

Infographics Powered by SAS® Visual Analytics and SAS® Office Analytics

Travis Murphy, SAS Institute Inc

ABSTRACT

A picture is worth a thousand words, but what if there are a billion words? This is where the picture becomes even more important, and this is where infographics step in. Infographics are a representation of information in a graphic format designed to make the data easily understandable, at a glance, without having to have a deep knowledge of the data. Because of the amount of data available today, more infographics are being created to communicate the information and insight from all available data, both in the boardroom and on social media. This session shows you how to create information graphics that can be printed, shared, and dynamically explored with objects and data from SAS® Visual Analytics. Connect your infographics to the high-performance analytical engine from SAS® for repeatability, scale, and performance on big data and for ease of use. You see how to leverage elements of your corporate dashboards and self-service analytics while communicating subjective information and adding the context that business teams require, in a highly visual format. This session looks at how SAS® Office Analytics enables a Microsoft Office user to create infographics for all occasions. You learn a workflow that lets you get the most from your SAS Visual Analytics system without having to code anything. You will leave this session with the perfect blend of creative freedom and data governance that comes from leveraging the power of SAS Visual Analytics and the familiarity of Microsoft Office.

INTENDED AUDIENCE

This paper is aimed at SAS Visual Analytics users who create and design reports and dashboards for their users. Managers can use this paper to determine what the teams can create and design with SAS Visual Analytics and SAS® Office Analytics. This paper is for beginner and intermediate SAS users.

INTRODUCTION

A picture is worth 1000 words. The world is at a point where the attention span of a consumer is only about eight seconds. If something doesn't grab their attention, chances are they will move on. Not only will they move on, but most of the time they won't come back. This has created a shift in the massive growth of using infographics to quickly show data-driven visuals for immediate impact. There are now infographics about how many infographics there are. There is a reason for this growth in infographics.

"Now you can circumvent written language to a large extent. A lot of printed words are there to describe things that occur spatially. In many cases a picture is worth a thousand words. Now we can generate these pictures and graphics and we can convey them to other people very easily. I think it's inevitable that visual media are going to become more important in conveying ideas and not just about raging fires."

Marcel Just, Center for Cognitive Brain Imaging at Carnegie Mellon University, 2010

As the quote infers, data visualization is a more effective way of getting a reaction from the audience. Analysts need to adapt to this shift in the audience's attention span and combine visuals with the massive amount of available data. We need to combine infographics with big data to take advantage of the opportunities that it presents. There are two types of infographics in broad categories: artistic and business. The artistic infographic is one in which graphic designers take information from authors and create a very artistic visual. This visual could be hung on the wall as a poster or put on the front page to support a headline. The other is the business infographic. This is a very structured visual and an extension of the dashboard concept. A dashboard can be an infographic as well. However, generally they are more about data than about being subjective, which often makes them a one-stop shop for self-service business intelligence. Both styles of infographics have their place, and when used correctly, they can have a great impact on the intended audience. The business infographic, which is the focus of this

paper, combines artistic elements like clip-art background images, and includes data-driven content from the corporate data warehouse or big data platform. Traditionally, the creator needed to spend a large amount of time with tools such as Microsoft Excel or with programming languages to develop and craft the correct data to support the right visual. This is not so any more.

Analysts do not have to write code to get great visualization from the data. They don't have to spend hours using scripts and spreadsheets to craft the data into a usable format. The analyst can start to be more creative on the visual layer and get better visualization in the infographic. This paper is not focused on the theory of design for infographics. I will leave that to the graphic designers, data journalists, and visual artists of the world. This paper focuses on the SAS analytic engine and associated software to make extremely powerful tools available to the business analyst to better create infographics.

The boardroom, just like the classroom, has a much shorter attention span to consume information and to get to the "AHA" moment as fast as possible. The emergence and growth of many data visualization tools have placed infographics and data visualization at the forefront when considering business intelligence solutions. SAS has been a leader in data visualization for 40 years. Over the years, the tools have improved to be more approachable for more people within an organization. It is proven that data presented visually is more easily processed by the brain than looking at the tabular format or words alone. Also, the number of infographics has increased dramatically over the past five years, and according to Google trends, this number continues to rise. The only caveat is that pictures and visualizations themselves should not impede the message or the clarity of the information being communicated. I know from personal experience, working on many data warehouse projects, that all stakeholders, whether executive or line manager, need to be guided on a path, a repeatable path, to the insight that is being communicated from the data platform.

What has changed is the vast increase in data: the volume, variety, and velocity. The Internet of things and surrounding applications are guaranteeing the continued growth in data assets. The importance of data visualization will be the difference between noticing a pattern or missing a pattern altogether. To add to this, business analysts need to do what they did in multiple pages in a dashboard now in eight seconds to capture the audience. Business analysts must provide insight and create a reason for the audience to click through to more detailed information. This is where the business infographic comes in.

ARTISTIC FREEDOM VERSUS COMMUNICATION

You need to innovate by communicating information from the increasing data in the world. This is often done at the expense of clarity. Creative visuals are great. But, they should not get in the way of context or narrative that needs to exist to provide insight at the fastest possible speed: *insight in an instance*. If the user or audience needs to study the visual and look deep into it for insight, then this delays the action or decision that can be reached from the insight. Actionable insight is key from any data-driven communication.

A balanced approach is key when communicating with data. The famous mathematician John Tukey once said, "The greatest value of a picture is when it forces us to notice what we never expected to see" (Tukey 1977). This quotation has been a constant test that I have applied to my work over the years. This concept is not new, and it is not just about how your graphic looks artistically. In fact, the story or insight the visualization brings to us is much more important. There is a need to balance the freestyle approach of personal productivity tools like web-based infographic tools, graphic design tools, or office productivity tools. The tipping point for me is empowering a business analyst or citizen data scientist to use the analytics tools that they have available, while being open and approachable and not requiring them to code or learn a totally new product.

To achieve this, you can use the enterprise strength of the SAS Visual Analytics engine with the popular personal productivity tools of Microsoft Office. This leverages the SAS offerings of SAS Office Analytics, which includes SAS® Add-In for Microsoft Office. Check the required software at the end of the paper for more information, including version numbers of the software used in this paper.

WHAT ARE WE TALKING ABOUT?

The best way to set the scene for what is being proposed is to look at the final output first. The following image shows what is being created in this paper:

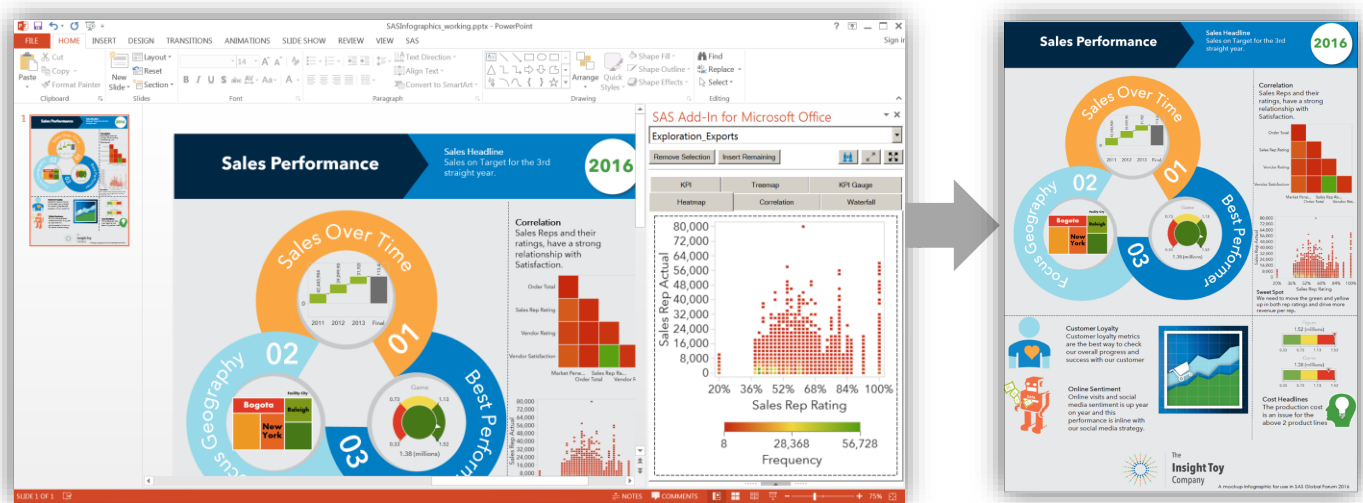


Figure 1. Infographic created by using familiar Office productivity and combining this with SAS

WHY ARE INFOGRAPHICS SO POWERFUL?

Infographics create the combination of art and science: not unlike a dashboard. The big difference is the subjective data and the narrative or story being told, which enhances the data-driven visual and engages the audience quickly through highlighting the required context.

There is a place for the artistic infographics that we have come to love. Infographics can be used with your day-to-day business analytics information that you create and distribute at work. This is another way to engage your stakeholders.

WHAT ROLE DOES SAS PLAY IN THIS APPROACH?

The infographic in Figure 1 contains visual objects driven from the trusted SAS analytics engine. This provides a more consistent infographic for the boardroom because trusted data sources are used to drive the visual elements. Business analysts can focus on the narrative and the story that they want to tell, rather than spending all their time doing data preparation tasks.

Here are a few key benefits from using this approach:

- **Repeatable**—You can refresh each of these visuals each week or month without any other rework. This is easy to repeat, not having to start from the beginning every time.
- **Scalable**—You need to scale to massive amounts of data, allowing the compute power of the SAS analytic engine to be leveraged underneath what seems to be a simple summary or individual gauge.
- **Approachable**—There is no code required. This approach leverages skills that an everyday user would have already, including using Microsoft Office, the SAS drag-and-drop user interface, and SAS Visual Analytics.

It is important to understand what technology is being used to achieve this unified approach: the SAS® Enterprise Analytics platform, office productivity tools, and your own design creativity.

OVERVIEW OF THE SAS SOLUTIONS

SAS VISUAL ANALYTICS

SAS Visual Analytics is one tool for business intelligence that covers all use cases. Many business intelligence vendors specialize in one of the following mindsets; SAS specializes in both.

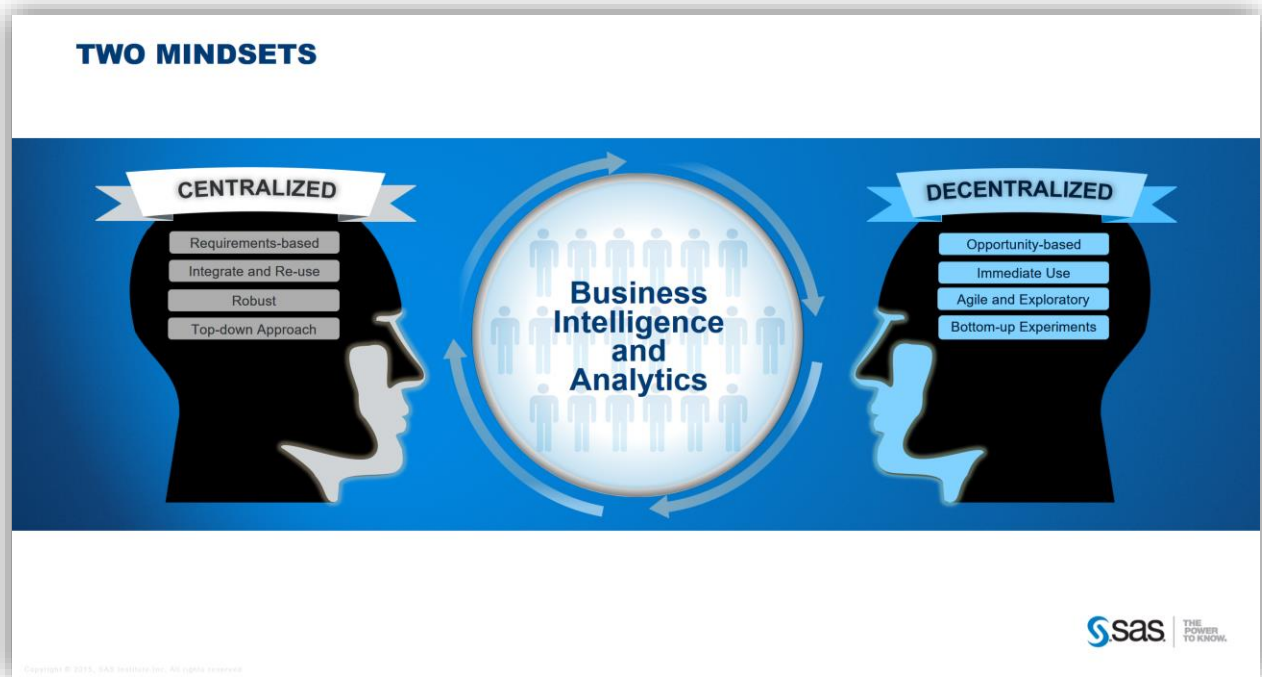


Figure 2. Two Mindsets

There will always be a need for both managed business intelligence (BI) and reporting and self-service data discovery and analytics. A single platform that can meet the needs of both IT and business analysts is the best for a modern BI system. IT needs to embrace the fact that business users will always demand a decentralized, self-service approach. However, if IT can monitor and leverage the content created by business users to selectively move through production processes and into their managed BI environments, then it is a win-win for both IT and business teams. For example, BI platforms should allow users to promote BI content and models generated in sandboxes to shared environments to use and collaborate on reports, dashboards, models, and infographics. IT and BI managers can make informed decisions about what business analyst content is ready for the next level of investment (for example, moving it into production) with all of the security and governance steps associated with such a move.

This is where SAS comes in and where SAS Visual Analytics delivers the value: approachable analytics. SAS Visual Analytics provides one system that includes options for both parts of the business. It is both agile BI and managed BI in an all-in-one approachable toolset. It even has analytics for business analysts like forecasting, binning, clustering, decision trees, correlations, heat maps, box plots, and much more.

SAS ADD-IN FOR MICROSOFT OFFICE

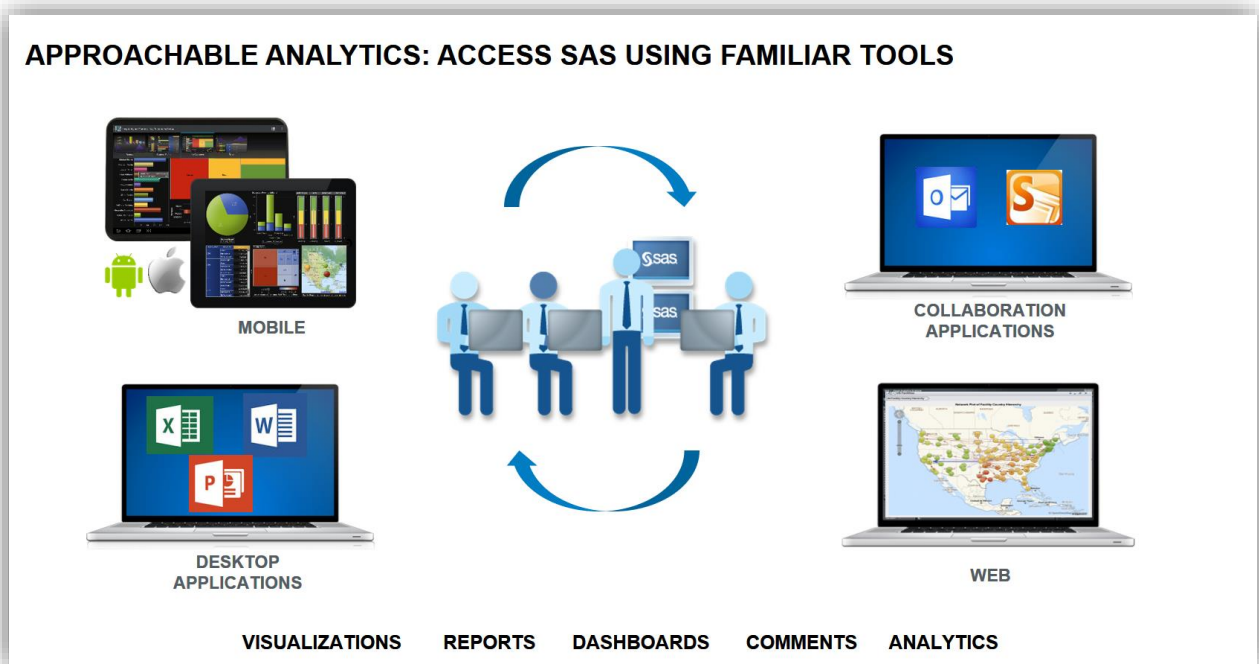


Figure 3. SAS Makes It Easy

As more people have access to data and analytics are applied to the data, it becomes increasingly important that people can easily have conversations about their BI dashboards and reports.

These conversations are critical – critical for understanding and interpretation, critical for alignment, and critical for decision making.

One of the most powerful ways to facilitate conversations around the data is to put the information where people can easily get to it.

You can make the information available in the places where you are working most often. Just access SAS through your familiar Microsoft Office interface or application of choice. It's that easy to analyze large amounts of data and view results directly in Microsoft Word, Excel, PowerPoint, Outlook, and SharePoint.

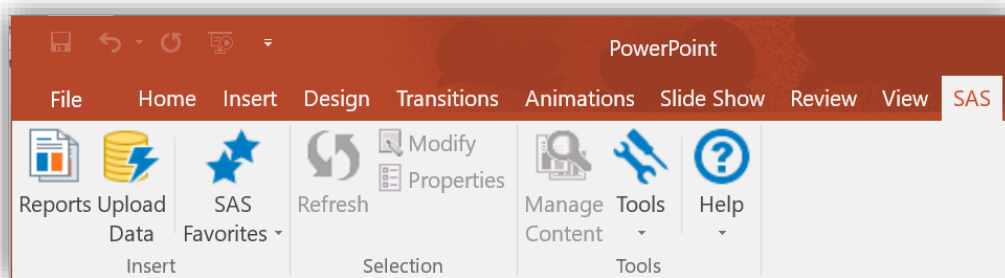


Figure 4. SAS Ribbon in Microsoft Office Showing SAS Visual Analytics Add-In for Office (PowerPoint in Office 2016)

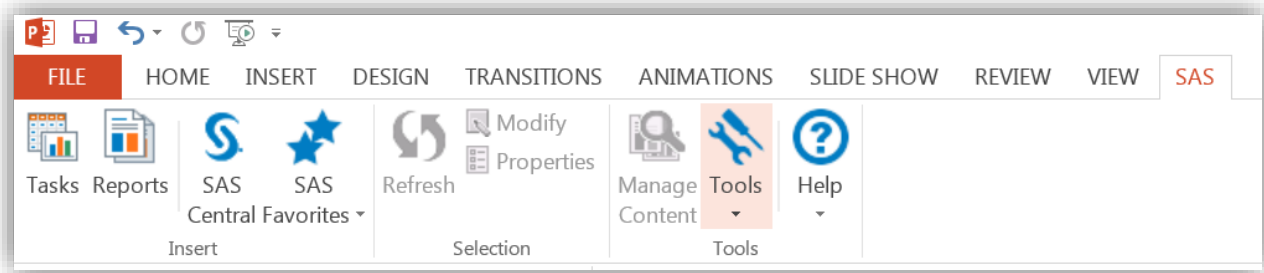


Figure 5. SAS Ribbon in SAS Add-In for Microsoft Office (PowerPoint in Office 2013)

The SAS add-in shows the licensed features based on SAS software. Both options provide users with access to SAS Visual Analytics to include in their office documents. The SAS Visual Analytics Add-In for Office is available only for PowerPoint or Excel. If you want Word, Outlook, and SharePoint, then the full SAS Office Analytics solution needs to be licensed. Additional self-service powerful analytical and data preparation tasks are unlocked in the full SAS Office Analytics solution. This latest offering for SAS Visual Analytics provides a great value for a team to grow into full office analytics with SAS.

I am focusing on the integration with PowerPoint and Excel because both are included and are the most likely tools for the business analyst to create data-driven infographics in the workplace for number-crunching or presentations.

Connect your data with SAS Visual Analytics and import whole tables, graphs, or reports directly into Microsoft Office.

WHY IS SAS DIFFERENT?

Big data is extremely relevant. It is not just a buzz word and it is here now. The vast increase in data has changed the landscape for analytics and data visualization. The **volume** of data, the **variety** of data sources, and the **velocity** of data input and the required **velocity** of data output are expected by business stakeholders. The Internet of things and surrounding applications are an opportunity that's never existed. Analytics drives decisions in every aspect of machine-to-machine communications and decisions. Data visualization importance grows to ensure that valuable insight is communicated to stakeholders from all of this data.

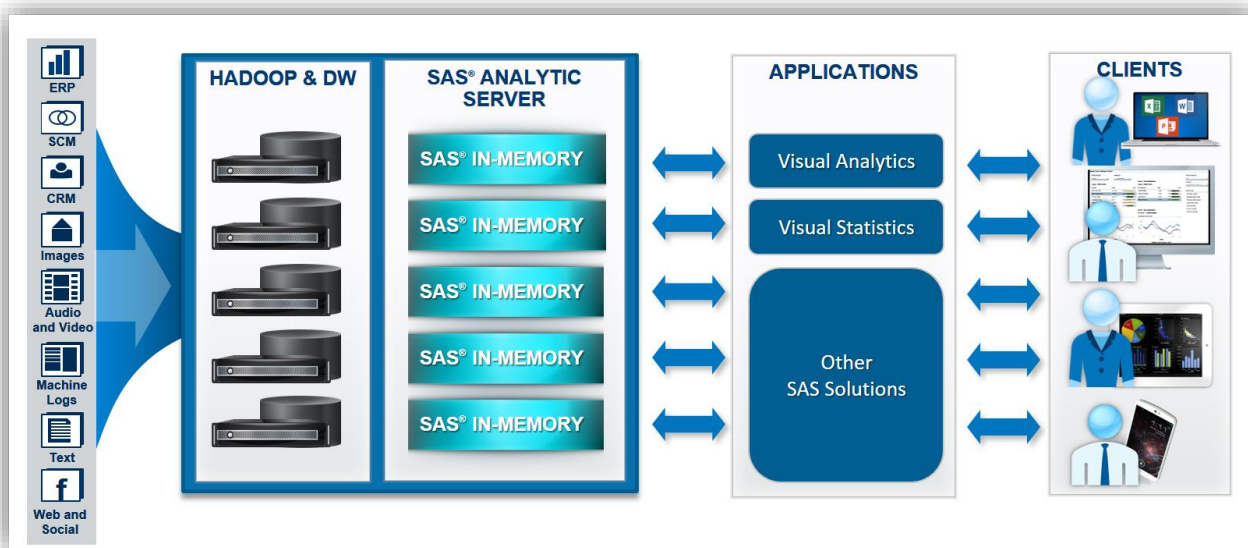


Figure 6. SAS Analytics Can Be Leveraged from Easy-to-Use Applications Via Many Accessible Clients

With the rise of and applications for big data, the analytics platform must scale to handle volumes today and the massive increase in volume occurring constantly. It is no longer acceptable to build an analytics platform and data visualization suite that do not have scalability at the forefront. SAS is an analytics platform that provides a very fast, secure, multi-user environment for concurrent access to data that is loaded into memory. It takes advantage of multi-threaded, distributed computing by distributing data and workload among multiple machines and by performing massively parallel processing. It is engineered to address iterative and interactive analytics, and to present results via tools like SAS Visual Analytics. SAS is not an in-memory database. Instead of just selecting rows of data and performing basic calculations (for example, for query, aggregation, and data manipulation), SAS can perform actions and analytical calculations on data. The velocity is handled with real-time capabilities built into the engine. This engine underpins the data visualization and infographics in this paper.

THE APPROACHES

The approach for creating infographics with SAS is to create repeatable dashboard-style business infographics versus the artistic infographics that can look great as posters on the kitchen wall, but can take months to update or create. I have backed a few of these artistic infographic posters on Kickstarter myself. On the flip side, the aim here is creating a business-ready environment to take some of the benefits of the infographics to the enterprise stakeholders or to the C-level executive in the boardroom. We need to continue to innovate how we capture and keep the attention of stakeholders. This is an option for you right now.

Here are three options for incorporating SAS analytics into an infographic.

OPTION ONE-BESPOKE DESIGN

Option one is to do everything manually; for example, build and design as a graphic artist, data artist, or journalist would. This option could also mean doing everything automatically. By automatic, I mean use SAS code (SAS/GRAPH and ODS) to build the entire infographic. This is an accurate and valid way to build the infographic and leverage the power in the SAS analytics platform. It does have one barrier though: it requires you to code in SAS. This is great for experienced SAS programmers. However, this is not the focus of this paper. I will leave this skill to the other SAS experts who have done a heap of work in this area, like Rob Allison, who is prolific in providing working examples of “the art of the possible” with SAS/GRAPH as a data visualization engine. An example of Rob’s work can be seen in Figure 7 (Allison

2013). I find that this option is best used when you have white-boarded your infographic design and have a clear vision of where all of the elements will live. This option can be done in batch to create files like HTML, PDF, etc., or can be packaged and run on-demand using a SAS® Stored Process.

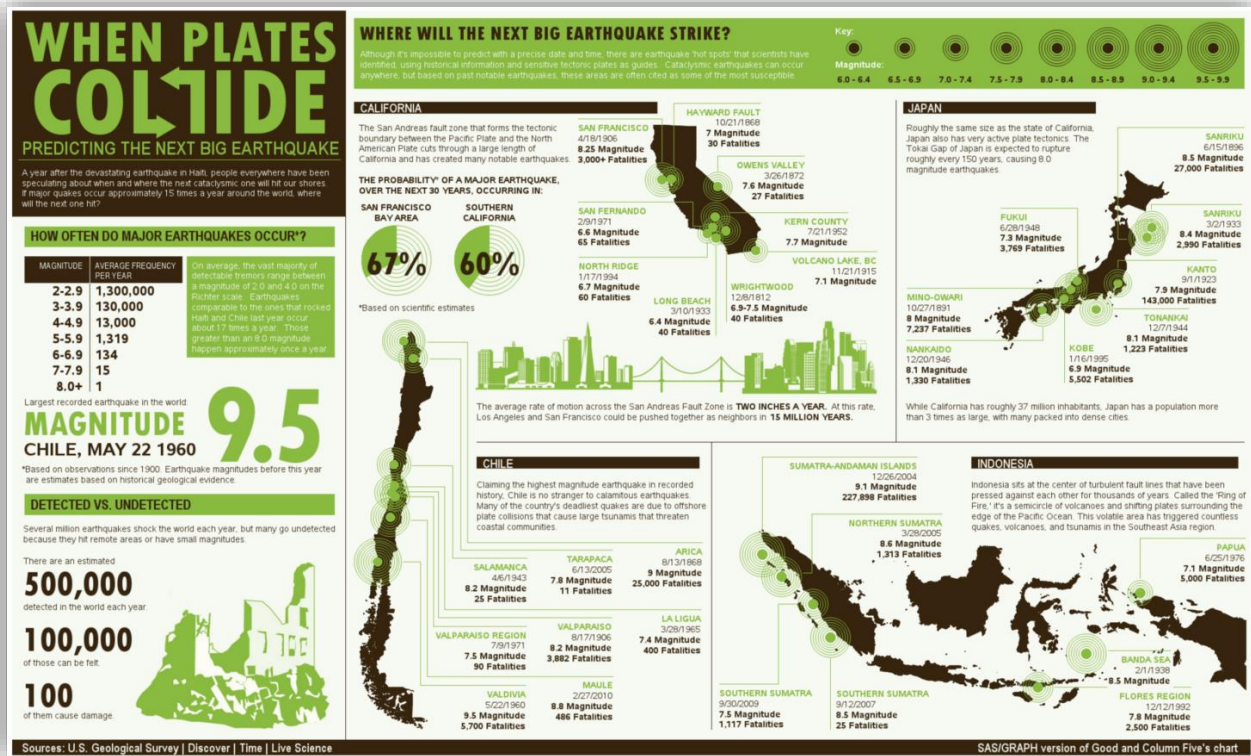


Figure 7. Infographic Created by Rob Allison Using SAS/GRAPH With Built-In Links to Drill Through to Details

OPTION TWO-DROP-AND-DROP TOOLS- NO CODING REQUIRED

Option two is where you want some of your infographic content to be entered as subject comments and graphics and other content imported easily from SAS Visual Analytics. This option enables you to leverage the large investment in data assets in your enterprise, as well as provide the creative freedom that you need to add the narrative required to communicate the insight in the eight-second window.

This option uses approachable analytics tools, such as SAS Visual Analytics, and your Microsoft Office tools to make it accessible by any business analyst or report user. This option can unlock big data analytics into the infographics created by designers.

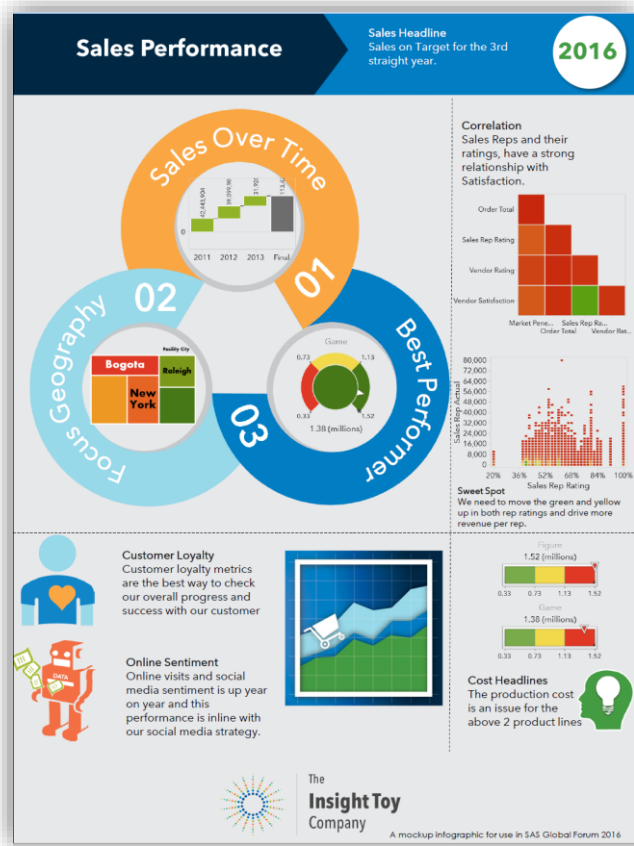


Figure 8. Infographic Using SAS Visual Analytics and SAS Office Analytics

This option focuses on the non-programmer and leverages the drag-and-drop GUI tools from SAS and the familiar Microsoft Office productivity suite.

OPTION THREE-HYBRID-A BIT OF BOTH OPTIONS

Option three is where you leverage bespoke analytics from SAS to embed elements into your infographics. This option leverages custom code or SAS stored processes from your data science team and creates a link to run each month or quarter. This means you are not limited in using reports. You could include custom SAS stored processes to insert an element of your infographic driven from bespoke analysis, right next to objects inserted via option two from the drag-and-drop method.

SAS® Enterprise Guide® options are not covered in this paper. However, it is an important part of the SAS Office Analytics suite. You can refresh any reports that you send from SAS Enterprise Guide to a Microsoft Office document in a flow, and then open the reports with links to the original SAS source when you open them in Microsoft Office. This aids in repeatability and ease of use for your infographics.

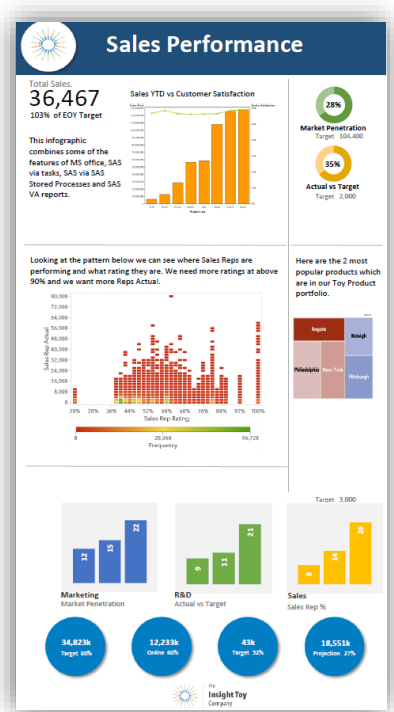


Figure 9. Multiple Graphs – Some from SAS Stored Process and Some from SAS Visual Analytics

In Figure 9, the top graphic (dual axis bar and line graph) is driven by a SAS stored process, mixed with some Microsoft Excel charts and some SAS Visual Analytics charts. The SAS stored process is leveraging a code object written by one member of the data science team.

MY APPROACH

Of the three options, I have chosen to focus on option 2. I will be leveraging graphics created in SAS Visual Analytics and inserting them into my infographic template inside PowerPoint and Excel. This requires no coding skills at all, and it is the most approachable option to get started today.

To do this correctly, I need to do some work inside SAS Visual Analytics first to create the data-driven objects for my infographics. Of course, I could just open my favorite SAS Visual Analytics report and grab any object. This means that I have not optimized my infographic's look and feel, though. I need to use the SAS Visual Analytics Designer to create my optimized report elements for best use in this highly visual design. This is seen in Figure 10 over the page.

You need to choose the subject area and focus on it as you step through the following information. I chose to focus on the sales data for my organization: a fictitious toy company that has sample data shipped with SAS Visual Analytics. This focus enables me to maximize my efforts as I consider the visual elements.

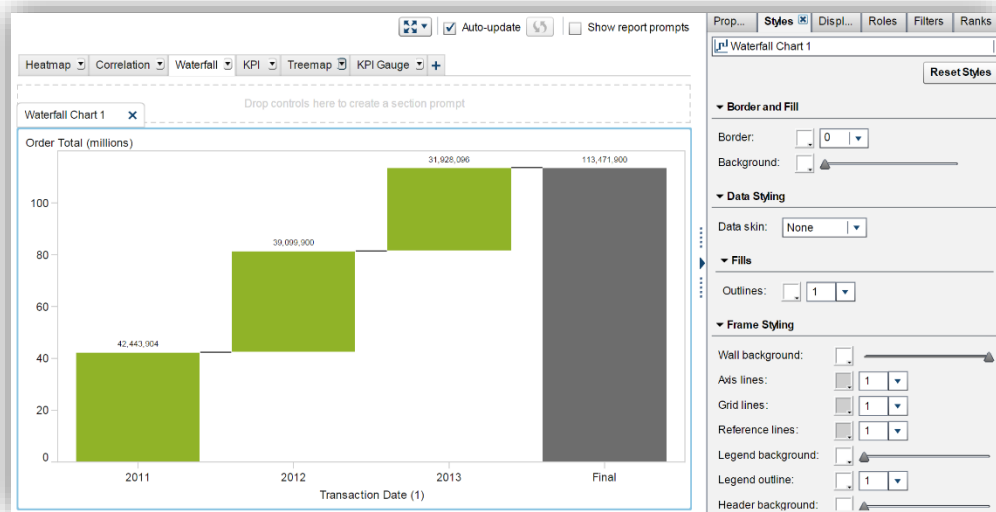


Figure 10. Create Visual Elements

Next, I need to ensure that I have all of my images and creative content for the infographic. This includes images for backgrounds and non-data-driven visuals, like logos and layout graphics (for example, dividers, and so on). At this point, consider fonts that best reflect the look that you are after. All of these touches make the look of the infographic much nicer. These steps will save you a huge amount of time. You could call these assets, or your *infographic toolkit*, the building blocks for your design.

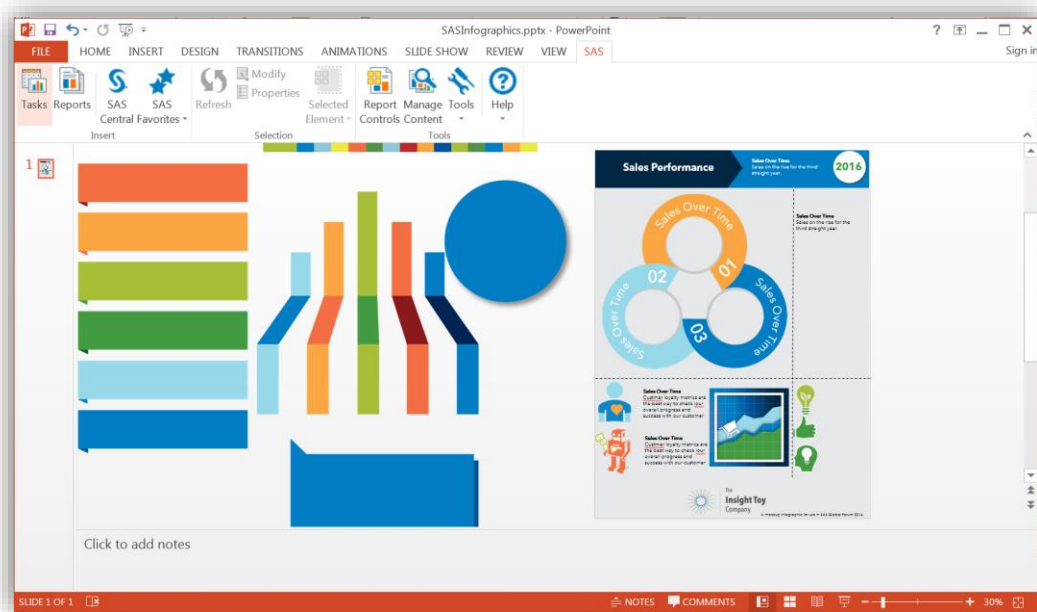


Figure 11. Infographic Toolkit: a selection of images and clipart ready to be used in creating the Infographic

It is now time to unify these visual elements into the infographic itself. If you are anything like me, this can take a long time to get just right. Many iterations of design and trial and error will probably occur before you have the desired layout and information to tell the narrative that you want from your data.

In Figure 12, you can navigate to all of your SAS Visual Analytics reports and analyses and insert desired elements into your infographic. This cannot be any easier, and don't forget that the computation and number-crunching is happening on the SAS platform, not on your laptop.

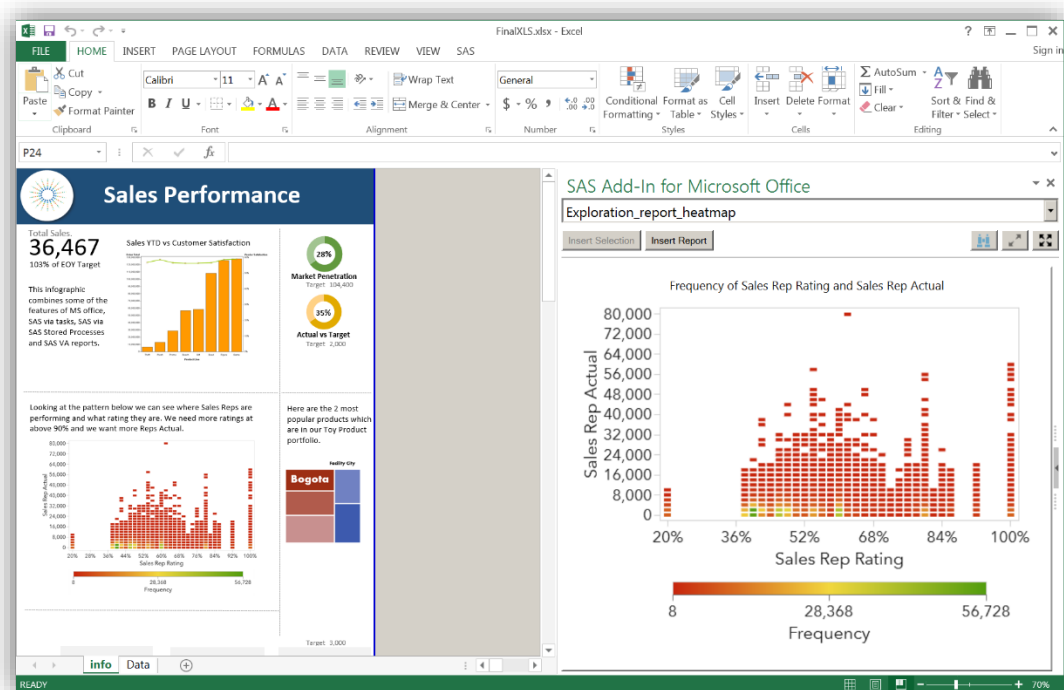


Figure 12. SAS Add-In for Microsoft Office Navigating to SAS Report from Microsoft Excel

Once you have added all of the desired content from SAS, you can add your subjective commentary and narrative to tell the story that you want in your infographic. Now, you are ready to see the end result. The way I have done this is to use the built-in **Save As** option to save to PDF, which is a publication- and print-ready format that you can share without allowing others to change the data. You could use image file types if you need to, for example PNG or JPG work well also. If you do want others to edit the design, you can just email the office document and they can edit the design. They cannot update the data if they don't have security permissions in the SAS analytics engine, though. This provides a great balance of creative freedom and data governance.

Figure 13, over the page, shows the final product of the infographics created with SAS Visual Analytics and SAS Office Analytics. These infographics show highlights such as the top three sales performers and sales by year for the past three years. The focus of these infographics is sales and company performance data, and they show sales performance at a glance.

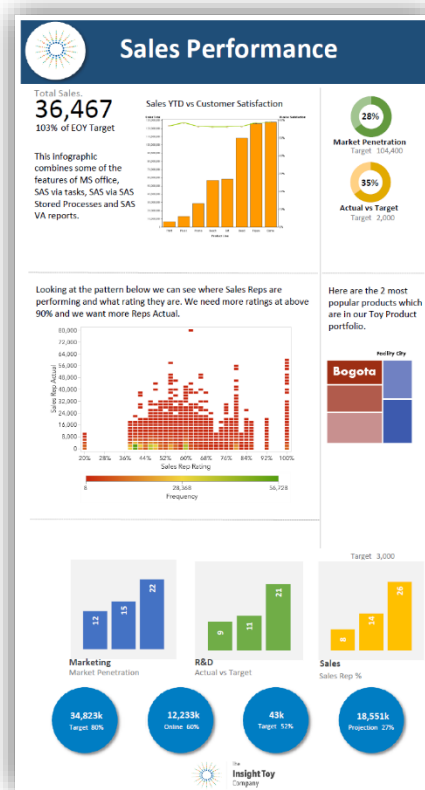
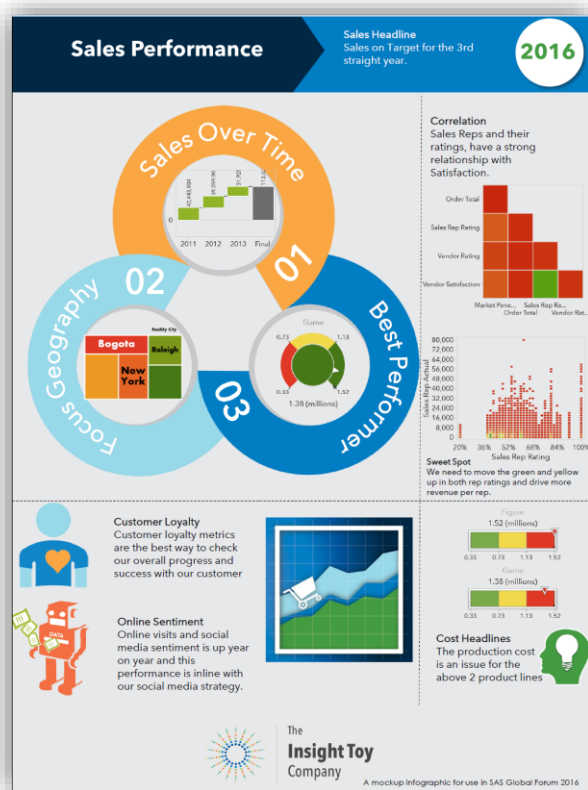


Figure 13. Final Infographics from PowerPoint and Excel

TIPS TO GET YOUR INFOGRAPHIC JUST RIGHT

To achieve this look with your own data, there are a few tips to keep in mind.

- **Start with a plan.**
 - **Narrative**—What are you trying to say? Is this infographic about the products that you sell, the social media channels, or the performance of the sales team? This frame of reference enables you to create the narrative that will resonate best.
 - **Colors**—Create your color pallet to enable you to insert and match the colors that you are using in both SAS Visual Analytics and Microsoft Office. There are tools to help with color selection, such as Color Picker for Windows.
 - **Set Up the Page**—Using a background image can be a good idea and can frame the entire infographic. It helps to keep the look and feel consistent. Set the page layout for your infographic to override the defaults if you want custom page sizes.
 - **Icons and Artwork**—Have the icons and graphics ready to go. You might have access to some through work. Or, there are many Internet sites with libraries.
- **Consider the SAS settings.**
 - Change the styles in SAS Visual Analytics as much as possible. This will minimize changes in Microsoft Office and make the infographic more automated for the next data refresh.
 - Change output options to PNG (from default ActiveX) in the SAS Add-In for Microsoft Office. This creates images which are true to your report design.
 - Apply styles when inserting content only. This means that refreshed content should not be affected if you change styles and the layout in your infographic.
 - Turn on the background and wall transparencies in the SAS Visual Analytics report. This does not really

change the SAS Visual Analytics side. When you insert these as part of the infographic, the background color will be the same as the layout that you have in Microsoft Office.

- Create final touches.
 - If some visual elements cannot be switched off in an object, include some shapes with solid fill to blend the objects with the background color. This will assist with your infographic precision.
 - Consider adding a link to the SAS Visual Analytics server in your design. This is a great way to unite the infographic user with the live dashboard. This can drive your audience to the self-service analytics platform.

CONCLUSION

The aim of this paper is to introduce a new use case for your trusted software from SAS, specifically SAS Visual Analytics and SAS® Add-In for Microsoft Office. I hope that this paper has provided some ideas on how you could achieve data-driven visualization in your business. I know that a step-by-step guide to create what is outlined in this paper would be a great asset. As an alternative, I plan to provide a video of creating the infographics, and I will post it to the SAS Communities site following SAS Global Forum 2016. I encourage you to share your creations on the SAS Communities SAS Visual Analytics site.

Remember that infographics and data visualizations need to include narrative or context to meet the needs of the audience, not just show aesthetics. You can have repeatable infographics with governed access to analytics resources within your enterprise. This leverages the power of big data and the SAS analytics engine with your familiar Microsoft Office productivity tools that you use every day.

REQUIRED SOFTWARE

Support Documentation at <http://support.sas.com/software/products/addin/index.html>

Here are the specific software versions used in this paper:

- Microsoft Office 2016 and 2013
- SAS Visual Analytics 7.3
- SAS Office Analytics, SAS Visual Analytics Add-In for Office and SAS Add-In 7.12 for Microsoft Office
 - SAS Visual Analytics Add-In for Office is available in Microsoft PowerPoint and Excel and works only with SAS Visual Analytics.

REFERENCES

Tukey, John W. 1977. *Exploratory Data Analysis*. Reading, Massachusetts: Addison-Wesley.

SAS Institute Inc. 2015. *SAS® Visual Analytics: User's Guide*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/onlinedoc/va/index.html>.

Time.com. "You Now Have a Shorter Attention Span Than a Goldfish." Kevin McSpadden. 2015. Available at <http://time.com/3858309/attention-spans-goldfish/>.

Nieman Reports. "Watching the Human Brain Process Information." 2010. Available at <http://niemanreports.org/articles/watching-the-human-brain-process-information/>.

SAS Learning Post-Blog Post. "Creating fancy 'infographics' with SAS." 2013. Robert Allison. Available at <http://blogs.sas.com/content/sastraining/2013/04/11/creating-fancy-infographics-with-sas/>.

RECOMMENDED READING

Bailey, D., Tim Beese, and Casey Smith. 2015. "Take Your Data Analysis and Reporting to the Next Level by Combining SAS® Office Analytics, SAS® Visual Analytics, and SAS® Studio." *Proceedings of the SAS Global Forum 2015 Conference*. Cary, NC: SAS Institute Inc. Available at <https://support.sas.com/resources/papers/proceedings15/SAS1804-2015.pdf>.

Bailey, D., Anand Chitale, and I-Kong Fu. 2014. "Share Your SAS® Visual Analytics Reports with SAS® Office Analytics". *Proceedings of the SAS Global Forum 2014 Conference*. Cary, NC: SAS Institute, Inc. Available at <http://support.sas.com/resources/papers/proceedings14/>.

SAS Institute Inc. *SAS® Visual Analytics: Video Library*. Cary, NC: SAS Institute Inc. Available <http://support.sas.com/training/tutorial/va73/>.

SAS Institute Inc. 2015. *SAS® Visual Analytics: User's Guide*. Cary, NC: SAS Institute Inc. Available <http://support.sas.com/documentation/cdl/en/vaug/67500/PDF/default/vaug.pdf>.

SAS Institute Inc. *SAS Visual Analytics Community*. SAS Support Communities. Cary, NC: SAS Institute Inc. Available <https://communities.sas.com/community/support-communities/sas-visual-analytics>.

Allison, Robert. 2015. "Robert Allison's SAS/Graph InfoGraphics!" Available at http://robslink.com/SAS/democd_infographics/aaaindex.htm.

SAS Institute Inc. 2016. *SAS® Office Analytics Fact Sheet*. Cary, NC: SAS Institute Inc. Available at http://www.sas.com/content/dam/SAS/en_us/doc/factsheet/sas-office-analytics-105595.pdf.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Travis Murphy
SAS Institute Australia and New Zealand
300 Burns Bay Road
Lane Cove, Sydney, NSW Australia 2066
Travis.Murphy@sas.com

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.