Paper RI-05

Pulling Data from Ellucian-Banner ODS with SAS-Enterprise Guide®: Not only fast but fun as well!

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Abstract

Assessment of learning, and of services, in Higher Education is crucial for continued improvement. Administrators and faculty are demanding, and using, data more and more in their decision making processes.

There are many data input experts on campus and, unfortunately, far fewer who can easily extract the data in the aggregate form required by administrators, accreditors, and other institutional stake holders. The SAS-Enterprise Guide® software (SAS-EG) interface with the Banner Operational Data Store (ODS) is a very powerful combination of softwares that enable the end user to **quickly** access the institution's data and produce descriptive reports. More powerful still is the ability to bring other relational databases, such as Excel spreadsheets, into the SAS-EG environment thereby allowing variables not available in ODS to be used in the analyses.

This presentation/demonstration will explore how to load ODS views into SAS-EG and how to produce simple descriptive statistics such as frequencies and tables. The process of including data external to Banner/ODS, via merging tables in SAS-EG, will also be demonstrated.

INTRODUCTION

The purpose of this paper is to familiarize the reader with the process of using SAS-Enterprise Guide (SAS-EG) to pull views from the Operational Data Store (ODS) in order to run descriptive or inferential statistics. For institutions running Ellucian-Banner, ODS is the system that pulls and stores banner elements from several tables in more or less logical groupings. For example, the ODS view called Academic_Outcome pulls together numerous Banner fields related to graduation. This paper will focus on student data but data in other banner modules can be analyzed using the same process.

If you are a SAS programmer who is still writing code to manipulate, merge, and analyze your data; the procedures described in this paper may not be of interest to you. However, let me state here that as an analyst who wrote SAS code for over 20 years, once I began using SAS-EG, I never looked back! SAS-EG makes writing SAS code a thing of the past when you want to analyze your data. Analyses that might have taken hours to produce can be done in minutes. As for the programmers at SAS who wrote, and continue to improve SAS-EG, there aren't enough ways to say thank you. You are absolutely brilliant!

One of the most valuable attributes to using SAS-EG to pull views from ODS is the ability to pull in and merge other files, for example, Excel spreadsheets or saved SAS datasets (SSDs). While there is a vast amount of data stored in Banner and written to ODS, there is always going to be information about your clients or students that is either not available in Banner or else has been pulled from Banner at a point in time and then stored as static files. SAS-EG allows you to merge these external files with your ODS views; provided you have a common field to link unit record data.

ACCESSING THE OPERATIONAL DATA STORE (ODS)

Okay, now that I told you in the introduction that you won't have to write code anymore, the first thing you need to do is write SAS code in order to access ODS. But the good news is that this code need only be written once and is easily stored and added to any SAS-EG project. (*For those of you unfamiliar with SAS-EG, your unique programs are called projects.*) Before you can create and run a project, you will need to work closely with the ODS manager in your IT department for two things, one is to determine the correct address for ODS and the second is to be granted permission to access the specific ODS views you need. This can be a bit frustrating but hang in there with IT and the various departments that 'own' access to views, it is worth the pain.

Here is an example of SAS code used to access ODS.

```
LIBNAME ODSMGR oracle user=mccannc password="xxx_xxxx" path='REPT'
schema=ODSMGR;

RUN;
```

With luck your ODS manager is also a SAS programmer and this will make perfect sense to him or her.

Once you have access to ODS and can open the views/tables you need, you can run a SAS-EG project.

When you open SAS-EG, the screen will appear similar to Figure 1. This is your starting point for a SAS-EG Project.

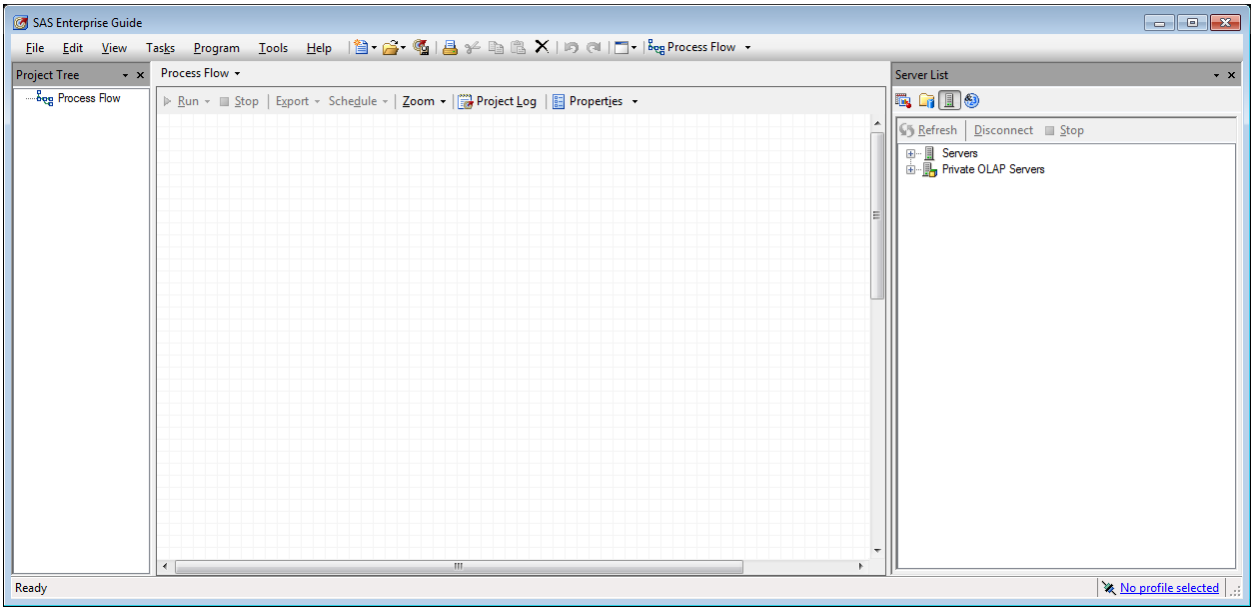

Figure 1 New Enterprise Guide Project Screen

The first task for using Banner/ODS data is to input the code allowing you to access the ODS views.

- Click on File
- Click new
- Click Program
- Copy or type your ODS access code to this screen

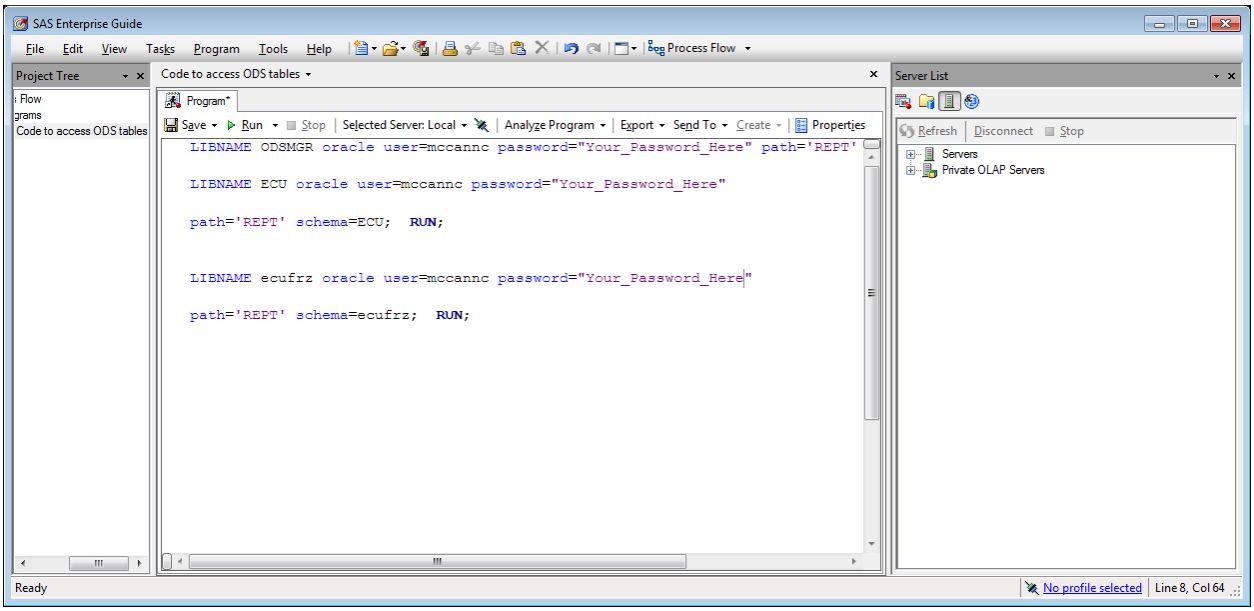

Figure 2: Code for accessing ODS

Once you get the code to work accurately, save the code, preferably to your My SAS Files folder. In future runnings, of this and other projects where you want to access ODS, you would need only to…

- Click on File
- Click open
- Click Program

and then select the ODS access program. Once you save your project, the access code icon remains as part of your project and you simply run the code icon in your project to reestablish your connection. This can be done by right clicking the program icon or clicking the green arrow run icon in your project flow task bar and choose to run the code. You will need to run this access code each time you invoke SAS-EG in order to access ODS.

USING THE OPERATIONAL DATA STORE (ODS)

Once you have run the ODS access program successfully, you can view the ODS datasets available to you in the Server List box.

- Expand Local (click the plus sign <+> to expand.)
- Expand Libraries
- Expand one of the schema you invoked with your program code, in this example, ODSMGR

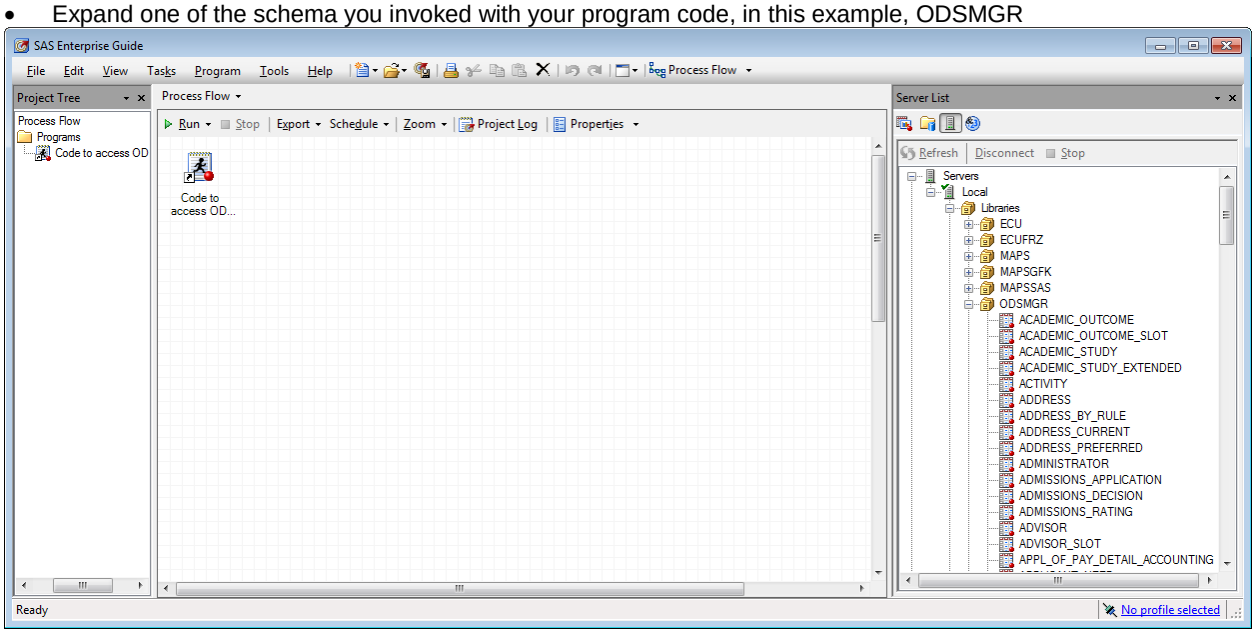

Figure 3. Listing the datasets in ODS

All of the ODS views that you have access to should be listed. Double click the view or views you want to use. In this example, I double clicked on Academic_Outcome. SAS-EG will open access to the datafile; it does not load the data into to your project. This is a really nice feature since some of the ODS views, like Academic_Outcome, are huge. *Hint: To increase your program speed it is often beneficial to limit the number of records you want to access. Refer to the section labeled* Using the Query Builder to Create New Datafiles.

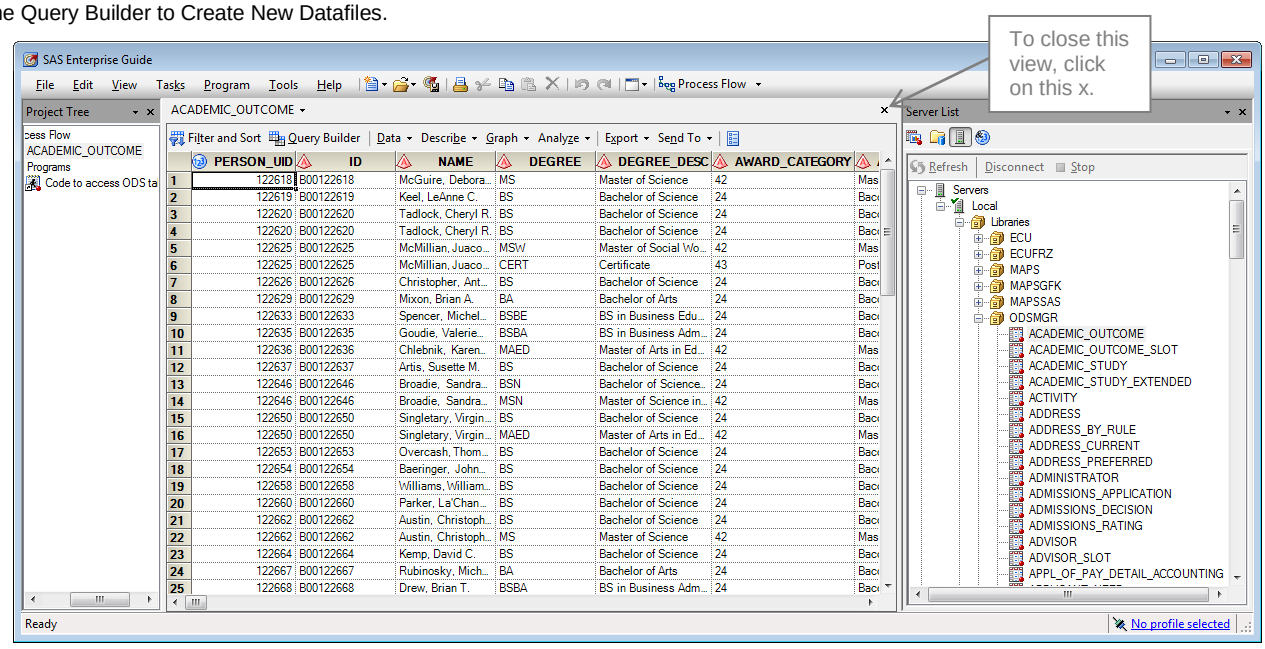

Figure 4 Opening an ODS view in SAS-EG

USING THE SAS-EG QUERY BUILDER FUNCTION

The query builder function in SAS-EG allows you to access data, limit data, recode data, and merge data to produce unique datasets. There are far too many manipulations available to the user in the query builder function to review here. Which aspects of the query builder function you use is, of course, dependent on what you are trying to accomplish but this

function in SAS-EG is truly powerful and one you will want to explore extensively. So, for purposes of brevity, I've created a scenario to explore which will demonstrate some of the functions that I find most useful in my role in higher education.

Scenario I

You are asked to provide the retention and graduation rates for new MSN (Master of Science in Nursing) students who began in fall 2008 and fall 2009.

The approach I take to such a request is to first break out what variables I need and where to find them.

Variable	Location	Notes
New MSN	Static File	Census files (Student Data Files) contain official enrollments for the institution.
Retention	Static File	Following semester SDFs.
Graduation	ODS	Academic_Outcome

- **Pulling Files into the SAS-EG Project**

The first step is to load the needed files into the SAS-EG Project. Earlier we loaded Academic_Outcome, a view in ODS, into our project by double clicking on it in the Server List (See Figure 4). Once you close the view, clicking the 'x' in the upper right hand corner, you can then bring other objects into the project. Three SDFs are needed, fall 2008, fall 2009, and fall 2010. To bring external datasets into your project,

- Click on File
- Click open
- Click data

This will open a search feature that lets you find the datafiles you need. The files we are looking for are saved SAS datasets (sas7bdat) but this is where you can also load Excel spreadsheets or other types of files. In Figure Five, the Files of type: bar shows the different file extensions SAS-EG will search for when opening data.

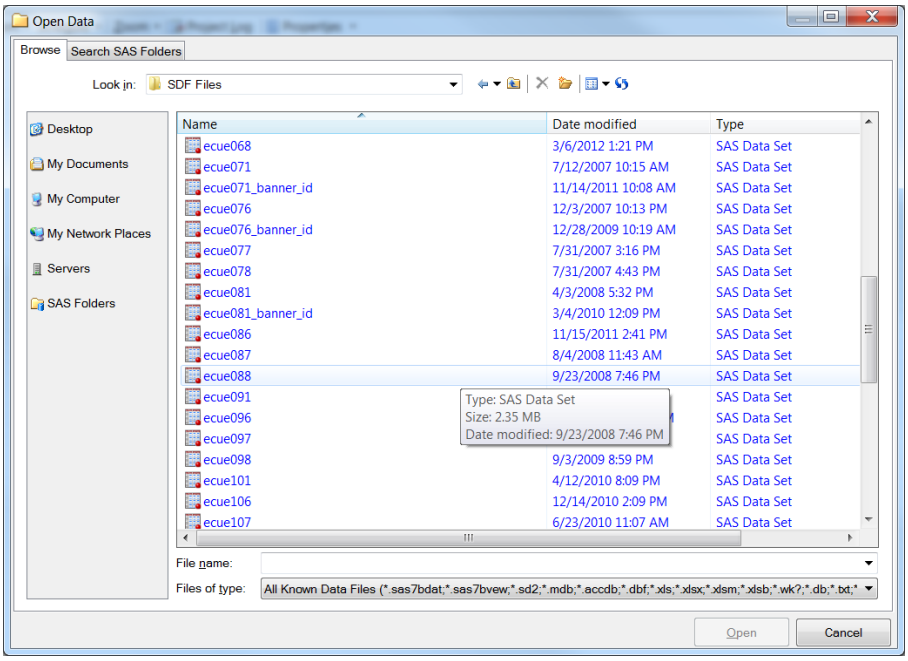

Figure 5: The Open Data screen.

To open access to a file[1] in your project, click on the file name and then click open. To select multiple files, hold down the <Ctrl> key, click on the file names, and then click open. SAS-EG will load the file(s) into your project. See Figure 6.

[1] When you are working with SAS-EG, you are not actually loading the data into your project but creating a link to the data. Keep this in mind if you move your datafile to a new physical location or if you share your project with another user. Most likely the links will no longer work and SAS-EG puts an ugly little red X on your icon and plays a horror movie sound effect to be sure you know that there is a problem.

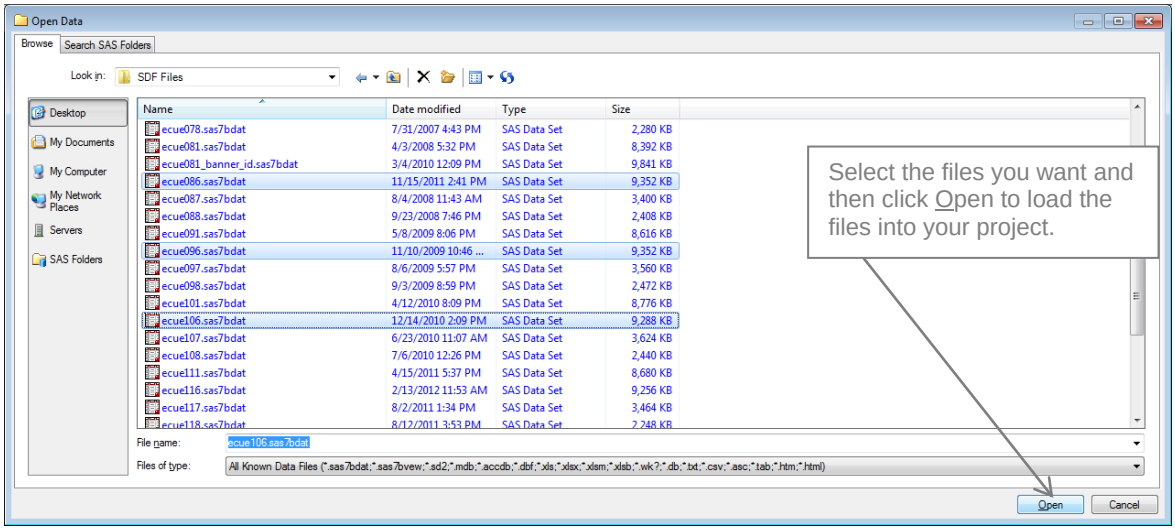

Figure 6: Opening Multiple Files

- **Using the Query Builder to Create New Datafiles**

The query builder in SAS-EG allows you to easily manipulate your files. Since ODS files are often too large and unwieldy to manage effectively it is prudent to use the query builder to quickly reduce files to more manageable sizes. In our scenario, we are interested in reducing the ODS Academic_Outcome view to only include records of possible interest. **It cannot be stressed enough that it is vitally important to know your data and how they are stored in ODS before you begin manipulations or analyses.** To create a new datafile, open your dataset (double click its icon or right click its icon and select open), and then double click on the Query Builder icon on the toolbar.

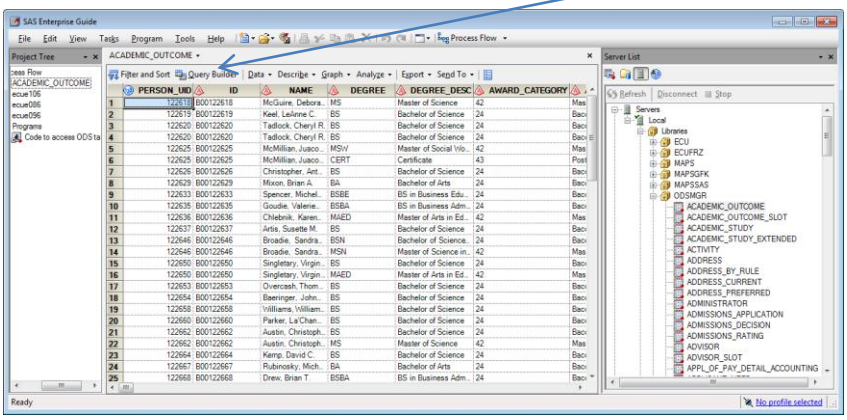

Figure 7: Open dataset

This opens a Query Builder box. See Figure 8.

Name your Query

Rename your Output File (very handy for easier merging)

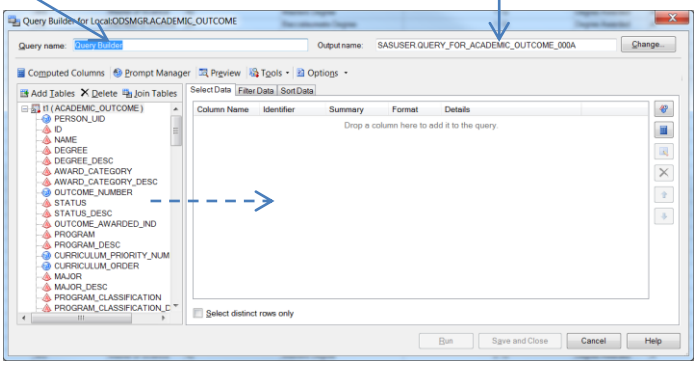

Figure 8: Building a New Dataset. The Select Data box in the Query Builder Function.

Pull some or all of the variables into the Select Data box. (You must have at least one variable here.)

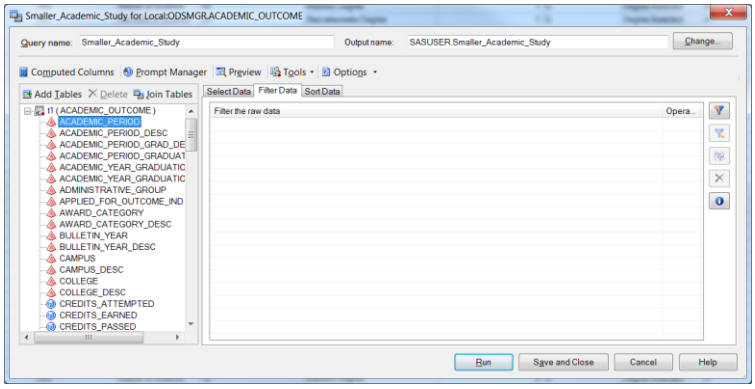

Figure 9: The Filter Data tab in the Query Builder Function.

The filter data tab, see Figure 9, is one of the most convenient functions of the query builder. This is where you limit the records that are being pulled into your new dataset.

Once you pull a field in, the Build a basic filter box pops up, Figure Ten. By clicking on the down arrow on the Operator bar, you can limit your selection based on numerous expressions such as equal to (the default), greater than, greater than or equal to, in a list, not in a list, and so on. By clicking on the down arrow to the right of the Value bar, you can get a list of all the values that field has in your database! This is a fabulous feature. You no longer have to look up or try to remember all the values of a variable; simply view the entire list and then click on the values you want.

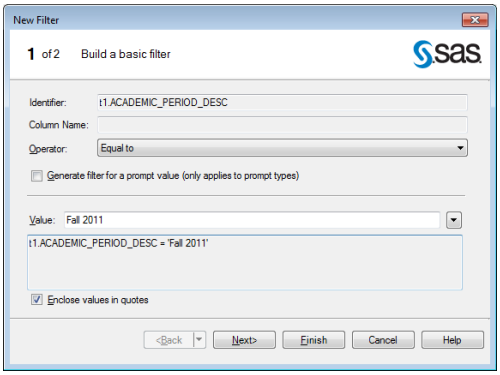

Figure 10: Build a basic filter in the Query Builder Function

Figure 11 shows the filters being used to pull in only those students who graduated from the College of Nursing after fall 2008 with a MSN degree. These are the filters needed to begin answering the part of the scenario question related to graduation.

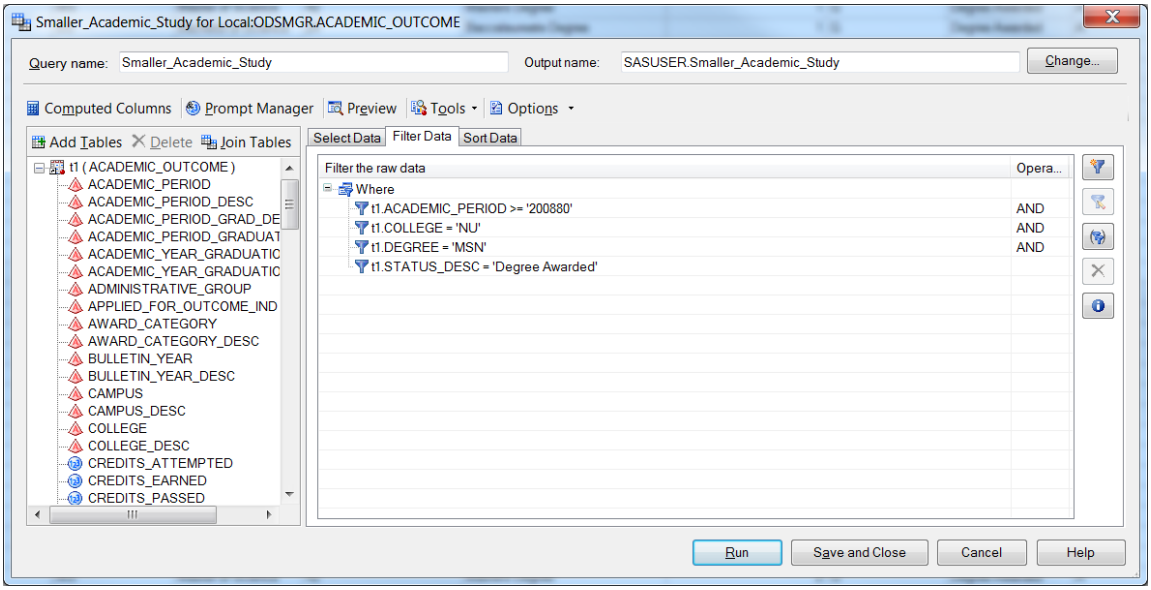

Figure 11: Completed Filter Data Screen in the Query Builder Function

- **Merging Files within the SAS-EG Project**

Figure 12 is a snapshot of all the files we need with the appropriate records selected to determine the retention and graduation rates of the entering fall 2008 and fall 2009 MSN cohorts. The Smaller Academic_Study dataset has graduate information. The datasets labeled MSN Cohort 2008 and MSN Cohort 2009 has the new MSN Students for each of those fall semesters. And the static files for '09 and '10 will be used for determining retention.

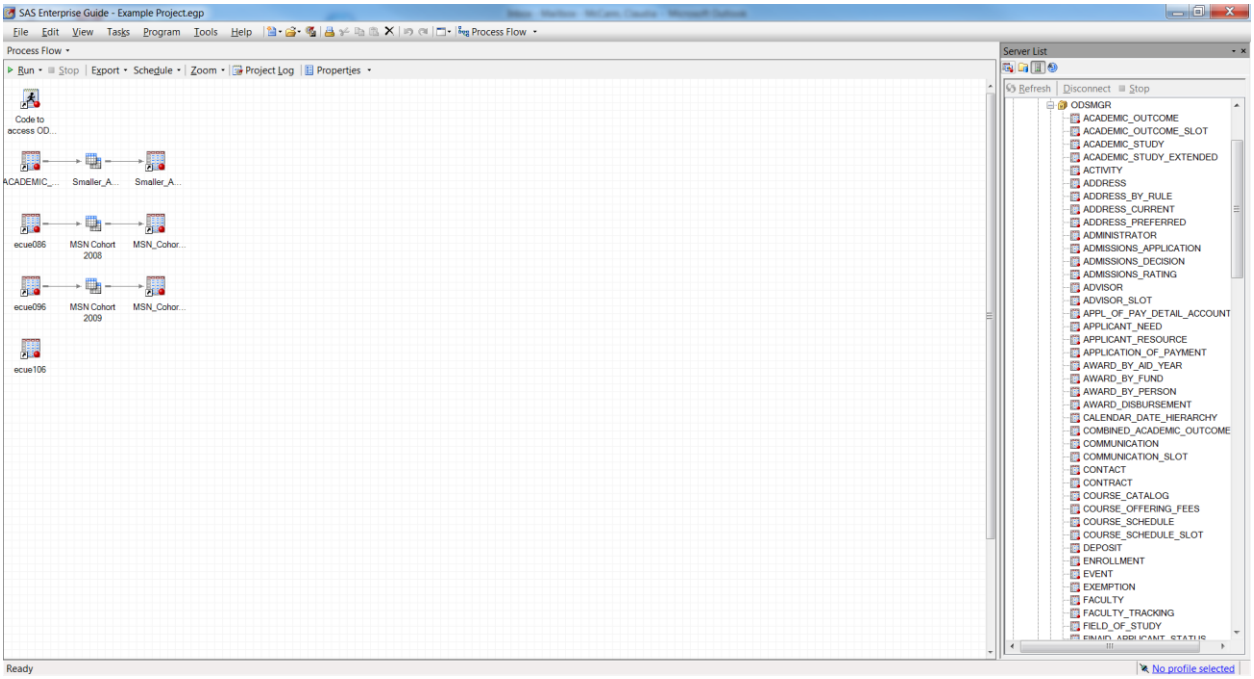

Figure 12: SAS-EG Project Screen

To begin, we want to know how many of the Fall 2008 cohort were enrolled in the Fall 2009 semester. To do this, we need to merge the MSN Cohort 2008 dataset with the fall 2009 enrollment dataset (ecue096).

1. Open the MSN Cohort 2008 dataset by double clicking the icon.
2. Click on Query Builder on the task bar
3. Rename the query, rename the output name
4. Click on the Add Tables icon

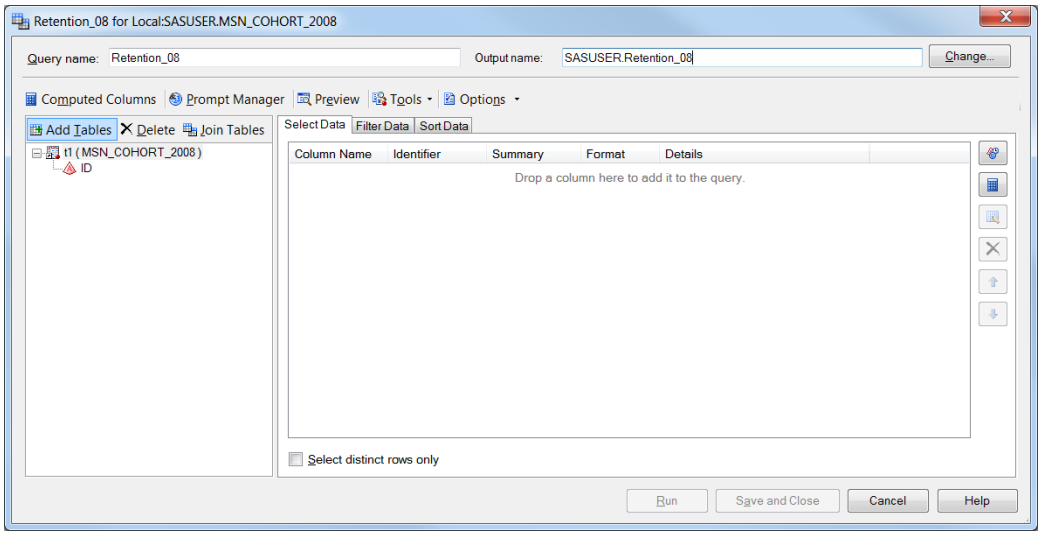

Figure 13: Merging Files using the Query Builder Function.

The Add tables icon opens the Open Data screen. The default is a list of the datasets in your project. This is where having renamed the output file comes in handy. Imagine 20 or 30 datasets and trying to figure out which one you want using the SAS default naming convention. It is worth it to take the time to rename your output file when you create your datasets.

In our example, we want to add the Fall 2009 enrollment file, ecue096 to the query.

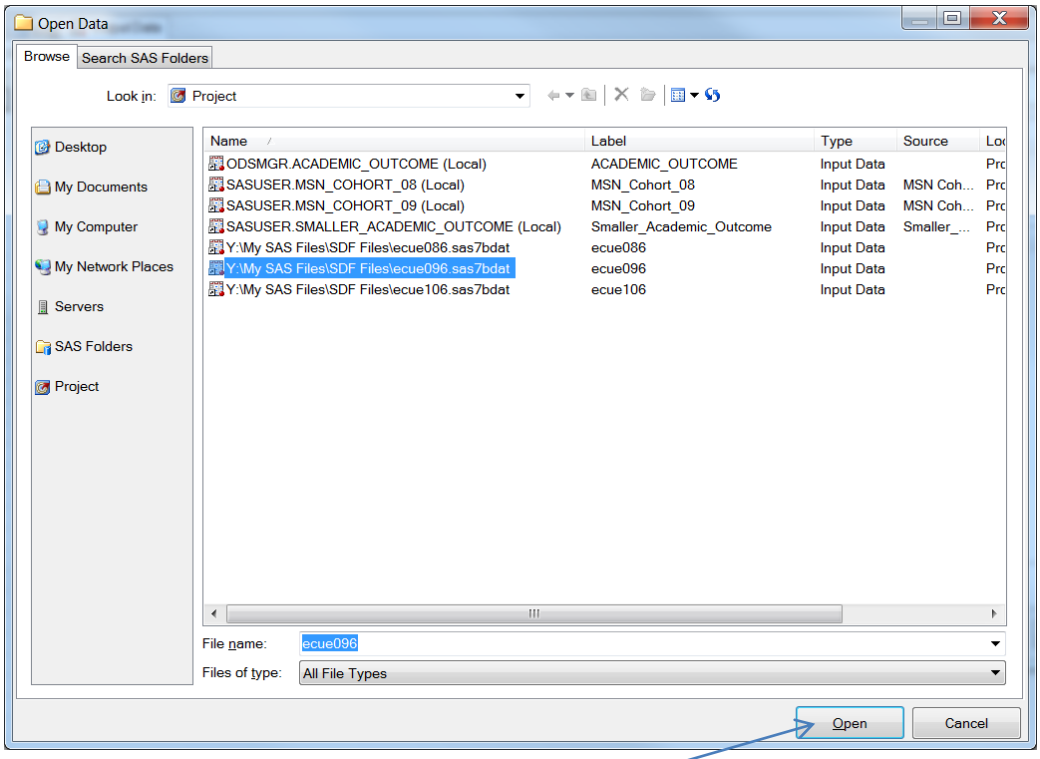

Figure 14: Adding Tables for the Merge

Highlight the file you want to add and click the Open button. Either one of two screens will open. If SAS-EG cannot find a variable to match on, as is the case in this example, SAS-EG will prompt you that a suitable join could not be determined for the new table and that you will need to join the tables manually.

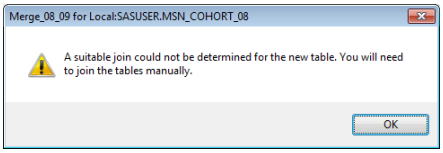

Figure 15: Problem with join.

Once you click OK to this message, the Tables and Joins Screen will pop up allowing you to establish the appropriate join between the two tables.

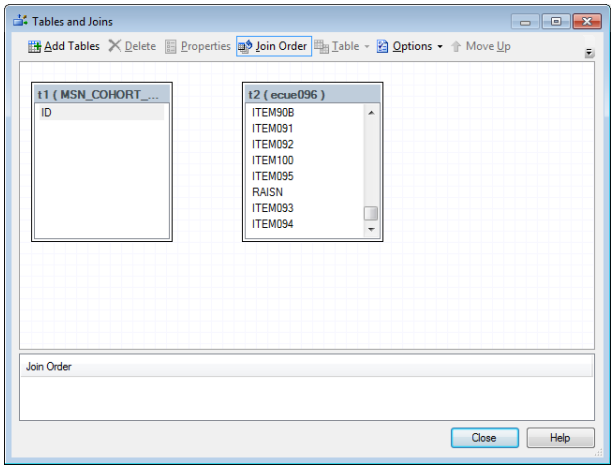

Figure 16: Tables and Joins Screen

Once you 'connect' the join variables, the Join Properties Screen appears. Here is where you can verify that the appropriate variables are being used to establish the join, select the type of join, and filter the join.

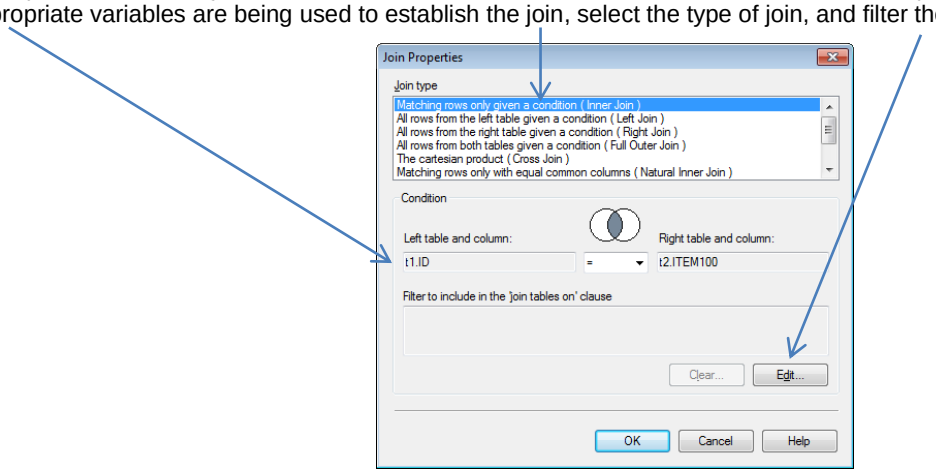

Figure 17: The Join Properties Screen

In our scenario, we want to join on ID and pull in all the records from our 2008 cohort file (Left Join).

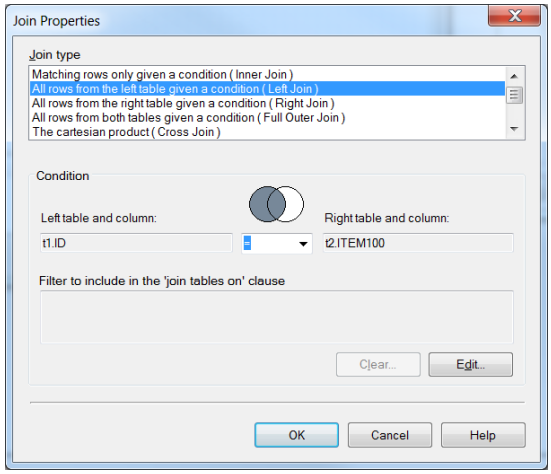

Figure 18: Example of a Left Join

Often times, when you are trying to join datasets, the variable you want to join on will have the same name in each of the datasets. In that case, SAS-EG will just add the new table to your Query when you use the Add Tables function. In order to view the join, click on the Join Tables tab to bring up the Tables and Joins screen. It is a good idea to look at the join in any case to be sure SAS-EG is matching on the variables you are expecting it to match on.

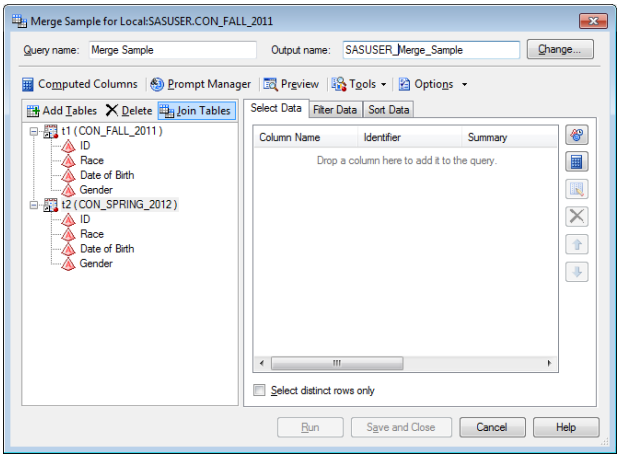

Figure 19: Join Tables tab in Query Builder

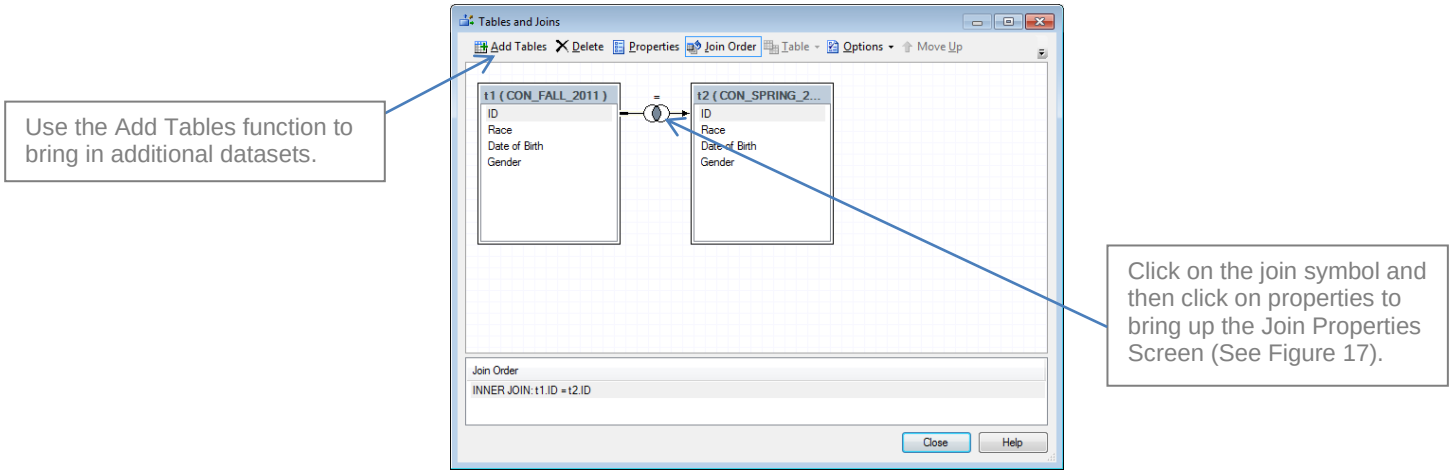

Figure 20: Options in the Tables and Joins Screen

You can also begin the merge process by opening your dataset, running a Query Builder process, and then click on Join Tables to open the Tables and Joins screen. Then use the Add Tables function here to pull in datasets and modify joins.

Once you are satisfied with how the datasets are merging, simply click the Run button on the Query Builder screen to create your new dataset. SAS-EG will open your dataset when it completes the Run.

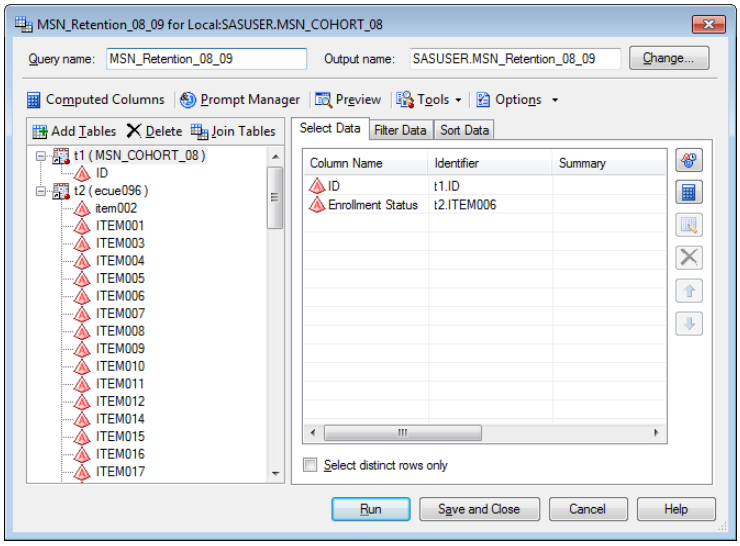

Figure 21: Run the Query Builder

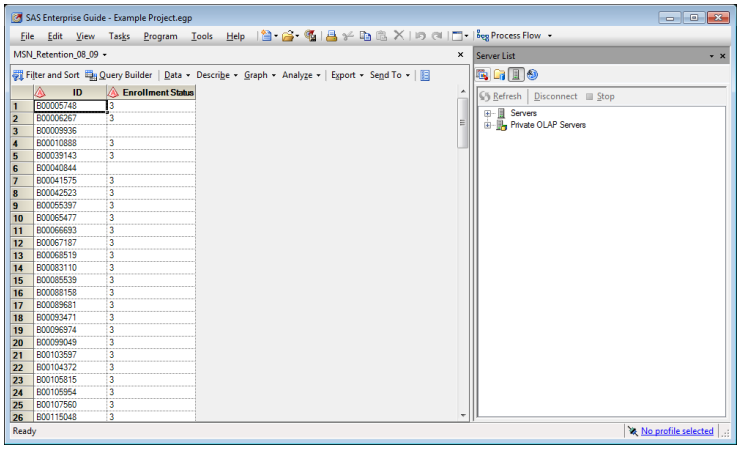

Figure 22: The Dataset Output

In our retention and graduation scenario, having run the merge between the fall 2008 cohort and the fall 2009 enrollment file, we can now simply run a frequency on the students' enrollment status variable for fall 2009. We know how many from fall 2008 were enrolled in fall 2009 (not missing on enrollment status) and how many were not enrolled in fall 2009 (missing on enrollment status). Thus the retention rate for the fall 2008 MSN class is 125/150 or 83.3%.

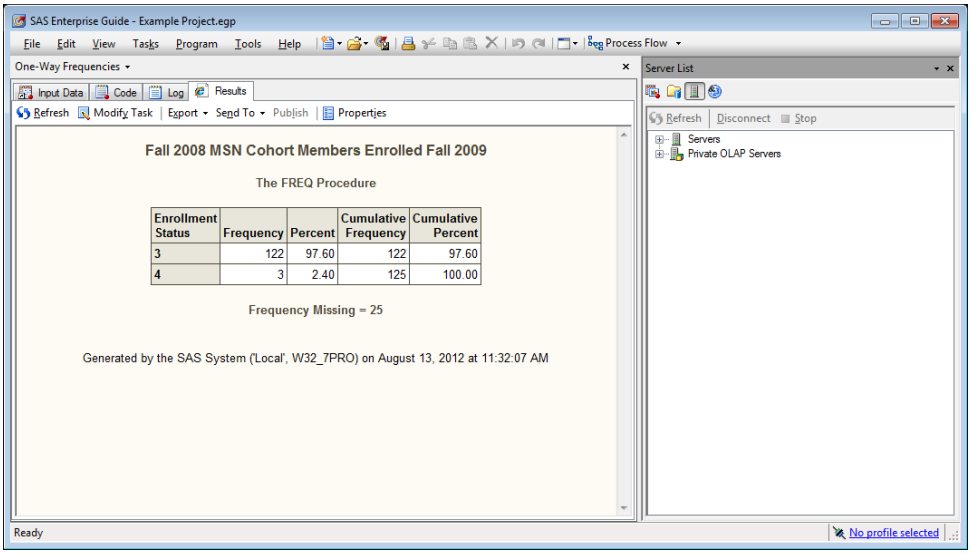

Figure 23: Output to Determine Retention

The next step would be to repeat the same procedure with the Fall 2009 cohort file and the fall 2010 enrollment file. The result is 106/120 or 88.3%.

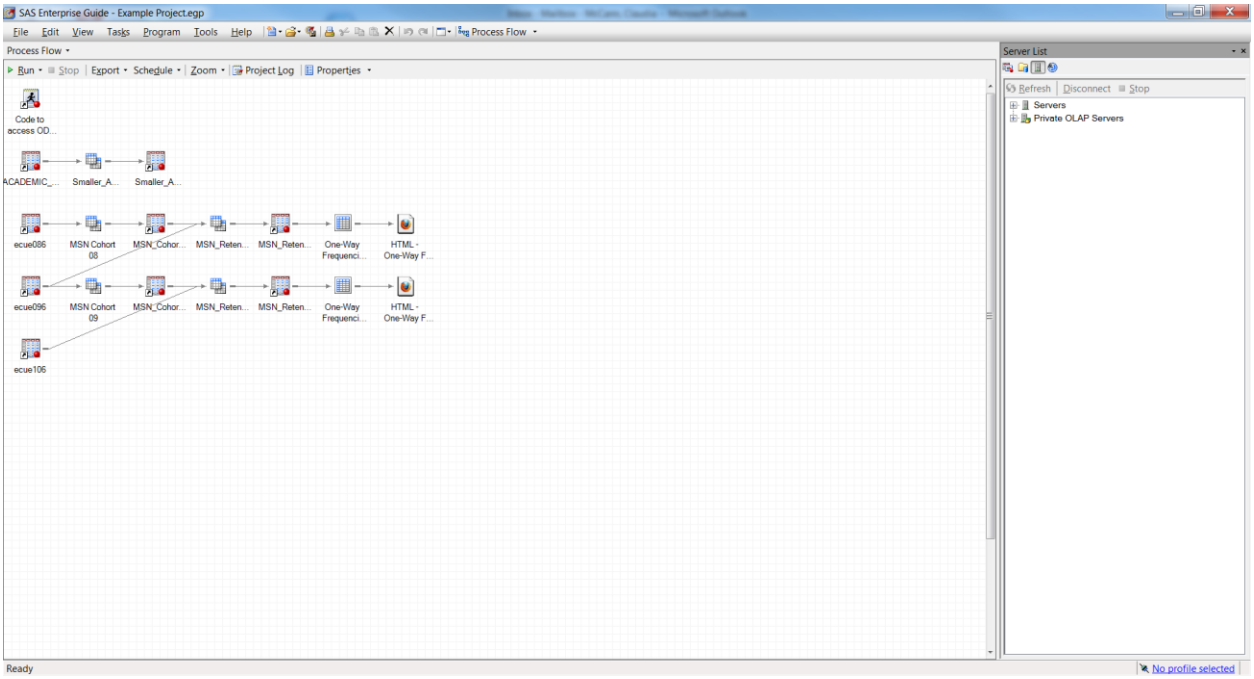

Figure 24: The Process Flow after running the retention analyses.

The only other piece of information needed is how many of the cohort members graduated with an MSN. For this analysis we match each of the cohort files to the Smaller_Academic_Outcome file that was created earlier.

- Open Smaller_Academic_Outcome
- Click on Query Builder
- Click on Add Tables and add the MSN_08_Cohort
- Drag the Grad Date field into select data
- Click on Join Tables to modify the join to get all the Cohort records.
- Run a frequency on Grad Date to determine how many graduated (valid value) vs. how many did not graduate (missing value)

Finally we need only repeat this same process for the Fall 2009 cohort. Modifying the Table Properties is a quick way to repeat this process without having to start from scratch. To do this:

1. Modify the graduated query for 2008 (right click on the query icon and click modify)
2. Change the query name and the output name.
3. Click on Join Tables and right click on the 2008 cohort table. This brings up the Table Properties screen. See Figure 17.
4. Click on Change and change the table to the MSN_COHORT_09 table. Click OK, Click Close.
5. Run the program choosing NO to the prompt about replacing the previous run.
6. Run the descriptive frequency again on Grad Date and compute the graduation rate for the 2009 cohort.

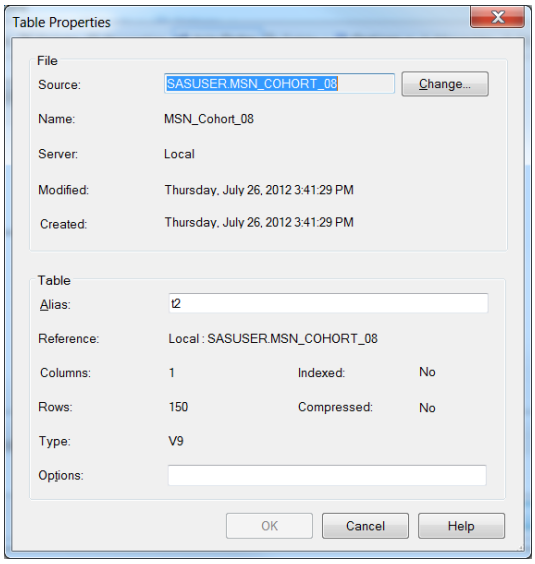

Figure 25: The Table Properties Screen

This completes the analyses and we are ready to report back. As you become more familiar with SAS-EG and with the data contained in your various datasets, this process can be done very quickly. Much quicker than writing code!

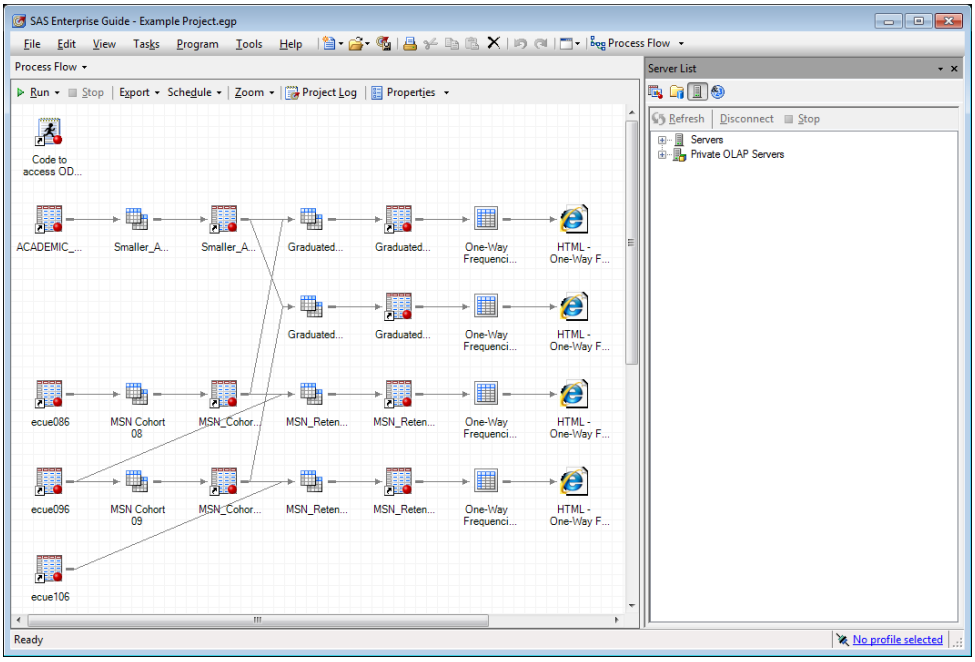

Figure 26: The Final Process Flow of the Project.

CONCLUSION

The purpose of this paper is to give end users a start on using SAS-Enterprise Guide as an analysis tool for Banner/ODS tables. I do not know of any more powerful or easier to use software that lets you pull data from ODS, merge it with other ODS tables or tables external to ODS, and run a vast number descriptive or inferential statistics all at the click of a few buttons. Perhaps the most frustrating aspect to writing this paper is not having had enough time or space to share all the tools and options available in SAS-Enterprise Guide that have been so helpful to me. I have used SAS-Enterprise Guide on a daily basis for the past five years at a higher education institution running Banner student, human resources, and financial modules. I can't imagine doing my job without it.

End users not using Banner/ODS will also find SAS-Enterprise Guide a very useful analytic tool. Whether you store your data in SAS, Excel. Access, dBASE, Lotus, or Paradox, or some combination of these, this paper should help you get started with this powerful SAS software. The technical support team at SAS for SAS-Enterprise Guide is a great group and has always been very effective in providing answers to problems in a timely, and patient, manner.

Table of Figures

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