

Easing into Analytics Using SAS® Enterprise Guide® 6.1

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ABSTRACT

Do you need to deliver business insight and analytics to support decision-making?

Using SAS® Enterprise Guide®, you can access the full power of SAS® for analytics, without needing to learn the details of SAS programming. This presentation focuses on the following uses of SAS Enterprise Guide:

- Exploring and understanding—getting a feel for your data and for its issues and anomalies
- Visualizing—looking at the relationships, trends, surprises
- Consolidating—starting to piece together the story
- Presenting—building the insight and analytics into a presentation using SAS Enterprise Guide.

INTRODUCTION

As an analyst, you probably need to provide actionable insights to enable effective decision making. With all of the demands on your time, you need powerful tools that are quick to learn and deliver end-to-end support for your analytics needs. SAS Enterprise Guide provides you with a wealth of analytics tools to help you easily turn all that data into useful information.

This paper will help you understand

- What tools are available
- How to use the tools for data exploration, analytics, reporting, and presentation
- How to easily create a variety of output formats to display your results
- How to build easily repeatable processes.

Whether you have been programming in SAS for years, are new to SAS software, or have dabbled with SAS Enterprise Guide before, this paper should shed some light on the depth, breadth, and power of the SAS Enterprise Guide environment. Because of the flexibility of SAS Enterprise Guide, there are usually many paths you can take to get to the same tasks. This presentation describes a few, but not all, approaches to each task.

PLEASE NOTE: The SAS Global Forum 2015 presentation and demos that this paper describes, will be **audio recorded and available after the conference**. The recorded demo and presentation will guide you through the features described in this paper. Please see:

- http://www.sascommunity.org/wiki/Presentations:Marje_Papers_and_Presentations
- www.sasglobalforum.com .- there will be a link to the recorded presentations.

EXPLORING AND UNDERSTANDING YOUR DATA

How can you easily get a feel for your data?

Perhaps you eyeball the data, OR if you are a SAS Programmer, you may run a series of Procedures like CONTENTS, FREQ, SUMMARY, GCHART, GPLOT, SGPLOT, SGSCATTER, etc.. But, there is a much easier and more effective approach!

QUICK AND EASY LOOK AT THE DATA

My first stop with any new set of data is the **SAS Enterprise Guide Data Explorer**, which enables you to

- View all or a portion of your detail data
- Easily create charts and graphs to explore the variables, and quickly highlight possible issues and outliers
- Highlight the “top 10” values of variables
- And produce many other statistics of your choosing.

How do you access the Data Explorer?

There are multiple ways to access the Data Explorer (File → Open → Data Exploration) but my preference is

- In the **Server List** window, you can view a list of the available servers, libraries, and SAS files.
- Use the plus sign (+) to expand the Servers and Libraries, and navigate to the dataset of interest
- Right click on the dataset and select **Explorer**
- **Tip:** If you want to Explore Temporary (WORK) datasets – OR – if you are working with LARGE data - see the tricks in the FAQ at

<http://blogs.sas.com/content/sasdummy/2014/02/17/favorite-eg-tricks-fecht/>

<http://blogs.sas.com/content/sasdummy/2014/07/09/performance-tips-sas-eg-datagrid/>

- **Note:** The Data Explorer options are normally configured to limit the number of rows and columns that are available (by default).
- Once you are in the explorer window, you can
 - Apply **filters** to control which variables and rows you view
 - Request **Quick Stats**, to view charts, plots, summary statistics, and more
 - Customize the environment to control
 - Usage with large data
 - Statistics that appear by default for character, numeric, date/time, and currency variables. Just select the **Select Statistics** tool in the Quick Stats view.
 - And many other options (SAS Enterprise Guide has A LOT of options!!).

To illustrate some of the features, see Figure 1 to view a portion of the data in SASHELP.HEART and notice

- Icons next to variable name describing the data type (numeric, character, currency, date)
- Quick Stats view on the right
 - **Tools** let you control data display (rows, columns)
 - **Select Statistics** lets you choose the default graphics and statistics to display for each of the 4 data types
 - For Character variables, the default statistics include
 - # of distinct values
 - Count
 - Vertical Bar chart showing frequencies
 - Top Distinct values – including frequencies for each (up to Top 10)
 - Notice that numeric variables have different default statistics.

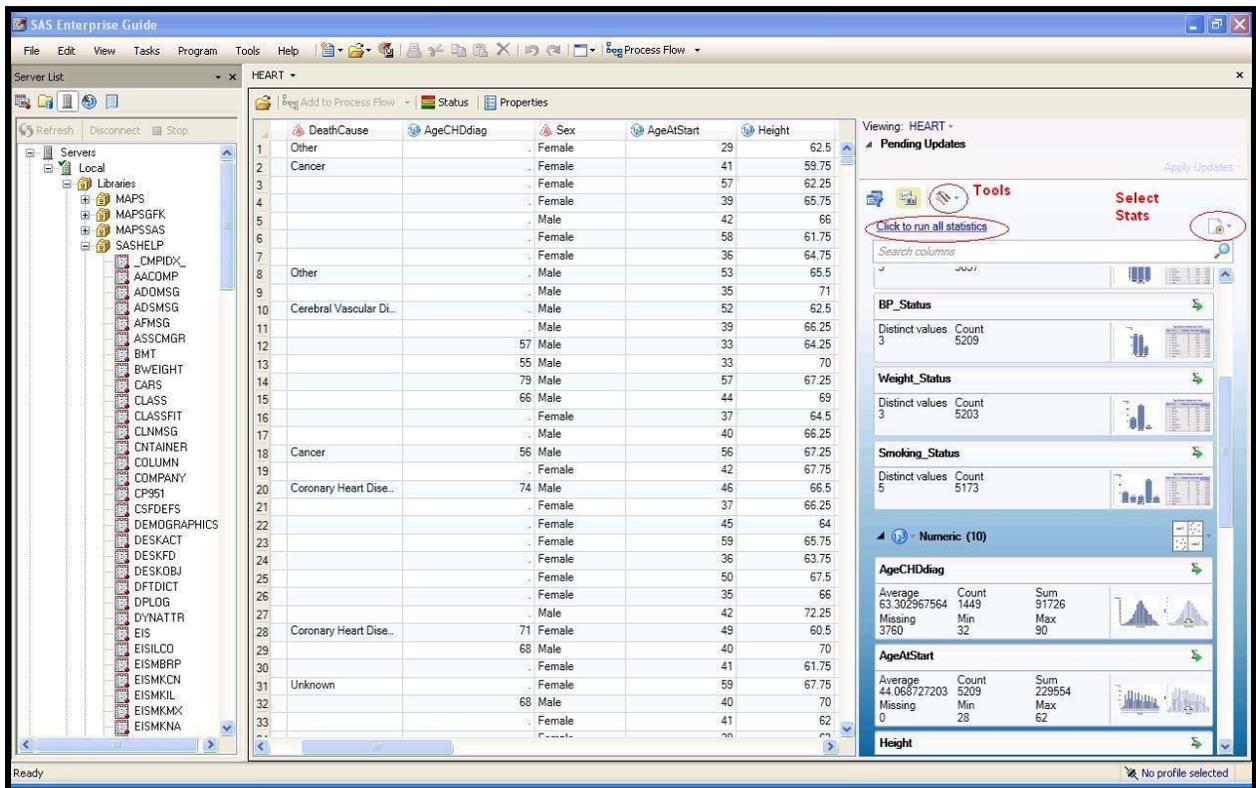


Figure 1 - Data Explorer - with Quick Stats on all variables

If you click on one of the graphics or tables in the Quick Stats view, it magnifies.

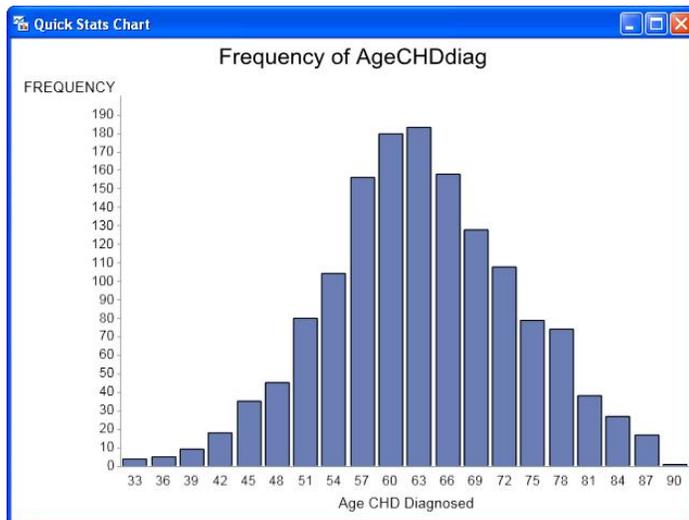


Figure 2 - Frequency Chart for AgeCHDdiag

DIG DEEPER – FIND THE ISSUES AND ANOMALIES

In the Data Explorer, you can focus in on areas of concern by using the Filters to explore subsets of data. The filters can be defined either in the **Data View List** view in the right pane, or by selecting the filter tool in the column of interest. When you apply filters, and rerun **Quick Stats**, the statistics represent just the subset of data so that you can focus in to find issues and anomalies.

TIP: SAS doesn't APPLY the filters (select columns, subset data, sort) until you select **Apply Updates**.

In addition to the **Data Explorer** for reviewing your data, filtering, and viewing subsets of data, there are many "built-in" Enterprise Guide tasks to easily accommodate further data investigations. Use the **Task Gallery** (new to SAS Enterprise Guide 6.1), or select **Tasks** from the menu bar, to select from over 95 different built-in tasks. **No Coding required!**

The **Task Gallery** provides easy access to the tools you need to explore, summarize, visualize, analyze, report, and so on. You can access tasks by Category, Name, and even visual representations.

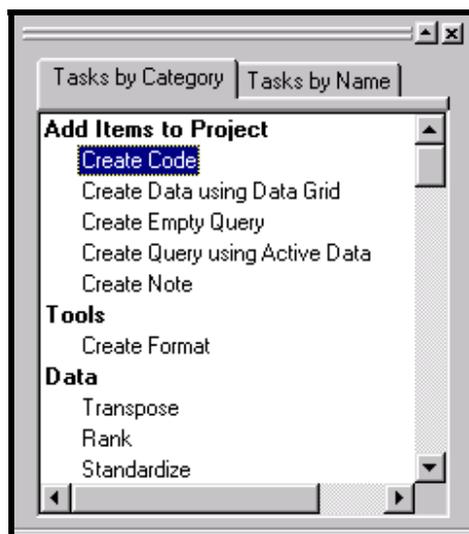


Figure 3 Task Gallery - by Category

Notice that the Task Gallery “by Name” also displays the underlying SAS **Procedure**. This can be useful if you need additional documentation on how the procedure handles data, methodologies, etc.

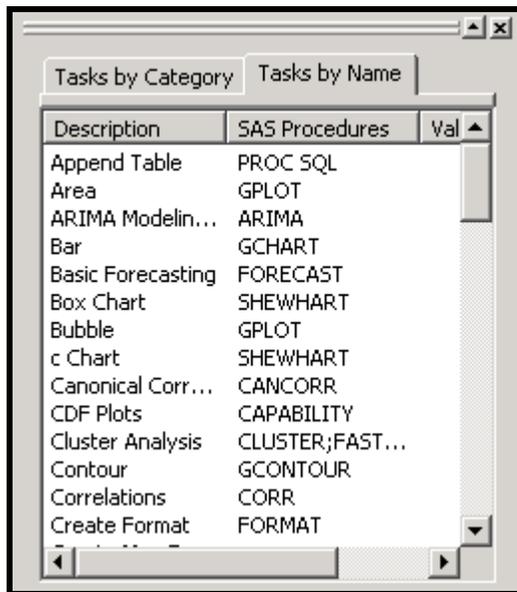


Figure 4 Task Gallery - by Task Name

If you want univariate descriptions of all of your variables, similar to the **Data Explorer** results, select **Tasks → Describe → Characterize Data . . .** The **Characterize Data Wizard** will step you thru the selections and produce results that can easily be printed or saved for later usage.

VISUALIZING YOUR DATA

To help you understand the underlying relationships in your data, SAS Enterprise Guide provides extensive graphics and analytics capabilities, through the built-in tasks.

For example, suppose you want to explore the relationships between 4 of the variables in the heart data, for different subsets of data. You can produce a **Scatter Plot Matrix** and easily control the features of the graphic. To get started, select **Tasks → Graph → Scatter Plot Matrix . . .**

Notice that the task let's you specify filters, variables to include in the scatter plot matrix, grouping variable (separate plotting symbols for each group), and even gives you the option of including a Histogram along the diagonal to better understand the distribution of each variable.

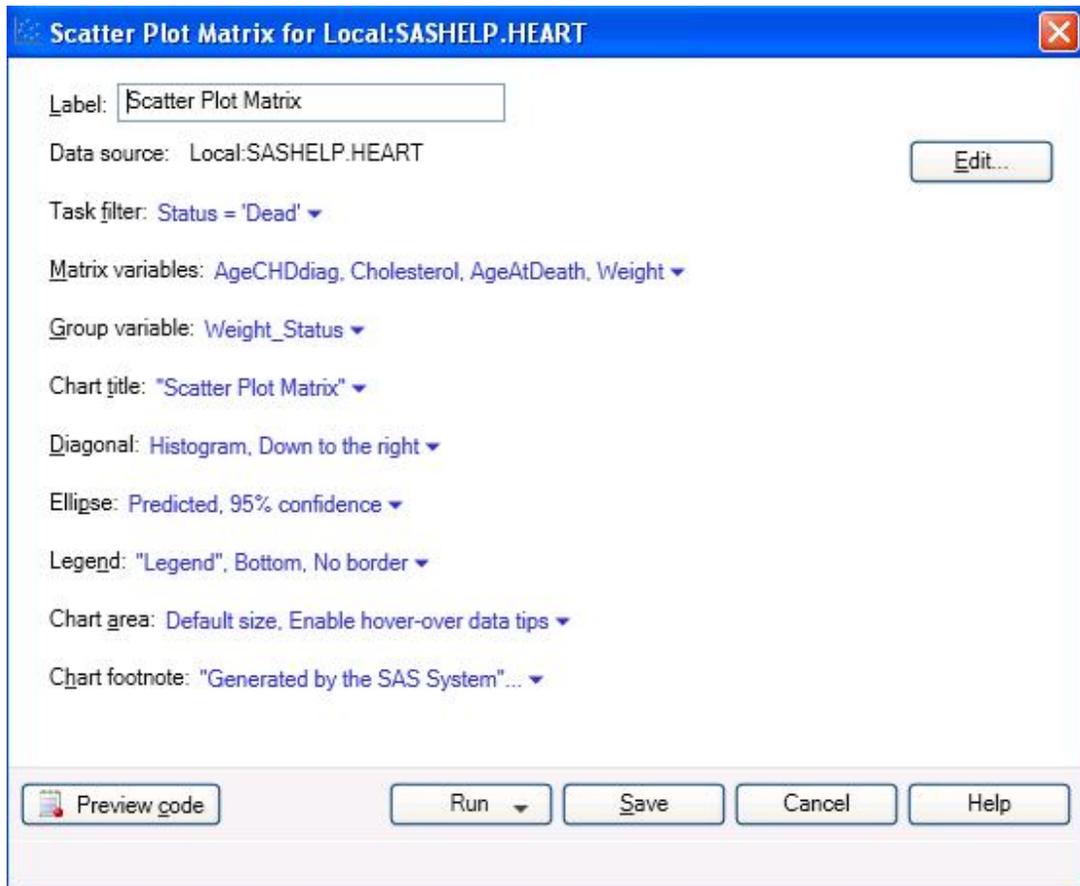


Figure 5 - Scatter Plot Matrix to explore relationships between variables

Behind the scenes, this task generates a program which uses PROC **SGSCATTER**. For the tasks that generate SAS code, you can view the code (select **Preview Code**), learn from the code, save it as part of other programs, and add additional options to your code that the task might not enable.

Notice the **Help** button. Every task has help to guide you through the choices and capabilities so that you can use the task effectively.

When you select **Run**, the task will produce your Scatter Plot matrix. Notice

- Histogram for each variable along the diagonal
- Scatter plot of each pair of variables
- Plotting symbol represents the grouping variable *Weight Status*
- Additional tabs can be opened to view
 - **SAS code** that is created for the task
 - **Log** with any messages
- If you need to make changes to your selections, select **Modify Task**
- You can **export** the results in a variety of formats. This will be discussed in the last section of this paper.

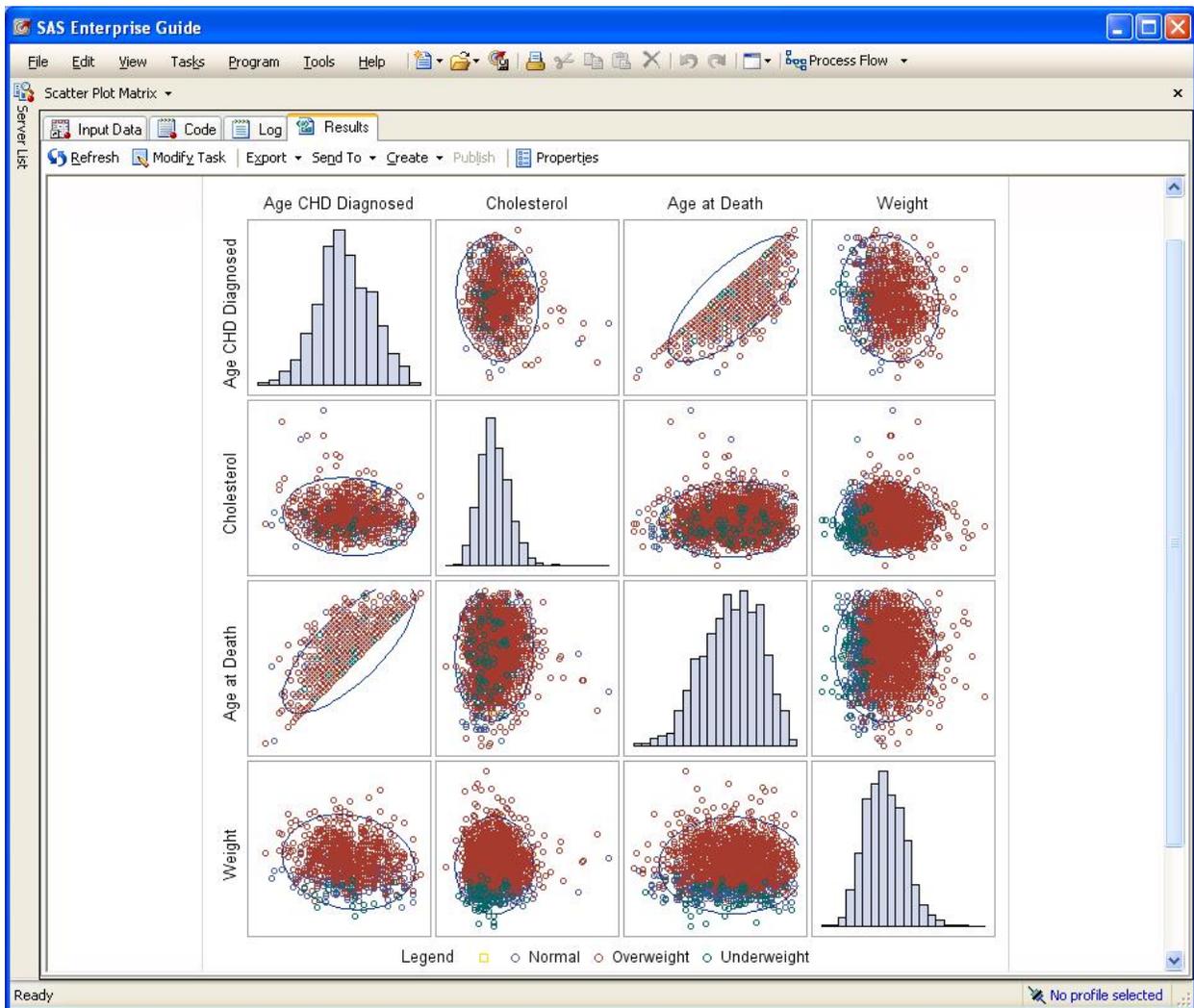


Figure 6 - Scatter Plot describing the relationships between pairs of variables

That was easy – wasn't it?? What other ways can you visualize your data in SAS Enterprise Guide?
Depending on the version you are using, there are a lot of additional Graph Tasks.

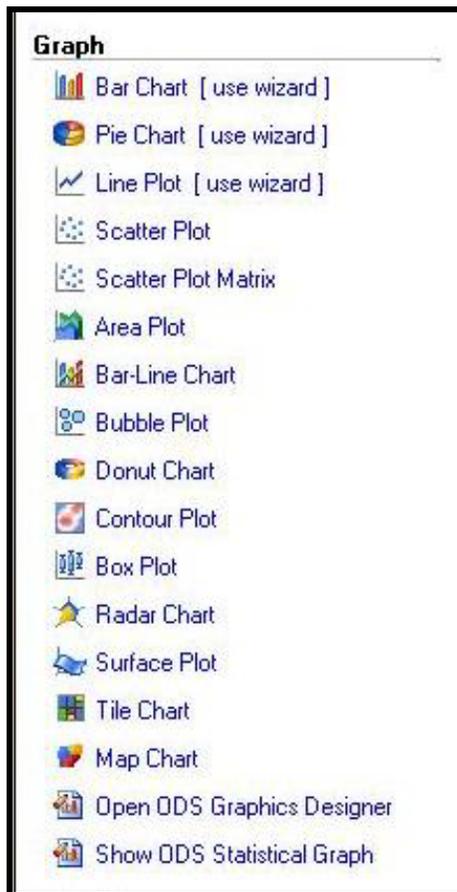


Figure 7 - Graph Tasks - choices are version dependent

Similar to Figure 5, the tasks above provide you with a variety of selections to specify your choices for data, variables, options, output customization, and more.

CONSOLIDATING YOUR STORY

Depending on your analytics goals, you may need to use the power of SAS Statistics and Analytics tools. Enterprise Guide tasks make it easy to use these tools to produce the insights you need.

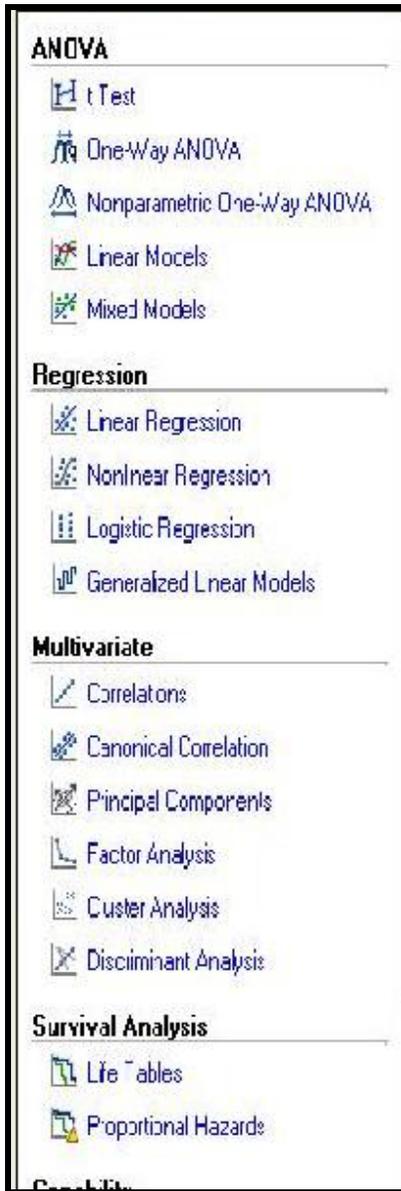


Figure 8 - Partial list of Statistics and Analytics Tasks

As you continue using tasks to build your story, SAS Enterprise Guide keeps tracks of the steps, and the results in a **process flow**. This process Flow can be saved as an Enterprise Guide **Project** so that you can

- Easily document the steps you took
- Use the Project as a starting point later to continue with the current analysis, or, apply the flow to other data.

To save a project, select **Save → Project as**

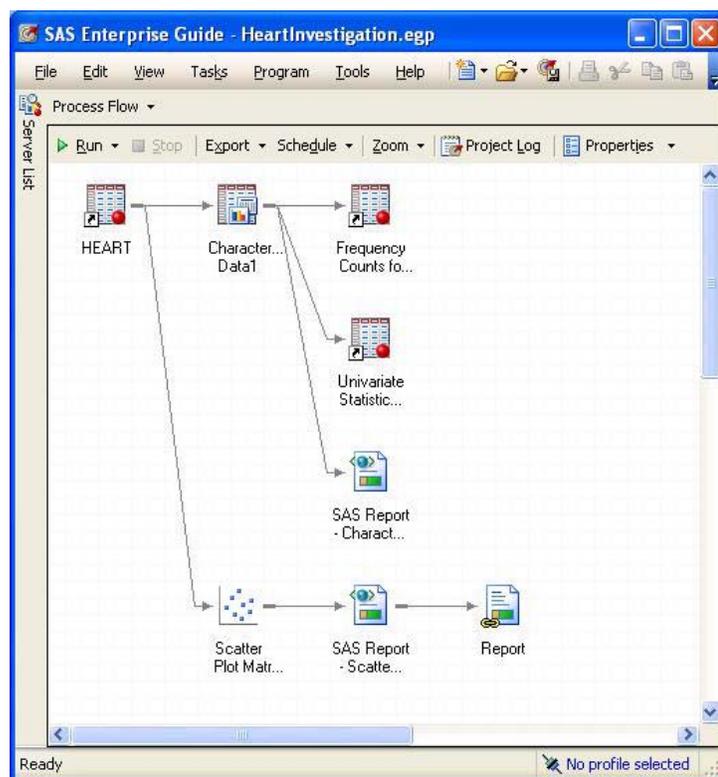


Figure 9 - Process Flow - 2 tasks and their results, using the HEART data

Additionally, you can create **Project Prompts** to generalize the project so that you can customize future results by changing data set names, time frames, variables, options, etc.

PRESENTING THE RESULTS

A challenge we all face is getting our results into a presentable format. SAS Enterprise Guide provides a variety of output formats for individual results of tasks, as well as an excellent tool to pull results together into a single report template.

Most results within Enterprise Guide can be

- Exported to HTML, XML, or PDF - select **Export**
- Sent to WORD, EXCEL, PPT - select **Send To**
- Saved as a report in the Enterprise Guide environment. - select **Create**.

You can also use **Tools → Options → Results** to

- control the format of all results that you produce
- customize the formats and properties of the different result formats.

If you would like to use Enterprise Guide to assemble multiple pictures and tables into a single location, select **File → New → Report**, select the reports from those you have created, and begin assembling your report. You can even bring in images such as company logos or pictures that support the data.

CONCLUSION

SAS Enterprise Guide provides a powerful and flexible environment to let you focus your time and energies on finding and deliverable actionable insights for effective decision making. Instead of learning and writing SAS programs, you can explore the built-in tasks and capabilities to fulfill your analytics needs.

This paper provides an overview of some of the capabilities for data investigation and analytics. Please also use additional resources such as

- live presentation of this topic at SAS Global Forum 2015 – recording available after the conference
http://www.sascommunity.org/wiki/Presentations:Marje_Papers_and_Presentations
- SAS Enterprise Guide **Getting Started Tutorial** – available via **Help** menu.

RECOMMENDED READING

For additional SAS[®] Enterprise Guide[®] presentations and explanations, please see

- http://www.sascommunity.org/wiki/Presentations:Marje_Papers_and_Presentations
- <http://blogs.sas.com/content/sasdummy/2014/02/17/favorite-eg-tricks-fecht/>
- <http://blogs.sas.com/content/sasdummy/2014/07/09/performance-tips-sas-eg-datagrid/>

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