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Making it Happen: Using SAS® to Implement Business Intelligence and Analytics in Small and Midsize Organizations

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ABSTRACT

Business intelligence and analytics often seem to be the domain of large organizations with deep pockets. This paper abolishes that myth and shows you how you can get started in much smaller settings. Whether you are a midsize company or a small group within a larger organization, using SAS to implement business intelligence and analytics is an achievable goal. We use real-world scenarios to demonstrate how to extract and share insight from your data.

This includes:

- formulating your goals
- using SAS® Enterprise Guide® to handle data management
- using SAS/STAT® to build and score predictive models
- using SAS Enterprise Business Intelligence to build a dashboard and a PowerPoint presentation to show these results

INTRODUCTION

There is a common misconception that your only real entry point to SAS is one or two copies of PC SAS sitting on desktop machines. We love the options a PC environment gives you for writing SAS programs and working with SAS Enterprise Guide. Ultimately, many organizations need something more but figure they either cannot afford it, cannot handle the complexity, or both. These concerns are thankfully unwarranted on all accounts.

Our group at SAS, U.S. Inside Sales, works with small and midsize organizations. These organization often have little or no prior experience with SAS, but they need tools to help them better run their businesses. We have had success with virtually every type of organization: retailers, media companies, government agencies, hospitals, credit unions, and much more. We address the two primary concerns of smaller groups – cost and complexity – through software bundles that enable organizations to get up and running quickly with budgets in mind for midsize organizations. If you are interested, check out <http://www.sas.com/software/smb> or contact your SAS Account Executive (919-677-8000) to discuss your organization's needs and how SAS can help at a reasonable price point!

This paper focuses on guiding you through using one specific package: SAS® Business Intelligence for Midsize Business. Unlike most competitors' versions of Business Intelligence (BI), SAS® Business Intelligence for Midsize Business includes world-class analytics from SAS/STAT and a robust set of data access and data management tools. In a nutshell, the architecture of this package is a server-based installation of SAS that handles data processing and analytics. You can access this processing through client applications such as the SAS® Add-In for Microsoft Office and SAS® Enterprise Guide, or through a set of SAS Web applications that just require a Web browser to show your results.

FORMULATING YOUR GOALS

It is never the size of your problem that is the problem. It's a lack of momentum. Without momentum, even a tiny obstacle can prevent you from moving forward. With momentum, you will navigate through problems and barely even notice them. – Dr. John C. Maxwell

Your goals will be unique. However, achieving those goals will follow a well-trodden path of IT project management. There are many outstanding books on that subject, but for small and midsize organizations in particular, you must come out of the gates delivering success with high-impact projects. Delivering real value quickly will enable you to build momentum and overcome the bias held by some that BI and analytics are not the right fit for a small or midsize organization.

So, how do you get to the stage where momentum will help you start tackling more and more complex challenges? This is a framework that we have found to be useful for reaching that point:

1. Enthusiasm
2. Planning
3. Implementation (also known as Hard Work)

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4. Align to business value
5. Momentum builds

ENTHUSIASM

You need enthusiasm and buy in from executives (ideally including someone who will “champion” the project), IT staff, direct management, and those implementing the analytics and BI. If you are missing support from one or more of those parties, everyone else will have to work hard to overcome that. Enthusiasm is what will see the project through obstacles even without momentum. It is the foundation for everything else. Cultivate enthusiasm within your organization through opportunities like lunch-and-learn sessions and informal training opportunities.

With all this said, enthusiasm should not be taken to the extreme of lunacy. Do not let enthusiasm lead to projects that drain large amounts of time and money for little or no gain.

PLANNING

Planning has two aspects: clearly identifying actionable business objectives and then allocating resources to make those happen. Getting to an actionable business objective is probably one of the trickiest parts of achieving success. A common, and very useful, industry model is to make your goals SMART: specific, measurable, attainable, relevant, and timely. All of these characteristics are critical to success.

For example, a mobile phone company might want to reduce churn (customers moving their service to a competitor) and this company might come up with the following business objective.¹

Initial Objective: Assign a churn score to all customers.

Upon further examination, this is not a clear, actionable objective:

- Who is considered a customer? Telephones? Individuals? Households?
- When does someone churn? When they turn off the service or when they stop making calls on that line? The “turn off” date can be too late to lure them back.
- Was the churn voluntary or involuntary? Both are interesting questions but should probably be considered separately.

This initial objective has one other flaw: we don’t know the business goal. As it turns out, the mobile phone company wants to put their best customers at risk of churning into a retention program. After clarifying the business goals and expectations, you could revise this objective.

Revised Objective: By September 24, provide a list of the 10,000 elite customer households who are mostly likely to drop to zero calls in October.

This is much better – expectations for what is being delivered are very clear.

Lastly, we cannot emphasize enough that you need to start by selecting just one or two projects that will have an immediate, highly-visible impact on the organization and can be completed reasonably fast. It’s a cliché, but you really do need to go after the low-hanging fruit. Remember, momentum is your initial goal: the credibility that you get from solving small problems will build the support that you need for larger challenges.

IMPLEMENTATION (ALSO KNOW AS HARD WORK)

This is the subject of the remaining sections of this paper. Implementation requires the right technology, staff, and training to make the project a success.

ALIGN TO BUSINESS VALUE

With enthusiasm, planning, and hard work, you should be able to arrive at a good prototype for how your BI and analytics project will deliver value. Now, you MUST get detailed feedback from key stakeholders about how to modify this prototype to best meet the needs of the organization. And do not fool yourself: it does not matter how pretty or statistically significant your output is, once the users and decision makers see it, they will have questions and want changes. This is good – it means they have enthusiasm too. Specifically on the BI side, make sure you ask questions that will help you to design reports that enable better decision making. Without a clear connection between reporting and better decisions, a project might get off the ground but will not stay in the air for long.

¹ This scenario was adapted from the SAS course *Advanced Analytics for the Modern Business Analyst*.

<https://support.sas.com/edu/schedules.html?id=1076&ctry=US>

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MOMENTUM BUILDS

As you complete projects that are relevant (as outlined above) and visible, you really will build momentum to tackle more complex challenges. Large, game-changing applications of analytics can reshape your organization, but those must be preceded by a number of smaller wins that over time create a culture of data-driven decision making.

DATA PREPARATION

*Blueprint:*²

1. *A process of photographic printing, used chiefly in copying architectural and mechanical drawings, which produces a white line on a blue background.*
2. *A detailed outline or plan of action: a blueprint for success.*

Throughout our paper, we will try to draw the lines of a blueprint that you can use for success in your environment. The starting point for this success is data access and manipulation, which we will now examine.

SAS can access data in a variety of formats: Microsoft Excel, Microsoft Access, text files (comma-separated, fixed column, and so on), as well as relational databases like Microsoft SQL Server. Working with databases is accomplished through SAS/ACCESS interfaces: these enable you to use SAS to directly read from and write to databases such as Microsoft SQL Server and Oracle. Often, small and midsize organizations will have data stored in many different formats at various locations around the enterprise. SAS can serve as a central point for bringing data together. This enables you to solve problems that previously were handled through tedious Excel-based techniques like VLOOKUP functions. Better still, because SAS is on a server, you only have to configure your database connections one time to let any and all client applications (including Web applications) tap into these databases, as governed by security permissions in both the database and SAS.

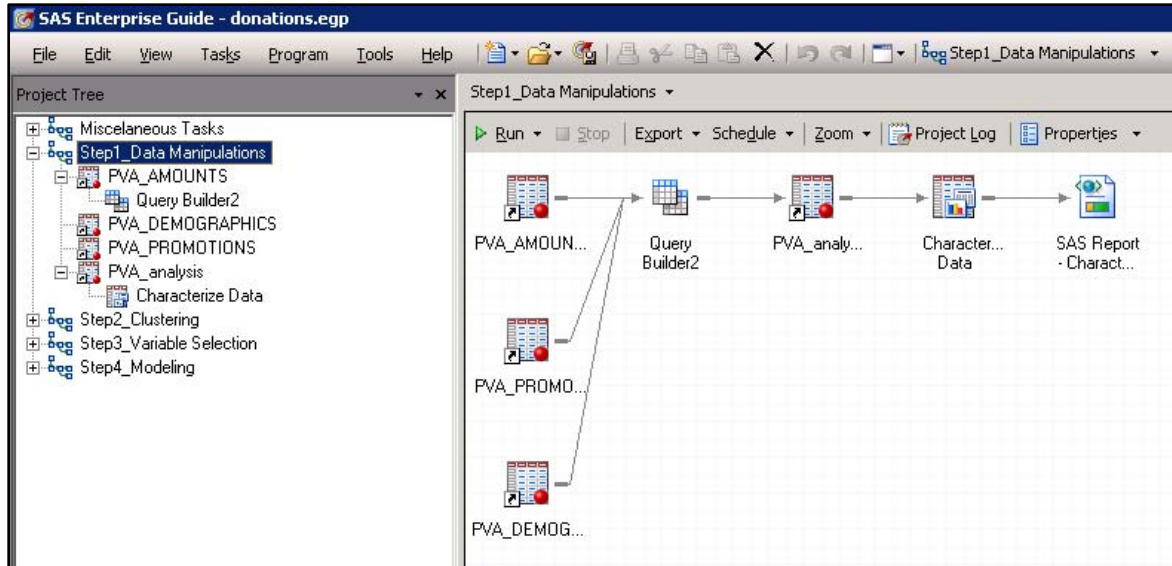
For example, let us say we are a nonprofit organization trying to improve our donor response rate and total donation amounts that will come from our next marketing campaign. SAS can help accomplish this goal through analytics, but first we need to access the data from three separate locations. Data preparation using SAS can be handled in a variety of ways, but small and midsize organizations largely gravitate toward SAS Enterprise Guide to handle their data needs. SAS Enterprise Guide has a huge range of capabilities (a full tutorial is available here³) and one of its primary uses is point-and-click data access and manipulation. In the steps below, we join three different data sets: historical donation amounts, historical response counts, and donor demographics. This data could come from three totally separate databases; to SAS, it doesn't matter.

Display 1 is an example of data preparation in SAS Enterprise Guide. The process flow brings together three separate data sources in the node labeled "Query Builder2." After the data is joined, a Characterize Data task was added to give us a summary report of the data values from all the resulting columns.

² Dictionary.com. Dictionary.com Unabridged. Random House, Inc. <http://dictionary.reference.com/browse/blueprint> (accessed: January 23, 2012).

³ The current web-based tutorial for SAS Enterprise Guide can be found here. <http://support.sas.com/documentation/onlinedoc/guide/tut43/en/>

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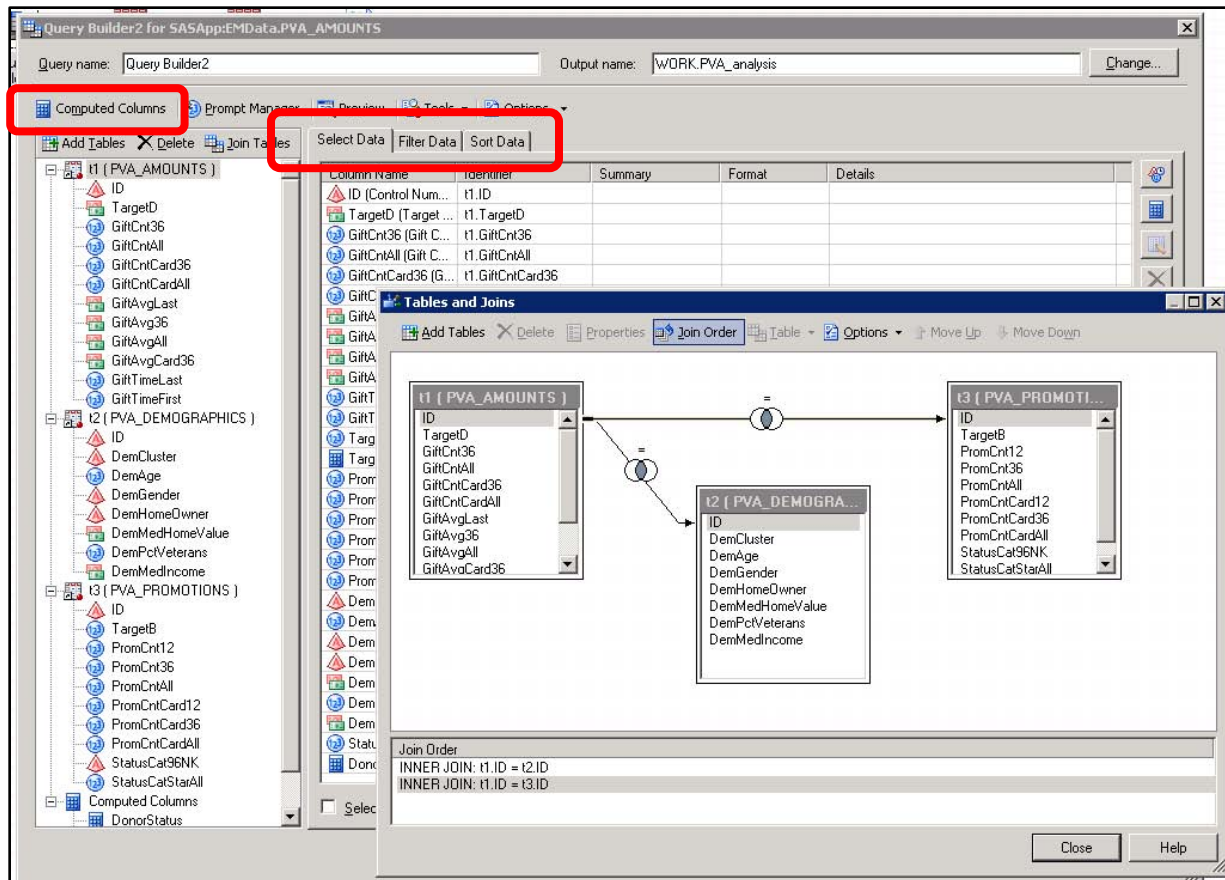


Display 1. Data Preparation in SAS Enterprise Guide

As shown, SAS Enterprise Guide is a graphical user interface (GUI) that enables you to build visual process flows showing you every step of the analysis. Process flows can be run on-demand as the data changes to quickly and accurately update results, which is one area where Microsoft Excel often falters as an analysis tool. You can also schedule process flows via the **Schedule** button – a feature that is explained when we discuss dashboards.

In our scenario, we also need to manipulate the data fields to create new categorical variables and change a character variable into a numeric variable: this is accomplished within the Query Builder using the Computed Columns feature. SAS Enterprise Guide uses the point-and-click Query Builder as its primary tool for data manipulation; it enables you join tables, recode columns, and much more. As shown in Display 2, the interface is broken into **Select**, **Filter**, and **Sort** tabs to let you specify which columns and rows you want in your final output. In the foreground, the Tables and Joins window visually illustrates how this data is being combined. The Computed Columns feature is available from the button in the upper left corner of the window, and it enables you to design new columns by recoding existing columns or building formulas using a formula editor.

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Display 2. Query Builder in SAS Enterprise Guide

While intuitive, SAS Enterprise Guide is an interface designed for power users that need the flexibility to transform their data in a variety of ways. These power users can learn SAS Enterprise Guide through the free tutorial, or through a variety of SAS training classes⁴. Incidentally, training is included in many SMB bundles from SAS, including SAS® Business Intelligence for Midsize Business.

BUILDING AND SCORING PREDICTIVE MODELS

Having worked through the process of prepping our data, we will now continue our blueprint for making analytics a reality at your organization. In particular, we will examine one common application of analytics which is building a predictive model to calculate who is likely to respond to a future offer based on historical data. For the nonprofit organization that we discussed above, the predictive model enables them to improve response rates and total donations in their campaign. Specifically, we want to build a formula that uses information such as the number and amounts of previous donations in order to output the probability that a person will respond to a new marketing offer. That will allow us to better spend our marketing time and dollars to go after people who are likely to donate.

One initial hurdle that smaller organizations face is a lack of staff trained in statistics. Another hurdle is the fear that without advanced degrees, analytics are an impossible goal. Fortunately, basic analytics are accessible: they are built into the point-and-click capabilities of SAS Enterprise Guide (no programming required!) and can be learned in a handful of afternoons dedicated to training. SAS offers both Live Web courses, as well as, self-paced e-Learning. Both types of curriculum cover techniques such as regression along with practical examples of when and how you would use these techniques⁵.

⁴ Users can come up to speed on the main features of SAS Enterprise Guide through the training course *SAS Enterprise Guide 1: Querying and Reporting*. <https://support.sas.com/edu/schedules.html?ctry=us&id=1035>

⁵ A terrific starting course for analytics is *SAS Enterprise Guide: ANOVA, Regression, and Logistic Regression*. <https://support.sas.com/edu/schedules.html?ctry=us&id=1281>

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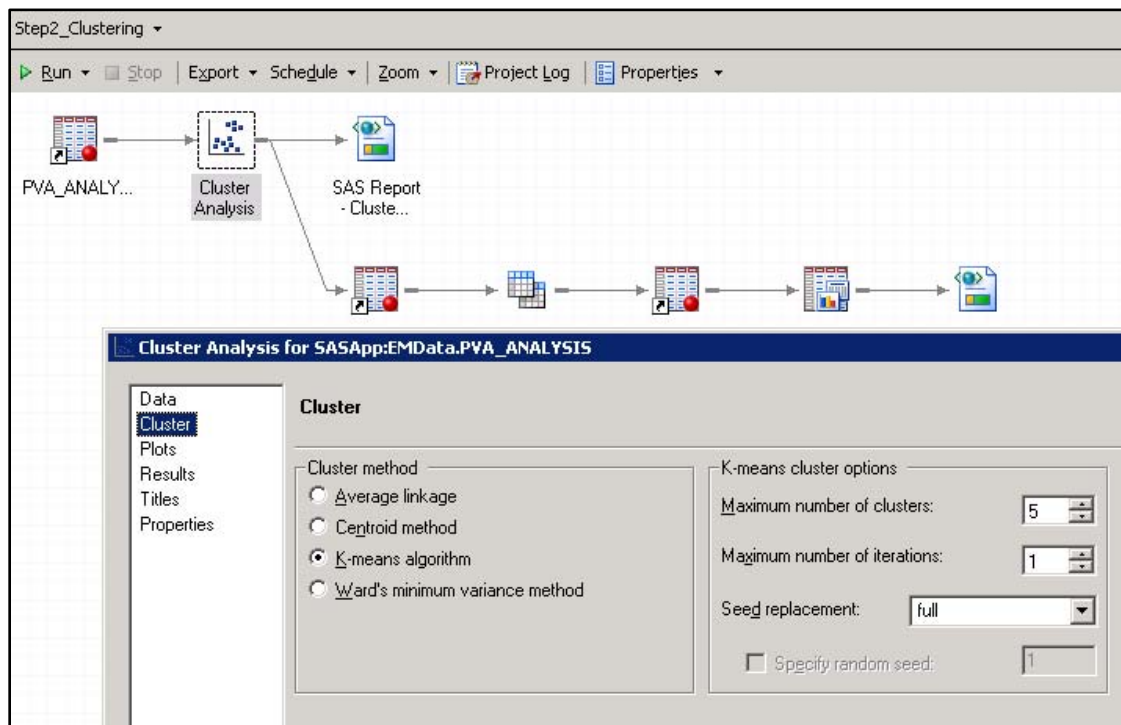
Once our data is prepared, we can start our process of trying to identify the people that are most likely to be donors. This process can take many different paths, but here is the approach we are choosing:

1. Put donors that are similar to one another in the same group (cluster)
2. Select one of the clusters as the basis for our predictive model
3. Use regression to determine which variables are important for building predictions
4. Obtain a final predictive formula and use that to estimate responses in a new campaign

CLUSTERING

The idea behind clustering is that we want to be able to segment our population into groups that have mathematically similar characteristics. This can complement traditional segmentation which groups people by demographic characteristics such as age group and gender. For a marketing campaign, being able to profile your customers in these ways lets you better target the type and level of outreach. Clustering can similarly apply to other industries; for example, in manufacturing, you can identify which machines are likely to break and thus, could benefit from preventative maintenance. The end result of clustering will not only assign each observation to a cluster, it will also give you a profile of what the clusters “look like.” For example, in our data “cluster two” of donors has a much higher average donation value than the other clusters – we are going to focus on them in building our predictive model.

Display 3 shows the point-and-click clustering capabilities to better segment the potential donors. You can specify information such as what variables to include and the number of clusters to be created.



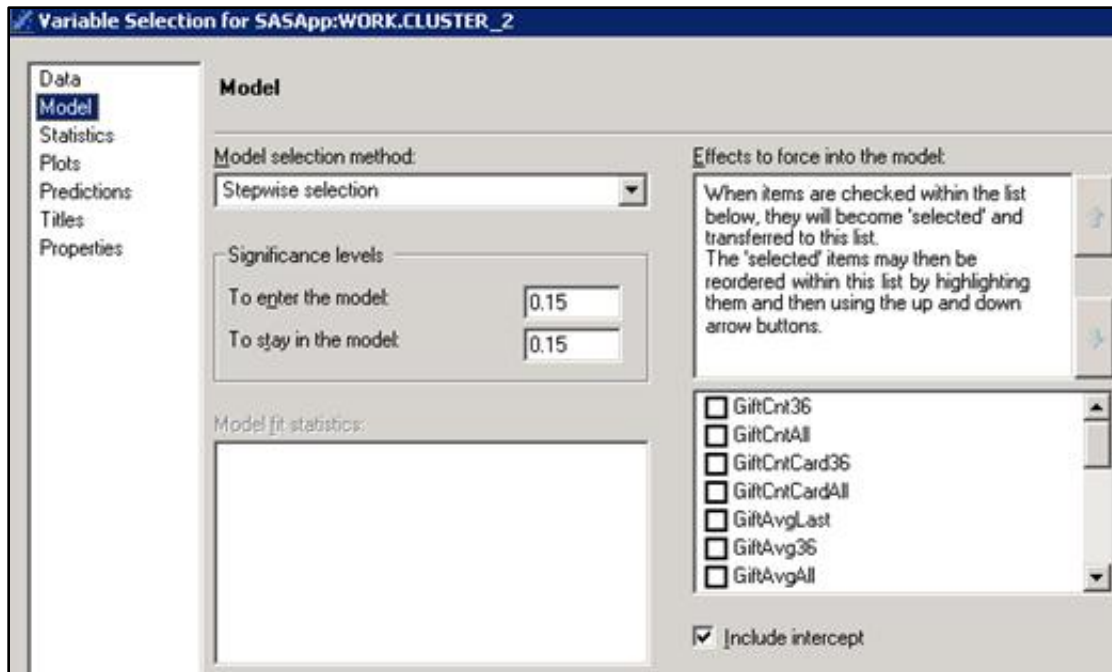
Display 3. Cluster Analysis Task in SAS Enterprise Guide

VARIABLE SELECTION AND MODELING

Once we have a cluster identified and isolated, we will determine which data variables best predict a person’s likelihood to respond to a campaign. This will also help improve efficiency in the modeling step, in case our analysis data set has a high number of variables. Variable selection is part of the Logistic Regression task in SAS Enterprise Guide. With all this set up, SAS will now build a regression model and give us a detailed report of its predictive power. This is all well and good, but the next step is where the true value comes into play.

Display 4 illustrates the variable selection portion of building a regression model. Stepwise selection is one way to isolate statistically significant variables that will be used for modeling purposes.

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Display 4. Logistic Regression Task in SAS Enterprise Guide

SCORING

Here is where we can finally get a view of what we have been building based on our blueprint. In addition to building a model based on past campaign responses, the Logistic Regression task lets us provide new data for applying the predictive formula. In other words, we can now predict who to target in our current marketing campaign. This application of a predictive formula to new data is called scoring. As shown below, we get a probability score from 0 to 1 indicating the likelihood of each donor to respond to the current marketing campaign.

Display 5 shows these results, where the far right column, IP_1, indicates the probability that the donor in question will respond to the current marketing campaign. A score close to 1 is very good and indicates a high likelihood of response. Note that some columns were hidden for clarity.

	ID	GiftAvgLast	GiftTimeLast	DemGender	DemHomeOwner	IP_1
1	00045361	\$4.00	18 M	U	0.4784286598	
2	00014972	\$20.00	25 F	U	0.4011040381	
3	00014975	\$15.00	16 U	U	0.4836551962	
4	00187614	\$20.00	16 F	U	0.4643753548	
5	00033265	\$10.00	21 M	U	0.5748285261	
6	00074393	\$20.00	24 M	U	0.3790008452	
7	00029879	\$16.00	15 F	U	0.450116594	
8	00066888	\$20.00	24 M	H	0.4386883081	
9	00115565	\$15.00	21 F	H	0.5194337457	
10	00187569	\$3.00	19 M	U	0.5503054062	
11	00129406	\$21.00	24 F	H	0.4711111942	

Display 5. Scoring Results Predicting the Likelihood to Respond

Depending on our goals for this project, cost of marketing, and so on, we can decide the threshold at which to start filtering out the low propensity scored donors. This lets us calculate a forward looking ROI based on the scores, the average donations in the past, and the cost of the campaign. The data shown above can easily be exported to

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Microsoft Excel. Or better yet, you can use SAS to combine the predictions with donor contact information and automatically generate a complete list of potential donors to target.

SHARING INSIGHT THROUGH BUSINESS INTELLIGENCE

The goal of all BI is to help enable better decisions, plain and simple. All the drill-down and fancy graphics in the world are useless if they do not help people better understand the problems and opportunities in an organization that require action. Don't give an executive a dashboard if they only want a crosstabular report in Excel.

Within the framework of SAS® Business Intelligence for Midsize Business, there are a multitude of options for sharing insight, including:

- dashboards
- Web reports
- stored processes
- tasks within SAS Add-in for Microsoft Office (Word, Excel, PowerPoint)
- ad hoc reports from SAS Enterprise Guide

Add in the ability to schedule and distribute reports, set up portal alerts, post to Microsoft SharePoint, configure report "bursting" and more: the number of options for doing reporting can seem pretty daunting. To remove some of these concerns, we list some best practices below for finding the right fit for each of your BI challenges.

Table 1 summarizes, based on our experience, some general rules of thumb for selecting an appropriate reporting type for the task at hand. Let each BI project guide your choice of reporting types, rather than trying to use only one technique to suit every situation.

Reporting Type	Works well for...	Not as useful for...
Dashboards	Key information that decision makers need to monitor on a daily basis, insight to share visually with large groups	Reports for single individuals, reports that change often, reports that need fast turnaround
Web Reports	Reports that incorporate tables, graphs and text; export ability to PDF and Excel; self-service reporting; drill-down reporting (OLAP)	Reports that demand an exact layout (pixel perfect), reports that need substantial data preparation upfront
Stored Processes	Reports that have unusual or unique elements (for example, annotated maps or advanced statistics), reports that incorporate a number of prompts	Reports that users can easily modify and interact with
Tasks within the Add-in for Microsoft Office	Information that people just want to see in Excel, Word, or PowerPoint; charts that can easily refresh as data changes; self-service reporting	Reports that need data preparation upfront, people who want to create reports with just a Web browser
Ad hoc reports from Enterprise Guide	Reports that need data preparation and even data import upfront, reports that use SAS programming code, ad hoc requests that need to be answered quickly	Reports that users can easily modify and interact with

Table 1. Selected Reporting Types and How Best to Use Them

There are a number of excellent papers and books covering each of these in detail. Our goal will be to demonstrate two of these – dashboards and tasks within the SAS Add-In for Microsoft Office– in order to build some reporting that would be useful to a small or midsize organization looking for a quick BI victory.

DASHBOARDS

When we talk to organizations about BI, everyone asks about dashboards. Some are more dashboard-driven than others, but in general the dashboard buzz has really caught on and become a must-have in the BI arsenal. Within SAS business intelligence, the SAS BI Dashboard Web application enables users to build attractive, interactive

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dashboards that can excel at showing both traditional BI as well as analytical results. These dashboards are Web-based so that anyone in your organization can view and interact with them from a Web browser. For a small or midsize organization, you can use a dashboard to:

1. monitor performance at aggregate and individual levels
2. report on analytical insight like customer segmentation, forecasts, and the success of marketing campaigns
3. serve as a launch point for other relevant reports

A dashboard will normally consist of one or more indicators, which you can configure through SAS BI Dashboard. These indicators can feature interactions and linking. An **indicator interaction** is the capability to have the user's selections from one indicator change another indicator's display directly on the screen. As a dashboard user explores data in one indicator, the other indicator updates on the fly. With **Linking**, clicking on one indicator brings up another indicator, report, or dashboard that is pertinent to the selection that you clicked. Through linking, indicators can have a "drill down" ability that lets you go quickly from a high level into details. This is often a high priority for executives.

SAS BI Dashboard is a reporting tool, not a data preparation tool. As such, our experience is that implementing a simple dashboard is actually a three-step process.

1. Use SAS Enterprise Guide to prep the initial data
2. Build your dashboard from SAS BI Dashboard
3. As needed, schedule regular updates to the data using SAS Enterprise Guide

Note that some organizations use SAS Data Integration Studio or a third-party tool to handle the data preparation, scheduling, or both. This would be an alternative to using SAS Enterprise Guide.

In the previous section, we took a set of historical responses to a marketing campaign and scored those against a new set of potential donors. So, how did it turn out? A dashboard would be an effective way for all interested parties – modelers as well as managers – to see on a day to day basis how the marketing campaign is performing. By seeing the performance in near real time, changes could be made to correct problems or seize opportunities while the campaign was progressing. Just as important, a dashboard like this keeps the power of analytics squarely on a manager's radar, and it helps you to build momentum and credibility within your organization.

There are many directions that we could go to present our marketing campaign results in a dashboard. We will adopt one of the simplest approaches by comparing the current campaign to the previous campaign in terms of response rate and revenue to date. Alternative (and probably better) approaches would include:

- plotting a marketing measure, such as lift. This would require creating control and test groups up front, but would give a much more scientific measure of how well your analytics are performing.
- incorporating cost data to see the true impact on profit rather than just revenue.
- splitting the display to monitor performance by marketing segments or statistical clusters.

Dashboard Data Preparation

Now that we have a clear idea of what we want to plot, we need the data to do it. Our table will need five columns:

Days Elapsed	Previous Campaign Response Rate (%)	Current Campaign Response Rate (%)	Previous Campaign Revenue (\$)	Current Campaign Revenue (\$)
--------------	-------------------------------------	------------------------------------	--------------------------------	-------------------------------

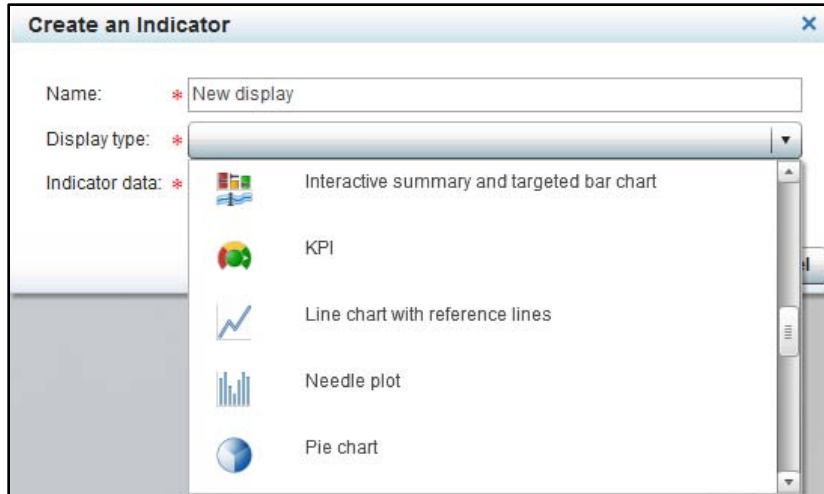
We will not go into specifics on putting this together, but it would typically be a combination of joins, computed columns, and summarization, all of which are available in a point-and-click interface from the Query Builder in SAS Enterprise Guide.

Dashboard Building

With the data in hand, SAS BI Dashboard now gives us a wealth of capabilities for plotting this information. There are more than 25 pre-built display types that can be selected for each indicator in the dashboard including KPI displays, forecast charts, and interactive bar charts.

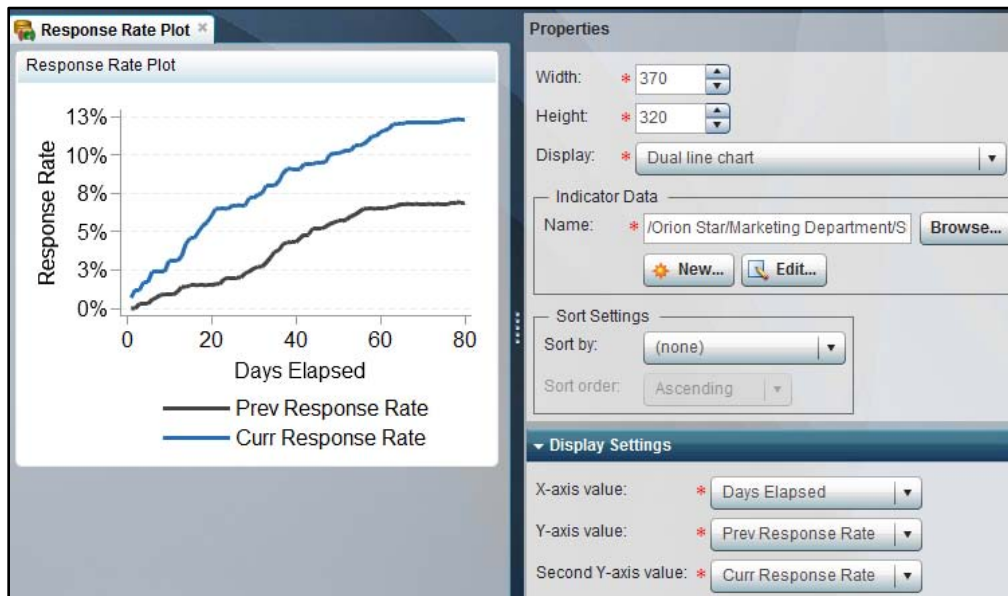
Display 6 contains a portion of the indicators available from SAS BI Dashboard. Every one of these is straightforward to configure in the Web environment to build out your overall dashboard.

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Display 6. Indicator Display Types in SAS BI Dashboard

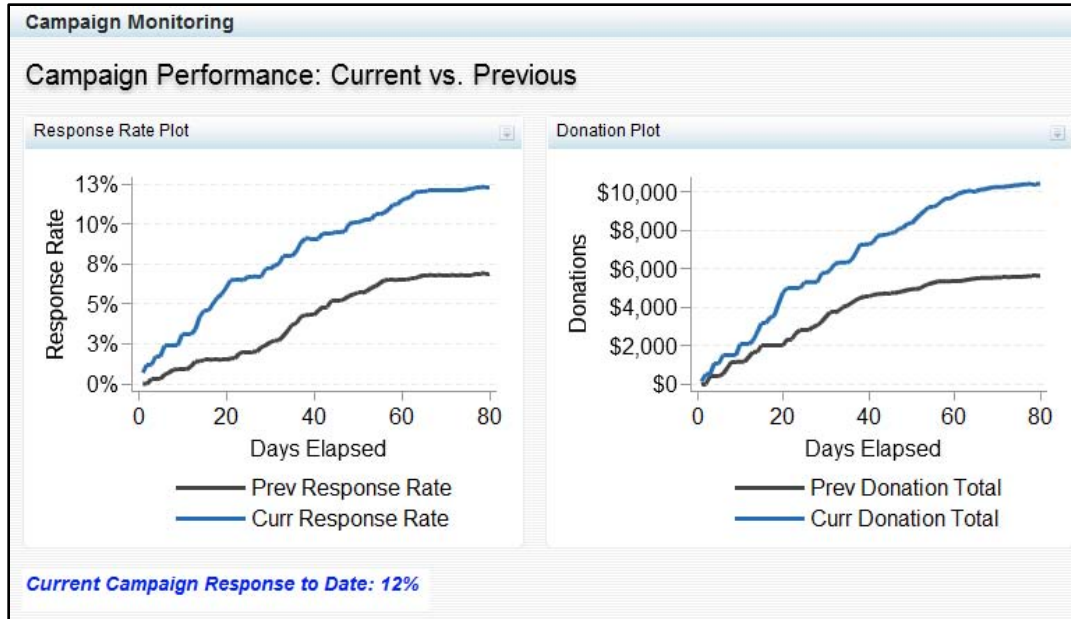
We specifically will use a dual line chart for both our response rate plot as well as our revenue plot. The data can be selected directly from a query and then configured to fit the chart type in question. An illustration of this appears below in Display 7.



Display 7. Dual Line Plot Indicator

A similar plot can be constructed for the revenue information. Once these indicators are created and saved, we can arrange them at the pixel level within a dashboard. Dashboards can also feature static and dynamic text, as shown below. Display 8 contains previous versus current total revenue and response rates at day 80 of the marketing campaign. Note the dynamic text with the current response rate at the bottom of the dashboard.

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Display 8. Completed Dashboard

This is a simple but powerful illustration of how analytics can be communicated to a general audience. The current campaign is clearly outperforming the previous campaign on a daily basis. Because of the tremendous success the campaign has already shown, an executive could decide to have the analysts mail additional brochures on day 30 to the next most likely respondents.

Dashboards can also include indicator interactions and linking. This is a natural way to increase the sophistication of the dashboard. For example, you could include a drop-down prompt (one type of indicator interaction) to specify a particular demographic such as females who are more than 60 years old. The resulting charts would be updated on the screen to reflect this selection. You could also build in linking, for example, to display a report with every transaction for the given day that you clicked in the chart. Demonstrating these elements is beyond the scope of this paper, but they can be handled by using the point-and-click capabilities built into SAS BI Dashboard, no programming code required⁶.

Scheduling Data Updates

For dashboards that retrieve new information daily, it is essential to update the reporting data at a reasonable interval. Let's consider the previous example, where the reporting data included the following columns:

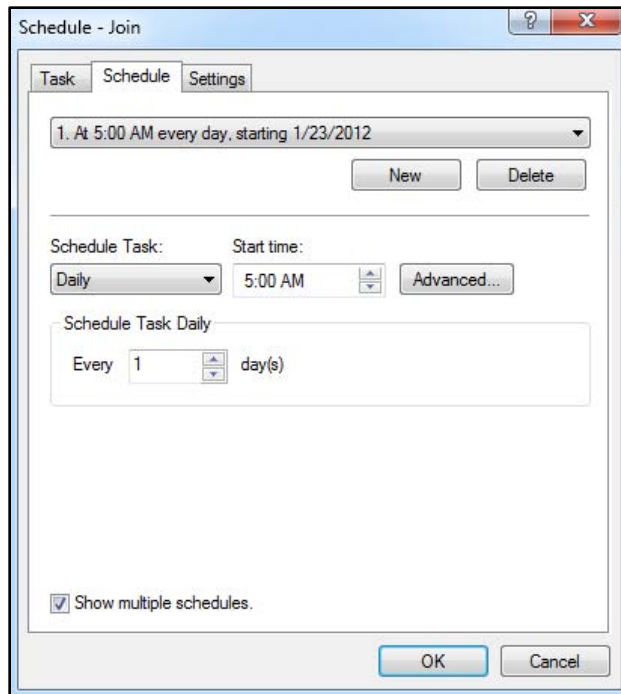
Days Elapsed	Previous Campaign Response Rate (%)	Current Campaign Response Rate (%)	Previous Campaign Revenue (\$)	Current Campaign Revenue (\$)
--------------	-------------------------------------	------------------------------------	--------------------------------	-------------------------------

The underlying data is transactions showing which customer donated on what dates – this transactional data will likely NOT have measures such as days that have elapsed since the start of the campaign. As discussed before, SAS Enterprise Guide can prep the data to compute the correct columns, and we now want to schedule that data prep to happen nightly, for example. The scheduling feature of SAS Enterprise Guide will guide you through a point-and-click interface to set up a schedule to automate this process.

Display 9 shows a portion of the scheduling dialog box that sets up the data update. After setting up the necessary data update one time, your dashboard will seamlessly display the current numbers at each viewing.

⁶ Learning how to design both basic and sophisticated dashboard is the SAS course *Creating BI Dashboards Using SAS 9.2*. <https://support.sas.com/edu/schedules.html?ctry=us&id=1189>

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Display 9. Scheduling Dialog Box in SAS Enterprise Guide

SAS ADD-IN FOR MICROSOFT OFFICE

"Until I see it in Excel, it's not real to me." – Unknown Executive

Microsoft Office is the foundation for creating and sharing information in the vast majority of organizations. SAS enables you to take the best of what Microsoft Excel, Word, PowerPoint, and Outlook can do and supplement that with additional capabilities to handle large data, design and apply analytics, automatically refresh charts, and much more. We are going to focus on reporting and illustrate how executives can have the most recent numbers surfaced automatically through a PowerPoint presentation.

First, let us look at the data that we want to chart from Microsoft Excel. This is accomplished by using the **SAS Data** button from the SAS Add-In. Our data is already stored centrally on the server, and SAS now lets you consistently access that data from Excel with no additional setup required. You can view as much or as little data as you want in either tabular format or within a PivotTable. Because the data processing is server-based, you never need to fear Excel row limitations again!

Display 10 shows the results from using the SAS Data feature, when you are looking at a particular data set with forecasting information.

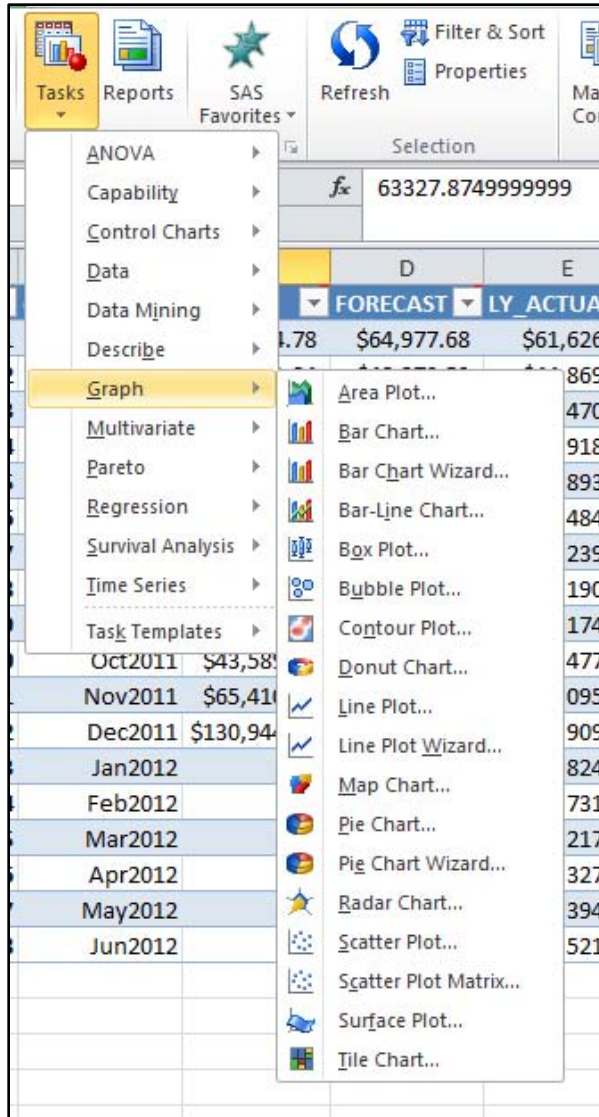
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	A	B	C	D	E
1	▼	order_date ▼	ACTUAL ▼	FORECAST ▼	LY_ACTUAL ▼
2	1	Jan2011	\$60,824.78	\$64,977.68	\$61,626.67
3	2	Feb2011	\$52,731.84	\$48,270.53	\$44,869.28
4	3	Mar2011	\$40,217.61	\$46,252.93	\$45,470.10
5	4	Apr2011	\$63,327.87	\$60,952.70	\$62,918.89
6	5	May2011	\$84,394.20	\$74,836.55	\$77,893.94
7	6	Jun2011	\$102,521.38	\$89,375.34	\$91,484.47
8	7	Jul2011	\$97,852.11	\$92,661.19	\$104,239.76
9	8	Aug2011	\$103,293.07	\$89,244.87	\$82,190.05
10	9	Sep2011	\$46,689.69	\$35,927.96	\$36,174.35
11	10	Oct2011	\$43,589.75	\$41,951.76	\$37,477.31
12	11	Nov2011	\$65,410.47	\$52,281.30	\$50,095.47
13	12	Dec2011	\$130,944.67	\$107,416.84	\$92,909.27
14	13	Jan2012		\$70,079.12	\$60,824.78
15	14	Feb2012		\$55,034.14	\$52,731.84
16	15	Mar2012		\$50,310.09	\$40,217.61
17	16	Apr2012		\$70,899.84	\$63,327.87
18	17	May2012		\$89,624.73	\$84,394.20
19	18	Jun2012		\$107,391.58	\$102,521.38

Display 10. Data Values Loaded into Excel Using the SAS Add-In for Microsoft Office.

We have historical sales information for the previous year along with six months of forecasts. Using SAS Enterprise Guide, we also prepared the table to include the previous year's sales as an additional column. We would like to plot this information in PowerPoint, which is simple by using the built-in tasks of the SAS Add-In. A **task** is a graphical interface that guides you through a particular type of analysis, for example, constructing a line plot. Display 11 lists some of the available tasks in the SAS Add-In. Incidentally, most of these tasks also appear in SAS Enterprise Guide.

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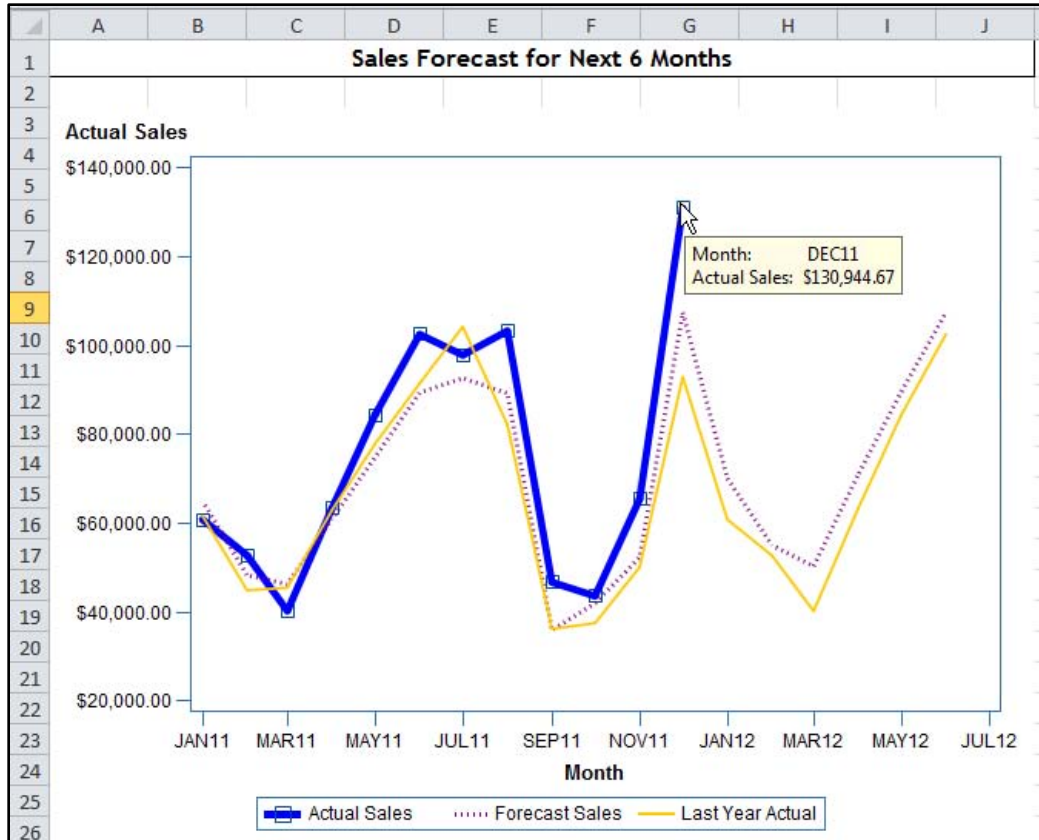


Display 11. Graph Tasks in the SAS Add-In for Microsoft Office

From the Line Plot task, we can select variables for the horizontal and vertical axes. We also have complete control over the line style: colors, solid or dashed, markers, and so on. Virtually any standard feature for chart creation is here, and remember that since the data is stored centrally, the chart can be refreshed with a single button as the data changes over time.

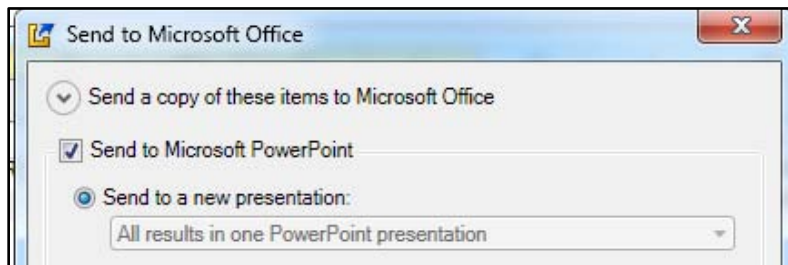
Display 12 shows the resulting plot with our forecast data. While Excel can natively generate comparable plots, the refresh capability of SAS can save hours of building and rebuilding similar charts each week and month for review.

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Display 12. Results from the Line Plot Task

If you need this chart in a PowerPoint slide, you can easily move it through the Manage Content feature as shown in Display 13. This maintains the same data links and ability to modify any part of the graph through the task interface.



Display 13. Send to Dialog Box within the SAS Add-In for Microsoft Office

We can refresh these charts as the data changes by clicking **Refresh** in the SAS Add-In for Microsoft Office. Even better, we can automate the refresh process so that a copy of the PowerPoint with the most recent numbers is stored on a network drive or e-mailed once a week or even once a day. How powerful would it be to know that even if a snowstorm hits, you will still have a PowerPoint with the current numbers e-mailed to your executive team at 8 AM every Monday morning?

CONCLUSION

SAS software can enable you to create a high performing analytics and business intelligence environment, even for small and midsize organizations. SAS has packages specifically for small and midsize organizations that will let you get started and “make it happen” with budgets in mind. By properly setting your goals, you can build momentum to continually tackle larger projects and build a data-driven organization. At your disposal is a wealth of options for analytics, Web-based dashboards, and integration with Microsoft Office – this paper illustrated some of the ways that you can employ these to create real value for your organization.

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RECOMMENDED READING

- Stubbs, Evan. 2011. *The Value of Business Analytics: Identifying the Path to Profitability*. New York City, NY: John Wiley & Sons.
- SAS Institute Inc. 2011. *SAS® BI Dashboard 4.3.1: User's Guide*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/cdl/en/bidbrduq/64524/HTML/default/viewer.htm#titlepage.htm>.

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