Chapter 8

Interactive Dashboards

Dashboards provide all the important information about a topic in one view. They are a popular tool for managers and subject-matter experts alike, allowing them to stay up-to-date and to make better business decisions. Having the right dashboard available means you don't have to look for different data sources that may be distributed over multiple locations, and you have a one-stop solution to the latest data available—assuming the underlying database provides updates in (near) real time.

A dashboard in Tableau typically consists of the charts from several worksheets and other elements. They can be made interactive by linking the individual charts, so that clicking a mark in one chart changes what you see in the other charts. This adds context and allows the end user to explore the data in various ways. For instance,

Visual Analytics with Tableau®, First Edition. Alexander Loth.

imagine a bar chart with product categories and a world map with sales locations. Clicking the bar of a specific category could filter the map to only show the sales of that particular product. Adding such interactivity helps bring the data alive.

Other elements can be added to a dashboard, including titles, text boxes, images, web elements, and navigation buttons.

By the end of this chapter, you will be able to:

- Combine several charts into one dashboard.
- Add interactivity with filter and highlight actions.
- Use URL actions to embed websites and allow email mailings.
- Follow an iterative process to further improve the design and usability of your dashboard.

PRELIMINARY CONSIDERATIONS

Before jumping in, it can be beneficial to pause and clarify the purpose of the dashboard. Ask yourself the following questions:

- What are you hoping to achieve with the dashboard?
- What is the intended effect?
- Who is your primary audience?
- What part of the data is most interesting for your target audience?
- Are you trying to communicate a specific point, or do you want to enable the audience to ask their own questions?
- What kinds of questions might they have?
- How can this data help your audience make better decisions?
- Are there secondary audiences or use cases that your dashboard also has to cover?

Answering these questions beforehand will help you build more effective dashboards.

That said, in practice, creating a dashboard is often an iterative process; there is no single, perfect dashboard. But with regular feedback from your target audience, you can quickly improve on a rough first design.

Making regular improvements is easily done in Tableau and also helps you get the necessary buy-in from colleagues who will use the dashboard on a day-to-day basis.

CREATING A NEW DASHBOARD

To create a dashboard in Tableau, click the New Dashboard button, which is next to the New Worksheet button that you probably have used several times by now (see Figure 8.1).

Familiarize yourself with the workspace and the Dashboard pane on the left side, as shown in Figure 8.1.

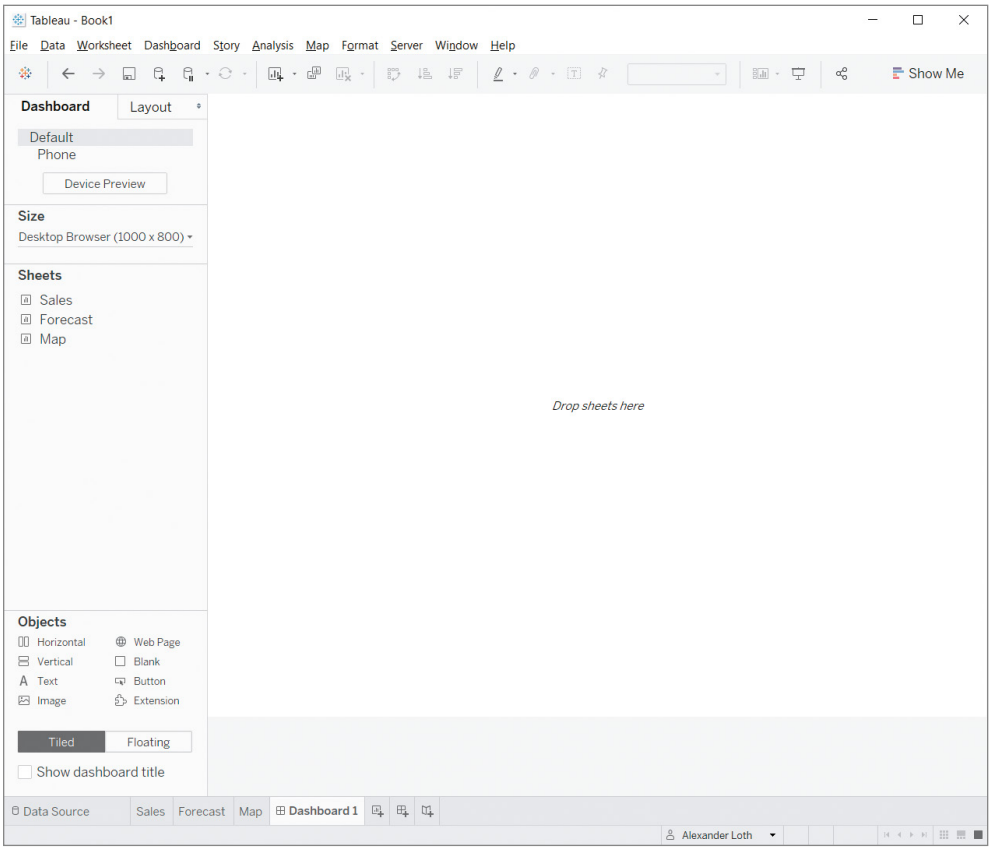

Figure 8.1 A blank dashboard.

THE DASHBOARD PANE

The Dashboard pane is essential for creating dashboards. It consists of the following sections, from top to bottom:

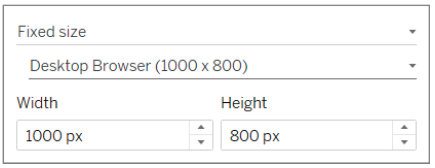

Figure 8.2 Defining the dashboard template size.

Device Preview Clicking the Device Preview button will give you an idea of what the dashboard will look like on different devices, such as smart phones and tablets, and on differently sized desktop monitors. In addition, you use this tool to create alternative layouts for different screen sizes.

Size The first step is usually to define the size of the dashboard's default layout using the Size drop-down menu. When you choose Fixed Size, you can manually define the width and height of your dashboard. You can also use common formats such as Desktop Browser (1000 x 800), shown in Figure 8.2.

Select Automatic to let the size freely vary according to the available space. Use the Range option to let the size of the dashboard vary, but only within a certain range. You can define the minimum and maximum height and width.

Automatic or range-sized dashboards have the advantage that they can make use of the full screen size. When using these options, make sure the dashboard is still usable on smaller screens. If elements are too compressed, you will have to either simplify the dashboard or create a separate layout for smaller screens using the Device Preview mentioned earlier.

Using a fixed size has the following additional advantages:

- The dashboard will look the same on each screen.
- The dashboard can load faster (due to caching).
- Floating dashboard elements are always in the same spot.

TIP Choose a size that fits well with the resolution of your colleagues' screens. The Desktop Browser (1000 x 800) setting has been found to work very well in practice.

Sheets Probably the most important section of the Dashboard pane is the one in the center with a list of your existing worksheets that you can place on your dashboard.

Objects The Objects section at the bottom of the Dashboard pane allows you to add additional dashboard elements. The options include Text, Image, Blank, Web Page, Button, and Extension.

Below that, you can toggle between Tiled and Floating. When Tiled is selected, sheets and dashboard objects are placed next to each other in a grid. When Floating is selected, new elements can be moved and sized independently of each other and placed on top of each other.

At the very bottom of the Dashboard pane is a check box to show the dashboard title.

TIP For beginners, it is often easier to work with Tiled layouts at first. When you use the Floating option, more work is required to size and place elements accurately. What's more, with automatic or range-sized dashboards, you have to ensure that the elements scale as intended when the size of the dashboard changes. Therefore, it is recommended that beginners use this option only in conjunction with fixed-sized dashboards.

Behind the Dashboard pane you can find the Layout pane. This has useful options for making finer adjustments to floating layout elements, but we won't touch on its features in this book.

PLACING CHARTS ON THE DASHBOARD

Both worksheets and dashboard objects can be placed on the dashboard by dragging the items from the Dashboard pane to the area labeled Drop Sheets Here.

Consider the workbook from Figure 8.1, which has three sheets: `Sales`, `Forecast`, and `Map`. (If you would like to follow along, take a peek ahead at Figure 8.5 and create each of the three charts in a separate sheet. You should be able to re-create these using the Superstore dataset, based on what you have learned in previous chapters.)

Starting with a blank dashboard, begin by placing the main worksheet (`Sales` in this case) onto the canvas. Then, add the second sheet (`Forecast`) in the same manner. Typically, the main sheet should sit in the top-left corner, which is where the eye tends to look first (at least, in cultures that read from left to right). So, place the second sheet below the first.

As shown in Figure 8.3, the area where the sheet will drop is shown in grey before you release the mouse button.

Tableau will group the filters and legends from all sheets on the right side of the dashboard, by placing them in a layout container. In Figure 8.3, you can see the color legend for the `Profit` measure.

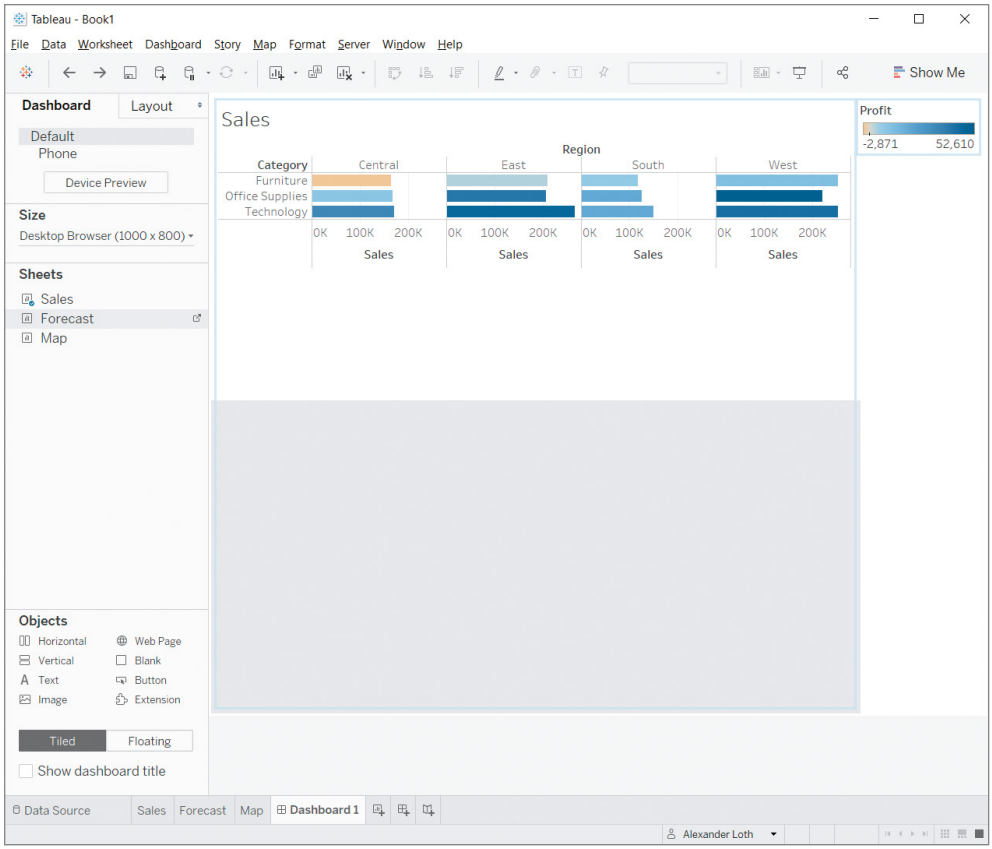

Figure 8.3 A second worksheet is being added to the dashboard.

You can also place worksheets between existing dashboard elements. When you drag a third worksheet, `Map`, between the container with the legend on the right and the first two sheets on the left, the dotted blue line indicates where the new sheet will appear (Figure 8.4).

TIP When you give your worksheets meaningful names, it will be easier to find the right charts when putting together a dashboard. Worksheet names can be changed by double-clicking the tabs at the bottom of the window.

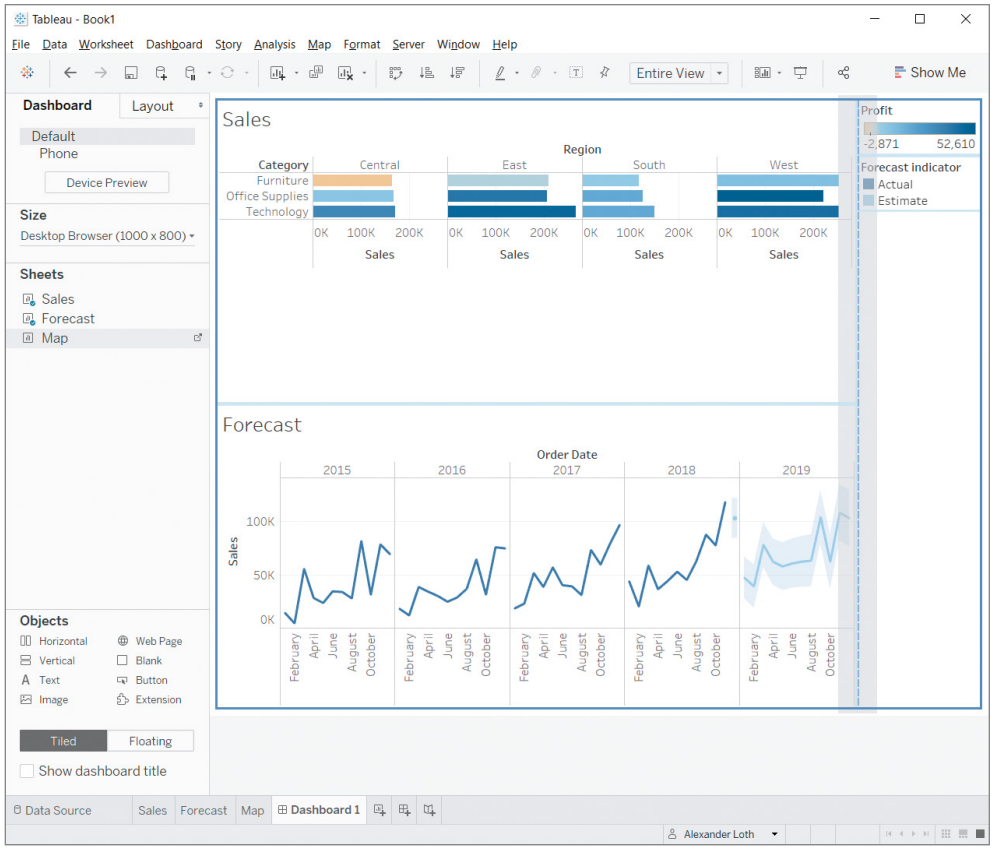

Figure 8.4 A dashed line indicates where the additional worksheet will be inserted.

In the case of this example, you will have to adjust the size of the map to make the layout of the dashboard more balanced. You do that by moving the left border of the `Map` container to the left, thereby giving it more space relative to the other sheets (see Figure 8.5).

DASHBOARD TITLES

The dashboard in Figure 8.5 is as yet unnamed. Right-click the Dashboard 1 tab at the bottom of the screen; in the context menu, select Rename. Then enter a name of your choosing, such as `Sales Overview`.

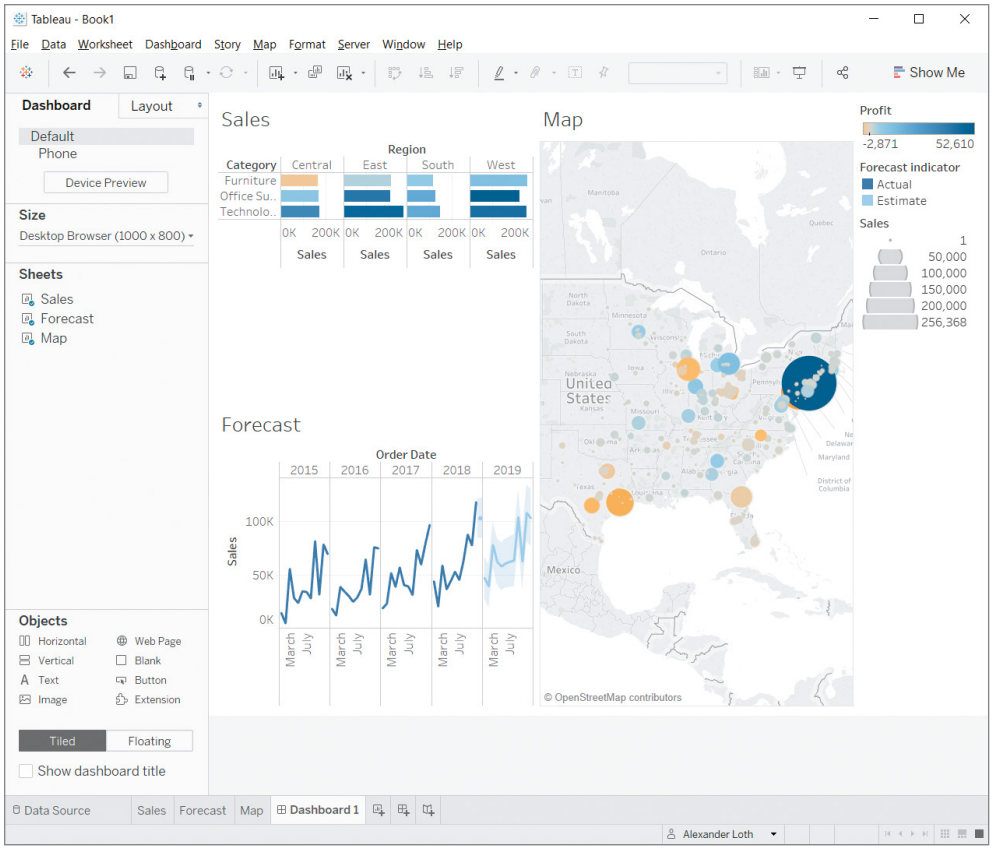

Figure 8.5 A dashboard with three charts.

Select the Show Dashboard Title option at the bottom of the Dashboard pane. As shown in Figure 8.6, the dashboard now has a proper title.

TIP Not happy with the text formatting? Double-click the title, or any other text box, to individually edit and format it.

NAVIGATION BUTTONS

By including navigation buttons, you allow end users to jump from one dashboard to another.

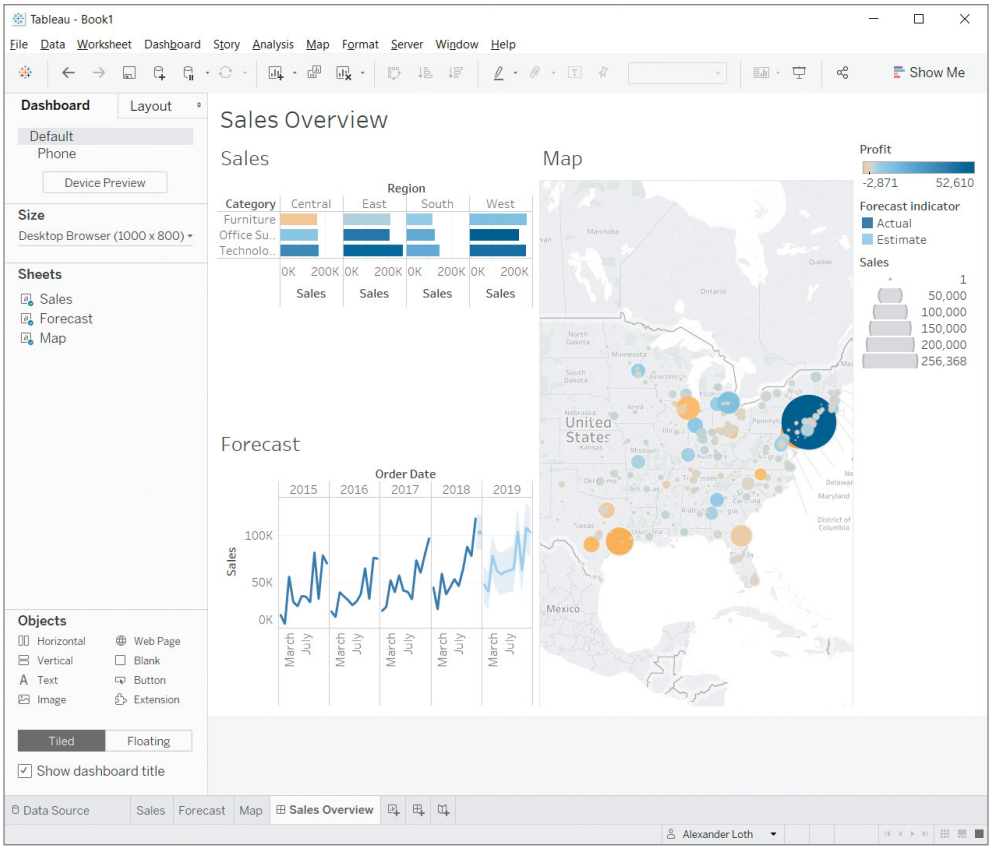

Figure 8.6 Dashboard with title.

From among the dashboard objects, find the Button item, and drag it onto your dashboard. You may have to resize the button with the mouse. In Figure 8.7, the navigation control has been placed above the color legend.

After placing the button, open its context menu and choose Edit Button. Select the target sheet in the Navigate To drop-down menu (Figure 8.8). This can be a dashboard, a worksheet, or a Story.

Optionally, you can change the image used for the button or edit the tooltip text, which tells the user what the button does when they hover over it.

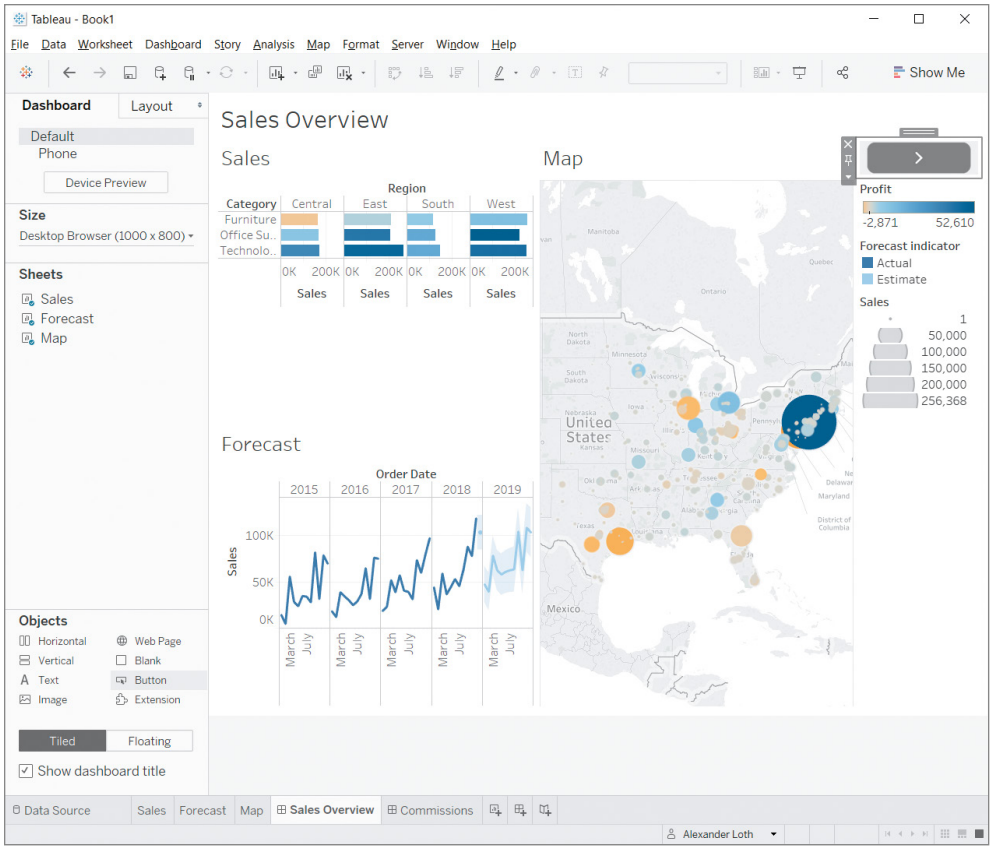

Figure 8.7 The dashboard with a navigation button.

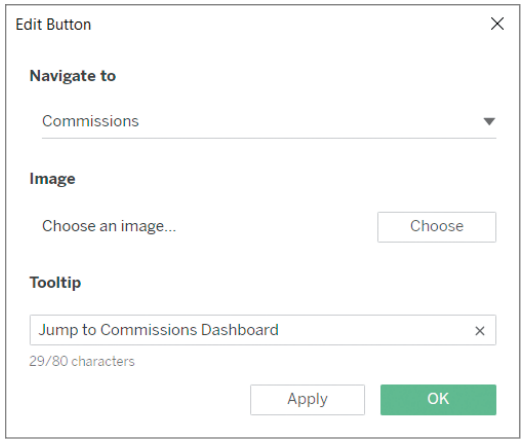

Figure 8.8 Edit Button dialog box.

TIP It makes sense to move buttons and other smaller elements out of the grid and set them to Floating, so you have better control over where to place them on the dashboard. You can do that for individual dashboard objects in the element's context menu.

DASHBOARD ACTIONS

Dashboard actions enable the end user to intuitively explore the data and better understand the connections between the different charts. Actions can be set up to filter or highlight charts, to open web content, or even to send email notifications. Advanced users can use dashboard actions creatively to implement even the most sophisticated linkages between charts. This is especially true since set actions were added in version 2018.3.

Tableau distinguishes between the following types of dashboard actions:

- **Filter actions:** Filter the target charts based on the selection in the source chart.
- **Highlight actions:** Highlight marks according to the selection in the source chart.
- **URL actions:** Open web content (and can be used to send email notifications) according to the selection in the source chart.
- **Set actions:** Change the values within a manually defined subset of your data. (Sets and set actions are beyond the scope of this book.)
- **Go-to-sheet actions:** Take the user to another sheet or dashboard, based on the selection in the source chart. (These work well in combination with navigation buttons, which can be used to take the user back to the entry dashboard.)

Filter Actions

Filter actions are a great way to link up two charts, and of all the different types of actions, they are the easiest to set up. In fact, doing so takes just two clicks. First select the sheet on your dashboard that you want to use as the source for the filter action.

Once you see the grey frame, open the small menu that appears beside it. Click the third button from the top—the one with the funnel icon, labeled Use As Filter—as shown in Figure 8.9.

Repeat the process for all sheets that you want to act as filters. To test the result, simply click one or more marks in one of the source sheets. For example, in the dashboard shown here, you could click the bar showing sales of furniture in the Central region. You can also select several marks at the same time: this works particularly well with maps,

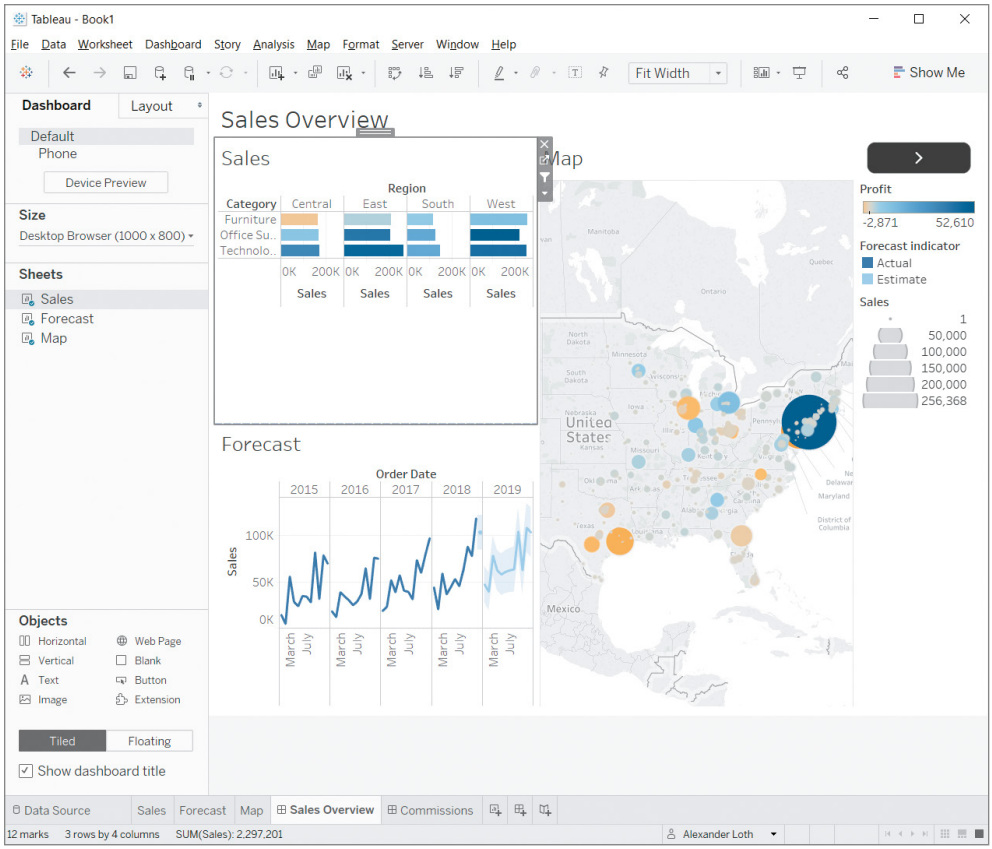

Figure 8.9 Using the top-left sheet as a filter for the other sheets.

where you can select several marks in a region by drawing a rectangle around them or by using the free-hand lasso tool. The other charts will also be filtered to only show the rows of data that underlie the selected marks in the source sheet. In Figure 8.10, they now show only data related to sales of furniture in the Central region.

To undo the filter, unselect the mark by clicking the white space on the source chart.

TIP As you can see, it is very easy to set up a filter action on a dashboard. But not every chart has to be linked to every other chart. Think carefully about which linkages make sense for your audience.

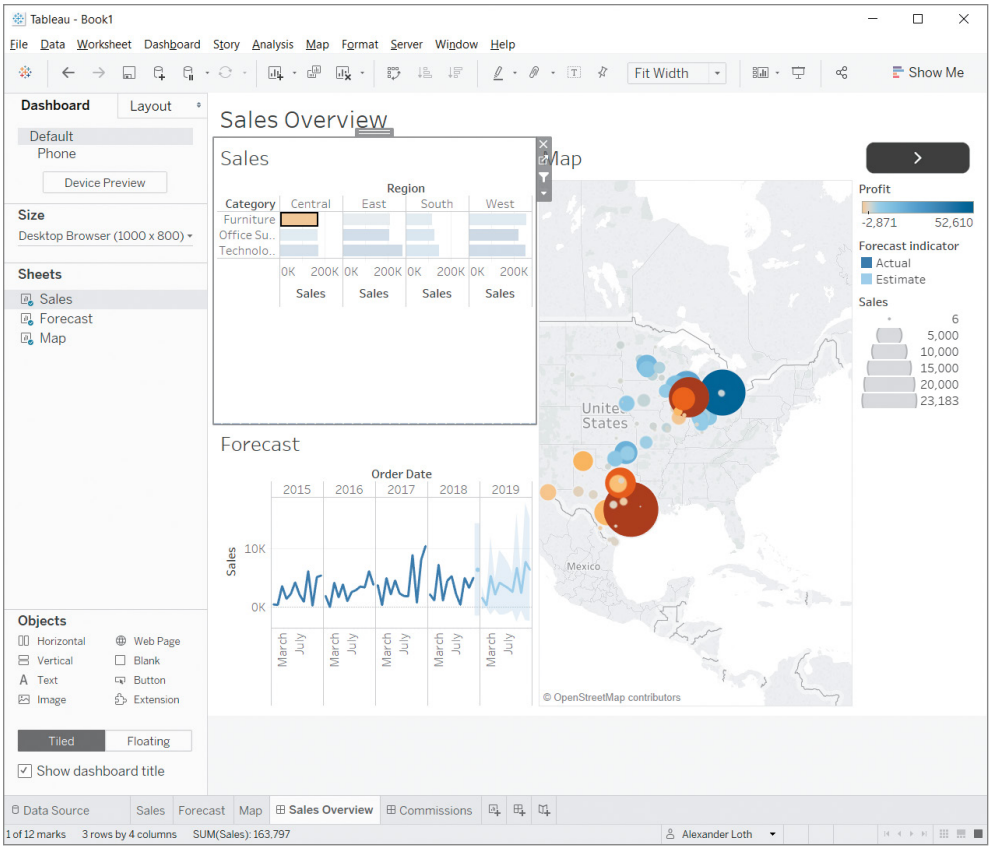

Figure 8.10 Filter action in use: only data from Furniture/Central is shown in the linked charts.

Adding and Editing Filter and Highlight Actions

By clicking the Use As Filter icon, you quickly generated a filter action. Such actions can be further adjusted and manually set up via the Actions entry in the Dashboard menu at the top of the screen. Selecting this opens the Actions window. If you have used the Use As Filter button to set up any filter actions, you will see the associated actions listed here—the addition of (Generated) to the name indicates that these were added by using the Use As Filter button. See Figure 8.11.

Select one of the entries, and click Edit to make further adjustments. Here you can also manually add dashboard actions, not just filter actions. Click Add Action to see a menu that lists the available action types (see Figure 8.12). Choose Filter or Highlight from the menu. We will touch on Go To URL in the next section.

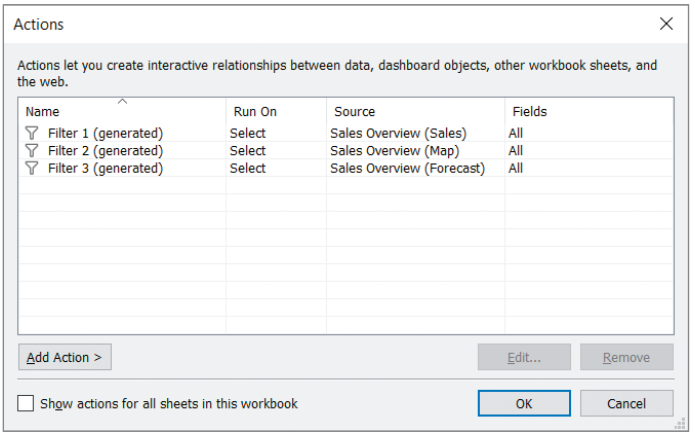

Figure 8.11 The Actions window lists all existing actions for the workbook.

After you choose a filter type, the Add Action menu opens a dialog box that lets you configure the action (see Figure 8.13), while the Edit option provides the same window to adjust existing actions.

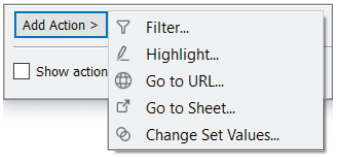

Figure 8.12 Choosing a filter.

In the Source Sheets section, you can select the sheets you intend to trigger the action. In addition, you can choose how the action will be triggered: on Hover, on Select (mouse click or tab), or Menu select (a link will be added to the tooltip).

Below that, you can specify the target: i.e. which target sheets the action should affect. For filter and set actions, you can also set what happens when the selection is cleared.

In the case of filter and highlight actions, you can specify which fields should be used to link the two charts (All Fields is the default).

TIP Target sheets don't necessarily have to be on the same dashboard. You can also link to sheets on other dashboards (within the same workbook). To do so, select the dashboard in question from the drop-down menu above the list of sheets. This can make sense, for example, if a second dashboard covers a different topic or presents a subsection of the data in more detail. Examples where I have seen this successfully implemented come from the fields of return controlling and workforce management.

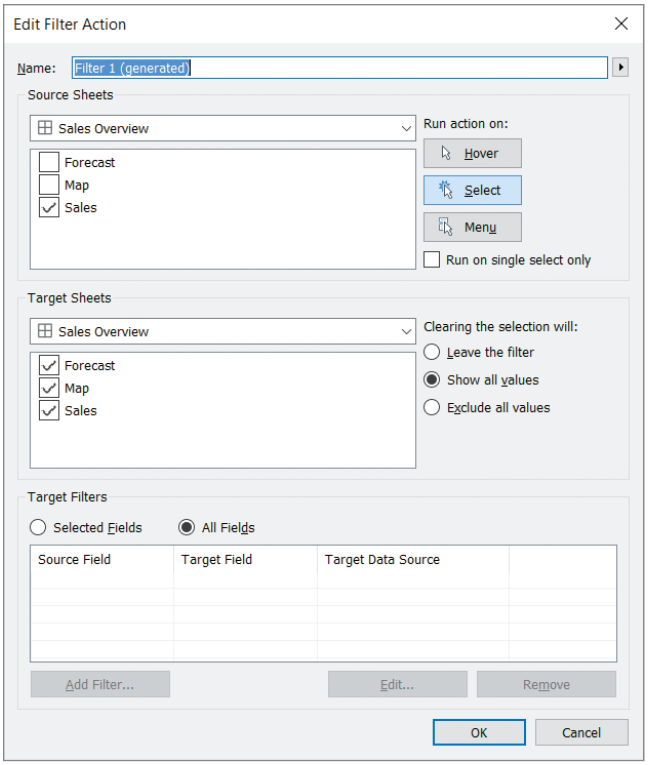

Figure 8.13 Configuring a filter action.

Adding Web Content via URL Actions

It can sometimes be useful to refer to web content, such as product sheets, web forms, or even whole websites, from within your dashboard. This is where Web Page objects come in.

To set one up, drag the Web Page object from the Dashboard pane to where you would like to place it on your dashboard. See Figure 8.14.

When you release the mouse, you will be prompted to provide a URL. Enter a web address here, if you would like to have the same website displayed at all times.

But you can also use URL actions to determine the content dynamically. In that case, leave the URL field empty. Choose Actions in the Dashboard menu, and, in the Actions window, click Add Action and choose Go To URL from the menu.

Tableau shows the window to set up and edit a URL action (see Figure 8.15).

Imagine, for example, that you would like to show the Wikipedia pages for cities on a map. Give the URL action a name, such as `City Information`. From the list of Source Sheets, choose those that contain the dimension `City`. In Figure 8.15, this would be the `Map` sheet.

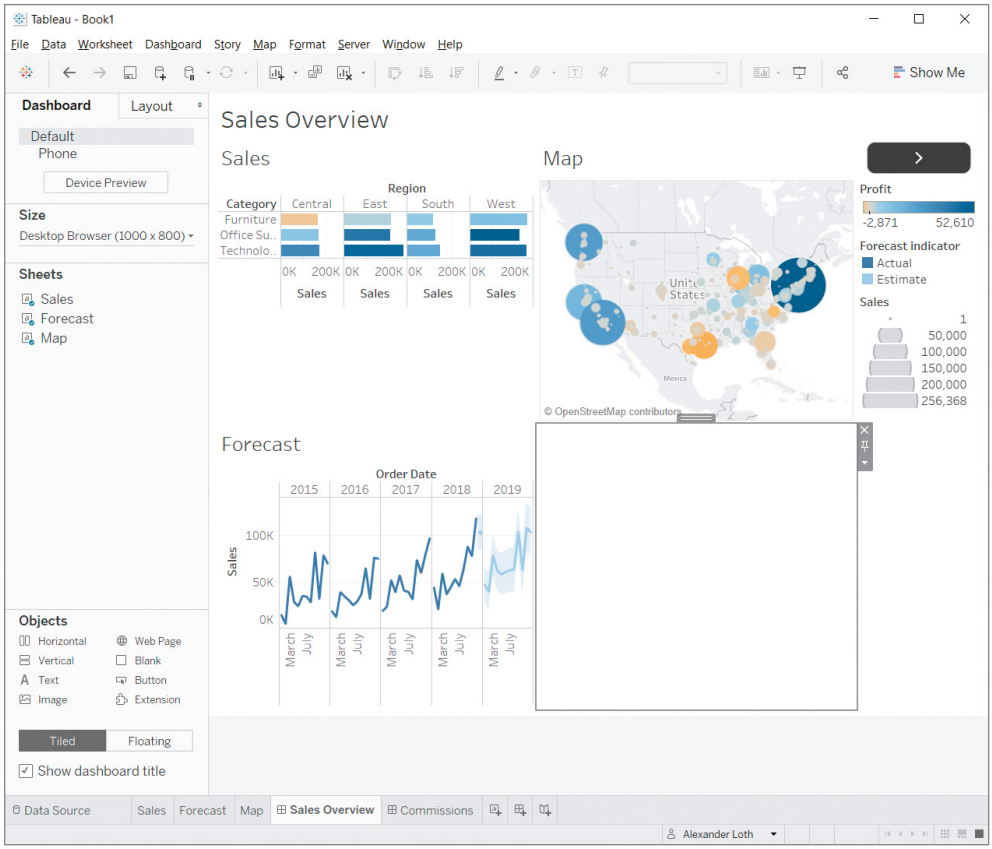

Figure 8.14 Empty Web Page object in a dashboard.

With just one URL action, it is probably best to run the action on Select. If several different actions are triggered by the same sheet, you have the option of running them from the context menu of the tooltips (choose Menu).

Most important, add the address of the website in the URL field. Use the arrow button to insert dimensions from your data that contain the entire URL or parts of it. If you had the URL for every city's Wikipedia page in your data, you would insert that field. You don't have such a field in the Superstore dataset, but you can use the fact that the URLs for most Wikipedia entries have a similar structure. So, you can use the following URL: http://en.wikipedia.org/wiki/<City>.

Here, `<City>` is a placeholder created when inserting the `City` field from the dataset. It will be replaced by the actual name of the city in question when it is selected in the source chart. Instead of using the arrow button, you can also type out the placeholder with the field name in angle brackets.

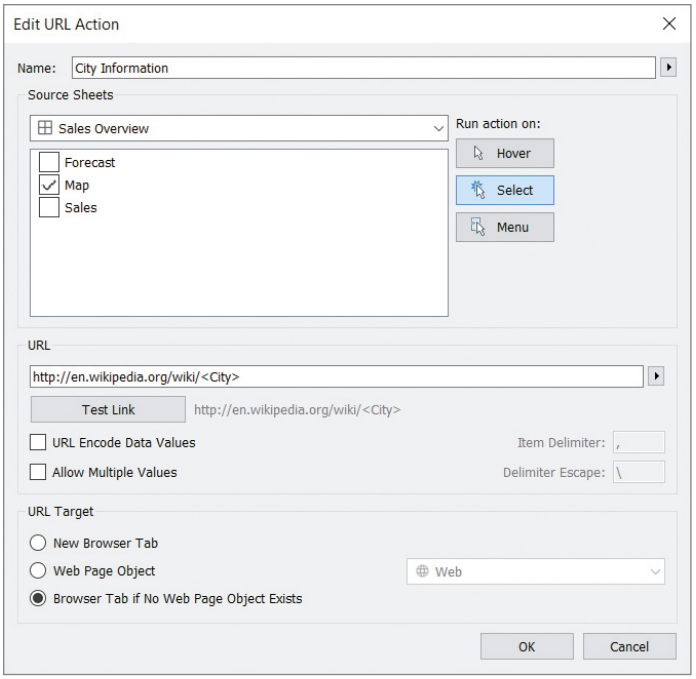

Figure 8.15 Configuring a URL action.

If your dashboard contains several Web Page objects, you can specify in the URL Target section which one to open the web content in.

TIP If your dashboard doesn't have enough space to display an entire web page, you can leave out the Web Page object and have the URL open in the web browser, instead.

To test the new URL action, click a city on the map. As shown in Figure 8.16, clicking Seattle will open the corresponding Wikipedia entry in the web element of the dashboard.

To get your creative juices flowing, here is a list of other websites that can be used in a similar manner. Note the inclusion of a placeholder in each URL:

- **Google search:** https://www.google.com/search?q=<City>
- **Google image search:** https://www.google.com/search?q=<City>&tbm=isch
- **Google Trends:** https://trends.google.com/trends/explore?q=<City>
- **Twitter search:** https://twitter.com/search?q=<City>

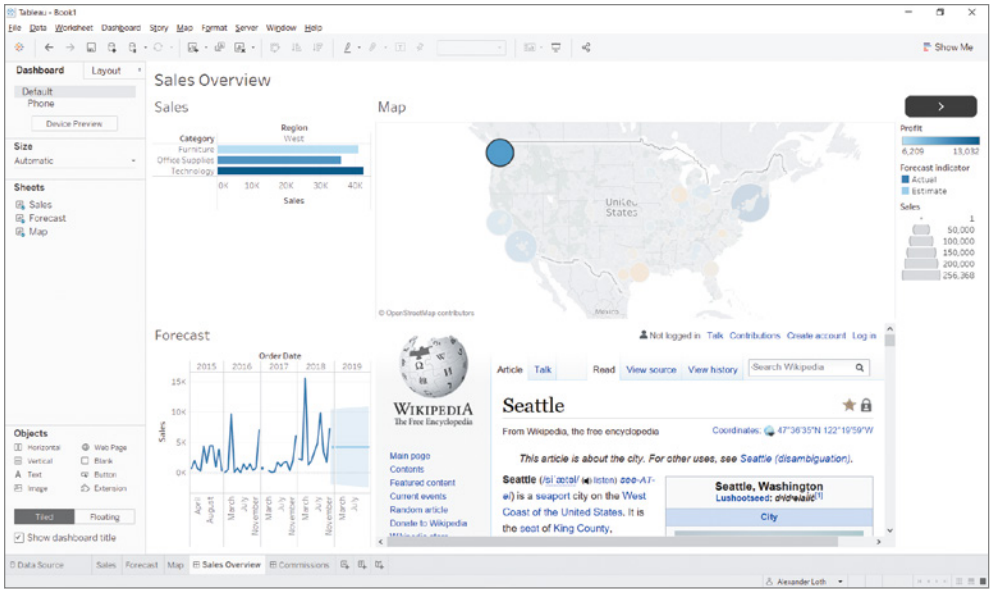

Figure 8.16 Clicking a city loads the corresponding Wikipedia entry.

Email Notifications via URL Actions

URL actions can also be used to set up email mailings from your dashboard. To do so, proceed as in the previous section, but do not add a Web Page object to the dashboard. You want the URL action to be processed by the browser, which will then open a new email in the email client (e.g. Microsoft Outlook). This happens because you are using the term `mailto:` in the URL. Specifically, the URL should look like this:

```
mailto: warehouse@mycompany.com?subject=Inventory check&body=<City>
```

If the email address also depends on the data, e.g. there is a different email address for each product manager, you can of course use a placeholder to insert that dynamically into the URL. It would look like the following example:

```
mailto:<Email address>?subject= product availability&body=<product name>
```

Note that the `subject` and `body` elements are optional and can be left out:

```
mailto:<E-Mail address>
```

TIP For this to work, you need an email client that can respond to the `mailto` URL. If you use a web email service such as Gmail, you will have to install a browser plugin first that can interpret the `mailto` function.

DASHBOARD STARTERS: TEMPLATES FOR CLOUD DATA

If you use Tableau Online in addition to Tableau Desktop, and if you work with certain cloud services, you can connect quickly to the data from these services using dashboard templates called Dashboard Starters. Tableau provides prebuilt dashboards for the following data sources: Salesforce, ServiceNow, Marketo, and Eloqua.

To create a dashboard based on one of the templates, go to the Workbooks tab in Tableau Online and click New Workbook. In the Connect To Data window, choose the rightmost tab, Dashboard Starters. See Figure 8.17.

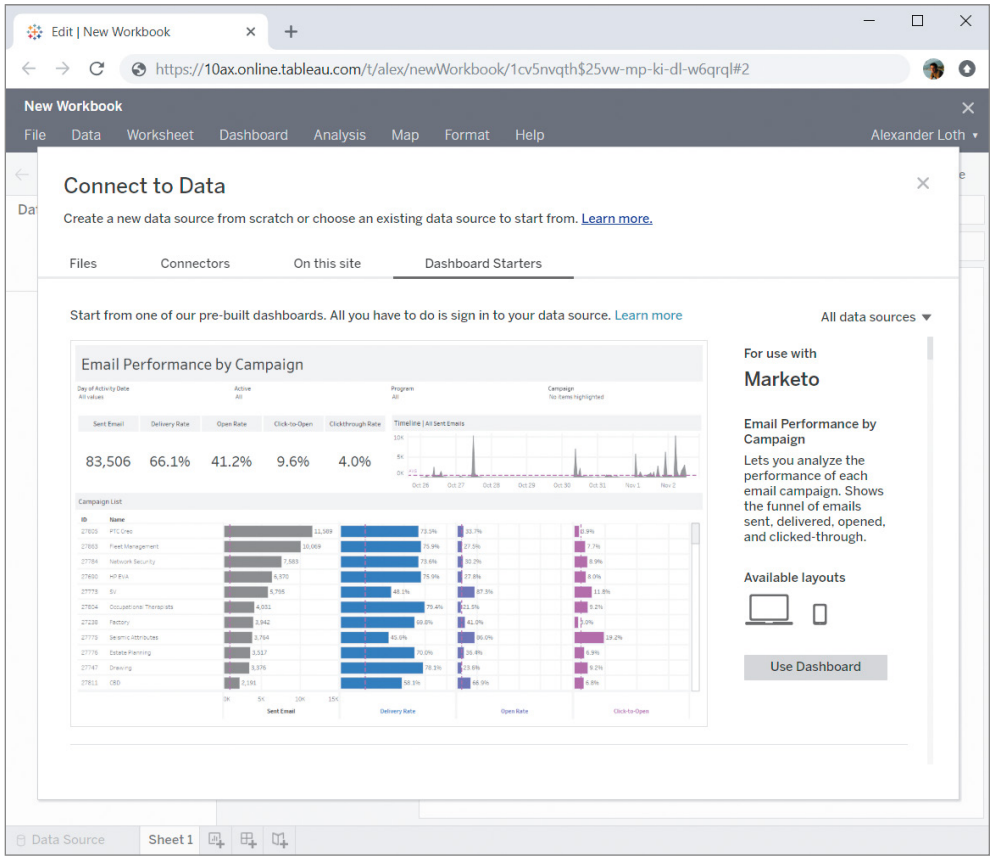

Figure 8.17 Creating a dashboard with Dashboard Starters.

Scroll through the list of templates, and choose one to associate with the data source you want to connect to. Click Use Dashboard. Finally, give the dashboard a name and define which project it will belong to.

Click Continue to create a new workbook based on this template and connect to your organization's data. If you would like to first see the dashboard with sample data, click Continue Without Signing In (see Figure 8.18).

After you click Continue, you will be asked to sign into your cloud service. You get to view a preview of the data while Tableau generates an extract.

Each Dashboard Starter contains a number of common dashboards:

- For use with Marketo:
  - Email Performance by Campaign
  - Email Performance Overview
  - Web Engagement
- For use with Eloqua:
  - Account Engagement
  - Campaign Details
  - Campaign Overview
- For use with Salesforce:
  - Account Tracking
  - Marketing Leads
  - Open Pipeline
  - Opportunity Overview
  - Opportunity Tracking
  - Quarterly Sales Results
  - Top Accounts

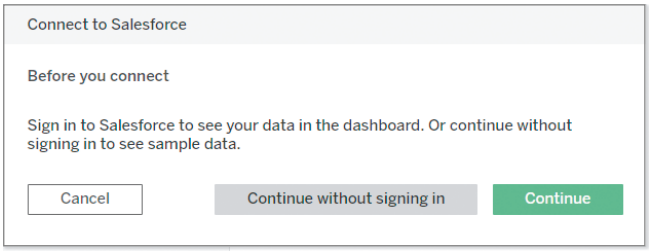

Figure 8.18 Dashboards can be tested with sample data by clicking Continue Without Signing In.

- For use with ServiceNow ITSM:
  - Executive Dashboard
  - Incident Report for IT Managers
  - Incident Tracker for IT Staff
  - Problem Report for IT Managers
  - Problem Tracker for IT Staff
  - Request Report for IT Managers

DASHBOARD BEST PRACTICES AND INSPIRATION

As mentioned at the beginning of the chapter, creating a dashboard is often an iterative process. After you make a first draft, you may realize, for example, that a crucial chart is missing or that the existing charts need to be tweaked in some way. It can take a few review cycles to find the optimal layout and design that the target audience finds intuitive to use.

Design Tips for Creating a Dashboard

Here are a few general tips and tricks for creating a great user experience for your audience:

Abstain From Adding Too Many Filters and Legends Too many filters and legends can clutter the dashboard and confuse the end user. In this regard, often less is more. Therefore, don't hesitate to remove unnecessary filters and legends from your dashboard.

Arranging Filters and Legends Group filters and legends that relate to the same content. Move them near to the charts in question or format them with the same background to make the link obvious. For the latter effect, right-click the filter or legend and choose Format Filters or Format Legends, respectively. Then, in the formatting sidebar that appears, choose a color you like from the Shading drop-down menu.

Give Guidance If your charts are linked via dashboard actions, move the one that serves as a window into the data to the top left, and move charts that are not meant to be filtered to the bottom right. That will implicitly provide a path for your audience along which you expect them to explore the dashboard: from top left to bottom right. For instance, you could go from a high-level overview of different product categories to a more detailed chart providing the evolution over time of categories that are clicked.

Also use text fields and numbers to guide the user through the dashboard by explicitly calling out what to do, in what order (e.g. "Step 1: Select a category").

Use a Unified Color Scheme Avoid using different color palettes. For example, if you use the orange-blue diverging color palette to show profits and losses, continue to work with this throughout your dashboard. Of course, often you will have to find a color palette that works with your organization's corporate design guidelines.

Don't Clutter Dashboards with Charts Restrict yourself to two to four charts. If you add too many visualizations, a dashboard can look cluttered, making it confusing and more difficult for the end user to get any insights from it. Remember, you can distribute charts onto several dashboards to tell a story or to let your audience explore the data in successive steps.

This is of course not a definitive list. It contains some basic, effective tricks that I have seen can make a big impact. Also, as with many such rules, there will be times when you need to break them. The longer you work with Tableau, the more you will find out what works and what doesn't; and eventually, you will develop your own style.

NOTE If you would like to further explore the topic of good dashboard design, you can't go wrong by consulting *The Big Book of Dashboards* by Steve Wexler, Jeffrey Shaffer, and Andy Cotgreave. It has lots of great examples of beautiful, effective dashboards.

Tableau Public: A Gallery of Inspiration

Tableau Public is a free platform for sharing Tableau workbooks with the world. This gallery of vizzes, as Tableau fans call the pieces of work displayed, is a great learning resource and can be a real source of inspiration.

On the Tableau Public website, go to the Gallery tab, or go directly to https://public.tableau.com/s/gallery.

The gallery is divided into two sections (see also Figure 8.19):

- **Viz of the Day:** This features a new, noteworthy visualization every day. Use the Subscribe button to receive the Viz of the Day by email.
- **Featured:** This is a curated list of evergreen vizzes. Use the drop-down menu to find interesting visualizations related to different topics, or from organizations from different sectors.

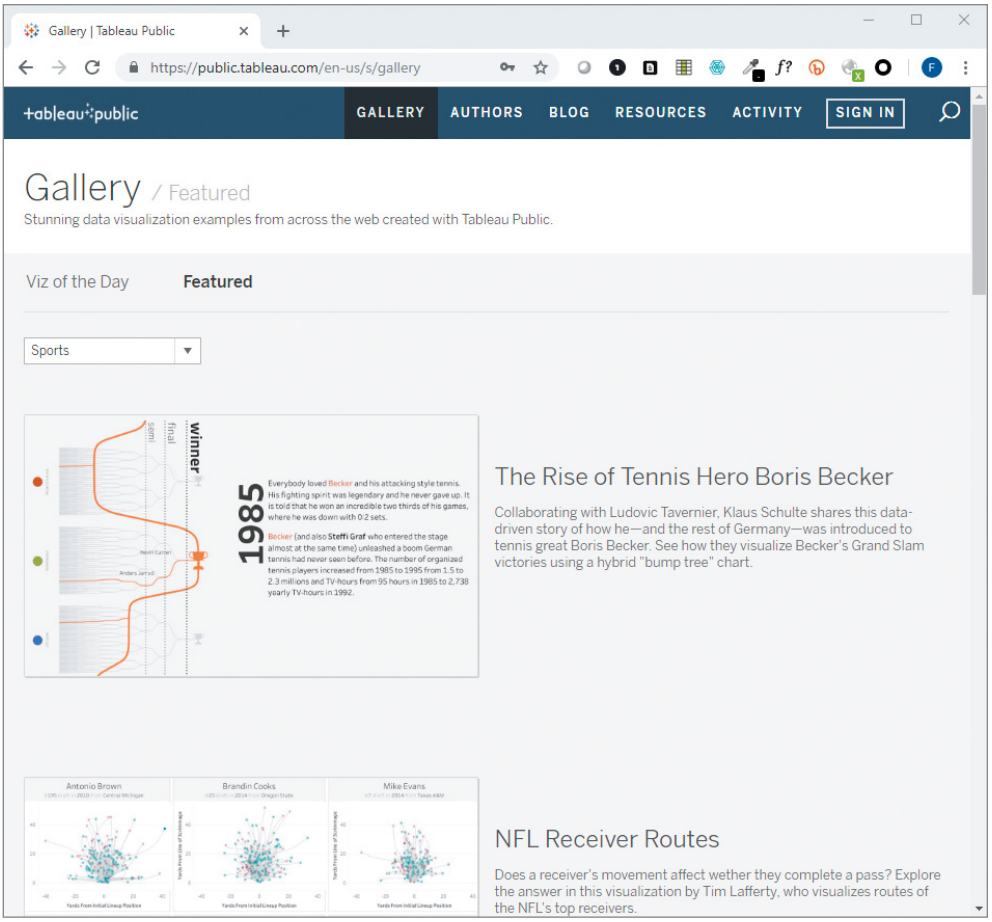

Figure 8.19 The Tableau Public gallery.

TIP Did a certain chart type catch your eye? Are you wondering how it was made in Tableau? Many authors allow you to download the underlying workbook (`.twbx` file). To do so, click the Download icon (1) in the toolbar at the bottom of the viz (see Figure 8.20). Then, choose the Tableau Workbook option (2). Once downloaded, you can open the workbook in Tableau Desktop and see how it was made.

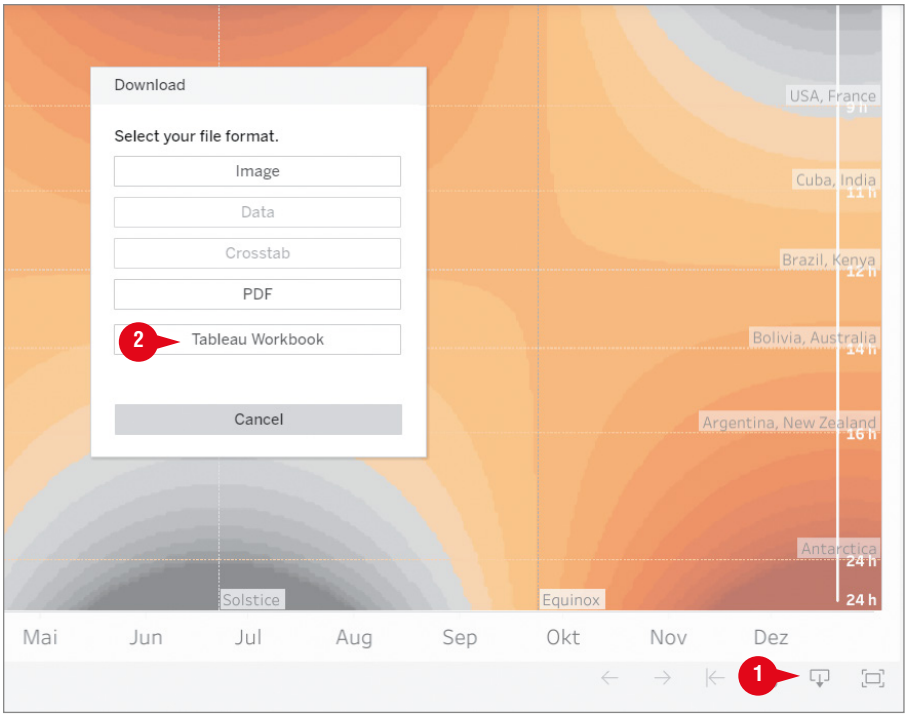

Figure 8.20 Many visualizations can be downloaded from Tableau Public.