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**Make Beautiful Vertically Scrolling Dashboards
in SAS® Visual Analytics**

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ABSTRACT

Tabs are a natural way of creating content-rich business intelligence dashboards. They visually separate distinct ideas and concepts, typically flowing from left-to-right to tell a story hidden in gigabytes of tables full of numbers, words, codes, and acronyms. As users ask for additional views and insights into their data, designers may start finding themselves pressed for space. Some users may want to add large crosstabs, while others may want detailed bar charts with 25 categories. Before SAS® Viya®, designers had the following options:

1. Make a new tab with additional visualizations
2. Try resizing all graphs to support the new graph
3. Move visualizations into stacked containers

Adding too many tabs and densely-packed stacked containers can make for a difficult and frustrating user experience. With SAS® Viya® and SAS® Visual Analytics 7.5, designers can increase their dashboard real estate by creating vertically scrolling dashboards at the click of a button. This paper aims to show designers how to break beyond the vertical pixel barrier, allowing dashboards to flow naturally not only from left-to-right, but also top-to-bottom.

INTRODUCTION

In 1898, Edwin G. Seibels revolutionized the way we organize our lives by inventing the filing cabinet¹. Accountants, healthcare professionals, and businesses jumped on the idea: why not keep important information in separated, easy-to-read folders that can be organized in any logical pattern? Edwin's invention lives on over 120 years later in the digital age through a system we simply can't live without: tabs.

Tabs are used to organize spreadsheets, browser windows, applications, and more. They serve an important purpose – but should be used sparingly. Too much of a good thing is a bad thing. When was the last time you've had a browser session that looked like this?

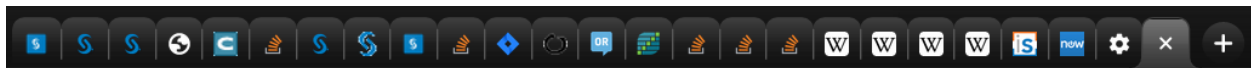


Figure 1. A Programmer's Natural Habitat.

Dashboards are no exception. A dashboard with too many tabs or densely-packed stacked containers can be equally difficult to use.

Since the boom of the smartphone and multi-touch sensitive laptop track pads, we are tabbing less and scrolling more. Websites, news apps, and smartphones are all designed around scrolling. How can we design our dashboards like this as well?

GET INSPIRATION FROM WHAT YOU USE EVERY DAY

Since SAS Visual Analytics is browser-based, it is only natural that end-users will think of it like a website. Designing a dashboard that behaves similarly to a website can help reduce its learning curve, making metrics the main focus rather than usability. Popular shopping

websites can be a good source of inspiration for designing a large dashboard. They are packed full of products, prices, sales, and images all competing for your attention. Multiple elements are at play to help make your search easy without being overwhelmed by the countless products eagerly awaiting your credit card number. For example, they may use a layout like [Figure 2](#) below:

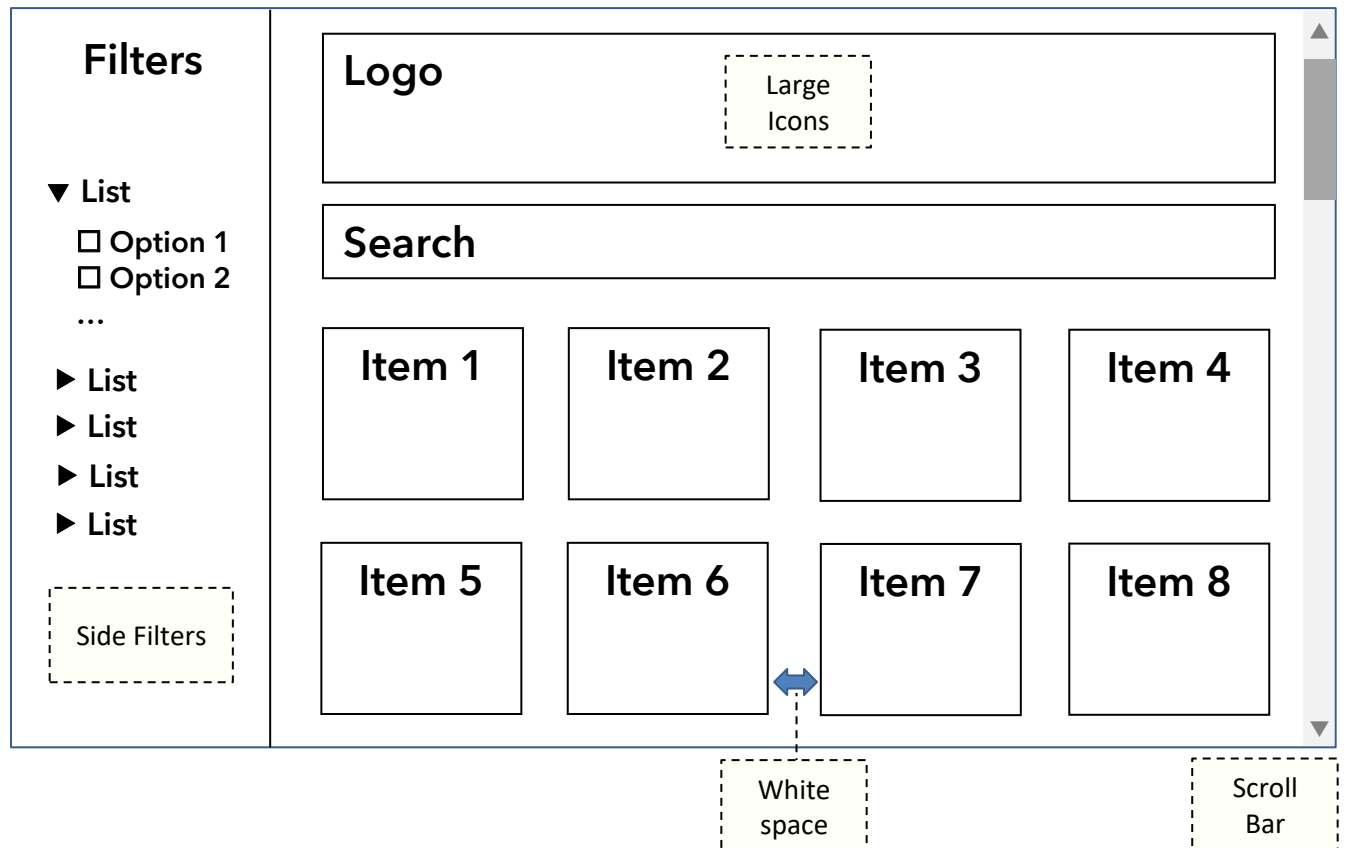


Figure 2. Shopping Websites Give You Loads of Information without Being too Overwhelming

Before jumping into templates for creating vertically scrolling dashboards, let's review some of these elements to understand their role in making these types of dashboards effective, and find out what tools are available in SAS Visual Analytics to create them.

This paper will discuss:

- Tools and techniques to make your dashboard feel more like a website
 - [Scrolling](#)
 - [Whitespace](#)
 - [Side Filters](#)
- Three templates for quickly building vertically scrolling dashboards
 1. [Simple](#)
 2. [Side Filters](#)
 3. [Journal](#)
- [Deciding if a scrolling dashboard is right for your end users](#)
- [Performance considerations](#)

All dashboard layouts discussed in this paper are available on the [SAS Global Forum 2020 Github](#) for SAS Visual Analytics 7.5, 8.2, 8.3, and 8.4+.

SCROLLING

Scrolling is a crucial factor that allows all objects on a page to be displayed with a higher resolution. By allowing users to scroll, important elements can be made larger and easier to read, are placed in a more centralized location, and can tell a story from top-to-bottom. Users are able to read information significantly faster than if information on a website scrolls compared to if the content is separated into multiple tabs. Not to mention, users tend to have a more difficult experience when compared to a scrolling one, especially if they're required to go back and forth to compare items between tabs².

Your dashboard may be one of dozens that your end users read every day. Keeping your dashboard feeling natural makes your vital statistics the main focus rather than how difficult it was to find them. The advantage of scrolling means you can keep your most important statistics and objects higher on the page. Those with a lower interest can be displayed further down the page. Without scrolling, those objects would either need to be made smaller, placed in a stacking container, or put into an entirely new tab. With scrolling, everyone will share the same high resolution graphs in the same place with little compromise³.

HOW SCROLLING FITS INTO SAS VISUAL ANALYTICS

New to SAS Visual Analytics 8 and 7.5, you have been given the power to break yourself free from the shackles of the Y-Axis. Adding a scroll bar is as easy as unchecking Avoid scrollbars under the Layout options in the Page Options menu. That's all there is to it!

Which objects are placed on the page, where they end up situated, whether the page is being viewed on a mobile device, and screen resolution all affect how the dashboard will look and feel. Some of these functions are automatically determined by SAS Visual Analytics and cannot be directly controlled; however, they can be influenced with certain settings. This is explained in further detail in the [Templates](#) section.

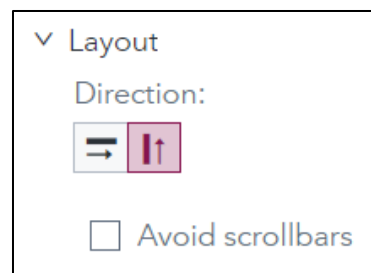


Figure 3. Adding a Scroll Bar.

WHITESPACE

Whitespace is the space between content⁴. Subtle, yet vitally important: whitespace gives eyes a break, helps separate unique or complex elements, focuses a user's eyes on one location at a time, and gives users a wide place to scroll without getting caught on page elements that interact with their scroll wheel. Whitespace is utilized so effectively nowadays that the absence of whitespace is more noticeable than the whitespace itself. Look to your left and right: this very paper is easier to read due to the whitespace built into this paper template.

How Whitespace Fits into SAS Visual Analytics

If you are placing multiple key values, statistics, or images in succession, adding additional white space between them can improve readability. The simplest way of adding whitespace is by using the Padding option found in the Style menu of any object.

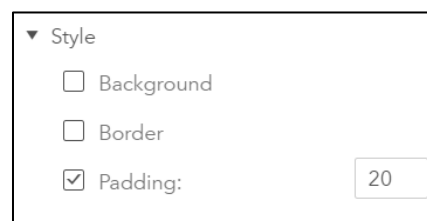


Figure 4. Padding an Object.

Padding is specified in number of pixels and applies to all sides of an object. Let's take a look at the importance of padding using a simple example. In [Figure 5](#), four time-series plots are placed side-by-side with a single Key Value above each. Each key-value/time-series combination is then placed into a Standard Container.

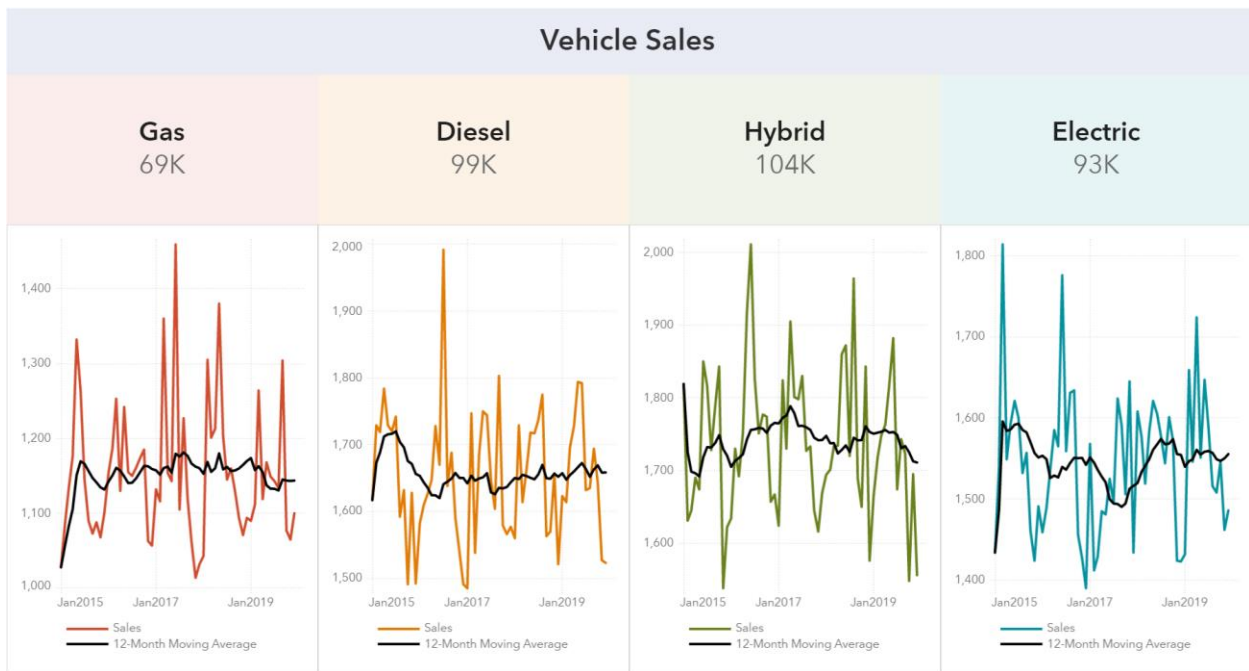


Figure 5. Before Padding

Yeesh. Imagine pulling that up every day first thing in the morning. The colors help distinctly identify the fuel types, but they're butted up next to each other and mesh together. Let's add 20 pixels of padding to each container to see if that will help.

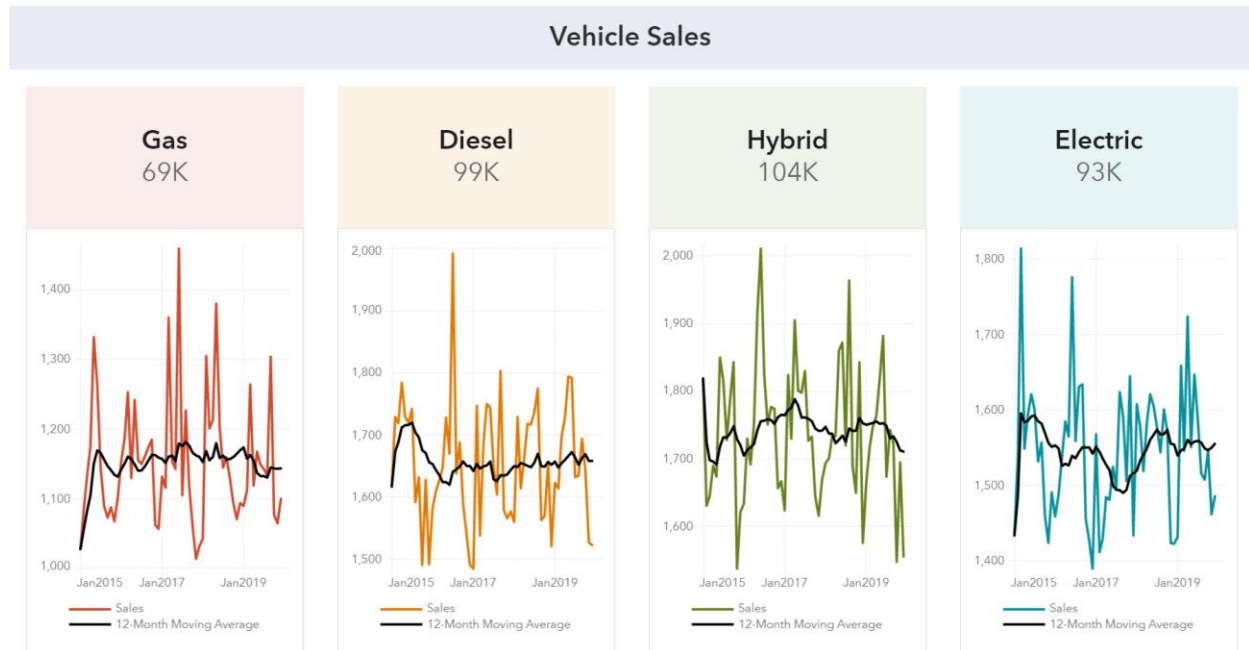


Figure 6. After Padding

What a huge difference a mere 20 pixels can make! A consequence of padding is a slight loss in graph resolution; however, this is a small price to pay for such a large improvement in readability.

Padding One Side of an Object

As of versions 7.5 and 8.5 padding cannot be applied only to one side of an object. You can achieve this by using an empty text box filled with a single character that is the same color as the background. This effectively makes a Text Box act as a "Buffer Box." This is useful for separating section headers in scrolling dashboards while allowing objects to maximize the available space. In the following example, a text box is added below "Section Header" and given a single white dot (".").

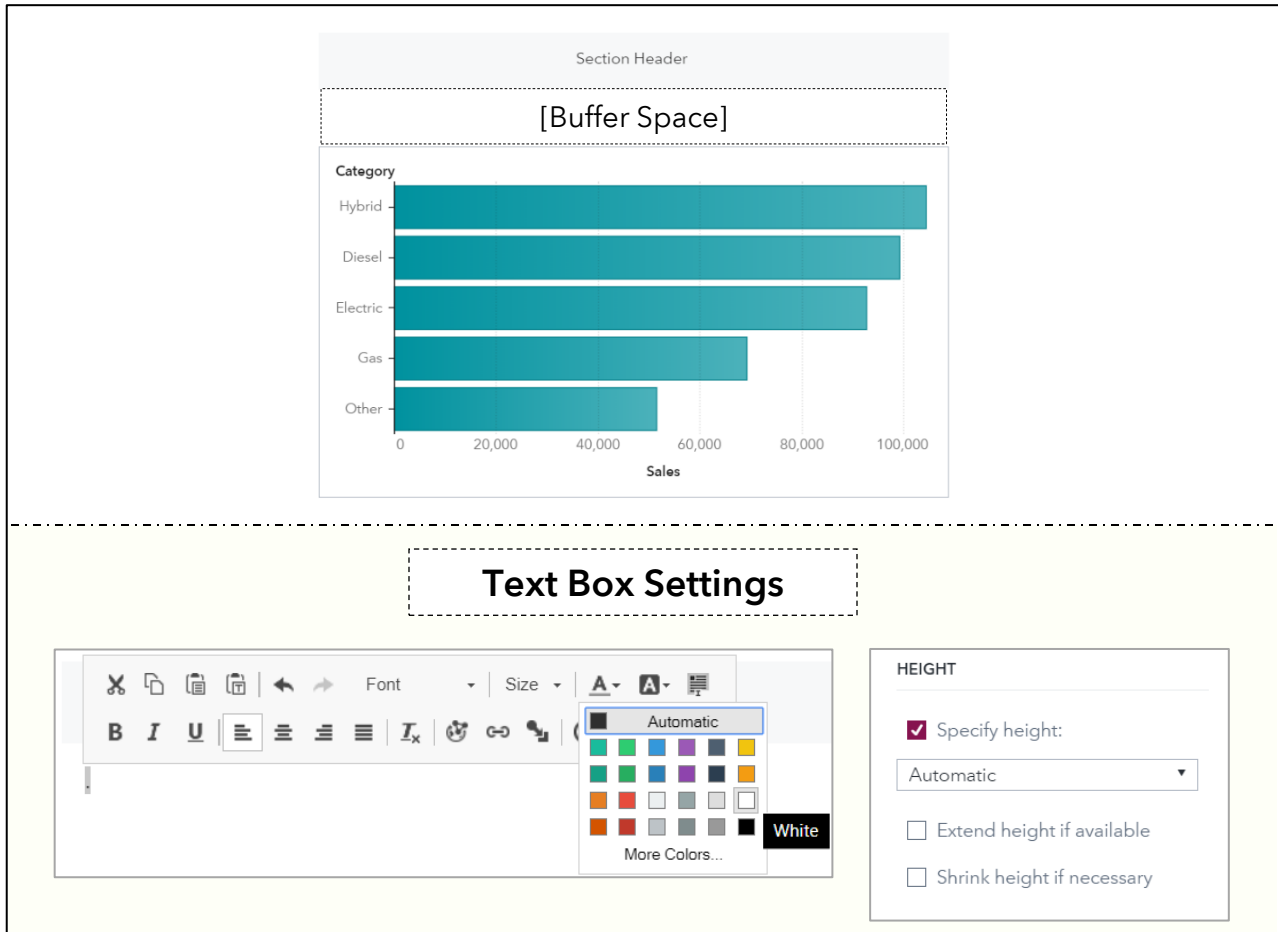


Figure 7. Creating a Text Box with a White Character to Act as a Buffer.

It is important that the text box Height settings are set to Automatic to ensure that the text box always maintains the same height regardless of screen or report resolution. Setting to a fixed value may introduce scroll bars to the buffer space.

If you are using the Buffer Box often, save yourself some time by saving the object to the Objects Pane. Drag and drop it to any place you need a buffer between objects.

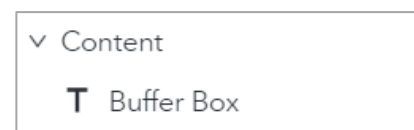


Figure 8. Saving the Buffer Box as a Reusable Object in 8.3+.

SIDE FILTERS

There is a reason websites all tend to place their filters on the left-side of the screen: modern desktop computers, laptops, and tablets generally have screens that are wider than they are tall, with two of the most common resolutions being 1920x1080 and 1366x768⁵. With these big, wide monitors, placing filters on the left-hand side uses screen real estate more effectively.

HOW SIDE FILTERS FIT INTO SAS VISUAL ANALYTICS

Between a user's actual browser, the favorites bar, SAS Visual Analytics menu, report title, report pages, and page controls, nearly 1/3 of the typical user's starting screen height is not used for report content. Additionally, adding both report and page filters together further decreases vertical content space, causing flattened graphs. Let's take a look at a few of the options available to make better use of the horizontal space.

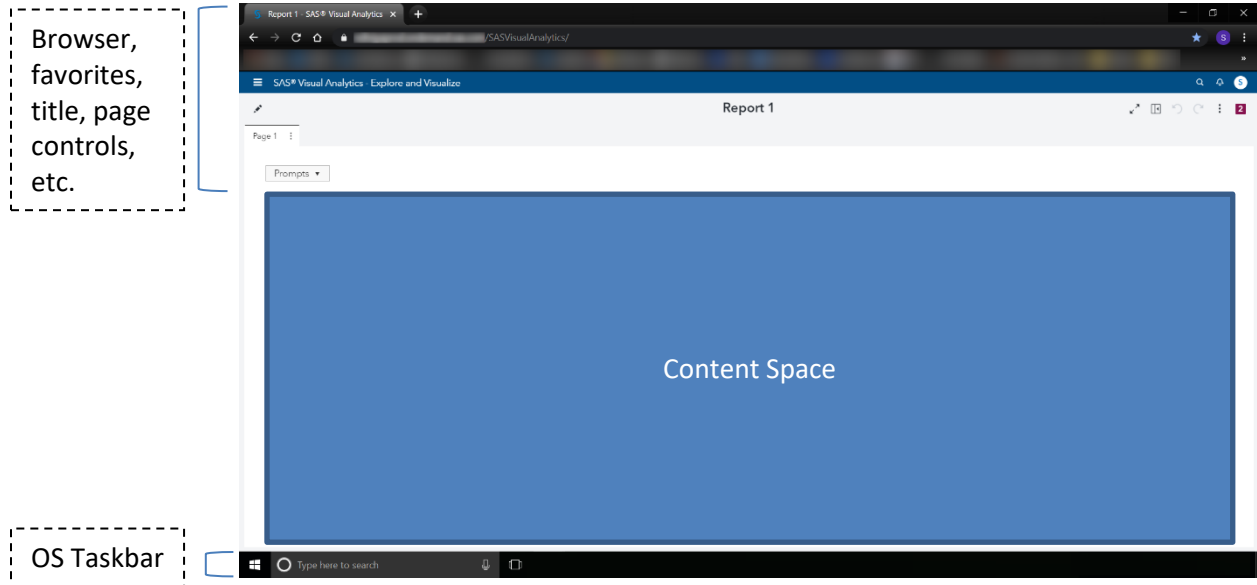


Figure 9. Always Consider your End User's Most Common Starting Screen Configuration.

Option 1: Vertical Scrolling Container

Adding a vertical scrolling container to the left-side of your report can quickly and easily create a space for holding an unlimited number of filters. Additionally, your list filters can finally be freed from the confines of prompt containers to let your users scroll rather than click through them while browsing the report. You can also use automatic actions to enable filter breadcrumbs at the top of the report, giving a common place for users to quickly recall which filters they applied during the course of their exploration. The screenshot in [Figure 10](#) shows an example of placing a vertical scrolling container to the left-side of a report.

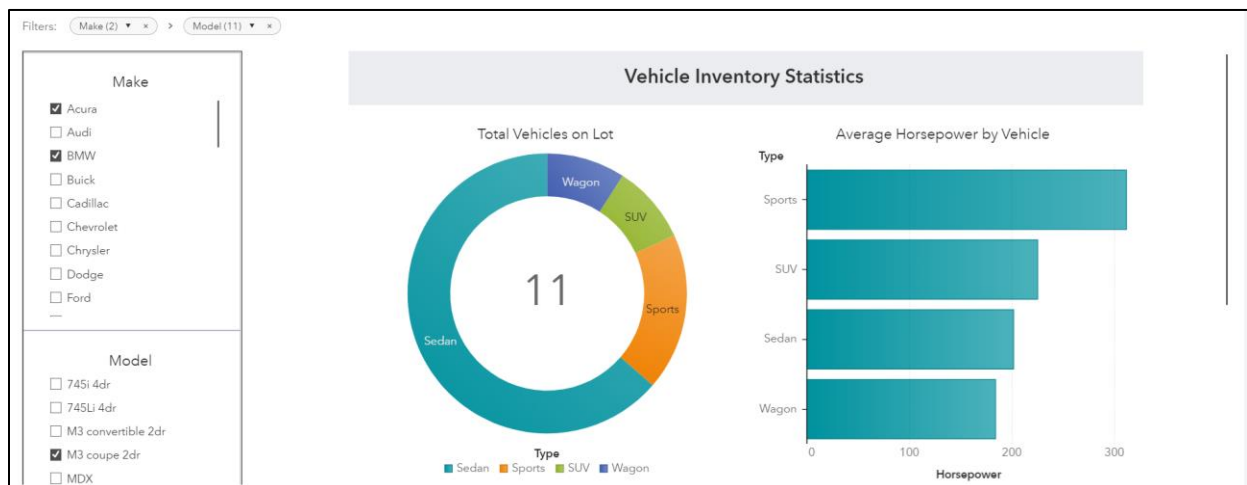


Figure 10. Adding a Vertical Scrolling Container Left of Objects Helps Use Screen Space Effectively.

Option 2: Page Control Placement (8.4+)

New to SAS Visual Analytics 8.4, you have control over where page controls lie. Instead of a standard container, you can directly place your page controls to the side. Side page controls are beneficial over container-based controls for three reasons:

1. Filters are automatically applied to all objects on the page
2. Filters transfer to linked pages and dashboards
3. Page controls are always available in any section of the page

This feature does come with some drawbacks:

1. A border cannot be placed around the Page Controls section
2. Filter breadcrumbs do not apply to page or report controls
3. Long or wide lists can cause layout and border incompatibility within Page Controls
4. Long lists or large numbers of expanded list filters can become compressed

If using long or wide lists, it is recommended to manually set their horizontal and vertical sizes located in the layout section of the list's options pane. If many lists are required but they do not fit within the page control section, placing them inside prompt containers is the next best option.

Now that we've learned about a few tools that can be used to improve our existing tabbed dashboards, let's talk about how these can all be brought together into vertically scrolling dashboards using three different templates.

BRINGING IT ALL TOGETHER: VERTICALLY SCROLLING DASHBOARDS

Let's say you are an analyst for a large car manufacturer and are tasked with creating some new dashboards to analyze vehicle sales across dealer lots. The higher ups want to have a minimalist dashboard that just gives them some key numbers that they can explore. You've just gotten a shiny new SAS Viya compute server with SAS Visual Analytics 8.4 and want to give them a dashboard with a modern look. After discovering the Avoid scrollbars option, you get to work thinking of a few ways to get them their daily serving of metrics.

TEMPLATE 1: SIMPLE SCROLLING

The most simple vertically scrolling dashboard can be made by unchecking Avoid scrollbars and adding content to a page. This dashboard is the easiest to make and support for both desktops and mobile devices; however, the left- and right-screen scroll areas are small and it may be frustrating with certain zoomable graphs. For example, if the user scrolls with their mouse or trackpad, they may cause a graph to zoom rather than the page to scroll.

Great for...	Benefits	Drawbacks
Infographics	Easiest to make	Small scrolling area
Mobile Dashboards	Easy to support	Lower central focus, increasing left-right eye scanning
Text-heavy or key value-heavy reports	Best mobile compatibility	
	Largest graphs	

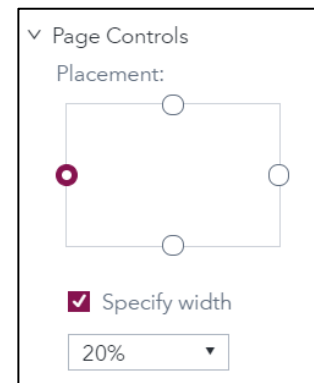


Figure 11. Version 8.4 Lets You Change Where Page Controls Reside.

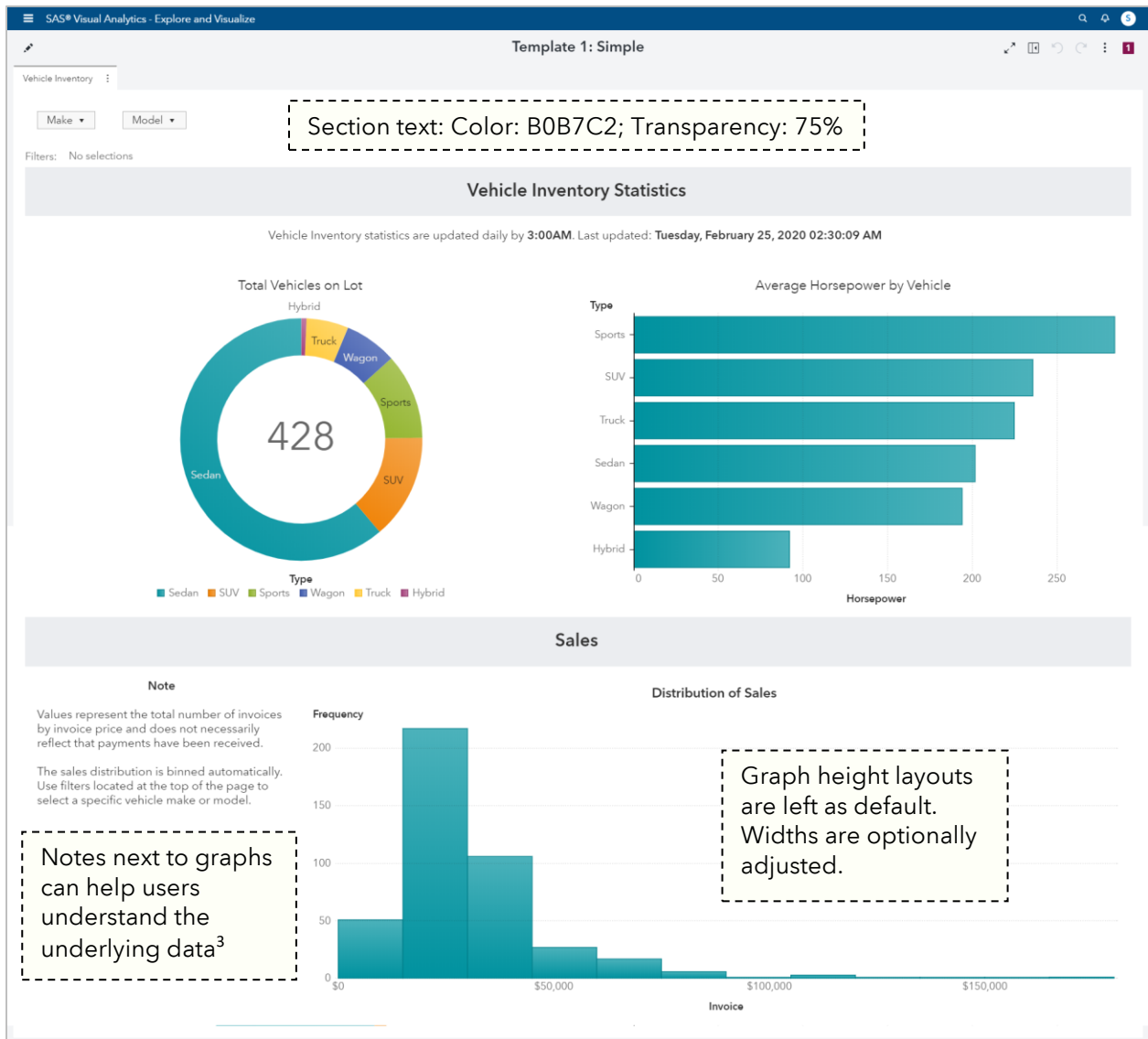




Figure 12. The Simple Template is Easy to Make and Highly Compatible with Different Resolutions.

1. Create a new page in SAS Visual Analytics
2. On the right-hand side of the page, click Options 
3. Expand the Layout section
4. Set the direction as Vertical 
5. Uncheck Avoid scrollbars
6. Add objects to the page with default settings

Object Settings

All graph settings in this template are typically left as default when added to a report. [Table 1](#) shows settings that will maintain high mobile and desktop compatibility. All settings marked as "Optional" mean that adjustments to an object's default layout may not be needed unless you are trying to achieve a certain design goal.

Object	Width Settings			Height Settings		
	Specify	Extend	Shrink	Specify	Extend	Shrink
Graph	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Automatic	<input type="checkbox"/>	<input type="checkbox"/>
Container	Optional	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Optional	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Text	Optional	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Automatic	<input type="checkbox"/>	<input type="checkbox"/>
Image	Optional	Optional	Optional	Optional	Optional	Optional

Table 1. Recommended Object Settings for the Simple Template.

The Simple template is the easiest to work with and support. Adding graphs to the report is as easy as dragging and dropping with little to no other modification required, making your life easier and users happy with quick turnaround times.

While this gets you started, but you'd like to make the dashboard a little more centrally focused and try moving the filters off to the side.

TEMPLATE 2: SIDE FILTERS

Side filters help improve your vertical real estate and give users a more website-like feel. With the default page control layout, lists are usually stuck within prompt containers, hiding their value unless the user hovers over them. With side filters, lists can be expanded and their values are always visible. [Figure 13](#) shows one of the two options available to implement this.

Great for...	Benefits	Drawbacks
Large list filters (in-page container only) High number of filters Desktop users with widescreen monitors	Increased vertical real estate Fully expanded list filters Easier navigation for high number of filters Large graphs Easier scrolling	Decreased mobile compatibility (Option 1) Lower compatibility with monitors < 1920x1080 May have poor aesthetics when there are few filters

Scrolling Container with border.
Width: 20%
List Control Height: Manual

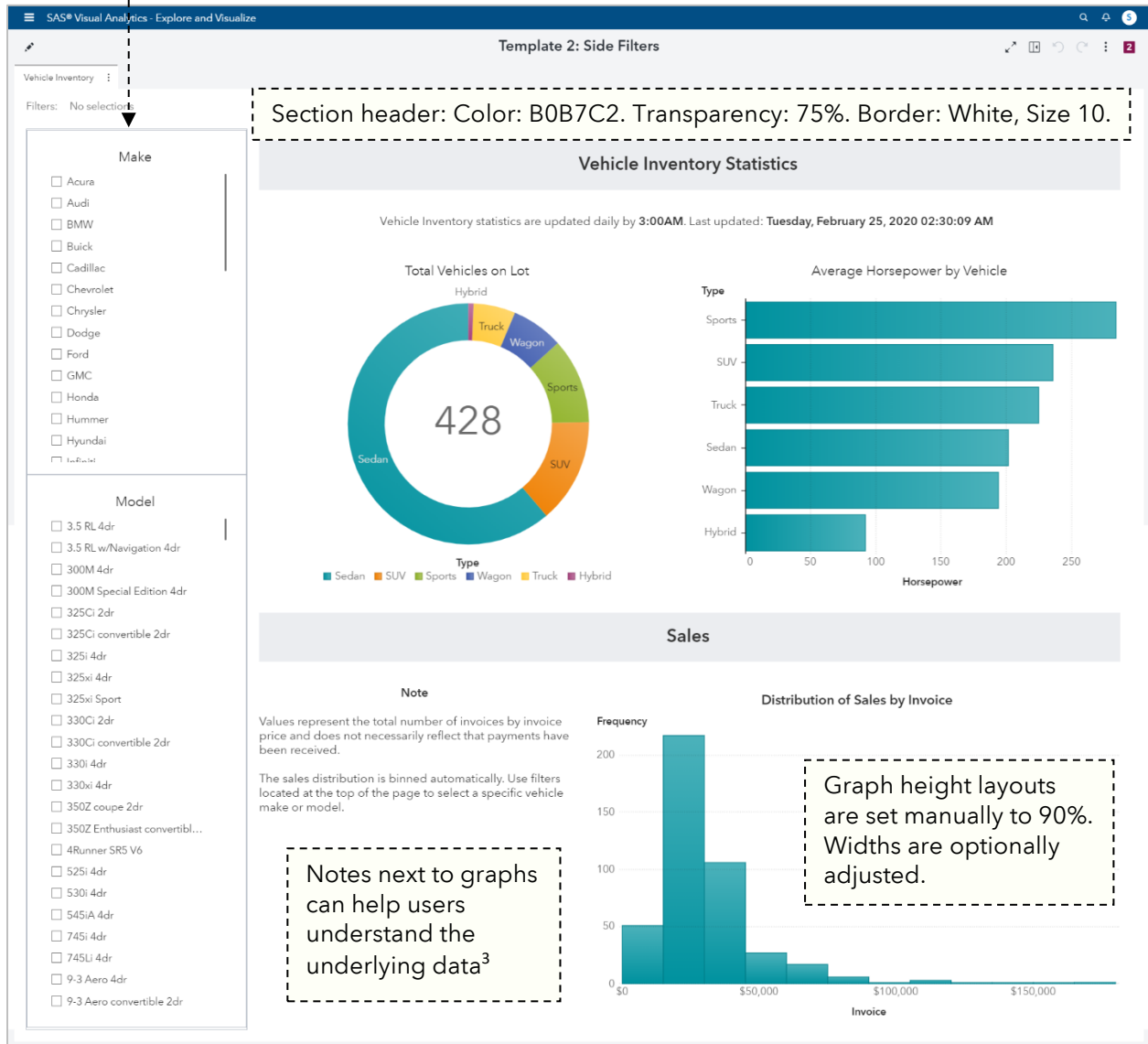



Figure 13. The Side Filter Template Expands List Filters and Helps Centralize Content Focus.

How to Create the Side Filters Template

1. Set the direction as Vertical  and uncheck Avoid scrollbars
2. Add graphs and section headers to the report. Graph height is adjusted in step 4.
3. (a) Drag a scrolling container to the left side of the report and set width to 20% OR;
(b) (8.4+) Set Page Controls to the left side of the report
4. If 3a:
 - Specify height: 90%
 - Shrink width if necessary
 - Extend height if available

If 3b: Use the Simple layout settings described in [Table 1](#)

5. Add report controls to the container and set heights manually as needed

Object Settings

With [Option \(1\)](#), a container to the left of all other objects will force SAS Visual Analytics to shrink the height of those objects. Setting their heights manually to 90% will allow objects to fill the page. If you are using SAS Visual Analytics 8.4 and have [page controls on the side of the page](#), use the object settings in the [Simple Layout](#).

Object	Width Settings			Height Settings		
	Specify	Extend	Shrink	Specify	Extend	Shrink
Graph	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	90%	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Side Container	20%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Control	Optional	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Optional	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Container	Optional	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Optional	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Text	Optional	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Automatic	Optional	<input type="checkbox"/>
Image	Optional	Optional	Optional	Optional	Optional	<input type="checkbox"/>

Table 2. Recommended Layout Settings for the Side Filter Template.

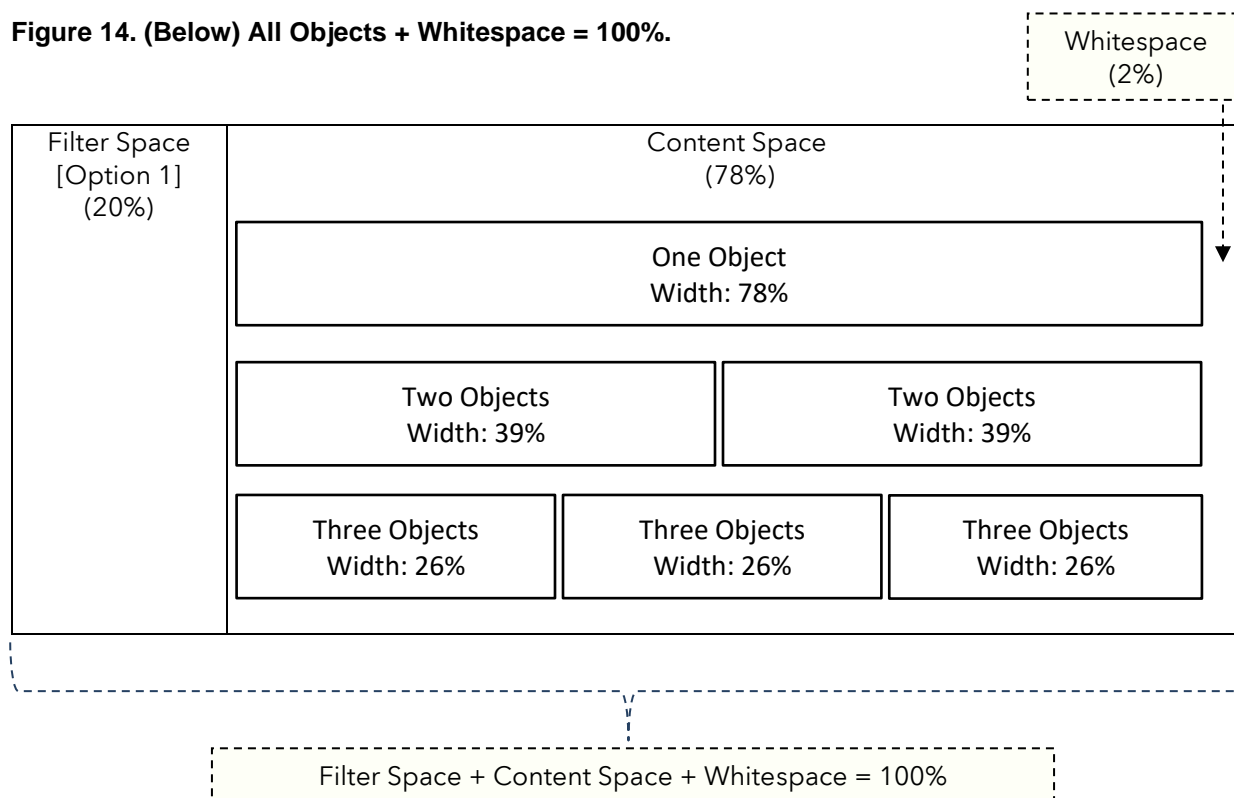
Padding Backgrounds or Borders

Padding objects does not affect their background or borders. In the example [above](#), a size 10 white border is added to each section header to create padding for both the background and text. To pad borders as well, add objects to a standard container and pad the container.

Improving Scroll Space

You may have found that it is easy for the mouse to be caught within a graph while scrolling, causing the graph to zoom rather than the page to scroll. Decreasing the width of the content space by 2% will add a wider scroll space to the right side of the page.

Figure 14. (Below) All Objects + Whitespace = 100%.



Use the object size formula below to estimate the size all objects must be to ensure they maintain alignment on the right side of the page. Note that if using side report controls (Option 2), the page control space should not go into this equation.

$$\text{Total Object Size} = O_1 + O_2 + \dots + O_n = (100\% - \text{Whitespace \%})$$


Now that you've played around a bit with whitespace on the side of the screen and like that it makes the page easier to scroll, how can you improve on it further? You remember that your audience will mostly be executives who tend to read big publications like the New York Times or the Wall Street Journal. These publications all have whitespace to the left and right of the page. What if you replace the side filters with a buffer box to achieve that effect?

TEMPLATE 3: JOURNAL

The Journal template in Visual Analytics (Inman, 2018) expands on the side-filter concept by replacing the left-side filter area with a buffer box sized between 10% and 12.5%. The buffer box forces all objects to shift to the right. Decreasing the width of all objects by about 10% gives white space to the right of each object. This setup gives both sides of the page large empty sections that make scrolling easy. Additionally, all objects are moved closer the center of the page, keeping the user's eyes more centrally focused.

Great for...	Benefits	Drawbacks
<p>Widescreen Monitors</p> <p>Creating a news website or journal-like feel</p> <p>Graph-heavy reports</p>	<p>Centrally-focused (decreased left-right eye scanning)</p> <p>Easiest scrolling</p> <p>Large, separated, and defined sections</p>	<p>Low mobile compatibility</p> <p>Manual adjustments needed for all objects</p> <p>Low compatibility with monitors < 1920x1080</p> <p>Decreased content space</p> <p>May be slow on older machines</p>

How to Create the Journal Template

1. Set the direction as Vertical  and uncheck Avoid scrollbars
2. Add graphs and section headers to the report
3. Set the following graph layout settings:
 - Specify height: 90%
 - Specify width: Sum of all object widths = 80%
 - Shrink width if necessary
 - Extend height if available
4. Drag a Buffer Box to the left side of the report with the following layout settings:
 - Specify width: 10%
 - Shrink width if necessary
 - Extend height if available
5. If objects unexpectedly stack or reflow, see the [below section](#) for troubleshooting

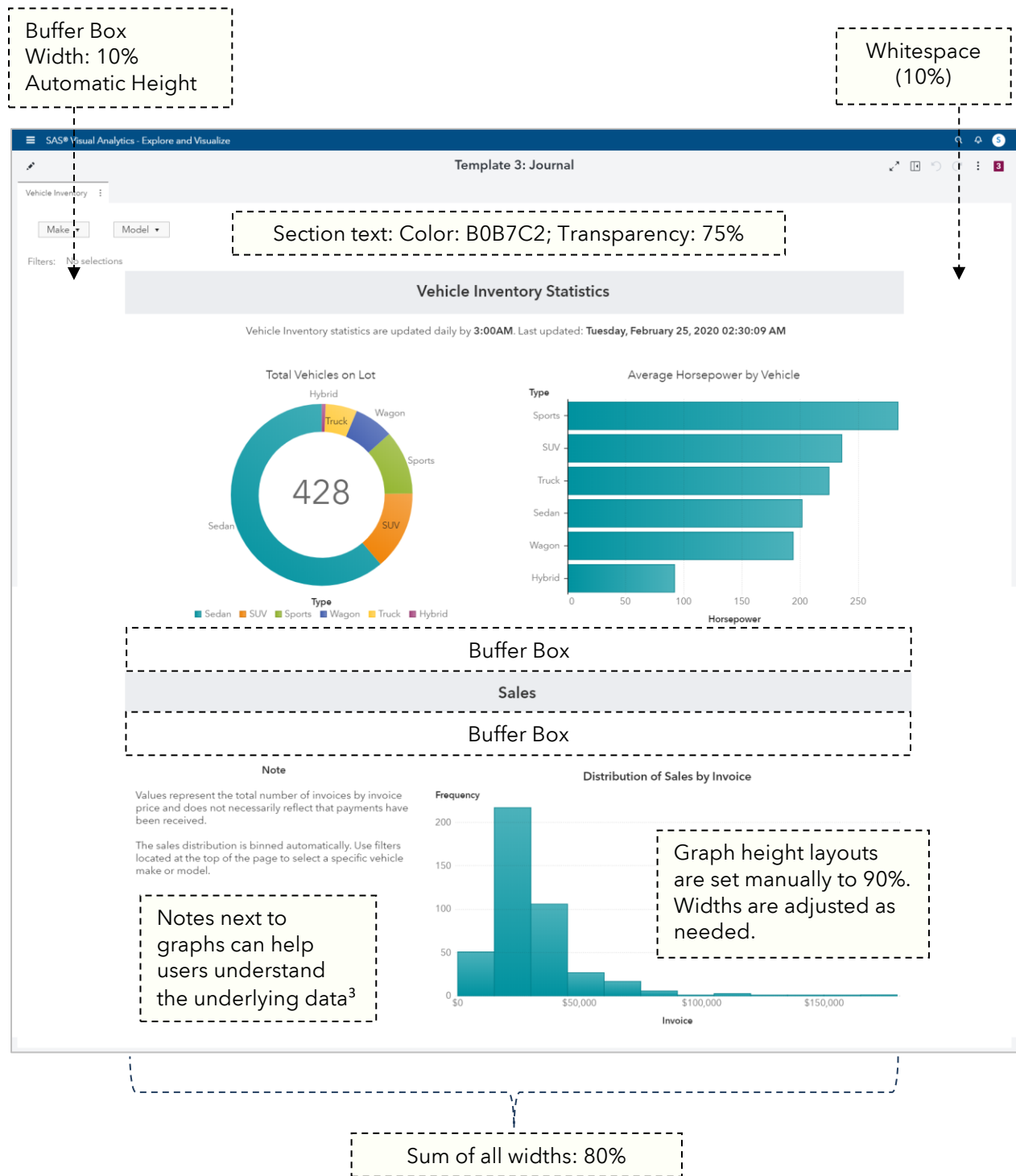


Figure 15. The Journal Template Adds 10% Whitespace to Both Sides of the Page to Center Content and improve scrolling.

The executives end up being quite happy with your layout and ask if you can start creating them their own version of the Wall Street Journal every morning to save on subscription costs. You remind them that your degree is not in journalism, but you do have a solid 12 dedicated fans who read your weekly food blog for bagel enthusiasts. They stick with the subscription instead.

Object Settings

One of the main downsides of this template is the amount of manual adjustment required to prevent SAS Visual Analytics from shifting objects into unexpected positions. Although the Content Space formula still applies, there is no one size fits all setting for all object layouts. The best way to work with this type of dashboard is by experimenting with different object layout settings and percentages until you achieve your desired design. Below are starting layout settings that tend to work with most objects during initial design and placement. Settings marked "As Needed" mean that manual adjustment is most likely required, but the optimal setting varies depending on your report and design goals.

Object	Width Settings			Height Settings		
	Specify	Extend	Shrink	Specify	Extend	Shrink
Graph	79.0%-80.0%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	90%	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Side Buffer	10.0%-12.5%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Automatic	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Control	As Needed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	As Needed	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Container	As Needed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	As Needed	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Text	As Needed	As Needed	<input checked="" type="checkbox"/>	Automatic	As Needed	<input type="checkbox"/>
Image	As Needed	As Needed	As Needed	As Needed	As Needed	As Needed

Table 3. Recommended Layout Settings for the Journal Template.

Troubleshooting Objects Unexpectedly Stacking (Reflowing)

SAS Visual Analytics 7.5, 8.2, 8.3, and 8.4+ all behave slightly differently when objects of different sizes are placed next to each other. SAS Visual Analytics has algorithms built in that decide if an object will fit on the page correctly. If it doesn't, objects will tend to automatically stack (reflow). Its behavior is analogous to word processing software automatically moving a long word to a new line if it does not fully fit on the line.

If you find that objects placed next to each other are reflowing unexpectedly or the page is not centered, decrease or increase the rightmost object by 0.5% until the object aligns to the desired location. Experimenting with the Extend or Shrink options for Width/Height settings may also achieve the desired placement. For more information on these options, see [Ryan Norris and Brian Young's SAS Community Forum post](#) and [SGF 2018 paper](#), "Tips and Techniques for Designing the Perfect Layout with SAS Visual Analytics."

IS A SCROLLING DASHBOARD RIGHT FOR YOUR USERS?

While there are significant benefits to adding the ability to scroll to your dashboard, it may not always be the right choice. The way your audience will consume your dashboard is the most important aspect of making any dashboard successful.

Consider a vertically scrolling dashboard when...

- You want to build a large, interactive infographic-style dashboard
- You have detailed data such as hourly, daily, and monthly time-series
- You'd like to create a top-to-bottom story with your data
- Your dashboard has many similar tabs whose graphs can be stacked into fewer tabs
- You receive a request to add a new additional large graph to an already-cramped tab, but the graph itself does not warrant its own tab
- Your users want to use their mobile devices with the SAS Visual Analytics app

Consider a tabbed dashboard when...

- Your story can fit comfortably on a single page
- Your dashboard needs to cover multiple disparate subjects
- You are working with a huge data source that performs many complex calculations
- Your average viewer's screen resolution is lower than 1366x768

Your dashboard can even be a hybrid of tabs and vertically scrolling elements. Some tabs can scroll vertically while others can sit on their own as a single page.

The main goal of a scrolling dashboard is to make it easier for the user to find and consume information to make business decisions. Making a page too long can be just as difficult to use as a dashboard with too many tabs. If you need an electron-scanning microscope to find the scroll bar, a few extra tabs won't hurt.



Figure 16. This Page is Way too Long.

DEVICE COMPATIBILITY

Mobile device compatibility will vary significantly depending on the type of dashboard you choose, the graphs you use, how many graphs are on a page, and the version of SAS Visual Analytics you are using. Table 4 is based only on personal subjective testing and can be used as a rough guideline to help decide which template works best for you. Your results and experience may vary depending on your dashboard design and future updates to Visual Analytics and its mobile apps.

	Min. Monitor Resolution (Recommended)	Ease of Scrolling			
		Desktop (Web)	Windows App	Tablet	Phone
Tabs	1366x768	N/A	N/A	N/A	Good/Fair
Template 1: Simple	1366x768	Fair	Fair	Excellent	Excellent
Template 2: Side Filters	1920x1080	Fair	Fair	Excellent/Good	Fair/Poor
Template 3: Journal	1920x1080	Excellent	Fair	Fair/Poor	Poor

Table 4. How the End User Will Interact with the Report Will Influence Which Template to Use.

Remember, you are not locked to create one dashboard that does everything well. It may even be preferable to create a second smaller dashboard that you optimize specially for mobile devices.

With the ability to create pre-defined object templates in version 8.3 and beyond, it is easier than ever to create mobile versions of dashboards that can help give users quick answers that they're looking for while in a meeting. As SAS Visual Analytics and the Visual Analytics App continue to improve, compatibility with scrolling will improve as well. Be on the lookout for new features that can make the above templates easier to create and more compatible with mobile devices.

PERFORMANCE CONSIDERATIONS

When you unlock the Y-Axis, you've made it easy to build an unlimited number of graphs on one page. As SAS Visual Analytics loads a page, *all* objects are loaded at once regardless of page size. The more objects that are added, the more strain on your hardware any time the page loads, filters are applied, or interactions occur. This issue compounds when working with objects that use big data sources on limited hardware. As you build your dashboard, monitor loading performance to determine if any specific calculations or elements are particularly difficult for CAS to crunch.

Operations that require sorting of huge data in a small-to-midsized distributed environment can hit performance the hardest. When building vertically scrolling dashboards, be aware that the following operations can cause significant performance hits when used often:

- Min
- Max
- First
- Last
- Median
- Percentile

There are ways in which you can design your underlying data effectively to reduce the impact of these operations. Check out Stephen Foerster's blog on [CAS Data Modeling for Performance](#) and his [Case Study on Optimizing CAS tables for VA](#).

DIAGNOSING PERFORMANCE PROBLEMS

If you run into significant performance issues with your dashboard, do the following:

1. Edit the report
2. Press **Ctrl+Alt+P**

This will bring up performance statistics for your dashboard. These give invaluable insight that will help you diagnose which objects take the longest to load. Fully diagnosing and developing different data models for high-performance dashboarding is outside the scope of this paper; however, your safest bet is to reduce or remove the number of objects from your vertical dashboard, or consider moving heavy-hitting objects to a different tab. For additional information about diagnosing and solving performance issues, check out Meera_SAS's Communities Library Post on [Debugging SAS Visual Analytics Report Performance Problems](#).

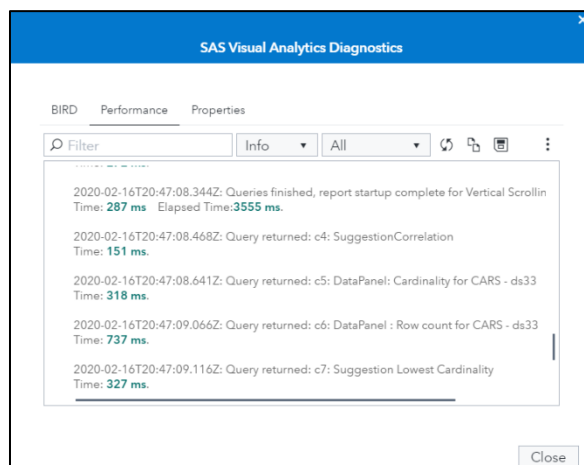


Figure 17. The Performance Diagnostics Tool Helps Narrow Down Slow-Running Queries.

CONCLUSION

In the smartphone age, scrolling is a normal part of our daily lives. Keeping things natural to the way we normally interact with our devices is important to reduce distractions that can stray users away from your dashboard. Carefully crafting dashboards to highlight vital information is what can drive million-dollar decisions. You very well could have developed the one metric or model that changes the direction of your company. If that information is hidden among a dizzying number of tabs, it may never end up being used to make the right call. Keeping things simple and easy to find will ensure that the right people see the right information.

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RECOMMENDED READING

- *Beautiful Visual Analytics Reports*: <https://www.sas.com/beautifulreports>
- *Elliot Inman's SAS Blogs*: <https://blogs.sas.com/content/author/elliottinman/>
- *Stephen Foerster's SAS Blogs*: <https://blogs.sas.com/content/author/stephenfoerster/>
- *Designing the Perfect Layout with SAS Visual Analytics*: <http://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2018/2166-2018.pdf>
- *Visual Analytics Users Guide*: <https://support.sas.com/en/software/visual-analytics-support.html>

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