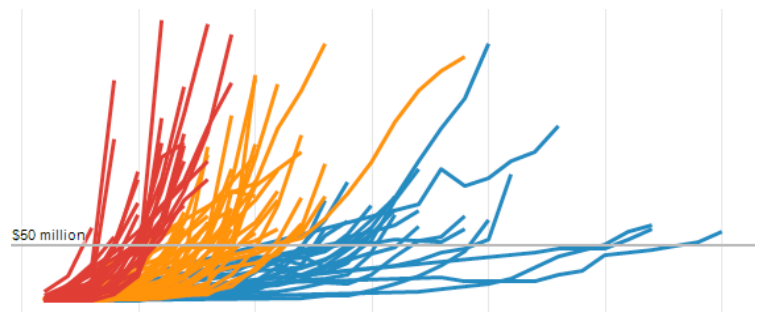




Tableau Visual Guidebook

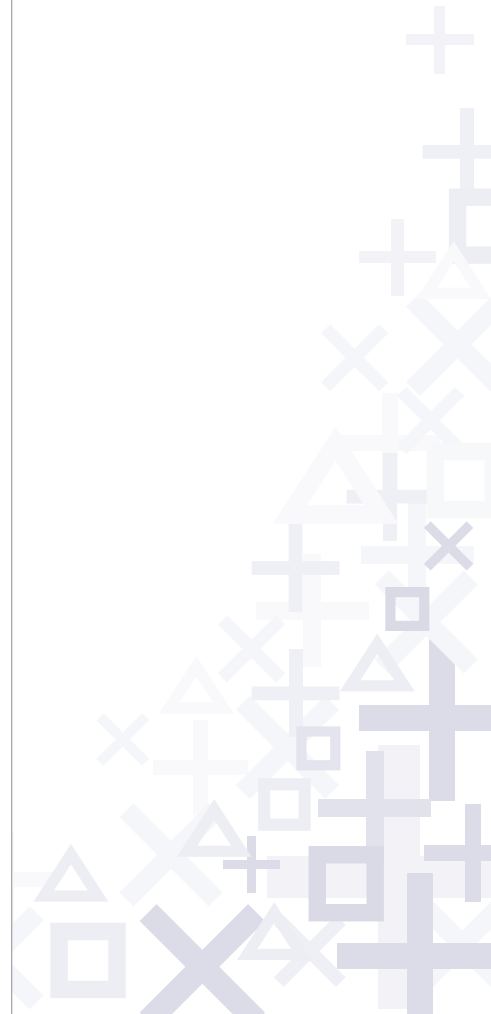


simple techniques for making
every visualization useful and beautiful



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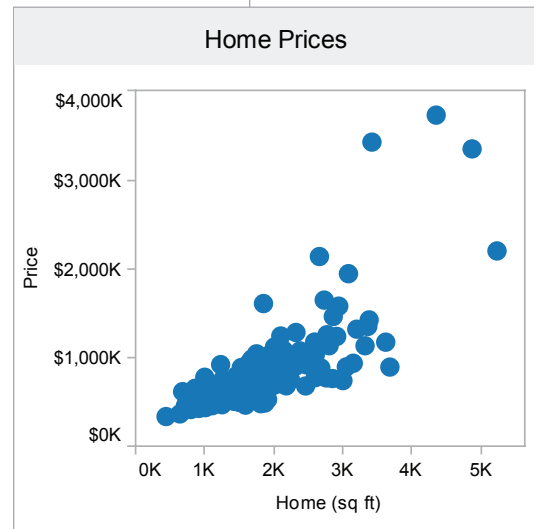
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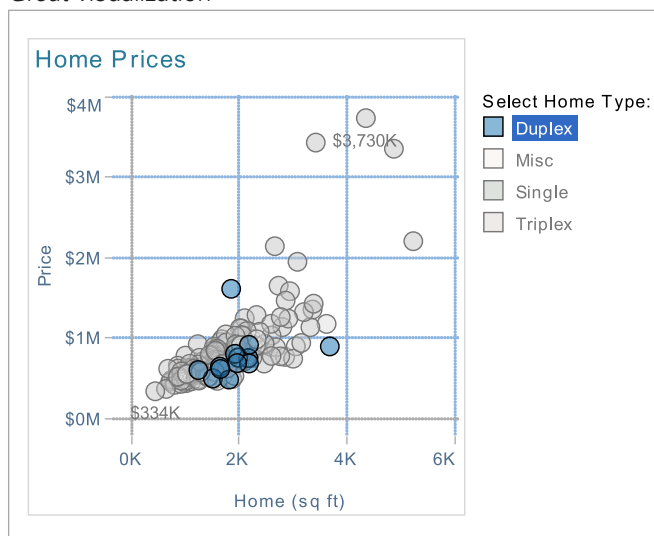
You made a viz! Congratulations, you are part of a small but growing group taking advantage of the power of visualization. However, going from good visualizations to great visualizations takes time, patience and attention to detail. Luckily, we have compiled a short but important list of techniques to get you started – happy vizzing!

Note: This document does not explain basic steps for building a viz, we assume you know how to do that. Rather this document explains tips for making your viz more effective.

Good visualization



Great visualization

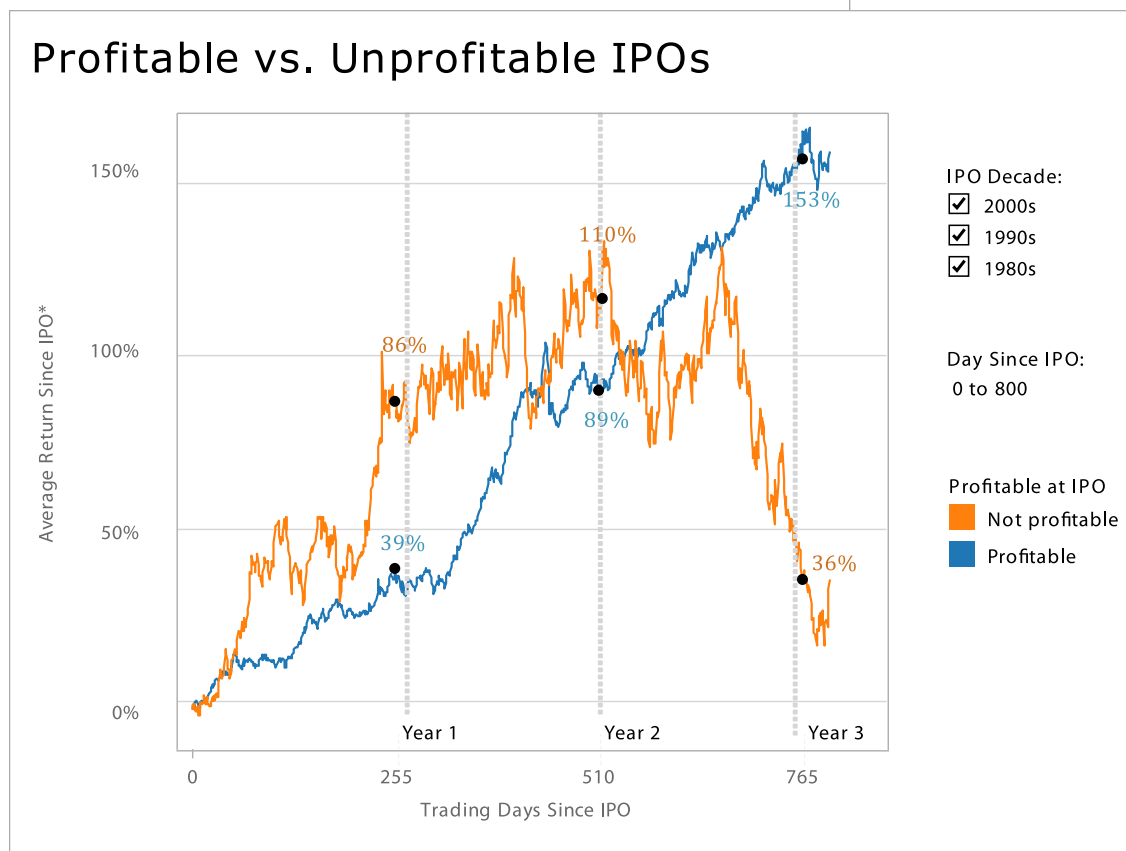


Ask Your Viz A Question

What are you trying to say? The single most important thing you can do to make a great viz is to **know what you're trying to say**. With the drag-and-drop flexibility of Tableau, anyone can get lost in a world of scatter plots and geocoding. It is vital that your visualization has a purpose. All of the maps, charts, and cross-tabs you create should work together to **fulfill that purpose**.

How do you know if your viz has a purpose? Well, **ask it a question** to find out. You don't literally have to interrogate your screen, but click around and view it for a while. What answers do you find? What other questions does it inspire? What conversations will it start? The point is that your viewers should be taking something away from their time with your viz.

Here's how you ask your viz a question:



Q: Does profitability at IPO affect stock performance?

A: *You bet it does!*

Q: OK fine, but if you remove all of those crazy IPOs from the 1990s, does it change?

A: *Yes, but not as much as you might think.*

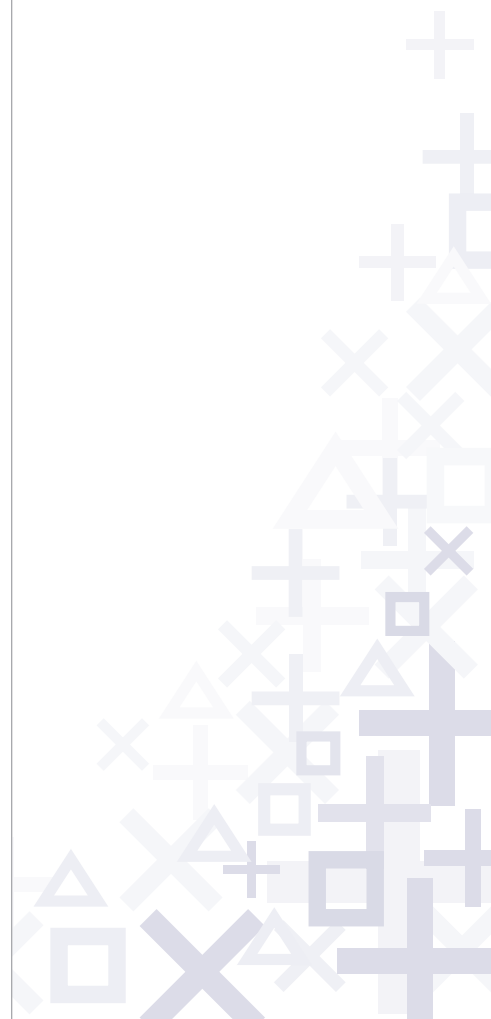
Perfecting The Big Picture

Whether or not your viz tells a story (though especially if it doesn't!), you should evaluate whether you're using the best kind of visualizations for the analysis that you are doing. Furthermore, you'll want to avoid bad views. Tableau provides a good set of defaults that will help you create good visualizations, but at the end of the day a human perspective is needed to polish a viz to perfection. Here are some things to keep in mind:

What's the best view?

Although most data can be presented effectively in several different formats, there are some sets that you will want to visualize in a certain format most of the time:

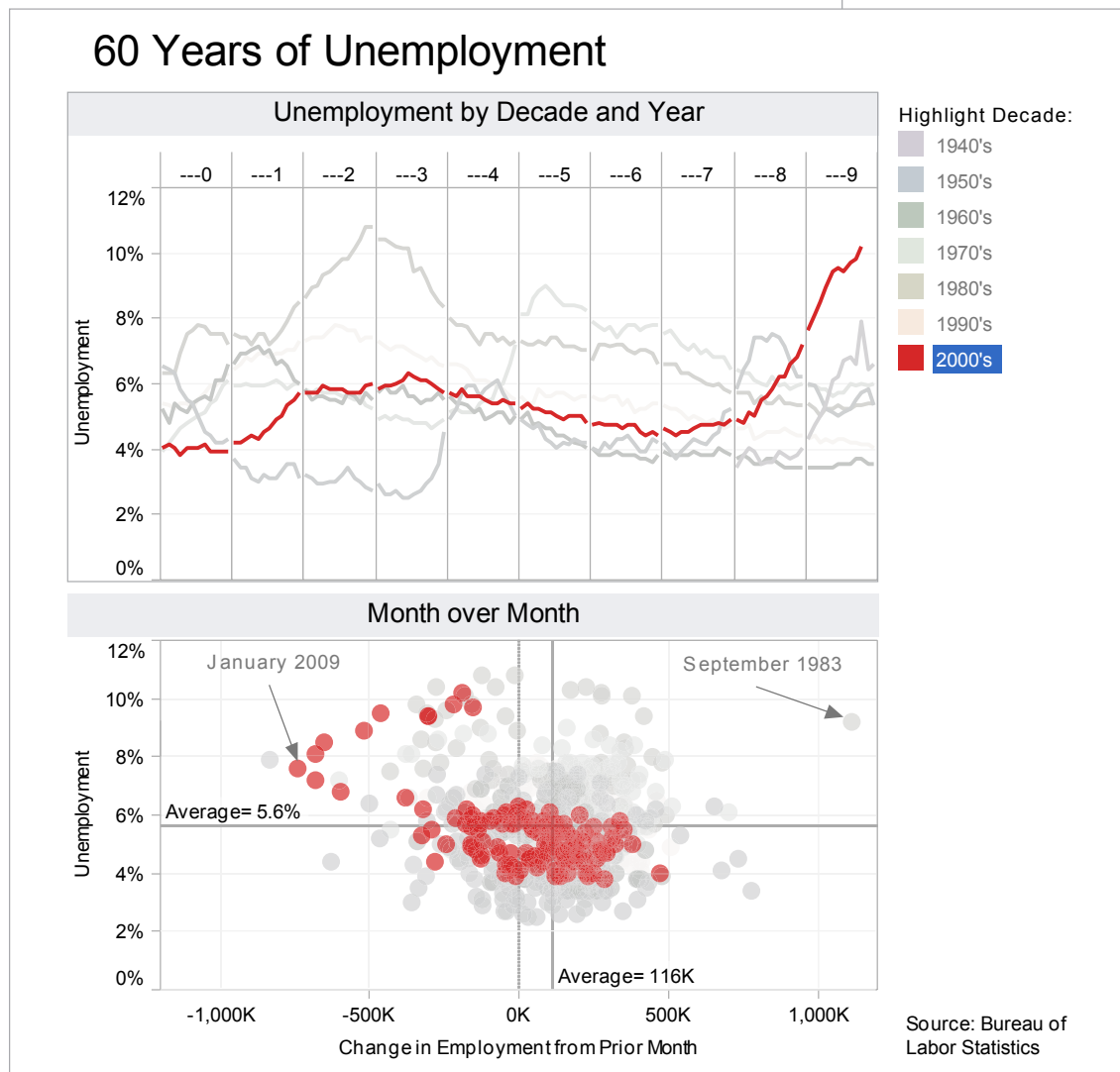
- When you are showing a **change over time**, you should probably use a time series (a line chart with time on the columns shelf)
- When you are showing **where** something is, use a map. However, maps are often best used with another chart detailing what the map displays, like a bar chart sorted from greatest to least.
- When you are showing the **highest** or **lowest value** use a bar chart.



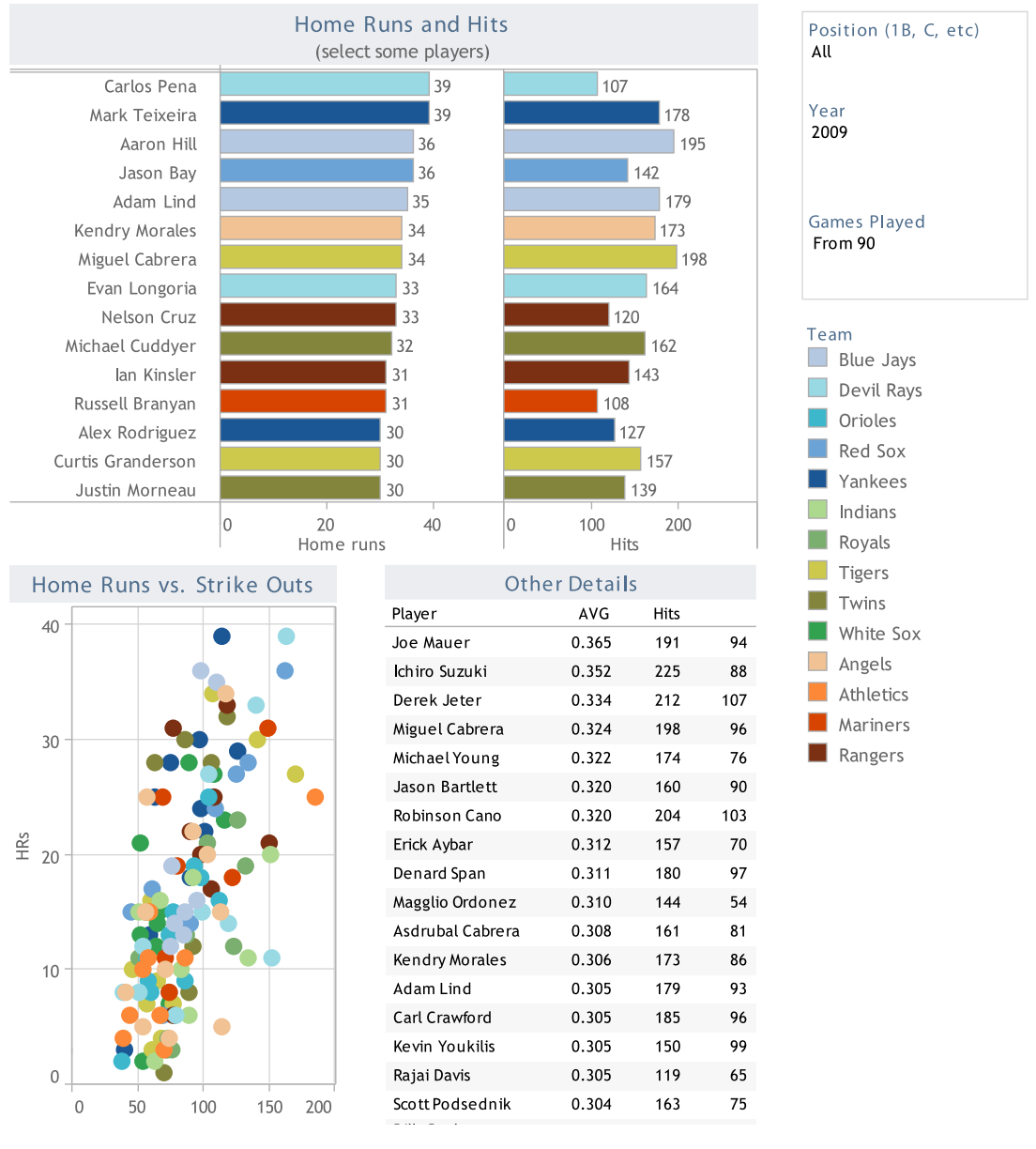
The power of the dashboard

A Tableau dashboard is a collection of several related visualizations shown on a single page, usually tied together through interactivity. (See *Make it Interactive* below.) Dashboards increase the analytical power of your viz by allowing multiple perspectives on your dataset in the same location. They can also be used to combine multiple types of data into a single location. When designing a dashboard it's important to **structure it properly** to ensure it is accessible to your audience. For example, the dashboard below is an example of interactive complementary views combined to tell a single story.

Note: We refer to the entire dashboard a viz and each individual pane in the dashboard as a view. For example, "Month over Month" is a view, which is part of the "60 Years of Unemployment" viz.




American League Power Hitters: 2000 - 2009



Major Guidelines

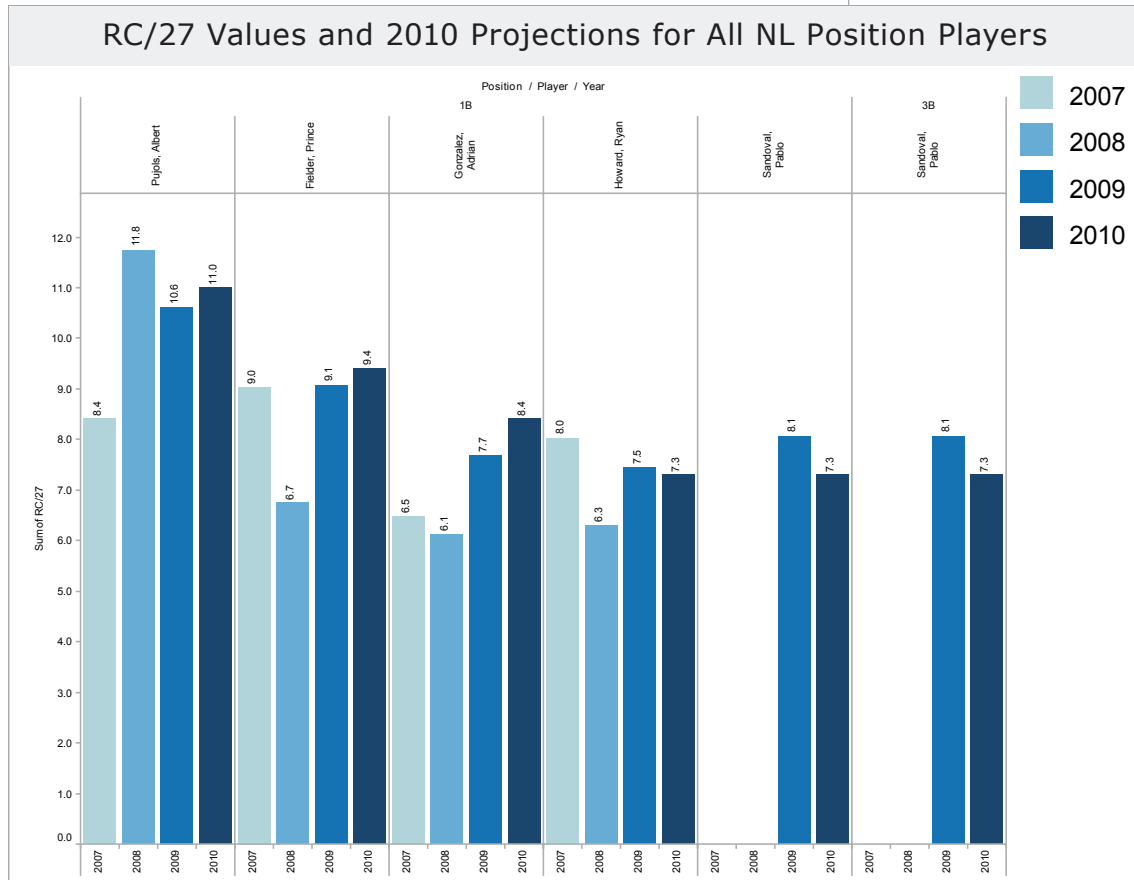
- Place the most important view in the top or top left. Generally, when looking at a dashboard, your eye is first drawn to the upper left corner. In this viz the Home Runs and Hits view is used to filter the remaining views, so it's positioned above everything else.

- **Group filters and legends** (using a layout container) to the right or bottom of your viz. If you have filters and legends that refer to similar values, format the layout container to have a border to increase the connection between them. For example, the Position, Year, and Games Played filters all refer to individual player statistics. The light border around these filters adds a subtle visual queue that they are related. 
- If your viz has chained interactivity (first view filters the next view which filters the last view), structure them top to bottom and left to right so that the final view to be filtered is on the bottom, or bottom right. For example, because the Home Runs and Hits view filters the others it makes sense it would be first.
- Position legends on the right hand side of the view they describe unless circumstances necessitate them being placed elsewhere. No matter what, make it clear which views your legends apply to.
- Speaking of color, avoiding using multiple color schemes per dashboard unless there are natural and independent color schemes in your data. If you are using multiple schemes, try using the Purple-Gray, Blue-Red and Green-Orange schemes.
- Generally, **keep your dashboards to 2 or 3 views**. When you add too many views the big picture can get lost and it becomes difficult to understand. Remember, you can use multiple dashboards to tell one story!

Orienting your views intuitively

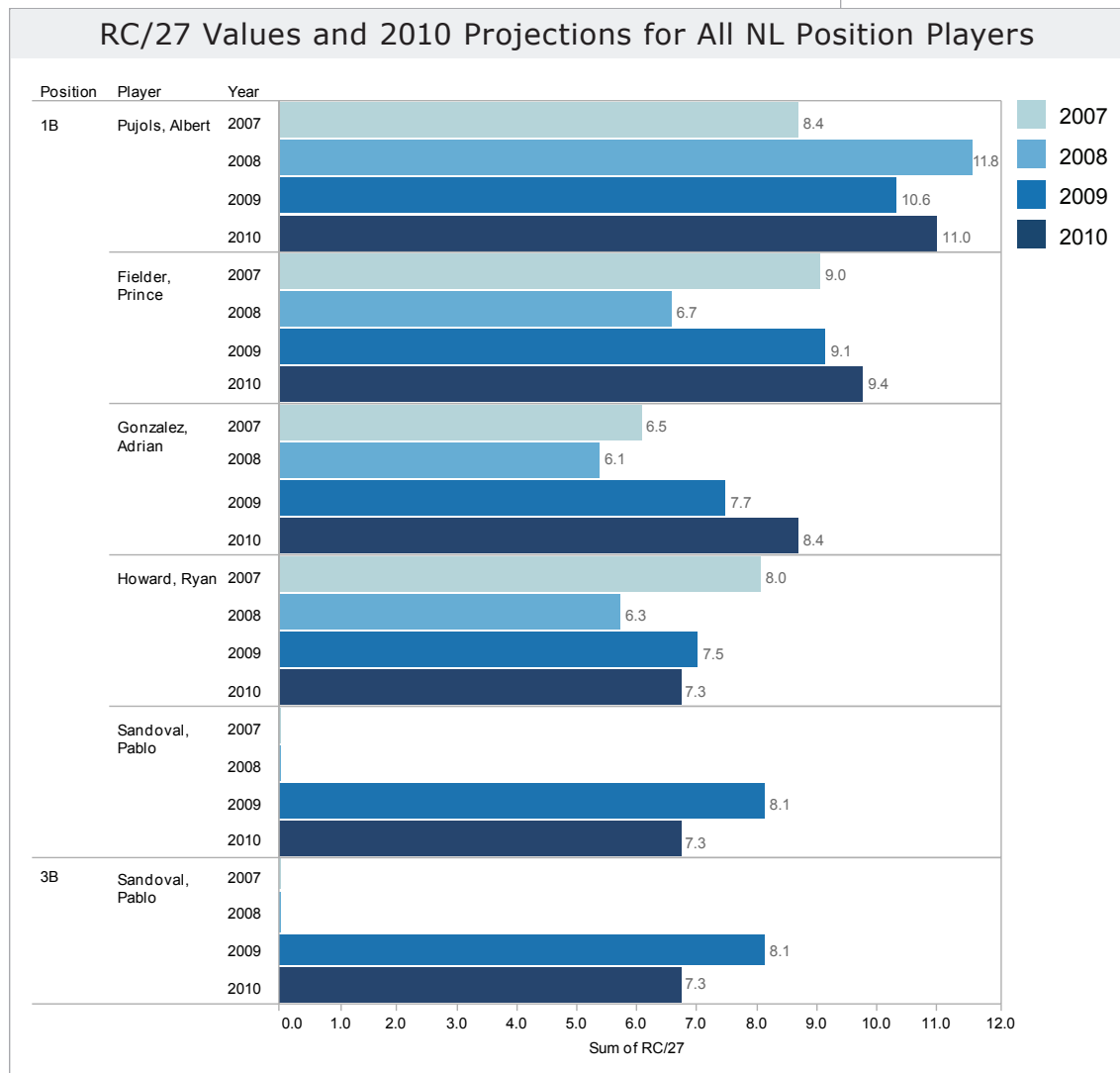
Sometimes, simple changes can go a very long way to making your visualizations easy to interact with.

For example, take a look at the view below:



Did you find it difficult to read? All of the labels are vertically oriented, which is generally difficult to read. If you find yourself with a view that has long labels that only fit vertically, try rotating the view. You can quickly swap the fields on the Rows and Columns shelves using the Swap toolbar button.

The same view is shown below only this time with a horizontal orientation. The simple change makes things a lot easier to read and make comparisons.

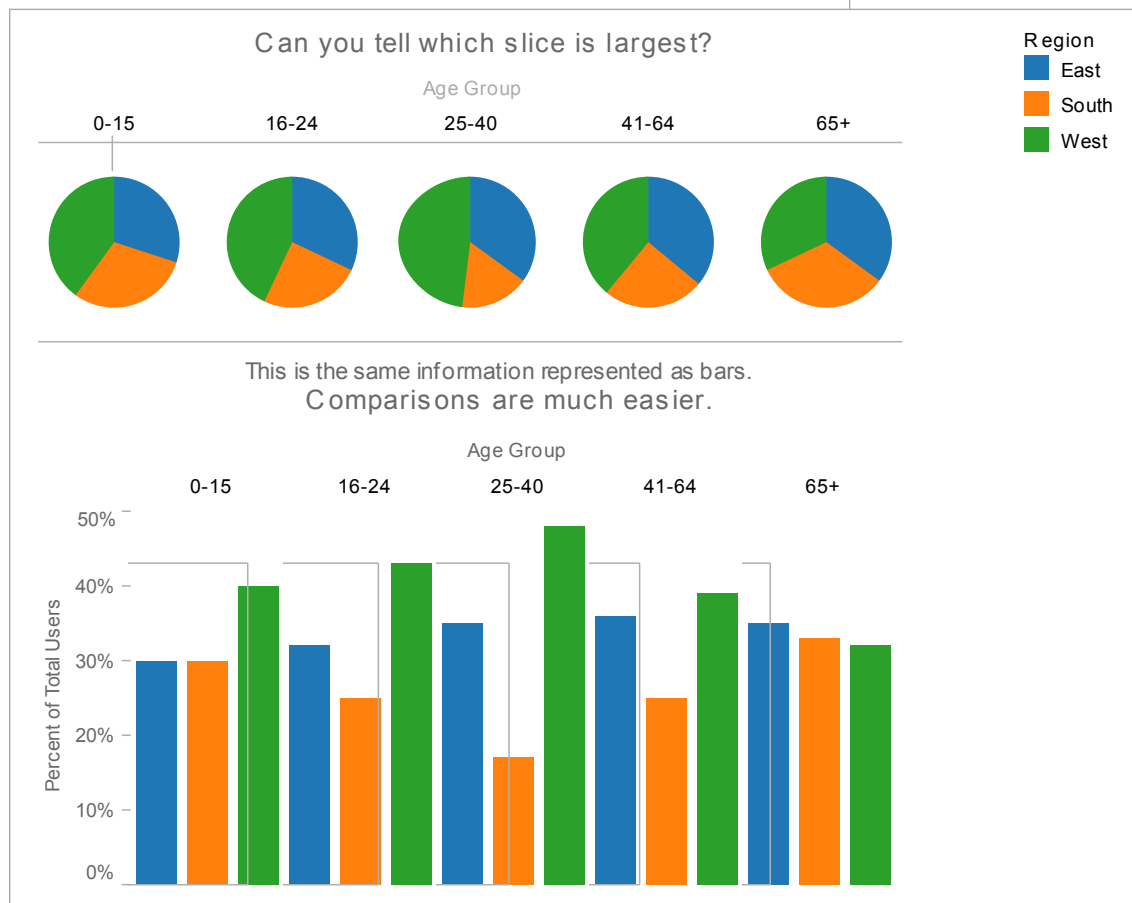


Pie charts — where to and where NOT to use them

Generally AVOID PIE CHARTS, and here's why:

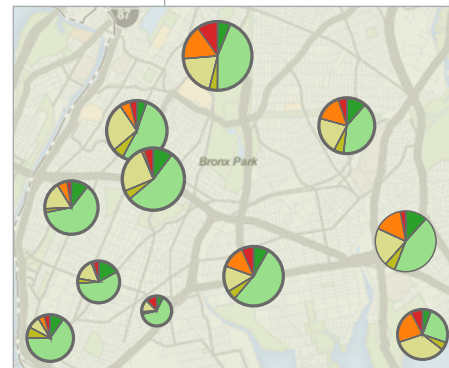
- The human eye is not very good at estimating area.
- You can only compare slices that are right next to each other

Instead, when trying to make comparisons, try bars. Our eyes are much better at comparing height than area.



That being said, do not be afraid to use pie charts in the following situations:

- When the wedges represent a percent breakdown of a measure
- When the area of the pie is a measure (so the circumference is telling the story)
- When the pie is being used on a map (as here)

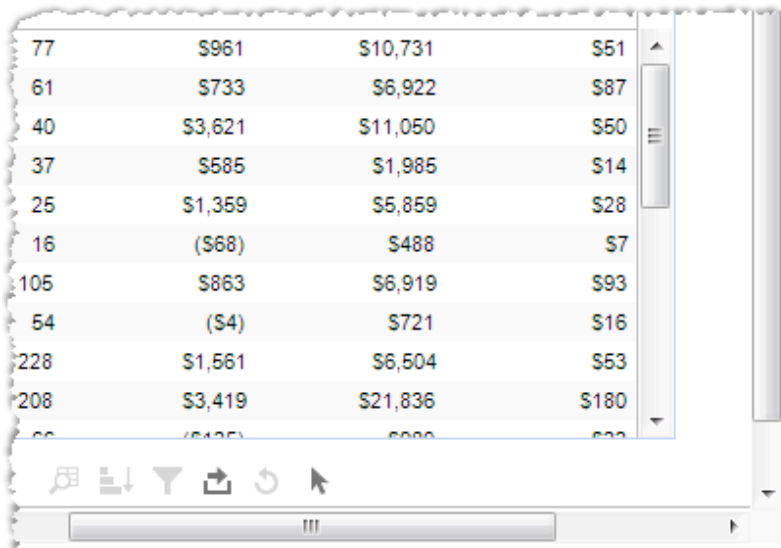


Sizing: Making sure your viz is visible

By default, Tableau dashboards automatically resize to fit as much content as you add and as big as you make the window. However, when you publish (to the web, blogs, presentations, etc.) you may find yourself more limited. Make sure that no matter where you are publishing you **construct the viz at the size you will eventually publish to** and use the Range sizing feature to avoid:

Scrollbars


When you republish a Tableau Public viz at a different size than the original you will find you often end up with scroll bars like the ones shown below. If you have already embedded your viz in a website and you changed the size, **make sure you re-embed** (use new code). In some circumstances, scroll bars on a particular list view are acceptable. Just try to avoid scroll bars on the overall dashboard as shown below.

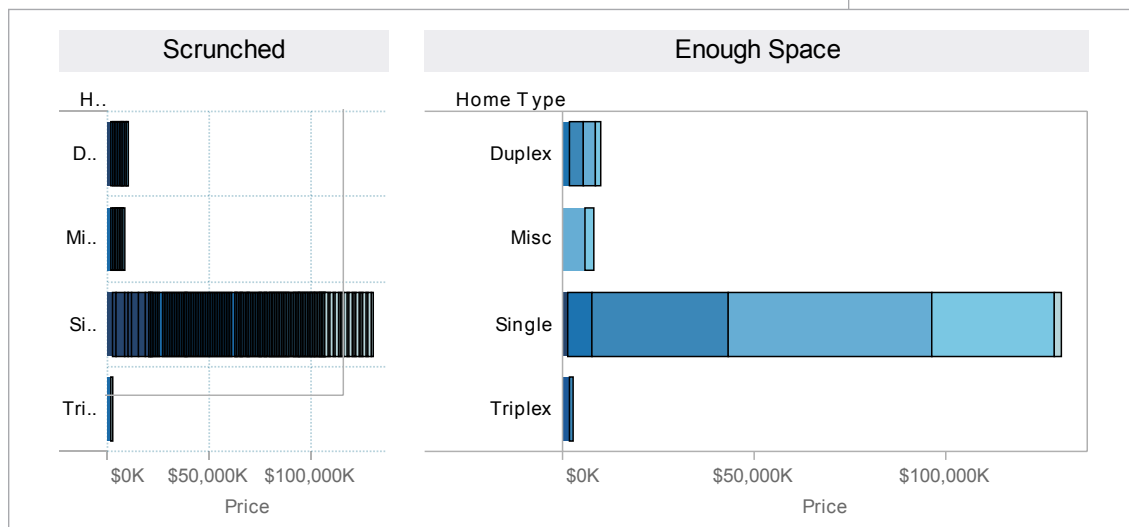
A screenshot of a Tableau dashboard displaying a table with four columns of numerical data. The table is partially obscured by a vertical scrollbar on the right side, indicating that the content is not fully visible. The table data is as follows:

77	\$961	\$10,731	\$51
61	\$733	\$6,922	\$87
40	\$3,621	\$11,050	\$50
37	\$585	\$1,985	\$14
25	\$1,359	\$5,859	\$28
16	(\$68)	\$488	\$7
105	\$863	\$6,919	\$93
54	(\$4)	\$721	\$16
228	\$1,561	\$6,504	\$53
208	\$3,419	\$21,836	\$180
66	(\$125)	\$999	\$33

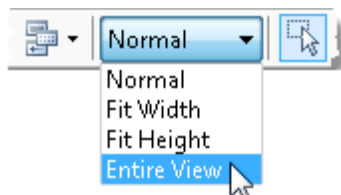
The screenshot also shows a horizontal scrollbar at the bottom of the dashboard area and a toolbar with various icons.

Scrunched views

Be careful that views are not being scrunched so much that there's not enough room to read headers, labels, or understand the data. Once you've provided enough space, make sure to clear any manual sizing you've added unless it is absolutely necessary. You can clear manual sizing using the Clear toolbar button . Clearing the manual sizing will often also prevent unnecessary scroll bars in your views.



Fitting



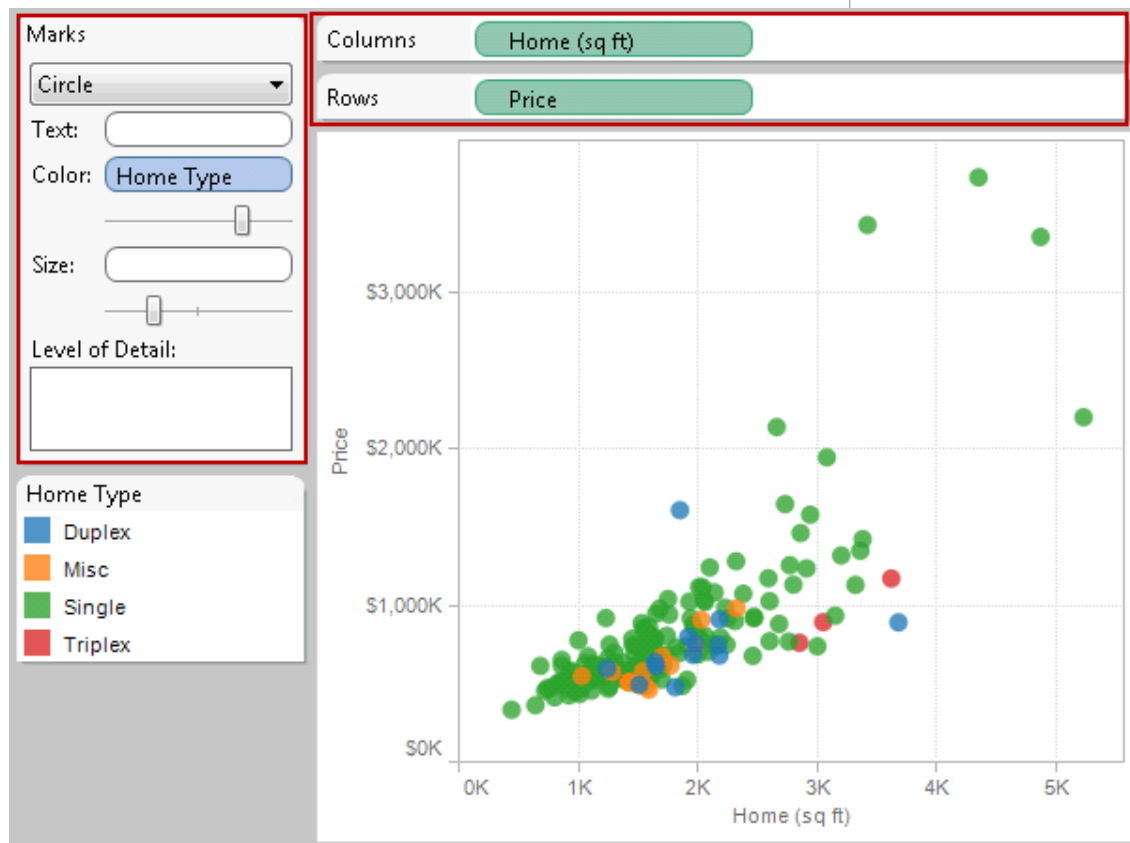
You can use the Fit options on the toolbar to specify how each view fits within the window. You can select from the following options:

- **Normal** – automatically resizes based on the data in the view and the size of the window.
- **Fit Width** – scales the view horizontally to fill the width of the window. Vertical scroll bars are allowed.
- **Fit Height** – scales the view vertically to fill the height of the window. Horizontal scroll bars are allowed.
- **Fit Entire View** – scales both the width and height to fill the window. Scroll bars will not be shown; rather all data will be scaled to fit within the window.

Select a fit that matches the data in the view and how it will be filtered. For example, you may set a simple cross-tab that shows a fixed set of data to Fit Entire View so that it always fills the entire space allotted to it. On the other hand, a view that is sometimes filtered to a few values you may want to leave as Normal so that the marks aren't stretched to fill too large of an area.

Emphasize the most important data

In all of your vizes, make sure to have the most important data on the row or column shelves. Less important data should be encoded in color, size, shape, etc.



Make It Interactive

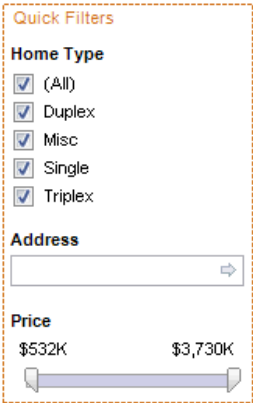
Interactivity can be the difference between a horribly confusing viz and an all-star analysis. However, needless interactivity can take an all-star analysis and make it useless. This section will teach you how to use interactivity well, but remember this: only use interactive views when you need it to guide the story or if there is too much detail to show all at once.

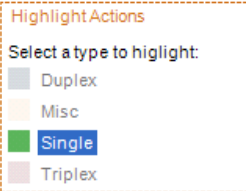
Quick Filters

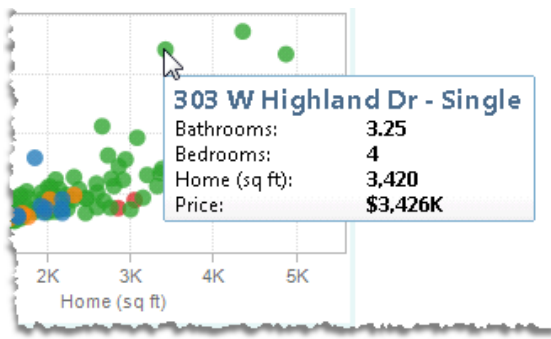
Quickly include and exclude data from the view with check boxes, radio buttons, sliders, and more. These can apply to a single view or make it global to apply to all views.

Color Legend Highlighting

Call attention to specific values by selecting a value in the color legend.

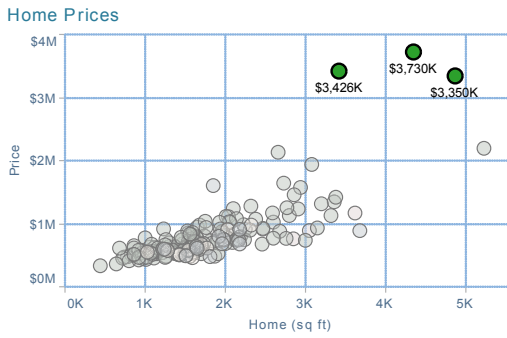






Tooltips

These “pop-ups” are an excellent way for users to get more details about your data quickly. They can also be used to instruct users on other interactivity.



Dynamic Data Labels

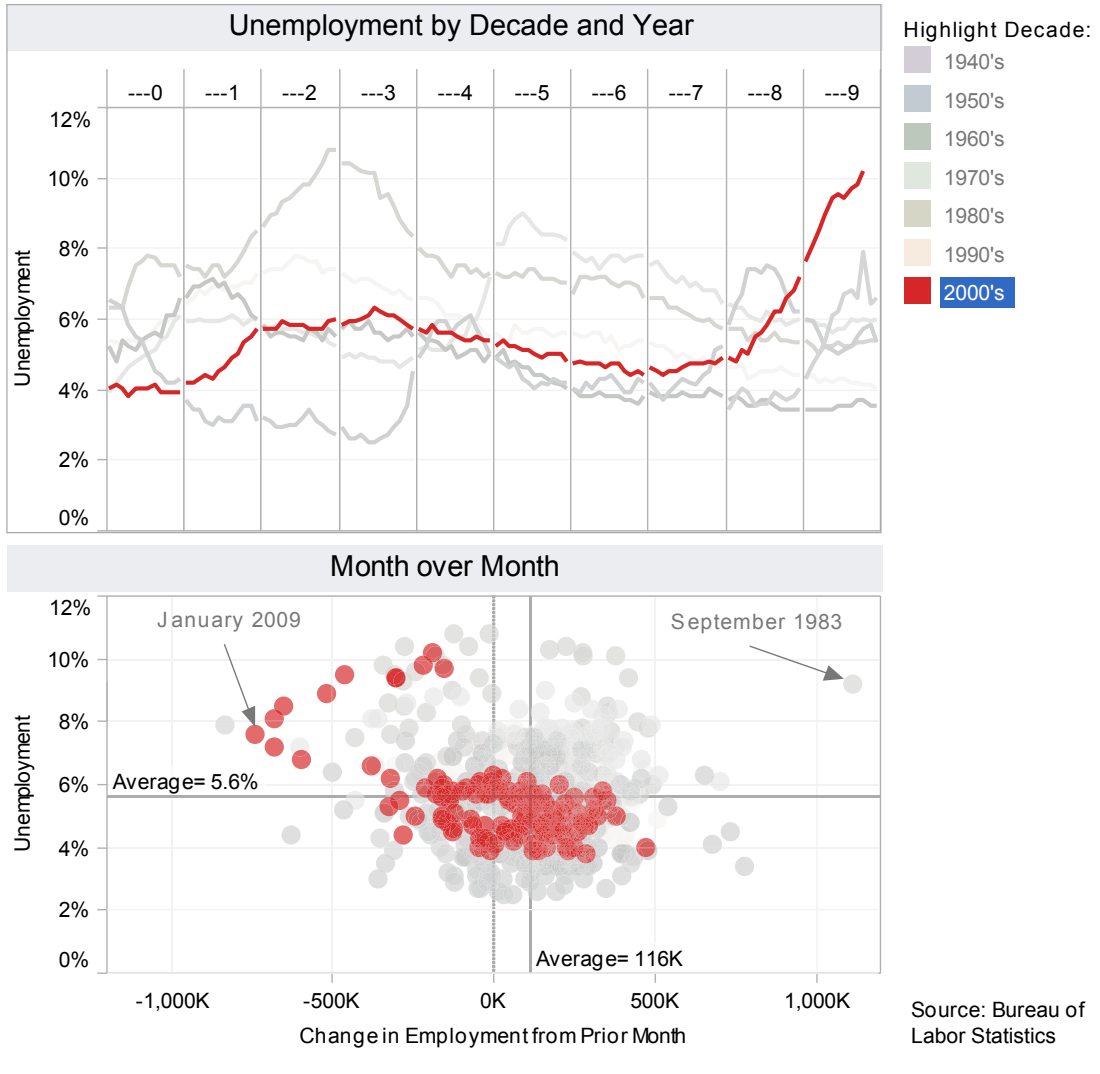
Tableau allows you to label your marks in a variety of different ways. If you expect your consumers to click your marks (perhaps for further detail in other sheets), label marks based Selection or Highlighting may be ideal. If you are using filters, labels on Min/Max could be an effective option. On static views, it can be best to set your labels to Always On.

Guided Analytics (Actions)

Highlighting - highlight related data based on selections in a particular view.
 Filtering - filter views based on selections in a particular view.
 Hyperlinks - link to external resources and webpages.

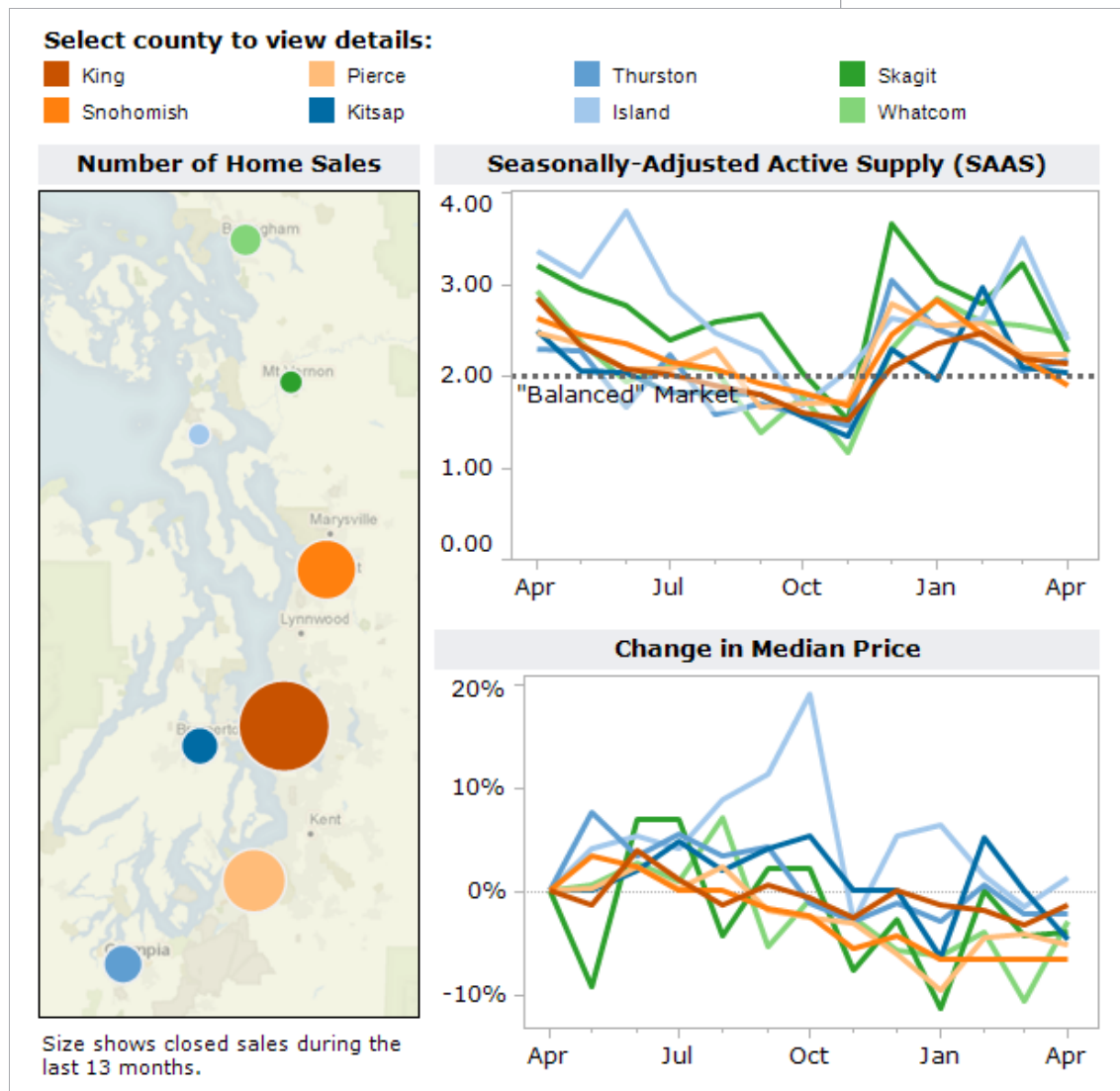
Even the simple visualization below benefits from color legend highlighting.

60 Years of Unemployment



Another thing to note if you take advantage of interactivity is that the visualization should **suggest interactivity**. The Legend in this Unemployment viz is named "Highlight Decade", which informs the viewer that they can interact with it.

Whatever interactivity you have built into your viz, make sure the viewer knows they can interact with it and understands where to look for the changes their interaction will bring about. The sub-headings of the views below **instruct** ("Select") and **inform** ("to view details").



Highlighting your best work

Highlighting related data across multiple views lets you quickly compare values. Think about your reader: **what are they going to be interested in?** What parts of your viz will they want to click and highlight? Furthermore, would you add analytical depth to your view by having something highlighted initially (when you publish)?

Legend highlighting

The easiest way to highlight is with legend highlighting. Simply click the icon in the top right of any color legend on a viz and you can highlight related data simply by clicking on it anywhere in the viz or legend.

Highlighting

Use the Highlight option  on the toolbar to select specific data to highlight across views.

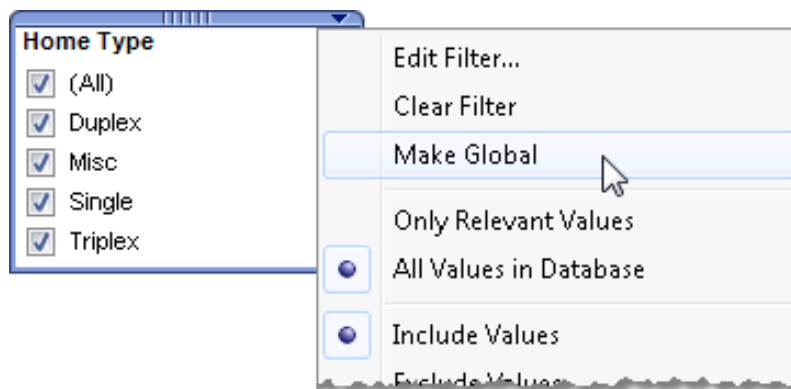
Think about what's most important to highlight. Often the subject of your viz (Player, Year, etc), will highlight well.

Quick Filters: give the wheel to your users

Tableau allows you to do some amazing (yes, AMAZING) things with filters. However, filters can also be a very good way of confusing your audience, so make sure to pay attention to the following. Quick filters let your viewers dig in and engage with the data. They can use them to narrow the scope of the viz or identify changes and make comparisons. Here are some tips on using quick filters effectively.

Global or local filters

Quick filters can apply to a single view in a dashboard (local) or all of the views at once (global). Use the card menu for the quick filter to switch between global and local filters.



If you are filtering by country and every view has country as one of its dimensions, then you should probably use a global filter. It would be confusing to see one portion of the dashboard filtered down to Australia and New Zealand, but have everything else still showing the entire world.

The great thing about Tableau is that you do not have to have a field in use to filter by it. In other words, I can have a bar chart showing the GDP of twenty countries, and then I can add a filter on Population so I can see only those countries with a population over 100M. These “slicing” filters are very powerful.

Not all filters have to be quick filters that are exposed to your audience. For example, a common way to clean up extraneous data is to exclude null values. That’s a filter that you probably don’t want to show as a quick filter.

Ordering of values

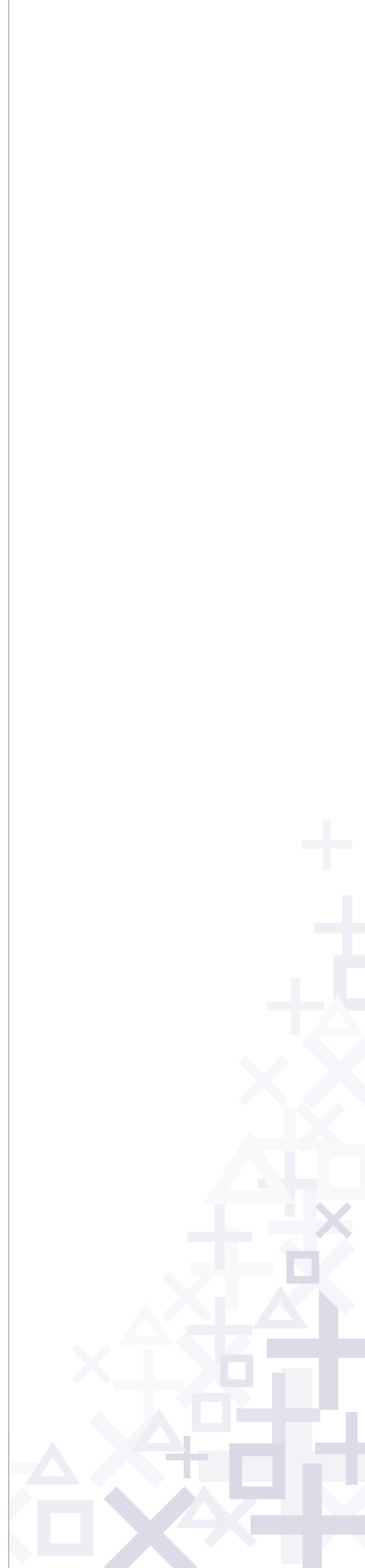
Make sure the values in the quick filter are in an order that makes sense for the data. For example, instead of listing classes alphabetically, you probably should list them Freshman, Sophomore, Junior, Senior. You can specify the order of a quick filter by setting the default sort order for the field.

All and single quick filters

Should users be able to select “All” in your filter? Or just go to one value? Tableau lets you do both. Figure out which makes sense, and set filter settings accordingly.

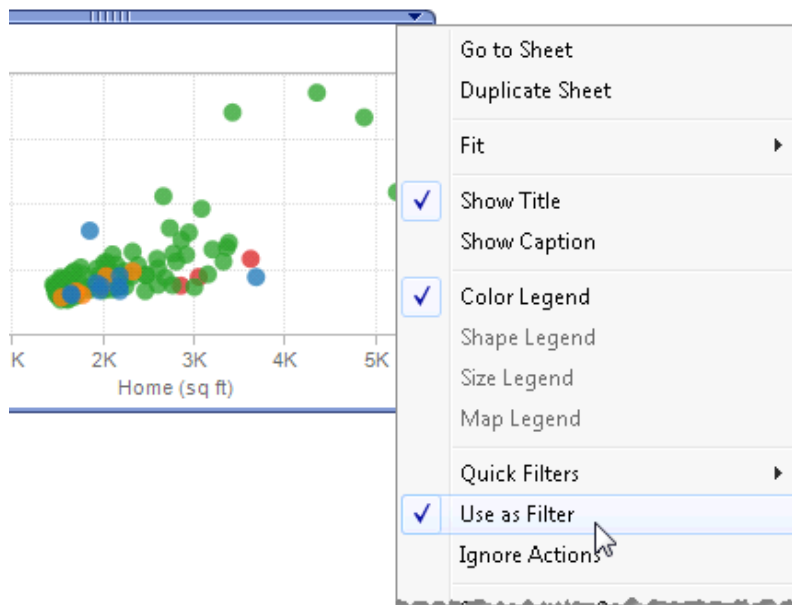
Initial State

When you are ready to publish, make sure you have checked the initial state of your view. Do your filters make sense?



Actions – Major League filtering

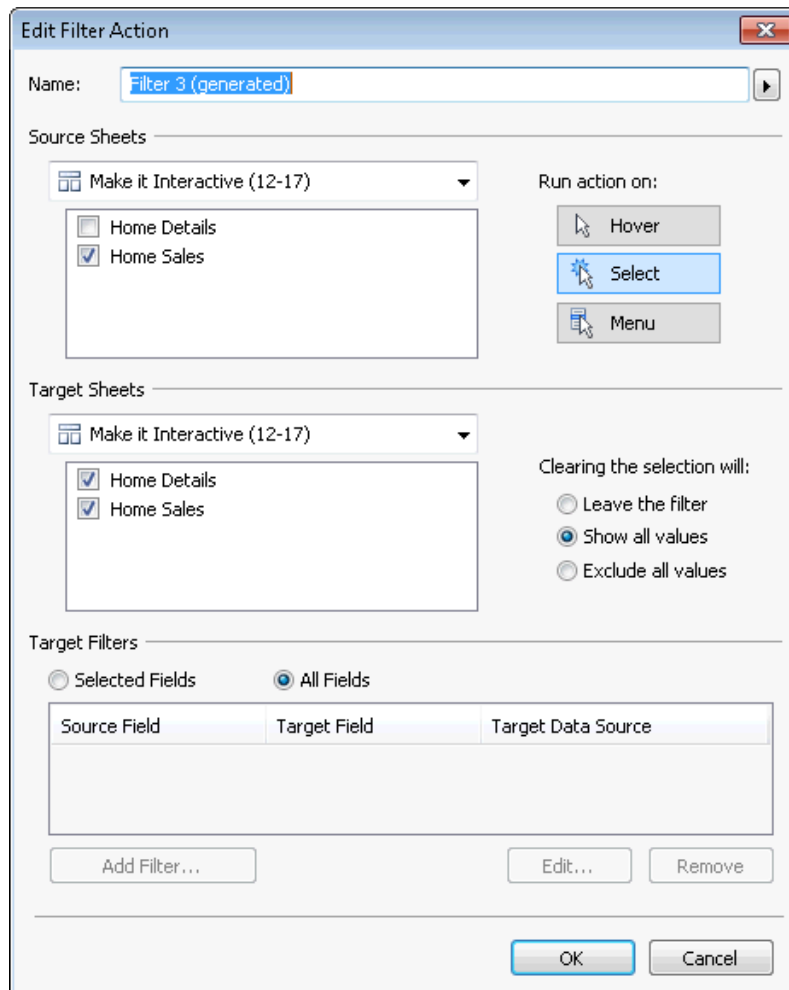
Actions are nuggets of interactive goodness you can set up directly within your dashboard (as opposed to in a legend or Quick Filter). They allow you almost unlimited flexibility in the interactivity of your visualization. Unfortunately, they are also the most complex and easy to misuse. Actions can be turned on in any view by clicking the drop down and selecting “Use as Filter” (below), or through the Actions dialogue box (Edit->Actions).



This very special interactivity should be used in the following scenarios:

- When it would be more intuitive to find the thing that you want to filter to in a view rather than a quick filter list (e.g., a map is better for filtering States than a list)
- When users will want to filter to values that group together in a view (e.g., regions of geographies, outliers, etc.)
- When you want to create a “details-on-demand” situation, where one view is used to filter a view below it that contains detailed information on the selection.
 - This is often very useful for large datasets that would overwhelm one view
 - Instead of putting all of the detail in one view, slice the dataset in the first view (maps are often useful), then have detailed information and measures in the view below that filters to your selection in the first.

We've already covered a few actions you can turn on with one click, including "Use as Filter," legend highlighting and highlighting from the menu bar. But there's oh so much more you can do with custom actions.



When defining a custom action, you need to specify the following:

- **Source Sheets** – what view will you activate the action from?
- **Run Action On** – how will you activate the action (e.g., hover, select, or right-click menu)?
- **Target Sheets** – what sheets will be affected by the action?
- **Clearing the Selection** – what do you want to happen when you clear the selection?

As you can imagine, this capability allows you to do some seriously cool stuff. There is no way to explain all of it, but explore what you can do with each viz.

Hyperlinking and using the power of the web

URL action is a hyperlink that points to a Web page, file, or other web-based resource outside of Tableau. You can use URL actions to link to more information about your data that may be hosted outside of your data source. To make the link relevant to your data, you can substitute field values of a selection into the URL as parameters. For example, say you have a list of Twitter users that are encoded in your data as the field <username>. You can create a URL Action that points to www.twitter.com/<username> and triggering that action will open the selected user's profile in a webpage. The link can open a new webpage or load in a web object directly in the dashboard. **Nice!**

The screenshot shows the Tableau interface with a bar chart of Profit by state. The 'Actions' dialog box is open, displaying a list of actions including 'Hyperlink1', 'Hyperlink2', and 'Hyperlink3'. The 'Edit URL Action' dialog for 'Hyperlink3' is also open, showing the following configuration:

- Name: Hyperlink3
- Source Sheets: Hyperlinks_Web (10-10)
- Run action on: Select (highlighted)
- URL: <unemployment link> (circled in red)
- Test Link: <unemployment link>
- URL Options: URL Encode Data Values, Enable Multi-Select
- Item Delimiter: ,
- Delimiter Escape: \

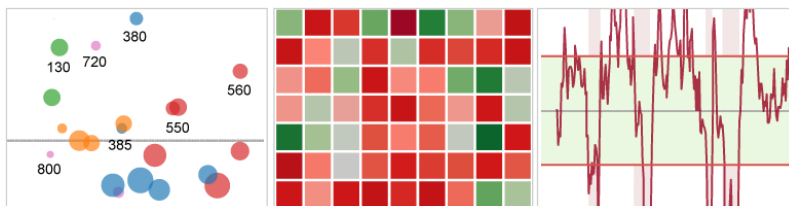
In the background, the 'Sources' section of the dashboard is visible, with 'Case-Shiller(S&P)' circled in red.

Formatting: Making Your Viz Shine

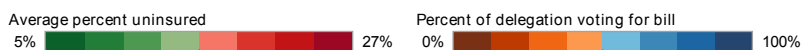
Although it seems simple, formatting your fonts, colors, tool-tips, viz sizing and the orientation of your views can change everything. This is also the most nit-picky part of making a viz; oftentimes the only way to succeed is through trial and error. Rest assured if you put your mind to it and follow these steps, you will have a great looking viz.

Color TV looks better than black and white. So do color vizes

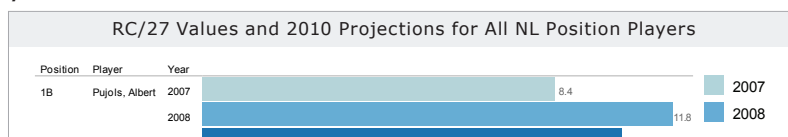
Color can be the difference between boring and inspiring.



Try to use no more than two color palettes. Make sure to **use non-overlapping scales** like the ones shown below.



The default title color (the grey shown below) can be changed to white, or a light color that does not clash with your other schemes.



If you are using color, choose **semantically meaningful colors**. If there are not any meaningful colors, then use the Tableau color sets; they have been custom chosen to match and not clash. When using colors that have an inherent meaning, make sure you've assigned them to the correct values in your database. For example, in many cultures Green is associated with good or positive while red is associated with bad or negative. Consider whether the colors you've assigned have alternate meanings that do not align with your message.

If the color meaning isn't obvious (red=hippos?), or your viz does not obviously label the color, then make sure to **include a legend**.

When using a diverging color palette, the midpoint and end points should be meaningful. Zero is often a meaningful midpoint.

Avoid adding color encodings with more than 12 distinct values.

Can you read this?

Fonts: **Can you read this?** (Can you read this?)

Although there are dozens of fonts available in Tableau, for best performance online, there are only a few that you will want to use. The following are the winners narrowed down by our resident viz-wizards:

- Trebuchet MS or Verdana
 - Especially for tables/numbers
- Arial
- Georgia
- Tahoma
- Times New Roman
- Lucida sans
- NOT Calibri or Cambria unless in tooltips (See below)

Also, do not forget the color of your fonts. As a general rule, **axes and labels should be dark grey** as opposed to the default black so they do not distract from the viz. Quick filter titles should be **a different color than the axes and bold** to indicate that they are common objects but distinct from the view. Try to keep it to 2-3 (Font) colors per page.

If you use different fonts and styles, make sure to check back over your viz after you are done and verify that similar parts of your visualization have the same formatting. For instance, all the filters should be the same style, and all the titles should be the same style (though perhaps different from the filters).

Lastly, never change adjacent fonts by more than one attribute (Size, Bold, Italic, Underline, Color, Serif).

Good Change **Bad** Change

Tooltips tell the story

Tooltips are the text boxes that pop up when you hover over an object and they can make the difference between a user loving your viz and not understanding it. In Tableau 5.1 and associated products, they can be formatted in almost any way you can imagine. However, the base tool tip that Tableau displays usually needs a great deal of work (We know! We're working on it.). To edit the tooltip, go to edit and then select Tooltip at the bottom.

Follow this example to learn some tips for improving the tooltip shown below.

Country: United States Number of Records: 1,366 Value: 266..	United States Number of Records: 1,366 Value: 266..	United States Planes: 1,366 Average Price: \$ 266M
--	--	---

First of all, you will want to **change to a font** that anti-aliases properly (does not get pixely) online. Generally, Calibri or Cambria look very sharp, but the default Tahoma is not bad.

Next, find the **most important part** of the tool tip and make that your title. In this example the United States is clearly the subject of the tooltip, so it is bolded and made 16 pt. font. You can also add other data to the title where applicable. For instance, if we were looking at states as well, you could format it to read “United States – Wyoming” for the title. Think of it like you would a sports card! “Kobe Bryant – Los Angeles Lakers”.

Next, **rename the measure names** so that they make more sense. “Number of records” does not mean much, but “Planes” is very descriptive. “Value” is also a relatively broad term that often raises more questions than answers. Average price could be better. Be specific in your tooltips.

In all of your tooltips, make sure that **numbers include units**.

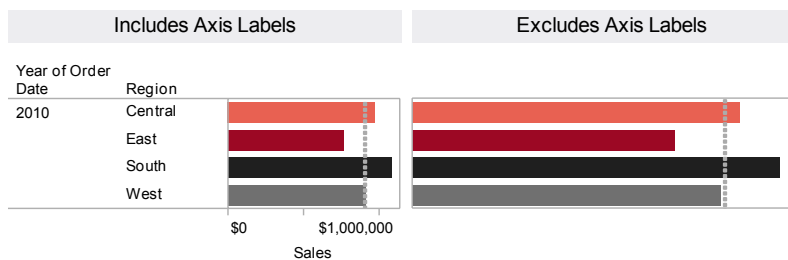
Tooltips are a great place to add annotations or notes for the viz. (e.g. *This data point for 2009 only) It is best to format notes slightly different from the rest of your tooltip, perhaps with a lighter shade and slightly smaller font.

Make intelligent axes or you'll just have pretty rectangles

Although Tableau provides a good template, axes are so important to the analytical experience that they require some extra attention. Remember, if your users do not have a good frame of reference for the view they are looking at, they will be flying blind (see the view on the next page).

- **Fixed axes:** By default the axis range automatically adjusts based on the data included in the view. If the view is going to be filtered (with quick filters or filter actions) your audience may not notice the change and it could be misleading. Changing axes also makes visual comparison very difficult. You can fix the axis to a specific range of values to avoid confusion.

- **Axis gridlines:** If fixing your axes isn't practical (often over a large range of data), add gridlines to the view to signal to the reader that the axes are changing. Reference lines can also be very effective at achieving the same result. However, make sure all of your lines are subtle to avoid distracting your users from the meat and potatoes of your view.
- **Axis label:** Make sure the axis label is appropriate and includes units when necessary.

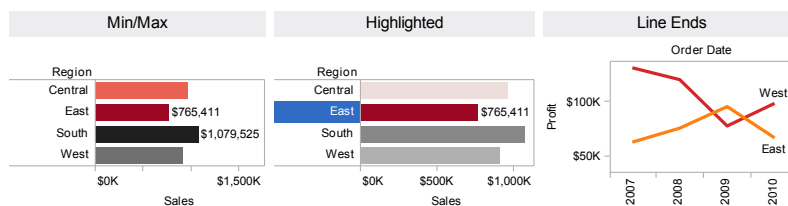


- **Axis tick label:** Make sure that the values on the axis are formatted appropriately (e.g., currency, unnecessary decimal places, etc.)

Labeling your viz in all the right places

Mark labels (the labels on your data points) can help you tell your story quickly and succinctly. Furthermore, it is much easier for your reader to read a mark label than mouse over for a tooltip. Select Format > Mark Labels to turn on labels. You can select from the following mark label options:

- **Labels on selection:** Label the selected marks in the view. Labels are determined based on measures in the view or fields on the text shelf. If several marks that are close together will be selected in the view, you may not want this option because the labels may get cluttered.
- **Labels on line ends:** Label the ends of lines in the view. You can specify whether to label just the beginning, just the end, or both ends. Labeling line ends often highlights the most important data – the last value in a line.
- **Labels on highlight:** Label the highlighted marks in the view.
- **Labels on min/ max:** Label the outliers by marking the minimum and maximum values in the view.



Testing Your Masterpiece

As you have no doubt followed every word of advice in the previous pages, you now have an interactive, beautiful visualization. However, this great creation comes with a great responsibility... testing! Beauty means nothing without function and you don't want your users' first click to clear everything on the page.

Don't let your actions get you into trouble

As you learned in the actions section, you can create some seriously complicated interactivity. You will want to test your viz for the following to avoid leading your users off a cliff:

- Does the action perform the task it was intended to?
 - Does it filter/highlight sheets it was not intended to?
 - Does it filter/highlight fields it was not intended to?
 - Does it filter/highlight at all?
- Does the view become confusing easily?
 - If you have two sheets that both filter each other, often you can get into confusing views very quickly. Generally, make sure your filters go in one direction and don't conflict with each other.
- Do pages or views often become blank?
 - Do you have "Clear on Deselect" checked in the action dialog box?
 - When you publish, there should not be any blank (completely excluded) views

Highlighting hijinks

Although less complex than actions, highlighting can still be very confusing. Click everything to make sure that your highlighting happens as you expect it to... and that it actually happens at all. One thing to be especially careful of when publishing to the web is that your color legends have highlighting turned on, otherwise they will just be legends.

Wait! Before You Publish...

Does your view make sense? Page 2

- Can you “get” the viz in 30 seconds or less, without other explanation?
- Can you ask the viz a question?
- Is it clear what the reader should do?
- Is the purpose of the viz documented in the title or surrounding text?
- Do you have legends?
- Did you mention your source in your viz and include a link to the website (if applicable)?
- Do you describe the data and explain any calculations?
- Do you have a title? Is that title simple, informative and eye-catching?
 - Subtitle: Look what journalists do with sub titles! Brilliant! Should we mess with 800 years of careful iteration by the world’s greatest authors? I suggest we follow along. Use a subtitle to explain your viz.
 - Make sure subtitles are formatted to be subservient (smaller, unbold) than the main title.

Structure: Pages 3-12

- Walk 10 feet away and look at your viz. What stands out?
 - If your eye is drawn to something that isn’t vital you may be off track
- Make sure your most important data is on rows or columns
- Do you use a dashboard? If so does it...
 - Have the most important view in the top left?
 - Have the filters/legends on the bottom or right hand side?
 - Have the views which are meant to be interacted with on the top?
- Three views to a viz max
- Are your legends and filters grouped or placed in an intuitive place? (Hint: top left is not usually ideal)

Interactivity: Pages 13-20

- If it can increase the analytical value of your workbook you should use one or some of the following:
 - Quick Filters
 - Highlighting (almost every view can use highlighting, even if only legend highlighting)
 - Filtering
 - Hyperlinking
- It should be OBVIOUS what interactivity you have added to the viz, and what the user should do to use it.
- Sorting
 - Make sure your sort order is obvious or explained
 - If it is a bar chart, make sure there is a column that includes the measure that you sorted by

Formatting: Pages 21-24

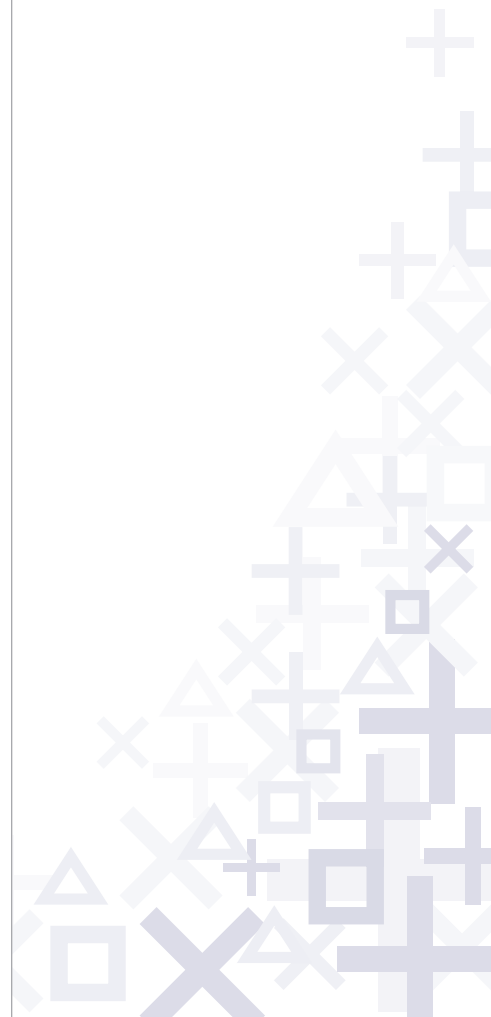
- Do your axes/labels/everything have human-readable names? (NOT "Value" or Sum(Apples))
- Do your axes/labels/everything have a reasonable number of decimals (not 1.00000)
- Do your mark labels come on when you expect them to?
- Do your mark labels make sense without an explanation?
- Do your Quick Filters have titles as commands ("Select a Team:")?
- Does it have color?
- Are you using only approved fonts? (No, you can't fudge this just once and use old English for a baseball viz! Nice try...)
- Have you fixed up your tooltips so they are AMAZING, simple and easy to understand?
- Is there a written explanation of what the viewer is looking at?
- Are all sheets and documents named (NOT Sheet1, etc)?

Testing: Page 24

- Do all of your actions work as you would expect?
 - Filters are global/local as they should be
 - Interactivity works as expected
 - Do your annotations go haywire when you try to interact? Click and test for a while... can you get yourself into crazy views that do not make sense?
- When you publish, do all of your tooltips, titles, headers and labels look as you intended them to?
 - When you publish, do you get scrollbars in an area you did not expect?
 - When you publish, is there a blank view that is unexplained?
None of your views should be completely excluded.

Last step

Do you like your viz? After all of this arduous, tedious and difficult tweaking, you better have a little crush on your viz. If not, it may be time to break up and start over.





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