Paper 145-26

Delivering Information to the People Who Need to Know
Carol Rigsbee, SAS® Institute
Chris Hemedinger, SAS® Institute

ABSTRACT

One of many things that SAS® software enables you to do is to deliver the information you have used SAS software to discover. Come and see how SAS allows you to create and generate reports and get them delivered to the right people giving them *The Power to Know* ™.

Enterprise Guide® software brings the full power of SAS to business analysts and SAS programmers in a PC client application via an easy to use point-and-click user interface. This Windows client connects to Version 8 SAS System servers and provides access any data types supported by the SAS System, uses the execution power of the server to run any SAS processes, and returns professional reports and graphics to your PC. Enterprise Guide also provides you with web deployment and repeatability of your analysis and results. This paper describes the latest features available in Enterprise Guide Release 1.2 in the areas of project management, query, OLAP support, data access and administration.

A NEW WAY TO USE SAS

Even long-time SAS users are impressed when they see how many traditionally complex operations are reduced to a few simple mouse movements with Enterprise Guide. For example, you can move your Excel data to an OS/390 server simply by dragging the Excel file icon to the server icon. You can use the visual query tool to create complex queries that join tables, even across different SAS servers. You can perform dozens of standard and advanced analysis tasks without writing a single statement of SAS code, simply by using the available analysis wizards. You can use the style editor to modify the appearance of the HTML output to suit your corporate standards or your personal taste.

HOW DOES IT DO THAT?

Enterprise Guide is a client application that uses a new enabling product, SAS Integration Technologies, to connect with a SAS server (Version 8 and later). Enterprise Guide is a true PC client application; you do not need any part of the SAS System installed on the local Windows machine to use it with other servers. Through the use of COM, DCOM, or TCP/IP protocols, you can use Enterprise Guide to connect to any SAS server that has SAS Integration Technologies configured and running.

When you use Enterprise Guide to connect to a SAS server, you have access to all data that the server has access to (even DBMS data through SAS/ACCESS® engines). You also have the ability to submit SAS programs for processing to the remote server and have the results played back to you in your Enterprise Guide session. Enterprise Guide uses the SAS Output Delivery System (ODS) to generate HTML results that you can view within Enterprise Guide or with any web browser. Enterprise Guide Release 1.2 supports two new formats: RTF (used by Microsoft Word) and PDF (used by Adobe Acrobat).

ADMINISTRATIVE POWER

Enterprise Guide comes packaged with a separate administrator application that lets you define the available SAS servers and other assets (such as users, groups, libraries, and binders). A system administrator can maintain a central repository of these server definitions so that end users of Enterprise Guide never have to see the underlying definitions, and any changes that occur later on are transparent to them.

Enterprise Guide® Release 1.2 provides many new features that give the administrator more power and flexibility to meet the needs of Enterprise Guide® users. Here are some of the new features:

- You can specify to use encryption when transferring data between Enterprise Guide and SAS servers. This feature uses SAS/SECURE™ software.
- You can also leverage your existing SAS Integration Technologies server definitions by importing them from an LDAP directory or LDIF file.
- The Administrator provides an interface to let you create SAS formats that are available for all SAS software users, including Enterprise Guide clients. Enterprise Guide users can also create formats for their own use within their projects.
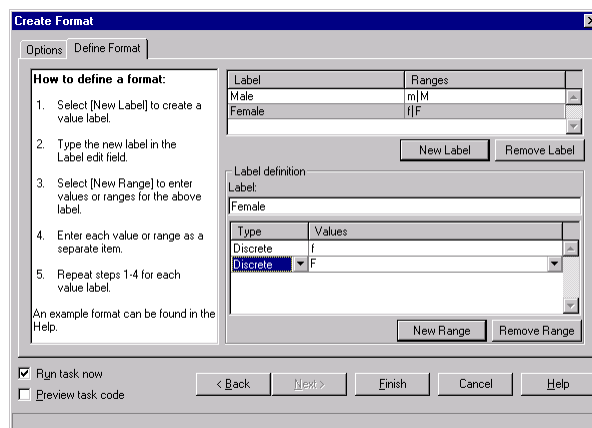

- The Library wizard is "DBMS aware" and provides different choices in the wizard based on the type of engine you selected. In addition, you can create libraries that allow each user to supply an individual user ID and password when the LIBNAME is assigned. You have more control on when libnames are assigned and de-assigned. You can also test the LIBNAME when you are running the wizard.
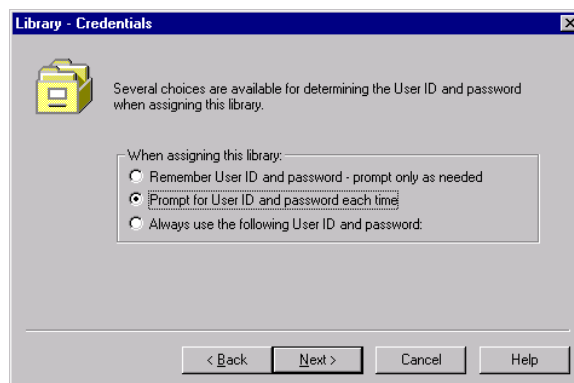
PROJECT MANAGEMENT

Enterprise Guide provides you with a project-based interface for organizing your work. The project window displays the active project and its associated data, code, notes, and results. In Enterprise Guide Release 1.2 you can reorder the project elements with a drag-and-drop operation.

Data is not embedded with the project – each data node is just a reference to the data that resides on the SAS server (or local data file). In Enterprise Guide Release 1.2 you can modify this reference to point a new location, server or even a new file name. You can do this by selecting the properties dialog for the data node.
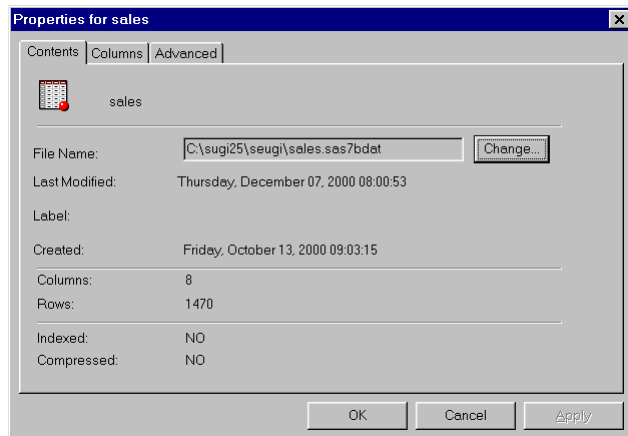

ACCESS DATA ANYWHERE

Enterprise Guide provides transparent access to SAS and non-SAS data. Of course you have access to any SAS data that your SAS server can get to, as well as any other DBMS data that you can reach through that server. In addition, you can access data on your local PC or network in most popular PC file formats (including Excel, Access, Lotus, etc.). You can use local ODBC or OLE DB drivers to read additional data that may be accessible from your PC.

TIP: You can see the LIBNAME statement and dataset name associated with a data source by dragging the data node to an empty code editor window and dropping it. Enterprise Guide will add the code to the window.

Enterprise Guide Release 1.2 provides an Import Wizard for Microsoft Excel and flat files. Using this wizard gives you more control over exactly how your data is imported and where it is stored. For example, you can now take a text (or flat) data file on a remote server like Solaris and easily convert it to a SAS data set.
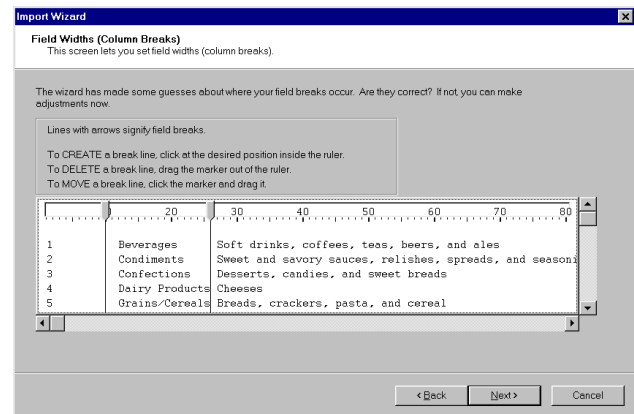

Once your data source is added to the project, you can insert new computed columns by using the data grid. (Note that this helps you just when you are initially creating a column – the expression is not preserved with the data file.)

OLAP SUPPORT

Enterprise Guide allows you to access multidimensional data. Using the integrated OLAP viewer, you can navigate MDDB cubes that are registered with the SAS/MDDB® server. In addition, you can view OLAP cubes through any other OLAP provider that supports OLE DB for OLAP. When you want to analyze the slice of data that you are currently viewing, Enterprise Guide creates a dataset that represents a snapshot of that slice.

In Enterprise Guide Release 1.2, the OLAP viewer presents your data with both a table and graph view. Both views are drillable.
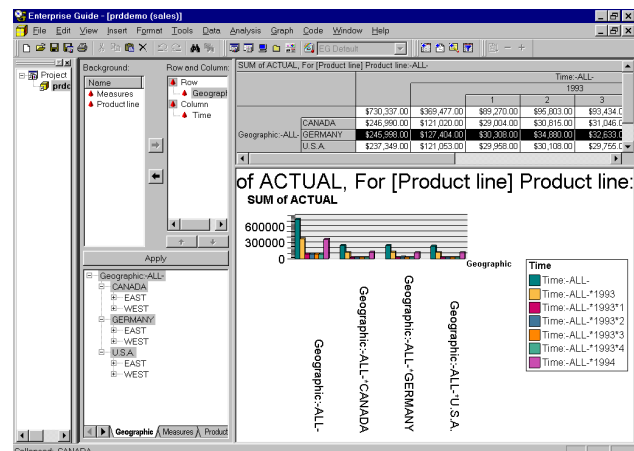
There is a new exception highlight wizard to let you control exception highlighting with associated hierarchy levels and also has enhanced header, footer and tool tip information. You can also control the graph and table cell styles via borders, fonts and colors.
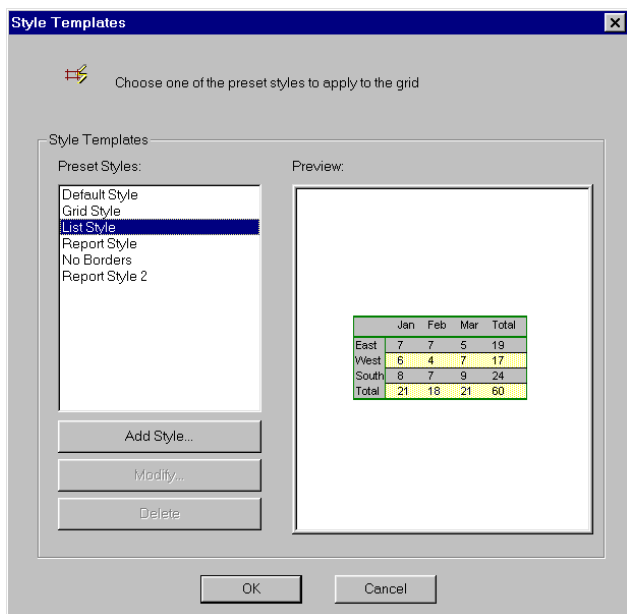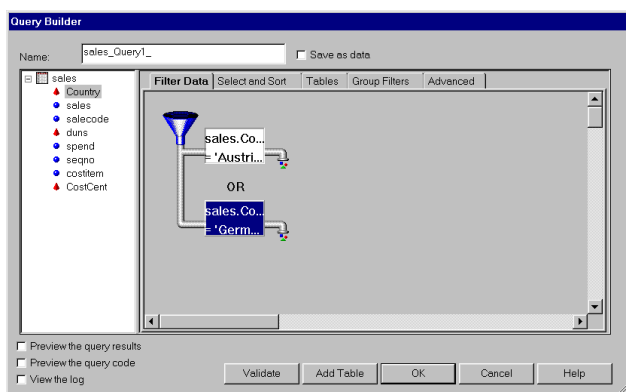
Within Enterprise Guide, you can create new MDDB sources or register existing MDDB sources with the SAS/MDDB server.

SUBSET WITH EASE

If your data is not ready to be analyzed "as is" from the table, you can use Enterprise Guide's integrated Query Builder to filter data, select columns, join tables, and more. You don't need to be an SQL expert to subset your data and get it in the shape you need.

You can select just the columns you need, and even use expressions to build additional columns! The built-in expression builder can help you take advantage of the data manipulation power of SAS to create new meaningful columns based on your existing data. As you use the Query Builder to construct your query, Enterprise Guide generates the SQL that SAS will use to generate the query results. At any time you can preview the data in the results to see if you are producing the results you expect. You can also view the generated SQL code to learn what's going on "behind the scenes".

As you use the Query Builder to construct your query, Enterprise Guide generates the SQL that SAS will use to generate your resulting dataset. At any time you can preview the results of the query to see that it's what you want. You can also view the generated SQL code to learn what's going on "behind the scenes".

TIP: *Want to change that AND condition to an OR? Simply double-click on it in the* **Filter Data** *view to toggle it.*

In Enterprise Guide Release 1.2, the query window is resizable so you have "elbow room" to build more sophisticated queries. You can create joins on multiple columns for all types of joins. You can use IF-THEN-ELSE logic through the CASE statement in your expressions to further control your query. The "IN" operator is supported in the Filter Condition Dialog.
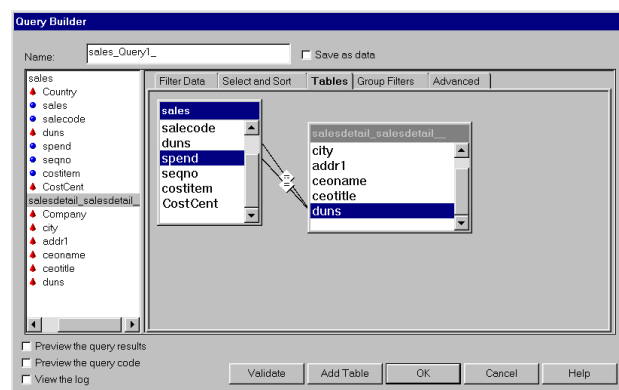
You can validate your SQL syntax on demand or the system will validate it for you as needed.

In addition to the other improvements in Enterprise Guide Release 1.2, the user interface for the Filter Condition dialog is redesigned to be easier to use. It also produces more efficient SQL code--particularly in the area of pass-through. You can use calculated variables when you are building your filters. You can edit both sides of the condition or edit the entire filter with the expression builder to add complex filter logic to your query.
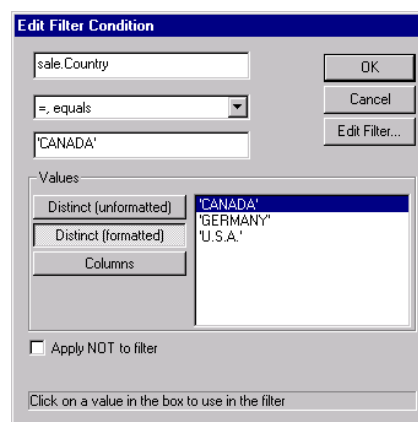
ANALYZE, THEN CUSTOMIZE

Enterprise Guide offers more than 50 focused analysis tasks that you can use to explore/report on your data. The breadth of these tasks cross various reporting and analysis disciplines, including:

- Basic reporting, such as listing data or summary tables
- Basic summary statistics and frequency analysis
- Data transformations, such as standardize, rank, transpose, recode values (through the use of SAS formats), append tables, and random sampling. You can even create spatial geometry data for use with the map charts.
- More advanced modeling, such as regression analysis and linear and nonlinear models
- Many varieties of graphs and charts, including bars and pies, line and surface plots, radar charts, and maps.

- Focused analysis in the disciplines of forecasting/time series and quality control.
- Utility tasks, such as creating SAS formats and registering MDDBs.

TIP: A*re you wondering whether a specific SAS procedure is addressed within the Enterprise Guide tasks? In the task list window, click the* **Tasks by Name** *tab; this view shows the tasks sorted by name with the PROCs that they represent. You can click on the* **SAS Procedure** *column to sort by PROC name.*

After you select a data source, you can launch any of the available tasks. The data source can be a ready-made SAS dataset, local PC data, or the result of a query. All of the tasks provide point-and-click interfaces to drive your analysis without you having to write any SAS program code at all. However, if you want to see what SAS code the task generates, you can view that in a preview window as well.

If the SAS code that the task generates does not represent everything that you want to do, you can make a copy of the code and alter it to suit your needs. In this way, you can use Enterprise Guide to get a good start on an analysis task and then just tweak it to fit your needs. Enterprise Guide includes the color-coded SAS program editor. The editor is integrated with the SAS syntax help so online help for a PROC or function is just a keystroke away.
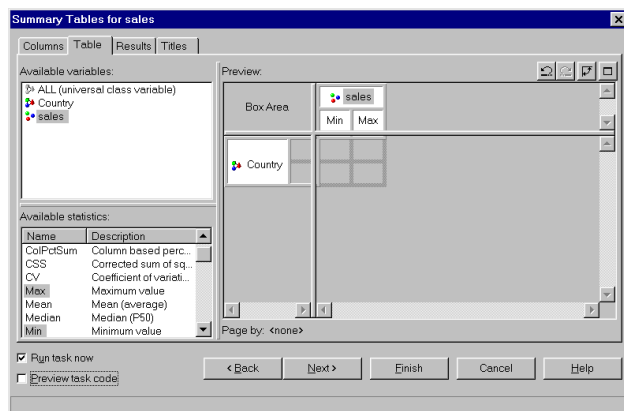
TIP: You can create a new code template using the settings for a task that you have already defined. In the project tree, right-click on the task node and select **Add as Code Template** *from the popup menu. This new code node is not associated with the original task, but it reflects all of the settings in the task at the time you created it.*

Enterprise Guide Release 1.2 continues the tradition of adding several new tasks to its repertoire. You can use the Append Data task to append several data files into a single file.
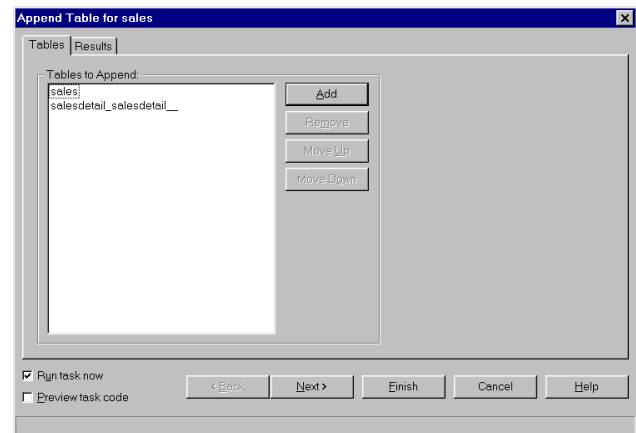
You can use the Random Sampling task to create a random sample of your data. As mentioned earlier in administrator section, there is a new Create Format task. In the charting area, you can create radar charts and also create spatial geometry data for use with the Map chart task.

In addition to the new tasks, there are various enhancements to the existing tasks. For example, you can choose to your summarize option before running a plot. All tasks now allow you to use custom labels for your data columns, as well as select existing SAS formats to use.

MAKE THE MOST OF YOUR RESULTS
When Enterprise Guide submits your SAS program or task to the SAS server for processing, it also submits the necessary ODS statements to allow your results to be received and replayed in your Enterprise Guide session. By default, the format of the Enterprise Guide output is HTML, but you can also create RTF and PDF output.

Enterprise Guide provides a document builder interface that lets you take the HTML results from different tasks, even those run on different SAS servers, and assemble a new document that contains only the portions of the results that you are interested in.

If the appearance of the HTML doesn't suit your needs, this is a case where beauty is truly only skin deep. The HTML appearance is dictated by applying a style, and changing that appearance is as simple as selecting a different style from the list. Enterprise Guide provides a style editor to help you create your own styles. You can use one of the many supplied styles as a base to get started with. Behind the scenes, the styles are actually Cascading Style Sheets (CSS), an HTML standard that is used to control HTML appearance. When you change and apply a new style, Enterprise Guide does not need to resubmit the task and generate new results—all style changes are applied locally with no remote server interaction.

TIP: If you use the style editor to specify a banner image (a graphic that appears across the top of your output), try specifying a URL of an image that is available on an http: server instead of a local image file. This will ensure that anyone who views your results will be able to access your banner image from a central location. Local image files are useful only if every person has a copy of the image in the same location on their local PC.

Of course, tabular reports aren't the only type of output that you can create within Enterprise Guide. You can also create interactive graphics (for Java or ActiveX devices) and static GIF-formatted graphics. Also, many tasks create output datasets that lend themselves to further analysis.

Once these objects are within your Enterprise Guide project, you

can either save them as a collection (an entire project at a time) or you can save them out as external files. You can export datasets, HTML (or RTF and PDF) results and documents, and SAS programs as external files that you can store on your local PC or on the file system of your SAS server.

Enterprise Guide Release 1.2 also ties in with the Publish capabilities of SAS Integration Technologies. This means that if you have an LDAP server configured with channels, you can use Enterprise Guide to create and publish content that can be automatically sent to subscribers or perhaps viewed in a portal application.
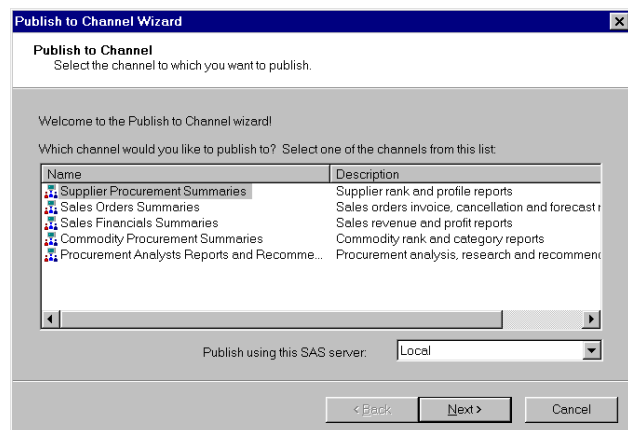
## TUNING FOR BEST PERFORMANCE
When a product such as Enterprise Guide provides such interactive access to server data, query support, and computational services, it must also balance that interactive experience with performance considerations.

Because application performance is an important consideration, Enterprise Guide reads remote data in discrete buffer increments. Many remote data sources are simply too large to bring across the network and load into a client session. As you navigate a remote data source using the integrated data viewer, Enterprise Guide determines which data records to request and transfer from the SAS server. Enterprise Guide Release 1.2 introduces significant performance boosts when scrolling through large data sources.

Local data (such as Excel files) stays local until there is a reason to move it to the server for processing. As soon as you initiate an analysis task or a query operation on a local data source, Enterprise Guide makes a copy of the data on the SAS server so the server can process it as needed.

Enterprise Guide provides dozens of options that let you tune the performance of how you interact with data and servers. Here are some of the options that you can control:

- You can choose to **not** display the query results right away (thus deferring the query execution).
- You can prevent the data grid from opening (and accessing and reading the data) when data is added to the project.
- You can customize the thresholds for performance warnings you get when you are about to issue a query on large data.
- You can save the output of a query as a SAS dataset so that there is no need to re-execute the query as you work with the result set.
- You can control when large results (HTML, PDF, or RTF) are to be added to your project. Extremely large results can significantly increase your project file size and cause delays when working interactively.
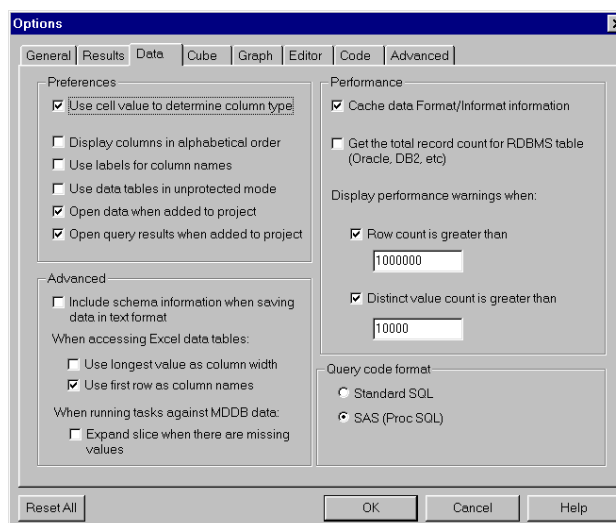
LATHER, RINSE, REPEAT
One of the great strengths of the SAS System is the ability to repeat the same analysis on changing data over time. In that tradition, Enterprise Guide allows you to repeat tasks that you have defined within a project, and even automate that process so that you can schedule it and let it run unattended.

Enterprise Guide exposes an automation object model that you can use within scripting programs to automate the application. One of the advantages of being able to script Enterprise Guide in this way is that you can then easily integrate it with other applications and processes that you might want to script. For example, here is a useful VB Script program that uses Enterprise Guide to create some HTML output, and then uses Microsoft Outlook to send that output to a recipient in HTML-formatted message:

```
Sub SendHTMLFile (filename, recipient, subject)

' Open and read the file
 Dim fso, htmlFile
 Set fso = _
   CreateObject("Scripting.FileSystemObject")
 Set htmlFile = fso.OpenTextFile(filename, 1)
 theHtml=htmlFile.ReadAll
 htmlFile.Close
' Automate Outlook to create and send msg
 Set myOlApp = _
  CreateObject("Outlook.Application")
 Set myItem = myOlApp.CreateItem(olMailItem)
 myItem.HTMLBody = theHtml
 myItem.Subject = subject
 Set myRecipient = _
   myItem.Recipients.Add (recipient)
 myItem.Send
End Sub

'-----
' Start up EG using the project name
'-----
Dim app
Dim prj

Set app = _
  WScript.CreateObject("SASEGuide.Application")
Set prj = app.Open("c:\MyProj.seg")

' ----
```

5

```
' use the PFD to selectively run tasks
'-----
Dim pfd
Set pfd = prj.ProjectItems("MyReports")
pfd.Run

' Get documents from output and mail them
'---- document "AllOpenDetail"
Dim objDoc
Set objDoc = prj.ProjectItems("AllOpenDetail")

'---- Save the document to a file
objDoc.SaveAs("C:\analysis_doc.htm")
strSubject = "All Products Detail List"
strBody = "Report of All Products Supported"
Call SendHTMLFile("C:\analysis_doc.htm",_
  "My.Boss@sas.com", strSubject)
'-----
' Save the changed project
'-----
prj.SaveAs("c:\MyProj.seg")
'-----
' Close the project
'-----
prj.Close
app.Quit
```

The preceding script makes use of an Enterprise Guide feature called the "process flow diagram", which allows you to define a sequence of tasks that can be run as a group. The process flow object is then accessible as a "scriptable" component.
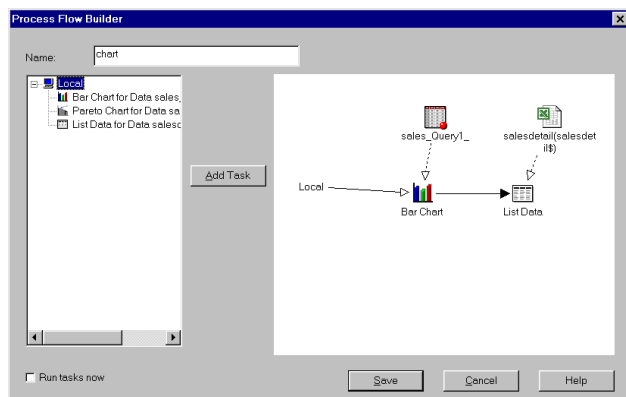
To run this script at a regularly scheduled time or interval, you can use an available Windows scheduler program, such as Task Scheduler or AT.

CONCLUSION

Enterprise Guide is a prime example of how enabling technologies can make the power of SAS more accessible to the desktop PC user. Because it's easy to get started and use, Enterprise Guide can help even the most novice SAS user become an accomplished SAS "programmer". Experienced SAS programmers can take advantage of the simple data and server access and use Enterprise Guide as a SAS programming environment.

REFERENCES

Hemedinger, Chris (2000), "Doing More with SAS using Enterprise Guide", *Proceedings of the 10th SCSUG Conference.*

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 or product names are registered trademarks or trademarks of their respective companies.

CONTACT INFORMATION

Your comments and questions are valued and encouraged.
Contact us at:

> Enterprise Clients
> SAS Institute Inc
> SAS Campus Dr.
> Cary, NC 27513
> 919-677-8000
> Fax: 919-677-4444
> Email: eguide@sas.com
> Web: www.sas.com/eguide
> *The Power to Know™*