

Doing More with SAS® using Enterprise Guide

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ABSTRACT

SAS® users all over the world are taking advantage of the power of the SAS System in new ways through Enterprise Guide®. Enterprise Guide is a Windows application designed to work with the SAS System running on any Windows, UNIX or OS/390 server. It provides an intuitive user interface to support data access, analysis, and reporting. It also has flexible capabilities for custom SAS programming and automation. This paper describes the major features of Enterprise Guide 1.1 and also provides some hints for how to get the most out of your SAS server via the Enterprise Guide client.

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 thin-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.

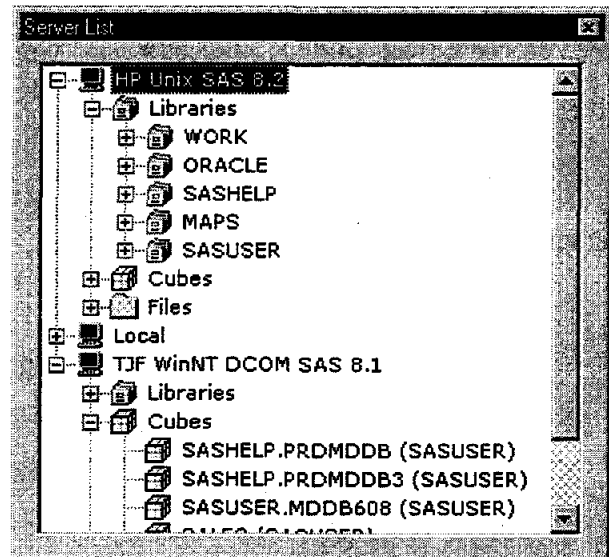
When you use Enterprise Guide to connect to a SAS server, you have access to all data that the server has access to (even DBMS data through SAS/ACCESS® engines). You also have the ability to submit SAS programs for processing to the remote server and have the results played back to you in your Enterprise Guide session. Enterprise Guide exploits the SAS Output Delivery System (ODS) to generate HTML results that you can view within Enterprise Guide or with any web browser.

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.

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 drivers to read additional data that may be accessible from your PC.

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.



Example: List of available servers and their contents

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 allows you to access multidimensional data. Using the integrated MDDB viewer, you can navigate MDDB cubes that are registered with the SAS/MDDB® Server that you are connected to, or through an Open OLAP provider. 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.

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.

SUBSET WITH EASE

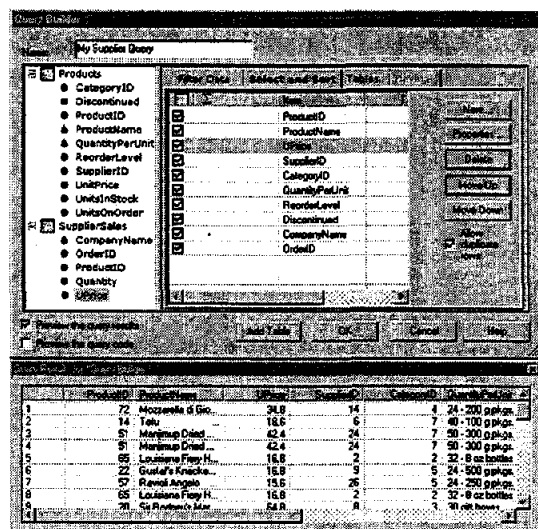
If your data is not ready to be analyzed "as is" from the table, you can use Enterprise Guide's Integrated Query Builder to filter data, select columns, join tables, and more. You don't need to be an SQL expert to subset your data and get it in the shape you need.

The Query Builder provides a visual interface to building SELECT statements and WHERE clauses. You can select just the columns you need, and even use expressions to build additional columns! The built-in expression builder can help you to construct expressions that take advantage of the data

manipulation power of SAS to build new meaningful columns based on your existing data.

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

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".



Sample query with results preview

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:

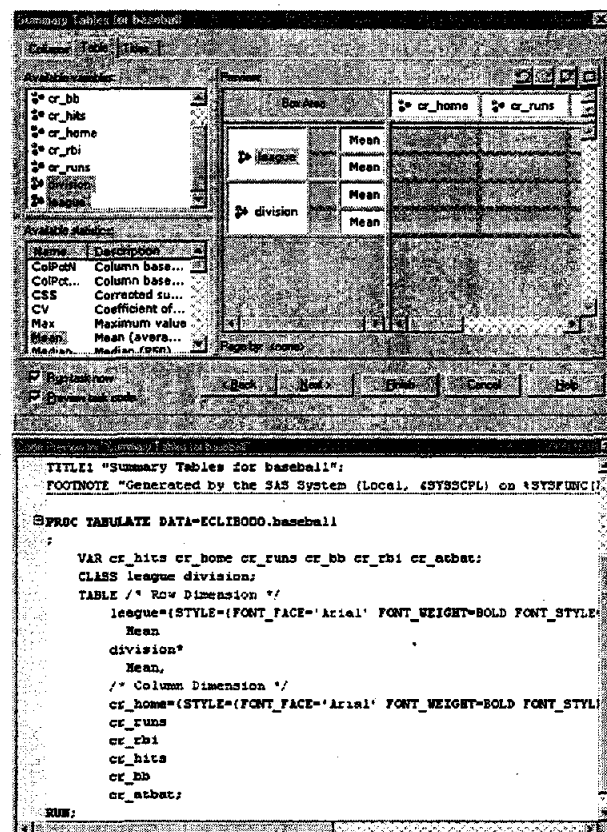
- Basic reporting, such as listing data or summary tables
- Basic summary statistics and frequency analysis
- Basic data transformation, such as standardize and rank
- More advanced modeling, such as regression analysis and linear and nonlinear models
- Many varieties of graphs and charts, including bars and pies, line and surface plots, and maps.
- Focused analysis in the disciplines of forecasting/time series and quality control.

TIP: Are 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.



Summary Tables task and the PROC TABULATE code behind it.

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.

MAKE THE MOST OF YOUR RESULTS

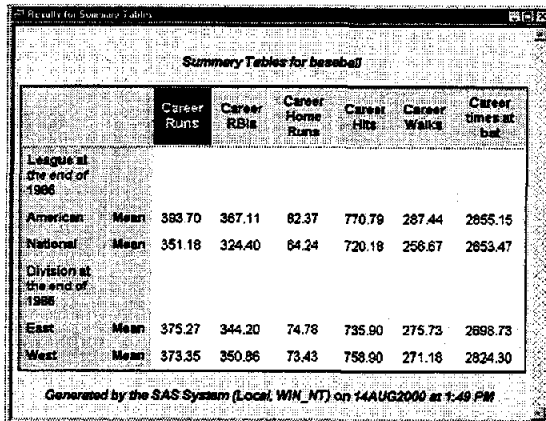
When Enterprise Guide submits your SAS program or task to the SAS server for processing, it also submits the necessary ODS statements to allow your results to be received and replayed in your Enterprise Guide session. By default, the format of the Enterprise Guide output is HTML.

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.



Summary Tables for baseball

		Career Runs	Career RBIs	Career Home Runs	Career Hits	Career Walks	Career times at bat
League at the end of 1996							
American	Mean	383.70	367.11	82.37	770.79	267.44	2655.15
National	Mean	351.18	324.40	64.24	720.18	256.67	2653.47
Division at the end of 1996							
East	Mean	375.27	344.20	74.78	735.90	275.73	2898.73
West	Mean	373.35	350.86	73.43	758.90	271.18	2824.30

Generated by the SAS System (Local WIN_NT) on 14AUG2000 at 1:49 PM

ODS-generated results from within Enterprise Guide

Of course, HTML text isn'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 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 1.1 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.

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")

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

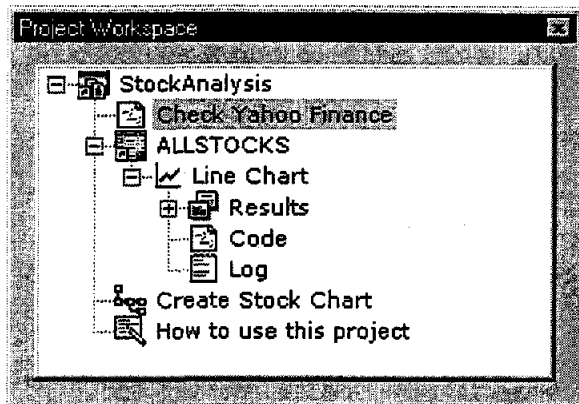
' Get documents from output and mail them
'----- document "AllOpenDetail"
Dim objDoc
Set objDoc = prj.ProjectItems("AllOpenDetail")

'----- 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
```

(Note: 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.



A project flow ready to run again and again.

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

Kramer, Gail (2000), "Enterprise Guide: An Intelligent Client interface that provides access to all of the power of the SAS System", *Proceedings of the Twenty-fifth Annual SAS Users Group International Conference*.

Vodicka, Scott (2000), "Enterprise Integration Technologies – What is it and what can it do for me?", *Proceedings of the Twenty-fifth Annual SAS Users Group International Conference*

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