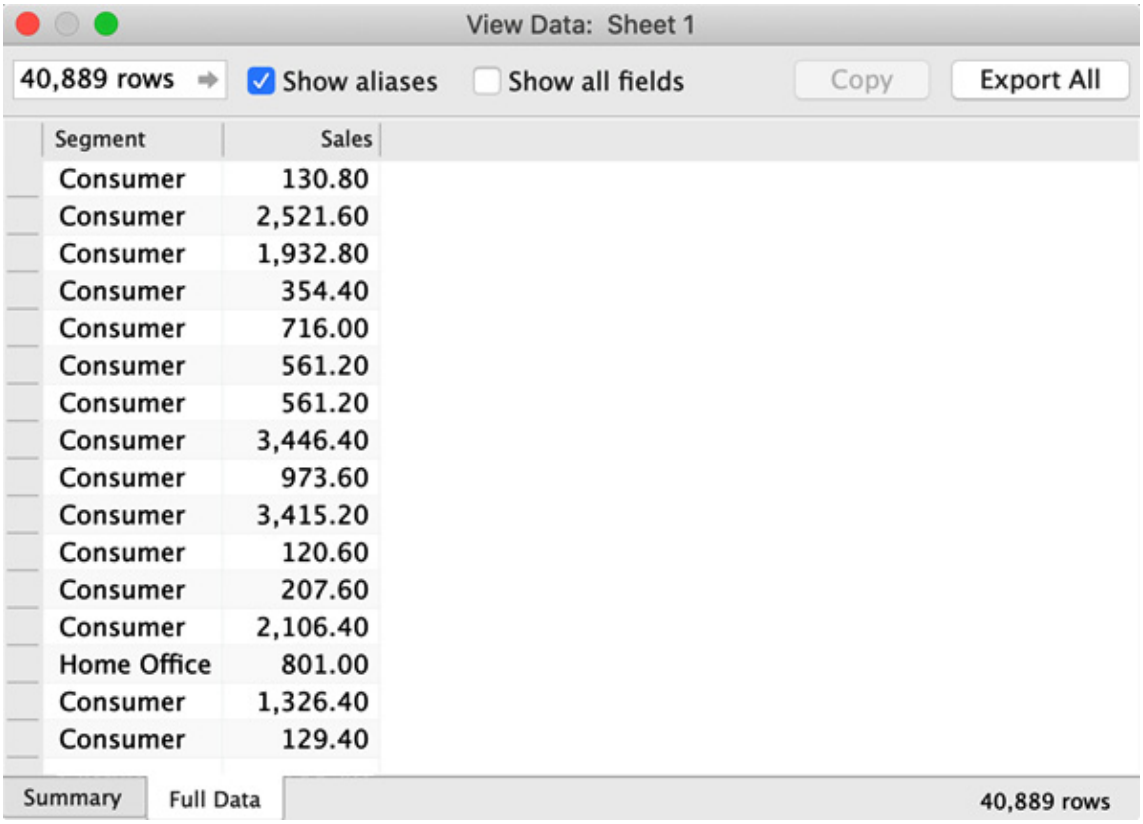
4. Click **Sheet 1** at the bottom of the screen to start a new visualization. To create the visualization from the list of available fields, drag **Segment** onto **Columns** and **Sales** onto **Rows**:



5. From the menu bar, select **Analytics**, then **View Data**. Tableau will then display a dialog with the data that's present in the visualization. It should come as no surprise that the data contains the three segments and their sales amounts, as we saw in the bar chart. In the bottom right, you'll see that the row count is *3*. In a more complex visualization, you'll see all the data that was presented in this dialog:



6. In the **View Data** dialog, select the **Full Data** tab at the bottom, then uncheck the **Show all fields** option at the top. Finally, change the default preview value of **10,000 rows** in the top left to *50,000*. The value in the row box will automatically adjust the total number of rows, **40,889** in this case. The data that is displayed now is the data that Tableau Desktop processed in order to render the bar chart:



In this example, we've determined that our data output from Tableau Prep contained many more fields than required to create the visualization. Furthermore, the fields that were required were more granular than required to render the visualization.

How it works...

In this exercise, we learned how to aggregate data in order to achieve a desired output with the minimum necessary data. Instead of an output with 26 fields and 40,889 rows, the visualization we created in *Step 4* could have been created with an output of 2 fields and 3 rows.

In the following exercises in this lab, we'll see methods for grouping and aggregating data in Tableau Prep.

Aggregating values

In this exercise, we'll look at the preferred methods for most users when aggregating data in Tableau Prep, using the aptly named **Aggregate** step.

Getting ready

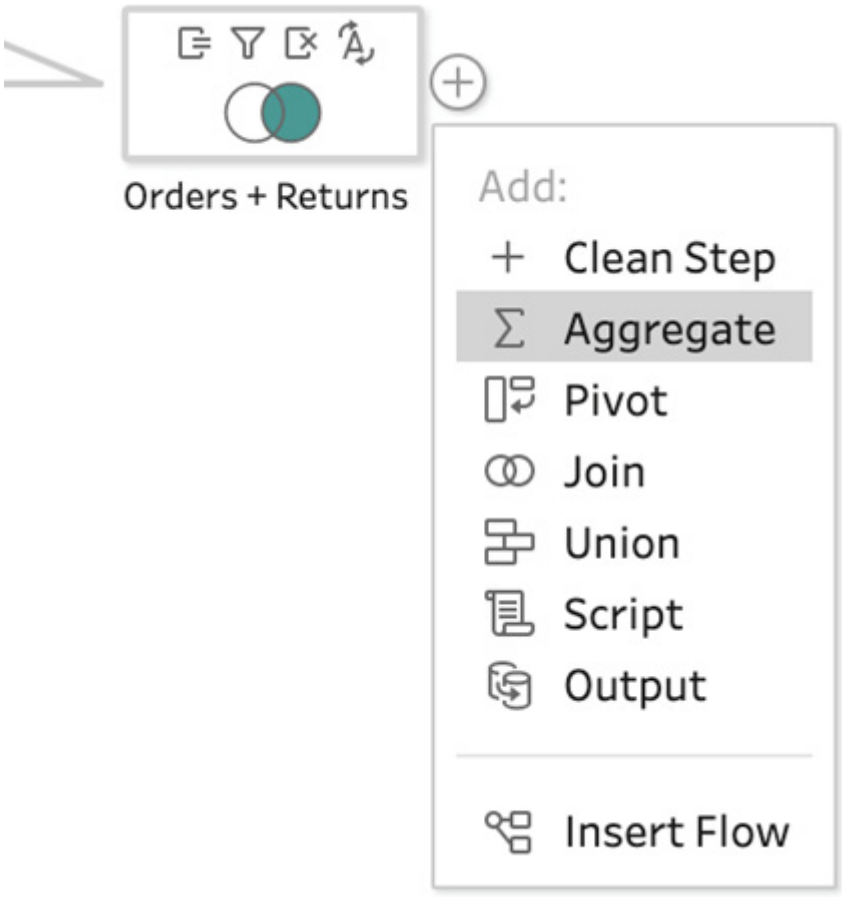
To follow along with this exercise, download the **Sample Files 4.2** folder from this course's GitHub repository. In this flow, you'll find a slimmed-down version of the sample **Superstore** flow provided by Tableau.

The last step in this flow contains more than 20 fields and outputs more than 40,000 rows. However, let's assume we are interested only in the total **Sales** amount by **Segment**. In this exercise, we'll achieve that output using the Aggregate step.

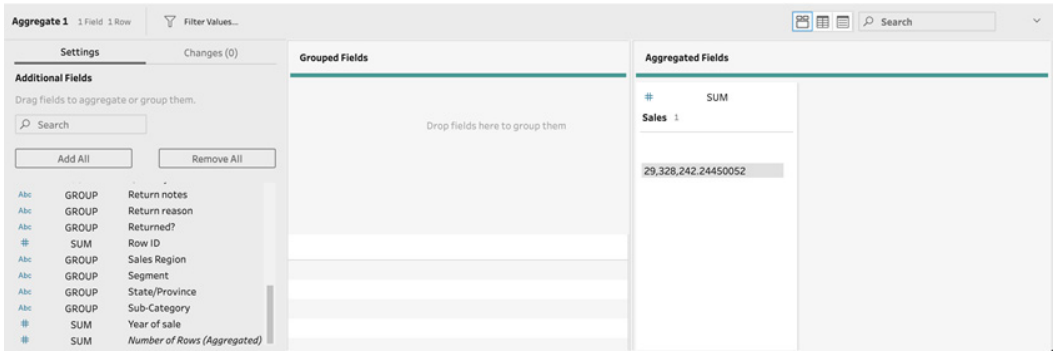
How to do it...

Start by opening the **Superstore.tflx** flow from the **Sample Files 4.2** folder in Tableau Prep, then follow these steps:

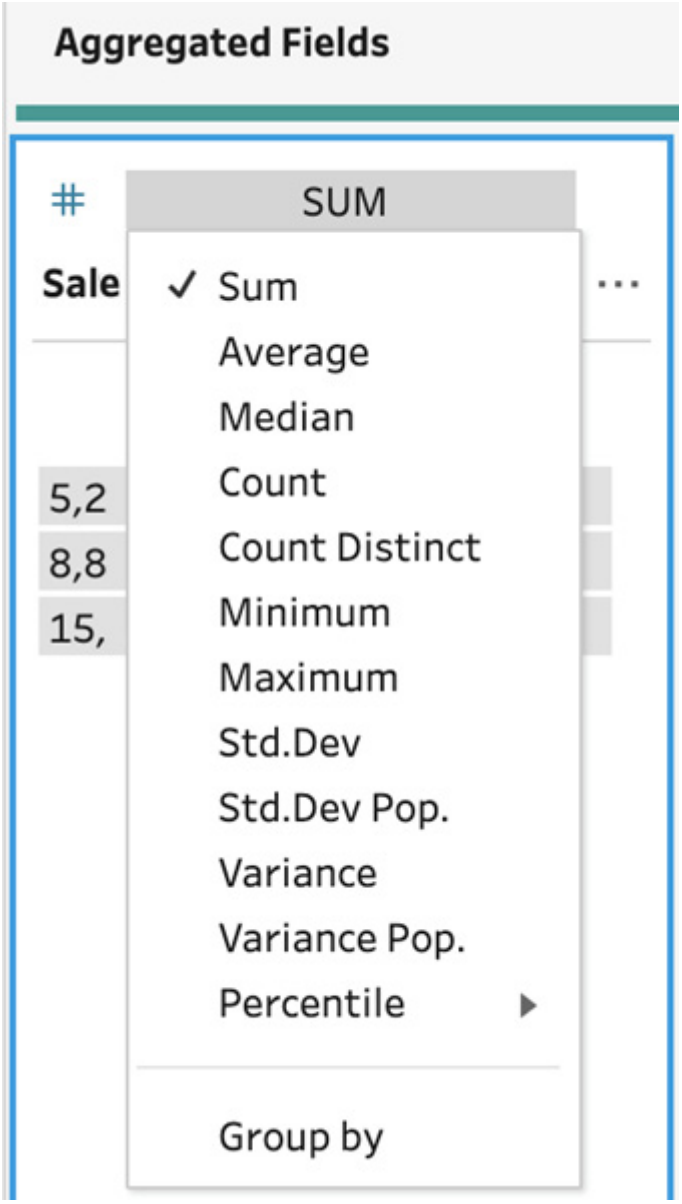
1. At the end of the flow, click the **+** icon to open the context menu and select **Aggregate** to add the Aggregate step to your flow:



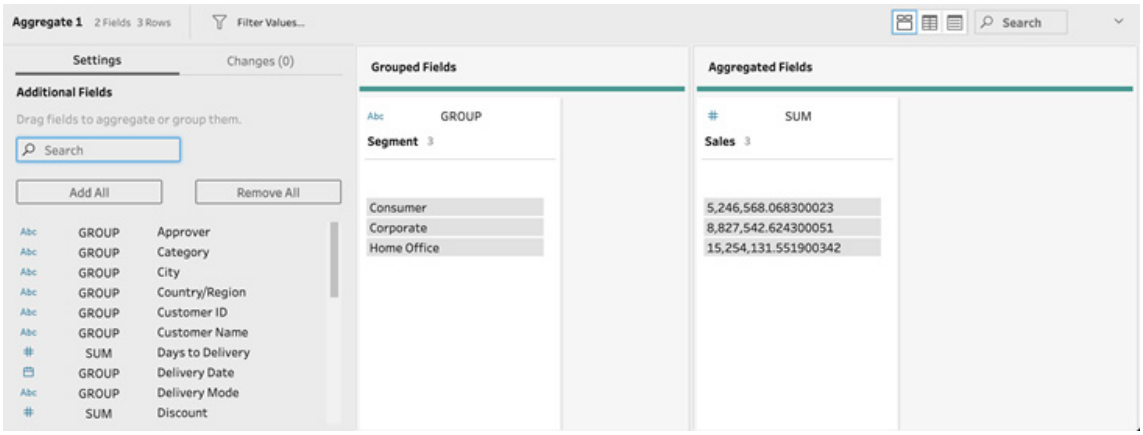
2. Adding the Aggregate step will bring up its configuration pane at the bottom. Here we can select the fields that we want to aggregate by dragging them into the **Aggregated Fields** section. Drag the **Sales** field into the **Aggregated Fields** section. Notice how we instantly see the aggregated value of 29 million:



By default, aggregating a numeric value will be done by **summarizing** its value across all rows. However, you can select from a range of basic mathematic functions, as well as several statistical functions, to use for aggregation. To do so, click the **SUM** function on top of the field in the **Aggregated Fields** section, and select the desired function:



3. The preview we're seeing in *Figure 4.8* is our current dataset that will be output, and so we must add **Segment** back in if we wish to view the sales amount by segment. We do so by creating a group. You can create a group by dragging the desired fields into the **Grouped Fields** section. Try it out and drag **Segment** into the **Grouped Fields** section:



And with that, we've aggregated and grouped our data in just a few clicks. You can add other fields to the Aggregate step by simply dragging them into their respective sections. When doing so, you can always select a different aggregation function for each field. For example, you can summarize **Sales** but add the average **Discount** amount.

How it works...

Aggregating data in Tableau Prep performs the calculations in the data preparation flow rather than outputting all data just for it to be aggregated later in a data visualization tool. It's a process that requires careful thought as you'll want to provide the optimal dataset for the intended downstream analysis: not too broad and not too narrow. In this exercise, you've successfully performed data aggregation. In the process of aggregation, you've created groups. Furthermore, the data preview in Tableau Prep itself might have given you the answer you needed without having to perform additional aggregation steps in a data analysis tool!

Using fixed LOD calculations for grouping data

Level of Detail or **LOD** calculations are calculation expressions that have been available in **Tableau Desktop** for some time. An LOD calculation allows you to aggregate your data at different levels of granularity within a single dataset.

For example, you might have a dataset with customer orders, where each row represents a single line item in an order. You might want to aggregate revenue by order, or by customer, without losing the granularity of your data. This is where LOD calculations come into play. In this exercise, you'll create an LOD calculation. In doing so, you'll group your data into distinct buckets and aggregate values in a single step.

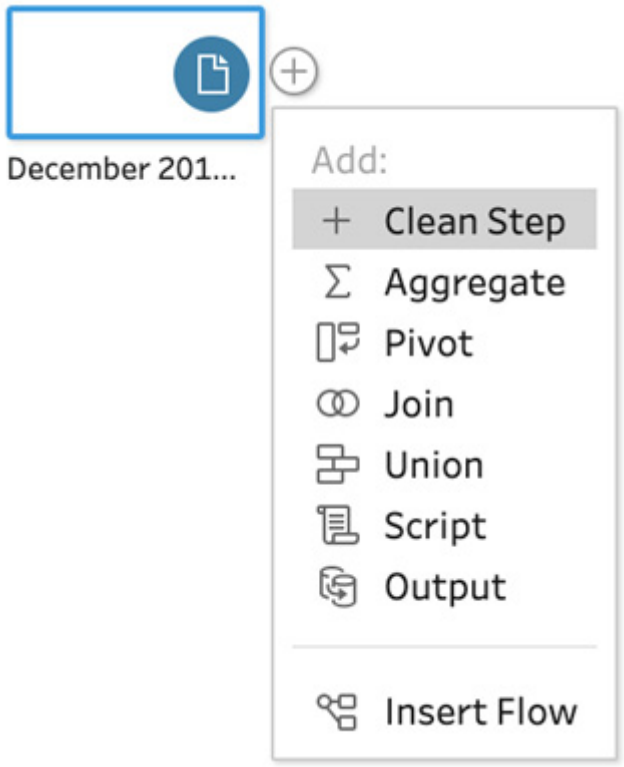
Getting ready

To follow along with this exercise, download the **Sample Files 4.3** folder from this course GitHub repository. You must have **Tableau Prep** version 2020.1 or greater to leverage the LOD functionality.

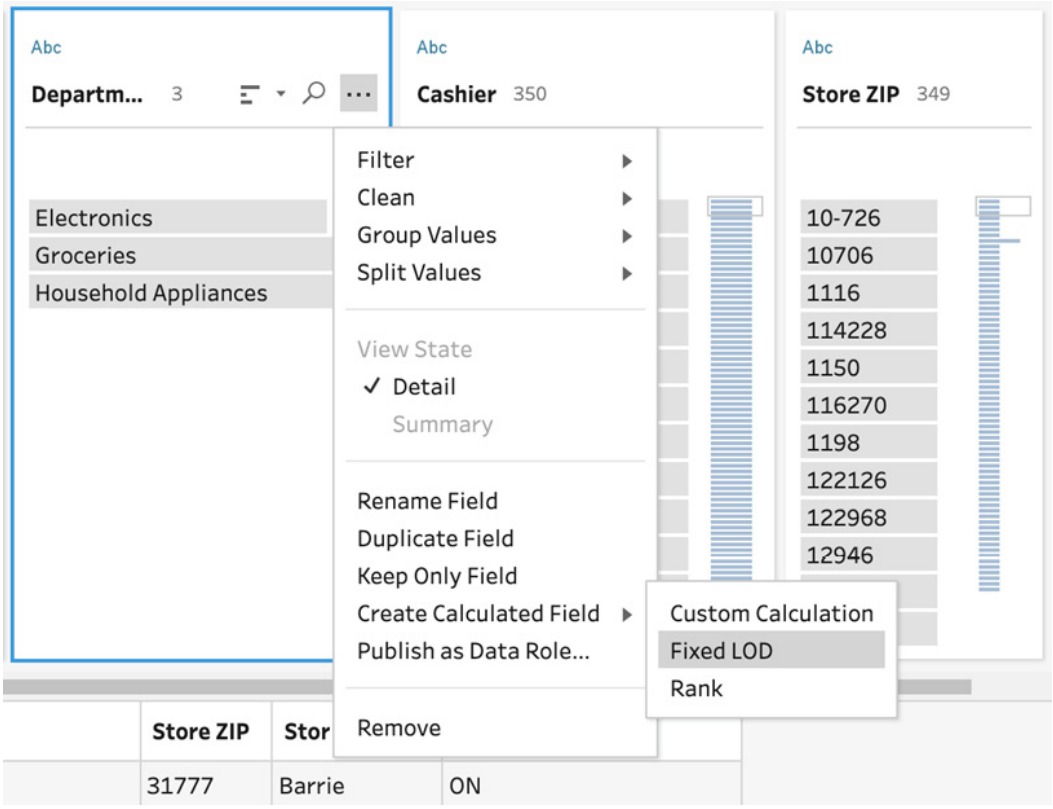
How to do it...

Start by opening Tableau Prep and connect to the **December 2016 Sales.csv** file from the **Sample Files 4.3** folder in Tableau Prep, then follow these steps:

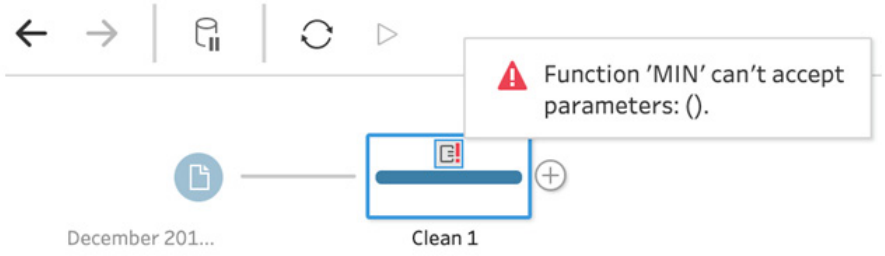
1. Click the **+** icon on the input tool and add a clean step to your flow:



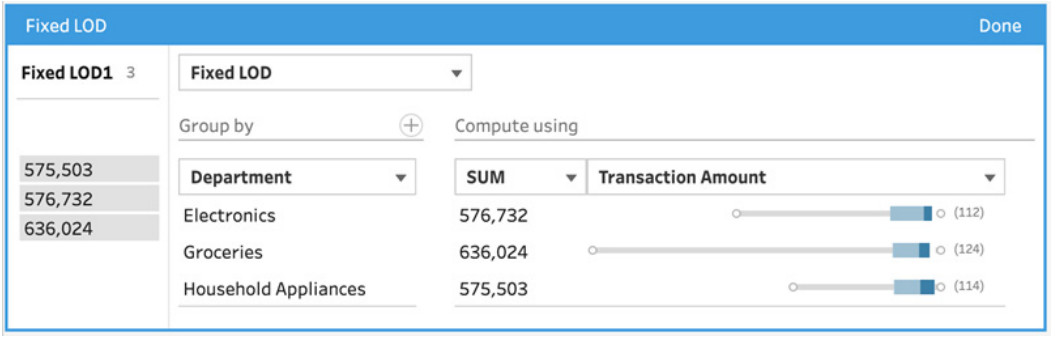
2. Suppose we want to see the total **Transaction Amount** value for each department. As seen in the *Aggregating values* exercise earlier in this lab, we can achieve that output with the **Aggregate** step. However, in doing so, we'd lose the LOD available. In order to prevent this, we'll create an **LOD** calculation. Expand the menu of the **Department** card, then, from the **Create Calculated Field** section, select **Fixed LOD**:



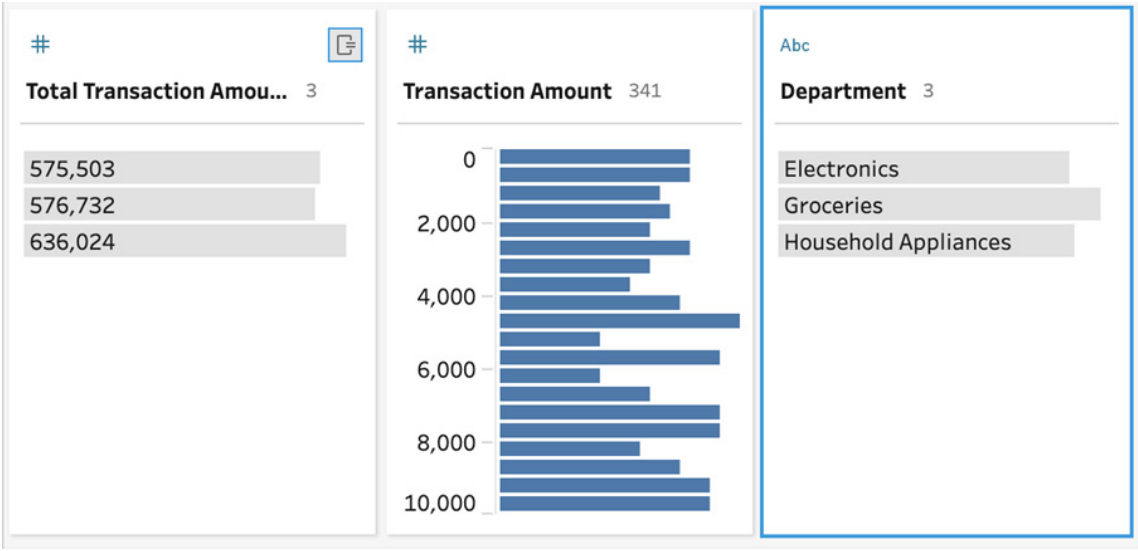
This step will cause an immediate error in your flow. That's expected, as we need to take another step to configure the LOD calculation:



3. Now that we're presented with the **Fixed LOD** dialog, we need to populate the **Compute using** section in order to complete the calculation. In our case, we want to aggregate **Transaction Amount**. To do this, select **Transaction Amount** from the list of values and select **SUM** as the aggregation method, then click **Done**:



4. Tableau Prep will instantly add a new field at the beginning of your dataset, named **Fixed LOD 1**. You can quickly rename this field to something friendlier by double-clicking the name and typing in **Total Transaction Amount by Department**. From the profile pane, we can quickly see the result of our action; the new fixed LOD field has only three values, one for each department. However, the original **Transaction Amount** field still exists with all its original values:



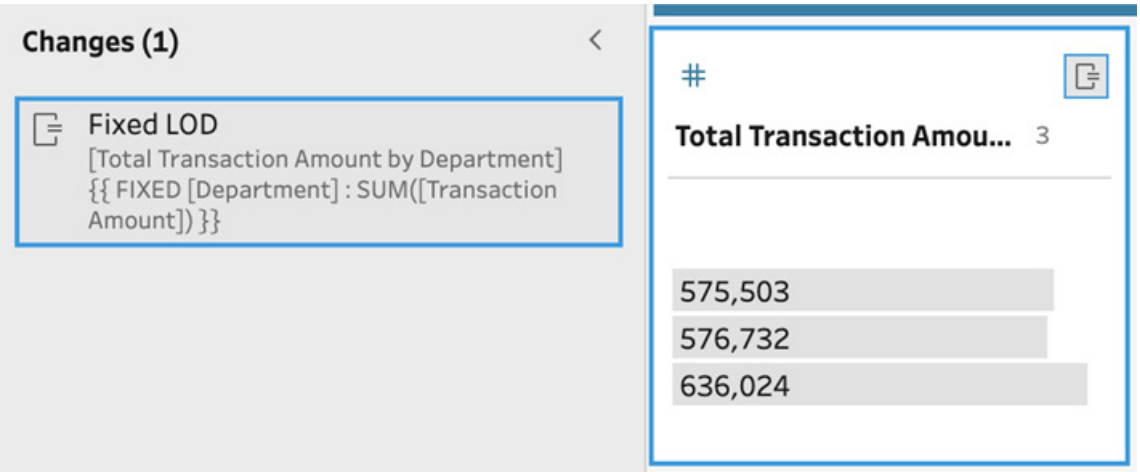
Tip

Ensure that whoever is using your output understands the various levels of detail in your output. There are certain calculations that need to be avoided with the LOD field. For example, a graph plotting the **Department** and **Total Transaction Amount by Department** fields will have inflated results as it will summarize values that have already been aggregated.

How it works...

Tableau Prep uses the same calculation expressions as Tableau Desktop. In this exercise, you've created an LOD calculation that resulted in the creation of a group and value aggregation in one powerful move.

In this exercise, Tableau Prep has done the hard work behind the scenes and created the appropriate LOD calculation based on our selections. You can view the calculation by opening the **Changes** pane:



You're now able to leverage LOD calculations to perform quick data preparation, and even data analysis, in Tableau Prep!

Grouping data

Grouping data in **Tableau Prep** can be done as part of the **Aggregate** step, as we've seen in the *Aggregating values* exercise earlier in this lab. The function we'll review in this exercise is different, in that it can group values from a single field based on certain criteria.

As an example, values in a Name field might include John Smith and Smith, John. These might refer to the same person, and so we can group them together as John Smith. Performing this type of grouping is key to your data preparation efforts and ensures the downstream analysis does not run into issues with seemingly duplicate names.

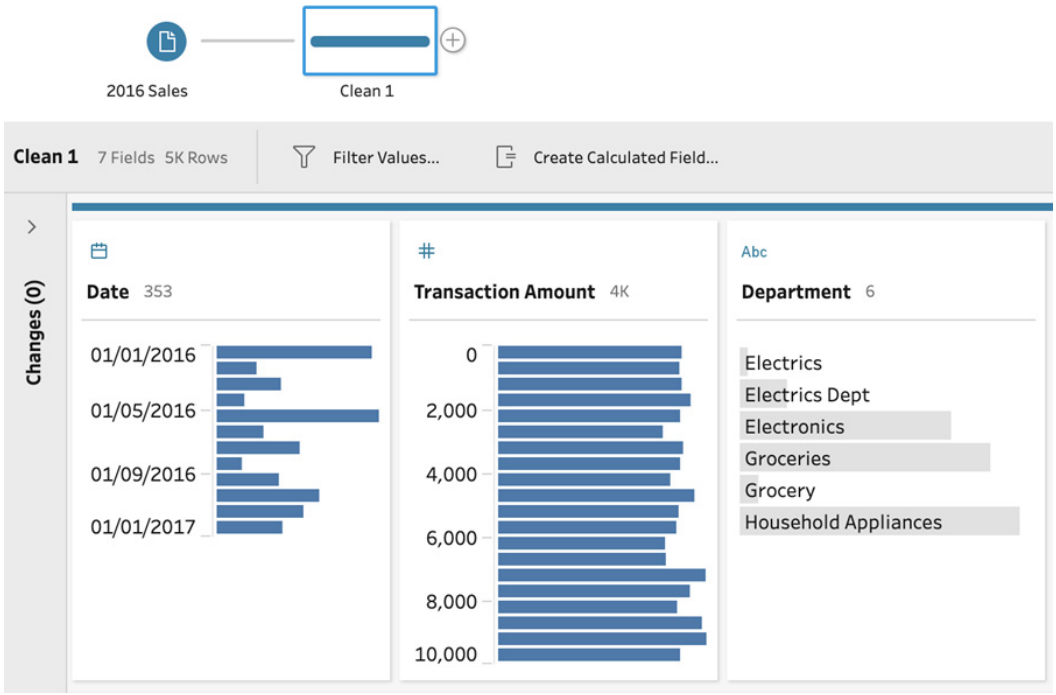
Getting ready

To follow along with this exercise, download the **Sample Files 4.4** folder from this course's GitHub repository.

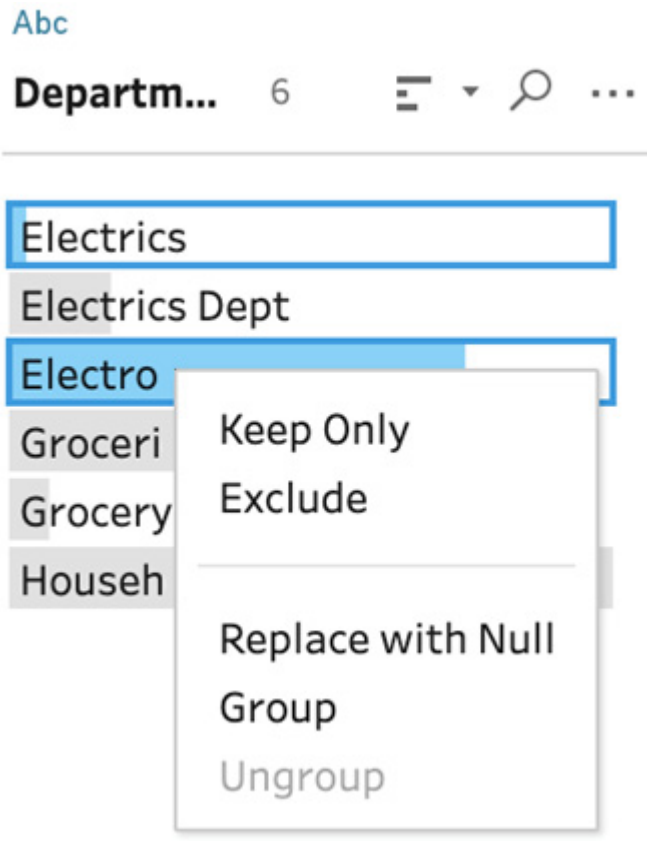
How to do it...

Start by opening Tableau Prep and connect to the **2016 Sales.csv** file from the **Sample Files 4.4** folder in Tableau Prep, then follow these steps:

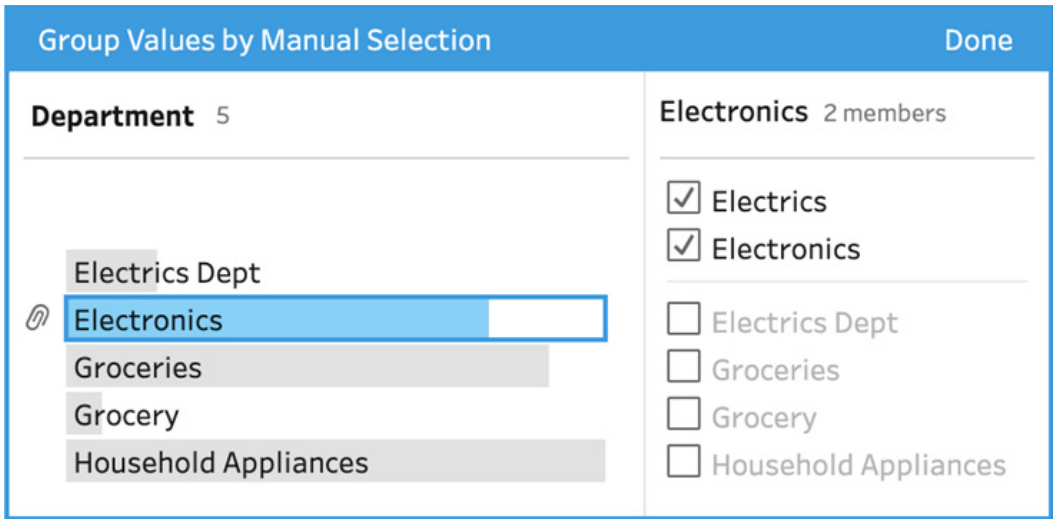
1. Add a clean step to your flow and observe the values in the **Department** field in the profile pane. We can see some of the data here has been entered inconsistently. Specifically, we have **Groceries** and **Grocery** and **Electronics**, **Electrics**, and **Electrics Dept**:



2. Let's resolve the issue by using grouping. Select both the **Electrics** and **Electronics** (hold the *Ctrl* key on your keyboard) fields. Do not include the **Electrics Dept** value. Then, right-click and select **Group Values**:

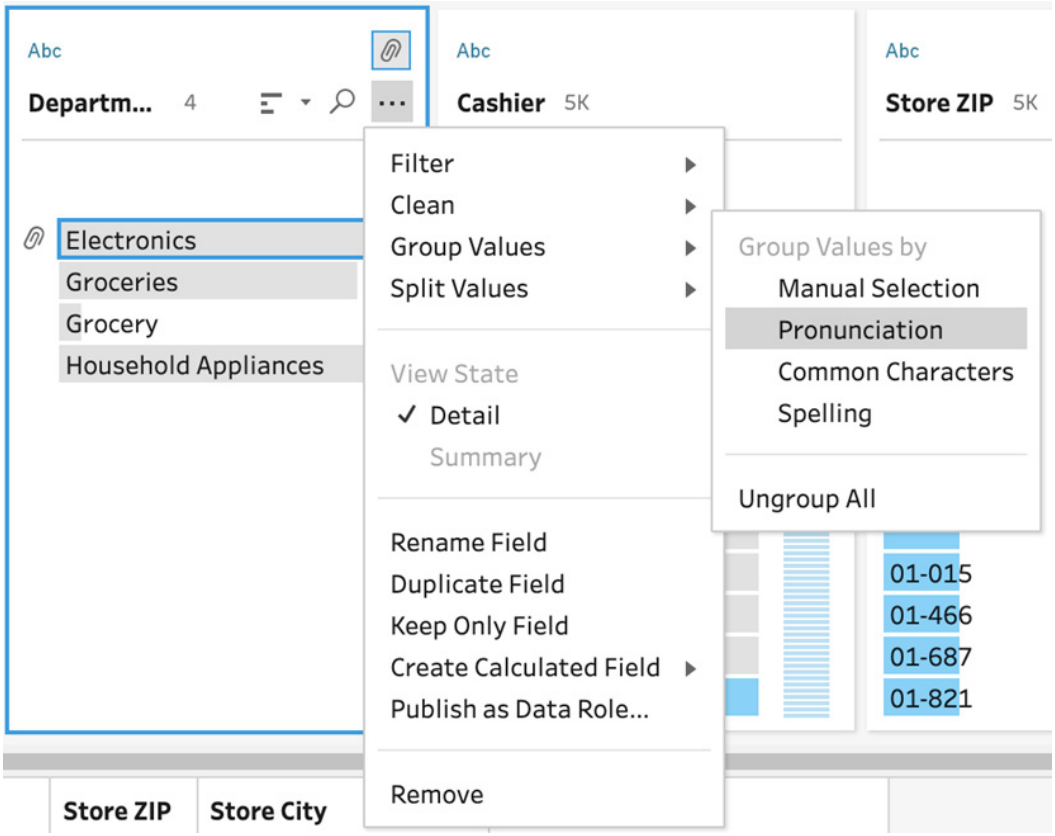


3. After the grouping action has been completed, a little paperclip icon will show up next to **Electronics**, indicating that multiple values are grouped together. Your data map changes over time and as a result, new values may be introduced. Let's assume the **Electrics Dept** value was added later. To edit the current group, right-click **Electronics** (the item with the paperclip) and select **Edit Group Members**:

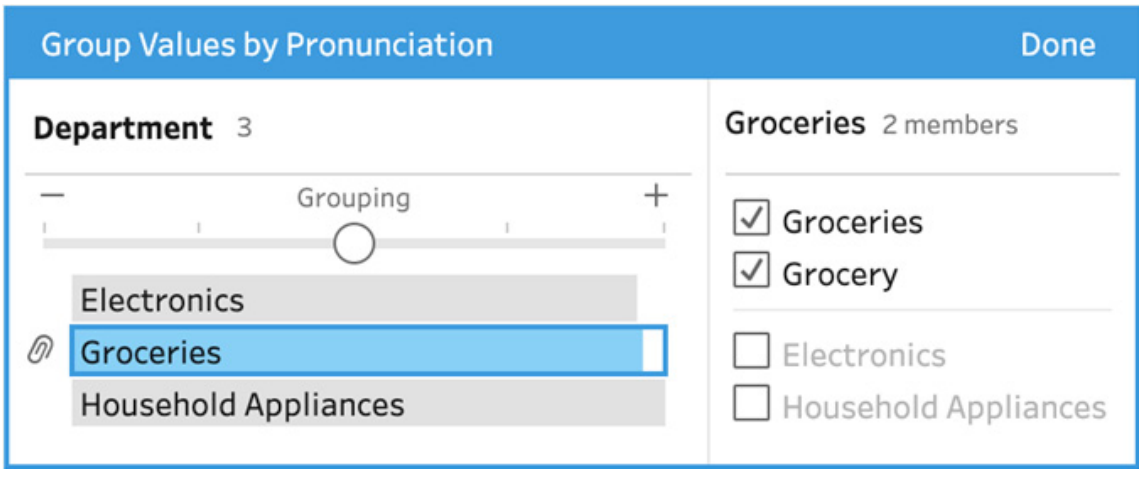


4. In the group members edit dialog, select **Electrics Dept** followed by **Done** to update your group to include all three variations of **Electronics**.

5. Thus far, we've been grouping data manually, that is, selecting values and grouping them. Tableau Prep has a number of built-in algorithms that can perform grouping for you automatically. Let's try this out on the **Department** field by opening the context menu, selecting **Group Values**, and then selecting **Pronunciation**:



6. The edit group member dialog opens up automatically so we can instantly view the results of this algorithm, and we can see here that it has grouped **Grocery** and **Groceries** together, as we wanted. Take note of how this edit group dialog is different from the manual grouping one we saw earlier. There's a slider at the top that influences the results of the algorithm. In this case, we see how similar the pronunciation should be in order to allow grouping. You can move it to the left and right to instantly see the effects it has:



How it works...

In this exercise, you've manually grouped data. You've also reviewed the different options available to you, including manual grouping, pronunciation, common characters, and spelling grouping options. When you run your flow,

Tableau Prep will replace any value in your group with the name of the group itself. Grouping is a great thing to do to improve the quality of your data and make the resulting analysis more robust.

With the knowledge gained in this exercise, you're now able to leverage the different types of data grouping options available to you in Tableau Prep.