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Running Projects for the Average Joe

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ABSTRACT

This paper explores some proven methods used to automate complex SAS® Enterprise Guide® projects so that the average Joe can run them with little or no prior experience. There are often times when a programmer is requested to extract data and dump it into Microsoft Excel® for a user. Often these data extracts are very similar and can be run with previously saved code. However, the user quite often has to wait for the programmer to have the time to simply run the code. By automating the code, the programmer regains control over their data requests. This paper discusses the benefits of establishing macro variables and creating stored procedures, among other tips

INTRODUCTION

The purpose of this paper to explore various easy enhancements to a SAS® Enterprise Guide® project, which will enable any user to simply run the requested code. Programmers will often be tasked to extract data into manageable segments for others to analyze. These requests are usually very similar and only need minor changes to run but the requestor may need to wait some time before priorities allow the programmer the time to actually run the extract. Building automation into these projects enable the requestor to run the projects themselves, reducing programmer load.

The automations that will be discussed in this paper will be simple tasks but proven effective. They include simple planning of the project, utilizing prompts to populate macro variables, creating stored procedures, storing user logs and automating the output. The Enterprise Guide version used for this example is 4.3, and the Microsoft Excel version is 2007. The data used in this example is accessible at data.gov and is the Consolidated State Performance Report for Achievement Assessments in Mathematics at the district level (data.gov).

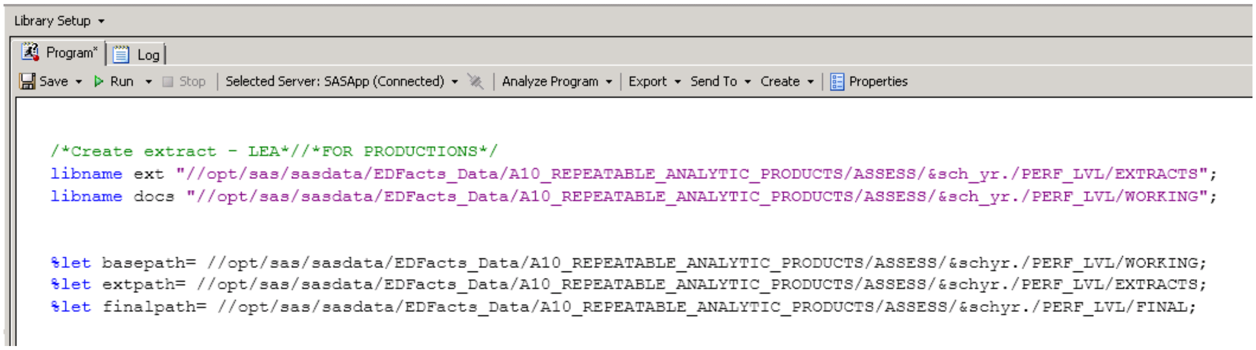
PLANNING THE PROJECT

Once the programmer has a full list of requirements with information needed, the programmer then needs to consider the audience. If the person that the data request is for is familiar with SAS®, the programmer may consider simply setting up the Enterprise Guide project with simple prompts and an automated output. However, if the user has little to no experience with SAS, the programmer will want to also establish a stored procedure. Depending on the setup of the user, the stored procedure may be able to be run from SAS Web Analytics by simply clicking on a link.

ORGANIZING THE NODES

In this example, the user will have a small amount of SAS knowledge. The programmer will want to create a stored procedure but also organize the project so that it will be easy for a user to follow in Enterprise Guide. For this reason, it is best to start with a notepad named ‘READ ME’. This will give the programmer a location to record directions for running the project and any other pertinent notes. The next node should be a program node to set up libraries, a utilities node. It is much easier to have all libraries established at the beginning of any project in one location so that if paths change, the programmer has one central location to update instead of multiple locations.

The code may look something like this:



```
/*Create extract - LEA*//*FOR PRODUCTIONS*/
libname ext "//opt/sas/sasdata/EDFacts_Data/A10_REPEATABLE_ANALYTIC_PRODUCTS/ASSESS/&sch_yr./PERF_LVL/EXTRACTS";
libname docs "//opt/sas/sasdata/EDFacts_Data/A10_REPEATABLE_ANALYTIC_PRODUCTS/ASSESS/&sch_yr./PERF_LVL/WORKING";


%let basepath= //opt/sas/sasdata/EDFacts_Data/A10_REPEATABLE_ANALYTIC_PRODUCTS/ASSESS/&schyr./PERF_LVL/WORKING;
%let extpath= //opt/sas/sasdata/EDFacts_Data/A10_REPEATABLE_ANALYTIC_PRODUCTS/ASSESS/&schyr./PERF_LVL/EXTRACTS;
%let finalpath= //opt/sas/sasdata/EDFacts_Data/A10_REPEATABLE_ANALYTIC_PRODUCTS/ASSESS/&schyr./PERF_LVL/FINAL;
```

The programmer should also organize the project so that everything is linked together. Even though Enterprise Guide will usually run the project in the correct order, it will help the user to follow the data flow in case of a run failure. This will also help ensure the stored procedure runs correctly.

To link two nodes together:

- Right click on the first node
- Click on 'Link <node name> to'
- Select the second node from the list of nodes

RETAINING USER LOGS

One of the more helpful functions when automating a project is to retain the user logs. As the programmer is not usually running this code, the user needs to be alert for problems in the data extract. If the expected results are not returned, the user will need to have the programmer review the problem. This is much easier when the programmer has the logs from the specific session that caused the problem. As part of the utilities node, the following code should be included:

```
PROC PRINTTO
 log="/opt/sas/sasdata/EDFacts_Data/A20_AD_HOC/ESB/JEN/SAS_log.txt"
   new;
run;
```

To revert the log back to the default, add a final node with:

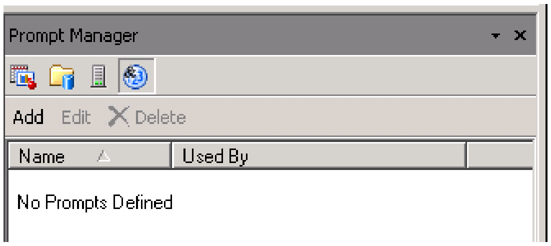
```
PROC PRINTTO;

run;
```

UTILIZING PROMPTS

One of the easiest ways to make an Enterprise Guide project open for multiple runs by anyone is to establish prompts to collect the settings for macro variables. For example, if the project is set up to run for school year 2012-2013 without macros, it will only run for that one school year. However, by establishing prompts, the same project can be run for any school year, state, and district combination. Establishing macro variables populated by prompts is a three step process. The first step is to setup the prompt.

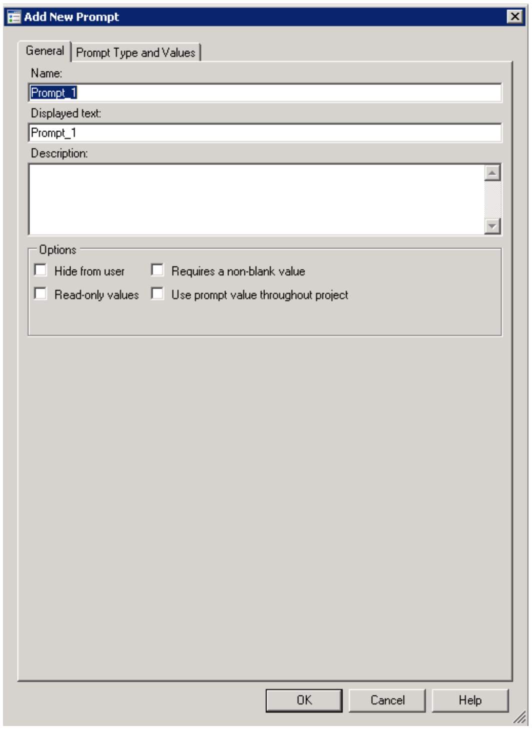
1. In the Server List window, click on Prompt Manager and click Add



No Prompts Defined

   a. Next, the Add New Prompt form will need to be filled out

      i. General Tab – This tab establishes the macro variable and properties



Name: Prompt_1

Displayed text: Prompt_1

Description:

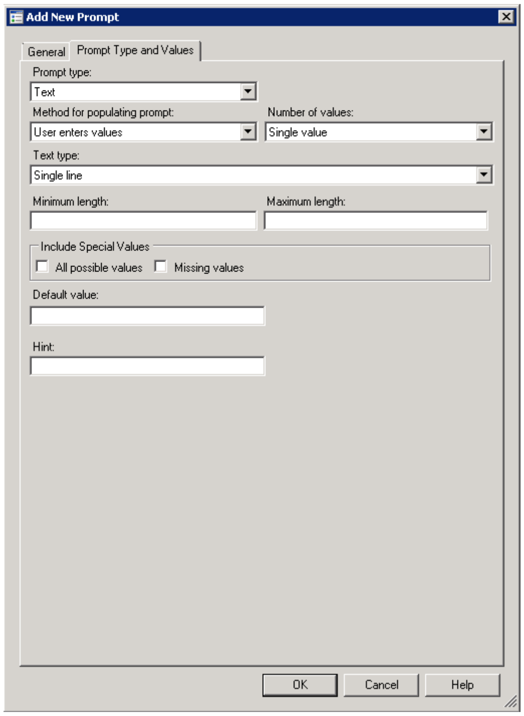
Options

☐ Hide from user ☐ Requires a non-blank value

☐ Read-only values ☐ Use prompt value throughout project

1. Name – Macro variable
2. Display Text – What the user will see
3. Consider the Options
   a. Recommendations: Check ‘Requires a non-blank value’ and ‘Use prompt value throughout project’
      i. Selecting ‘Use prompt value throughout project’ creates the macro as a global variable so it does not need to be defined again.

ii. Prompt Type and Values tab



Prompt type: Text

Method for populating prompt: User enters values

Number of values: Single value

Text type: Single line

Minimum length:

Maximum length:

Include Special Values

□ All possible values □ Missing values

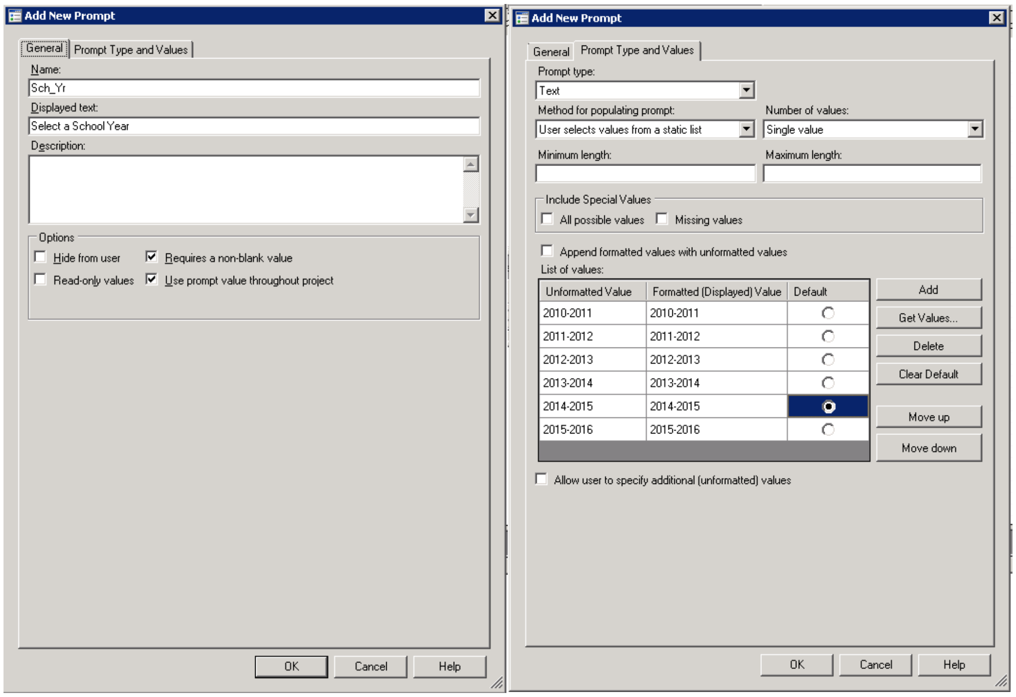
Default value:

Hint:

1. Prompt Type – options are ‘Text’, ‘Text’ ‘Range’, ’Hyperlink’, ‘Numeric’, ‘Numeric range’, ’Date’, ’Date range’, ‘Time’, ‘Time range’, ’Timestamp’, ‘Timestamp range’, ‘Data source’, ‘Data source item’, ‘File or directory’, ’Color’, ‘Data library’ and ‘Variable'
    a. For this example, select text
2. Method for populating prompt – options are user enters values, user selects values from a static list or user selects values from a dynamic list
    a. When selecting the option for a dynamic list, consider the fact that Enterprise Guide will need to query the list to get the most recent options available
        i. In this example, the query for a dynamic list would take a great deal of time and the user will only want an option of possibly six options. For this reason, select static list option
3. Number of values – options are single value, multiple value, multiple ordered values
    a. For this example, select single value
4. Minimum and Maximum Length – may be entered if desired or left blank if it will not alter the possible entries to the macro
5. Include special values – check if ‘All possible values’ or ‘Missing values’ should be an option. In this example, neither would be an option for school year so they will not be checked.
6. List of values – Click ‘Add’ and add values manually or click ‘Get Values..’ to have the list populate
    a. As school year is easily defined, for this example, select Add and manually add the desired school years.

b. The Default option can also be selected as values are entered

b. The final screen should appear as:



Add New Prompt

General | Prompt Type and Values

Name: Sch_Yr

Displayed text: Select a School Year

Description:

Options

- ☐ Hide from user
- ☑ Requires a non-blank value
- ☐ Read-only values
- ☑ Use prompt value throughout project

OK | Cancel | Help

Add New Prompt

General | Prompt Type and Values

Prompt type: Text

Method for populating prompt: User selects values from a static list

Number of values: Single value

Minimum length:

Maximum length:

Include Special Values

- ☐ All possible values
- ☐ Missing values

☐ Append formatted values with unformatted values

List of values:

Unformatted Value	Formatted (Displayed) Value	Default
2010-2011	2010-2011	○
2011-2012	2011-2012	○
2012-2013	2012-2013	○
2013-2014	2013-2014	○
2014-2015	2014-2015	●
2015-2016	2015-2016	○

Add | Get Values... | Delete | Clear Default | Move up | Move down

☐ Allow user to specify additional (unformatted) values

OK | Cancel | Help

2. The second step is to establish the query filter.

   a. Create a query as needed. In this example, a simple query will be built to include all fields and filter on both state and school year.

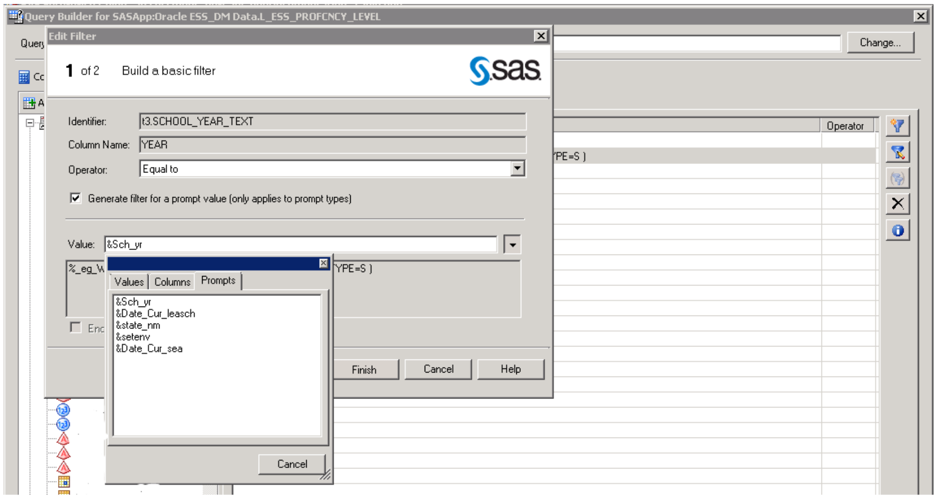
   b. Create a filter

      i. Select the field to filter on

      ii. In the new filter box, check the ‘Generate filter for a prompt value’ box

      iii. Click on the arrow at the end of the value box and select the prompt tab on the pop-up window

         1. Select the correct prompt



Query Builder for SASApp:Oracle ESS_DM Data.L_ESS_PROFCNCY_LEVEL

Edit Filter

1 of 2 Build a basic filter

Identifier: t3.SCHOOL_YEAR_TEXT

Column Name: YEAR

Operator: Equal to

☑ Generate filter for a prompt value (only applies to prompt types)

Value: &Sch_yr

Values | Columns | Prompts

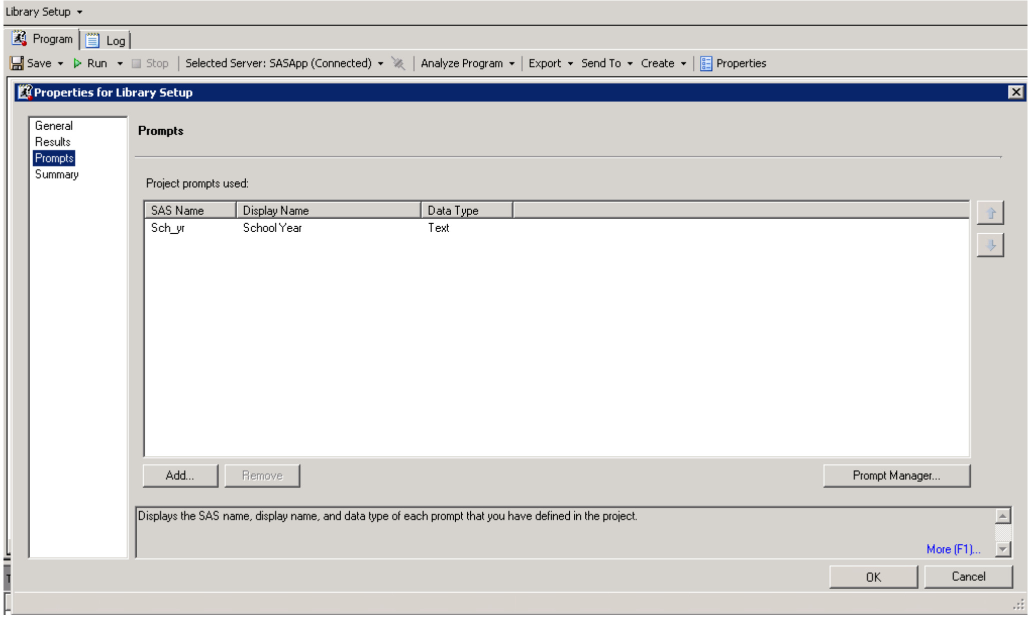
&Sch_yr
&Date_Cur_leasch
&state_nm
&setenv
&Date_Cur_sea

Cancel

Finish | Cancel | Help

iv. Click Finish

3. The final step is only needed if using a Program node. The programmer needs to call the prompt whereas in other node types, Enterprise Guide automatically adds it when the filter is created.
   a. In the program window, click on Properties
   b. Click on Prompts in the left hand menu
   c. Click Add and select the prompt



Properties for Library Setup

Prompts

Project prompts used:

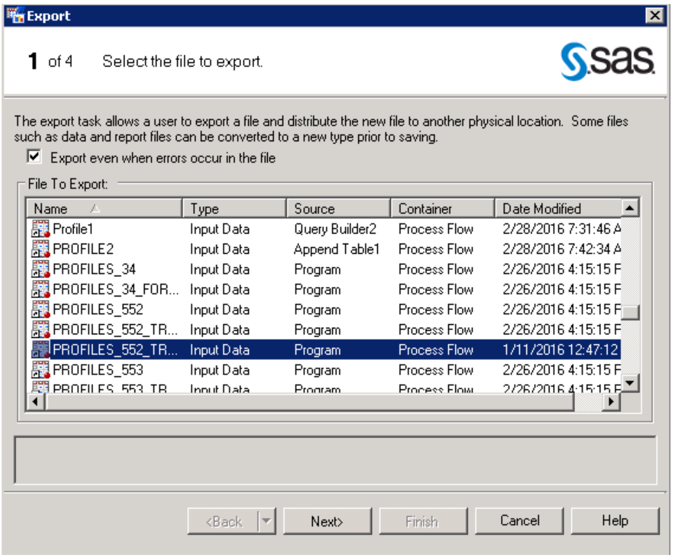
SAS Name	Display Name	Data Type
Sch_yr	School Year	Text

Displays the SAS name, display name, and data type of each prompt that you have defined in the project.

AUTOMATING THE OUTPUT

Once the code had been run and the report or extract file is prepared, the user still needs a way to open it. Although Enterprise Guide will automatically display the results, the user may not know how to move the results from Enterprise Guide to another format. The recommendation is to automatically export the file. There are two ways to achieve this. Using the prompts, the programmer can right click on the results and select ‘Export SAS Report – Program1 as a Step In Project’. This will keep the results always exporting to the same location with the same name.

1. The first screen will have the programmer select the dataset to export.



1 of 4 Select the file to export.

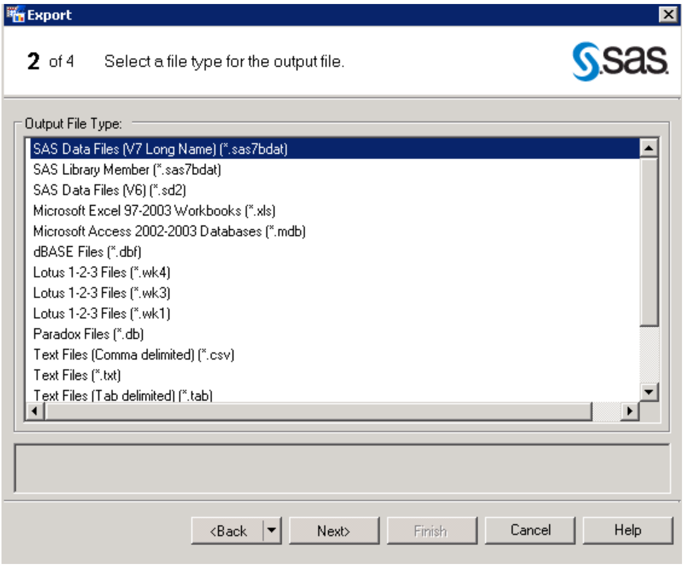
The export task allows a user to export a file and distribute the new file to another physical location. Some files such as data and report files can be converted to a new type prior to saving.

☑ Export even when errors occur in the file

File To Export:

Name	Type	Source	Container	Date Modified
Profile1	Input Data	Query Builder2	Process Flow	2/28/2016 7:31:46 A
PROFILE2	Input Data	Append Table1	Process Flow	2/28/2016 7:42:34 A
PROFILES_34	Input Data	Program	Process Flow	2/26/2016 4:15:15 F
PROFILES_34_FOR...	Input Data	Program	Process Flow	2/26/2016 4:15:15 F
PROFILES_552	Input Data	Program	Process Flow	2/26/2016 4:15:15 F
PROFILES_552_TR...	Input Data	Program	Process Flow	2/26/2016 4:15:15 F
PROFILES_552_TR...	Input Data	Program	Process Flow	1/11/2016 12:47:12
PROFILES_553	Input Data	Program	Process Flow	2/26/2016 4:15:15 F
PROFILES_553_TR	Input Data	Program	Process Flow	2/26/2016 4:15:15 F

2. Next, select the file format type

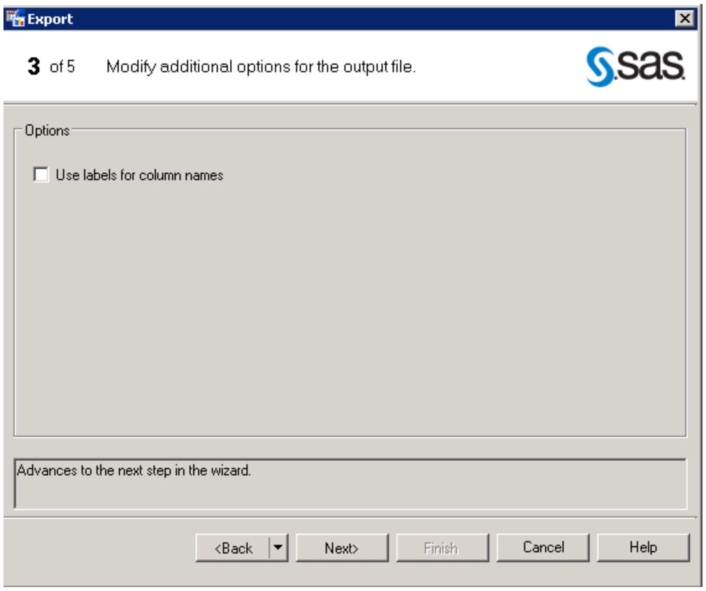


2 of 4 Select a file type for the output file.

Output File Type:

SAS Data Files (V7 Long Name) (*.sas7bdat)
SAS Library Member (*.sas7bdat)
SAS Data Files (V6) (*.sd2)
Microsoft Excel 97-2003 Workbooks (*.xls)
Microsoft Access 2002-2003 Databases (*.mdb)
dBASE Files (*.dbf)
Lotus 1-2-3 Files (*.wk4)
Lotus 1-2-3 Files (*.wk3)
Lotus 1-2-3 Files (*.wk1)
Paradox Files (*.db)
Text Files (Comma delimited) (*.csv)
Text Files (*.txt)
Text Files (Tab delimited) (*.tab)

3. Select preference on using labels for column names



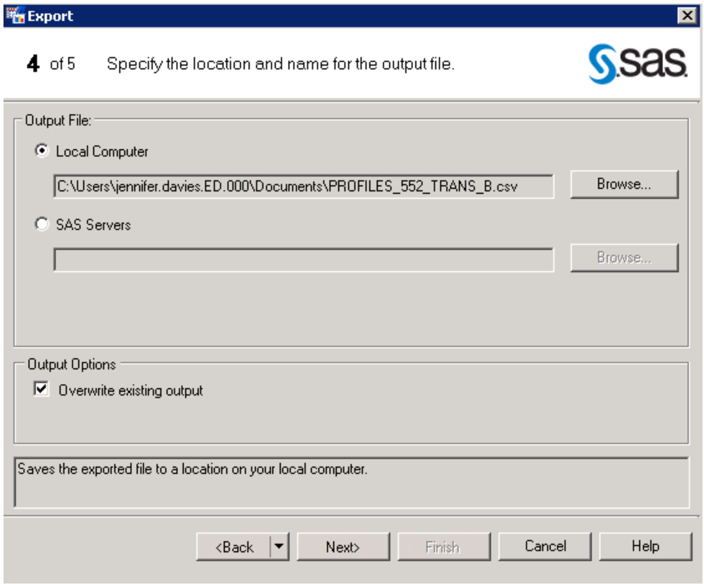
3 of 5 Modify additional options for the output file.

Options

☐ Use labels for column names

Advances to the next step in the wizard.

4. Select the path to store the file



4 of 5 Specify the location and name for the output file.

Output File:

● Local Computer

C:\Users\jennifer.davies.ED.000\Documents\PROFILES_552_TRANS_B.csv

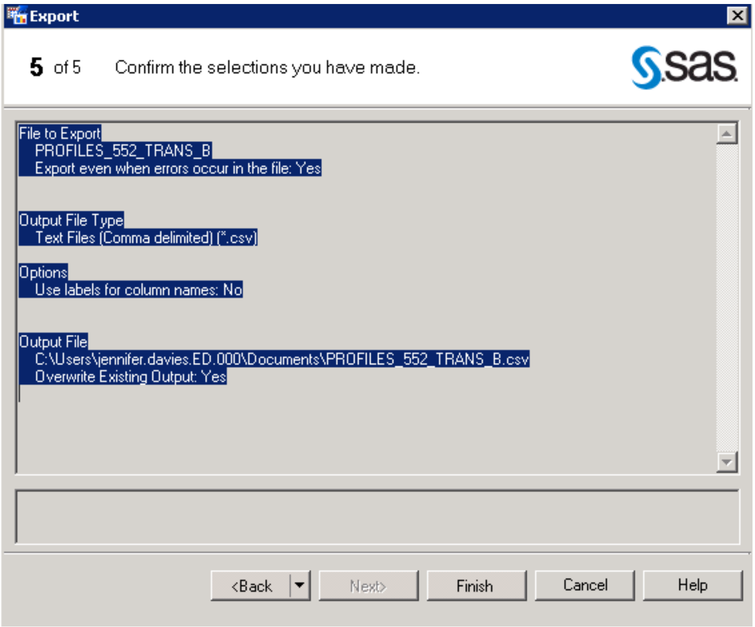
○ SAS Servers

Output Options

☑ Overwrite existing output

Saves the exported file to a location on your local computer.

5. Approve the code



File to Export
    PROFILES_552_TRANS_B
    Export even when errors occur in the file: Yes

Output File Type
    Text Files (Comma delimited) (*.csv)

Options
    Use labels for column names: No

Output File
    C:\Users\jennifer.davies.ED.000\Documents\PROFILES_552_TRANS_B.csv
    Overwrite Existing Output: Yes

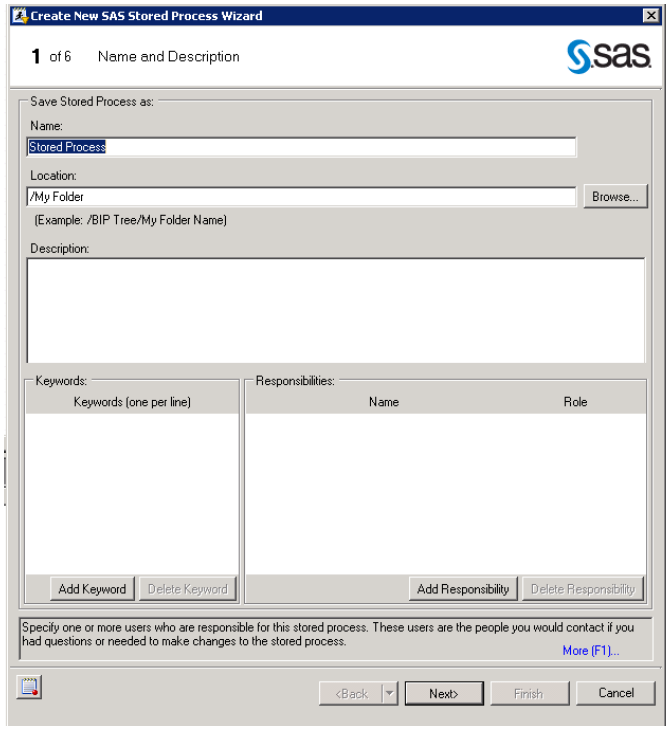
Another method is to use a Program node to export the results. In the example below, the programmer was able to export the results and make the name dynamic based on the school year selected in the prompt:

```
PROC EXPORT data=profiles_&sch_yr._format
      outfile="/opt/sas/sasdata/EDFacts_Data/A20_AD_HOC/ESB/JEN/
       EDF_SCH_STATUS_&sch_yr.csv"
      dbms=csv REPLACE;
run;
```

STORED PROCESS

The final method for automating Enterprise Guide projects for the user is to compile all of the separate pieces of the project into one set of code. This is done by creating a stored procedure. The creation of a stored process will not differ greatly from user to user with the exception of where the process is stored and how it is accessed. Even if the stored process is never linked to another SAS Business Analytics tool, it is still helpful to give the user one link to click on to run instead of a full project.

1. Right click anywhere in the projects window. Select ‘Create Stored Process’
2. Enter the name of the process and where is will be saved



Save Stored Process as:

Name: Stored Process

Location: /My Folder

(Example: /BIP Tree/My Folder Name)

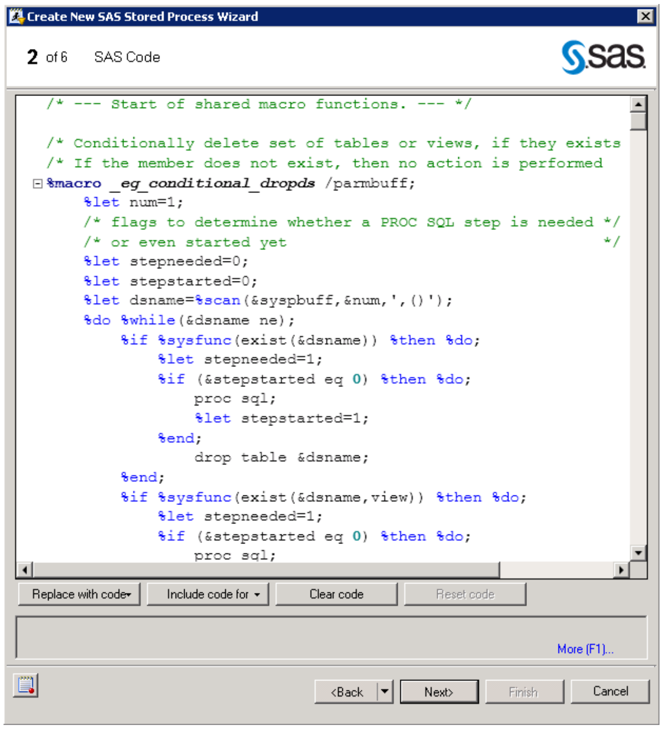
Description:

Keywords:

Responsibilities:

Specify one or more users who are responsible for this stored process. These users are the people you would contact if you had questions or needed to make changes to the stored process.

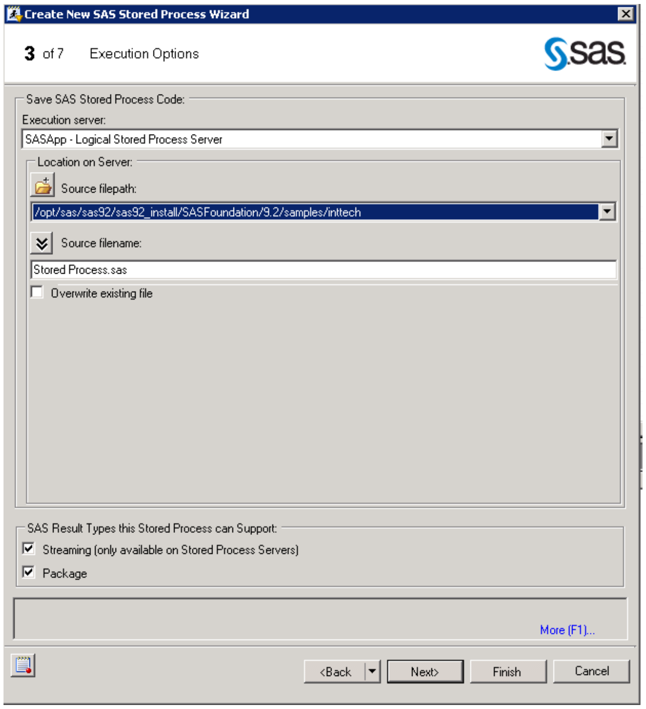
3. Review the code window and click Next



```
/* --- Start of shared macro functions. --- */

/* Conditionally delete set of tables or views, if they exists
/* If the member does not exist, then no action is performed
%macro _eg_conditional_dropds /parmbuff;
    %let num=1;
    /* flags to determine whether a PROC SQL step is needed */
    /* or even started yet                                   */
    %let stepneeded=0;
    %let stepstarted=0;
    %let dsname=%scan(&syspbuff,&num,',()');
    %do %while(&dsname ne);
        %if %sysfunc(exist(&dsname)) %then %do;
            %let stepneeded=1;
            %if (&stepstarted eq 0) %then %do;
                proc sql;
                %let stepstarted=1;
            %end;
                drop table &dsname;
        %end;
        %if %sysfunc(exist(&dsname,view)) %then %do;
            %let stepneeded=1;
            %if (&stepstarted eq 0) %then %do;
                proc sql;
```

4. Select the ‘Execution Server’ and ‘Source Filepath’ and click next



Save SAS Stored Process Code:

Execution server: SASApp - Logical Stored Process Server

Location on Server:

Source filepath: /opt/sas/sas92/sas92_install/SASFoundation/9.2/samples/inttech

Source filename: Stored Process.sas

☐ Overwrite existing file

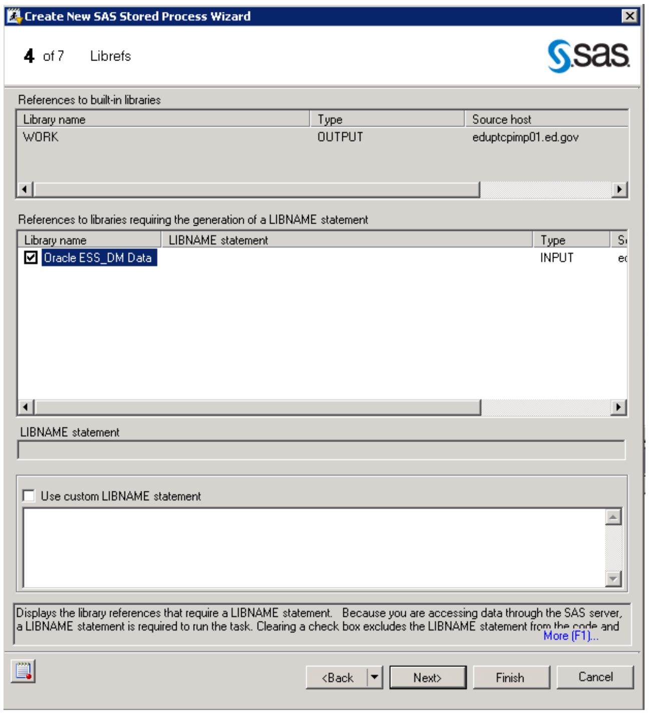
SAS Result Types this Stored Process can Support:

☑ Streaming (only available on Stored Process Servers)

☑ Package

5. Verify the library references.

    a. Some systems require that the stored process does not create the libref since it is automatically created at startup. Uncheck the libref in this situation



References to built-in libraries

Library name	Type	Source host
WORK	OUTPUT	eduptcpimp01.ed.gov

References to libraries requiring the generation of a LIBNAME statement

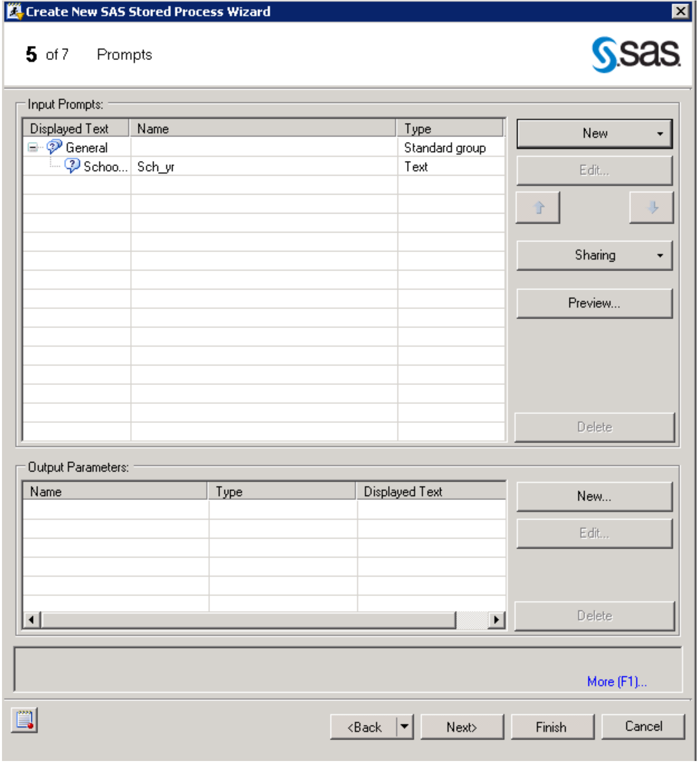
Library name	LIBNAME statement	Type	S
☑ Oracle ESS_DM Data		INPUT	e

LIBNAME statement

☐ Use custom LIBNAME statement

Displays the library references that require a LIBNAME statement. Because you are accessing data through the SAS server, a LIBNAME statement is required to run the task. Clearing a check box excludes the LIBNAME statement from the code and

6. Verify the prompts are all included as necessary and in the desired display order



Create New SAS Stored Process Wizard

5 of 7 Prompts

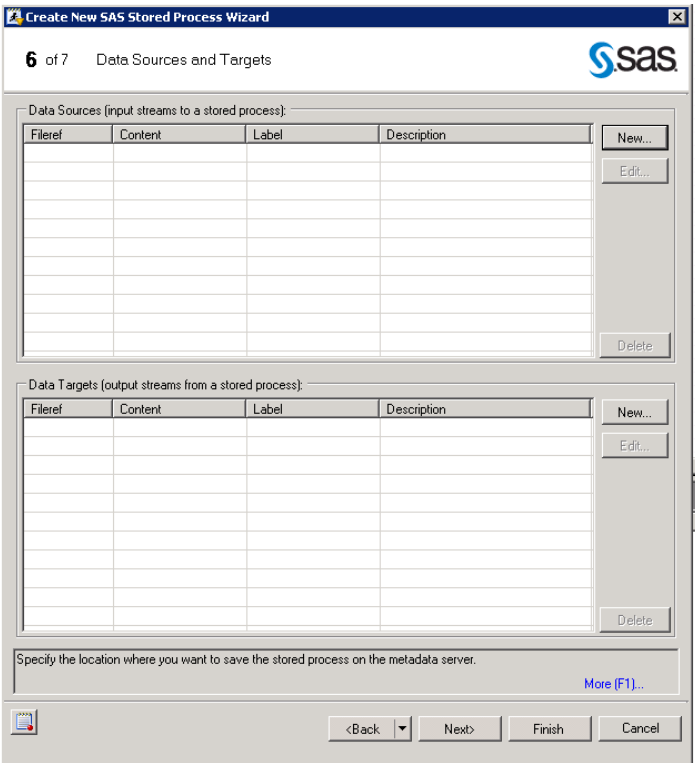
Input Prompts:

Displayed Text	Name	Type
General		Standard group
Schoo...	Sch_yr	Text

Output Parameters:

Name	Type	Displayed Text

7. Verify Data Sources and Targets



Create New SAS Stored Process Wizard

6 of 7 Data Sources and Targets

Data Sources (input streams to a stored process):

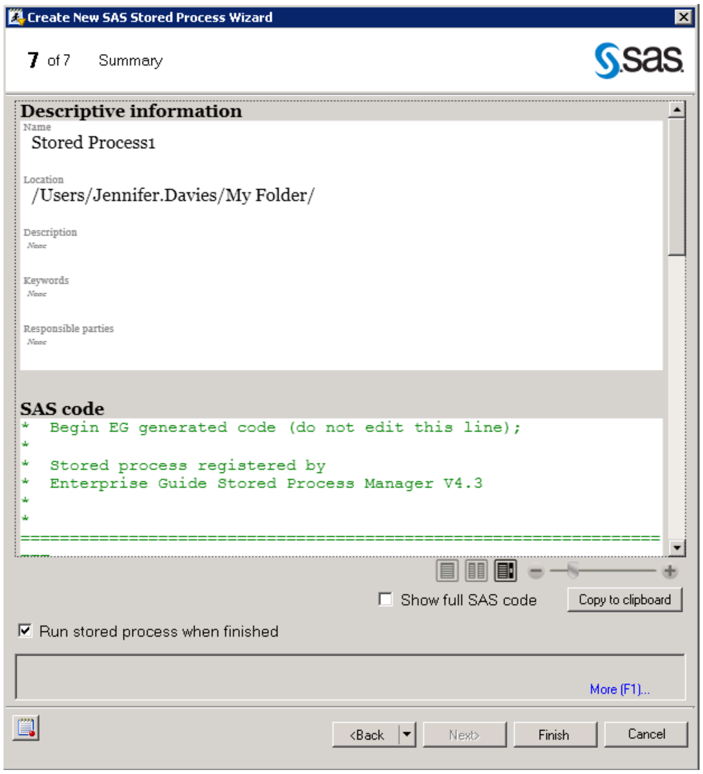
Fileref	Content	Label	Description

Data Targets (output streams from a stored process):

Fileref	Content	Label	Description

Specify the location where you want to save the stored process on the metadata server.

8. Verify the stored process has created correctly by validating the summary



Descriptive information

Name
Stored Process1

Location
/Users/Jennifer.Davies/My Folder/

Description
None

Keywords
None

Responsible parties
None

SAS code

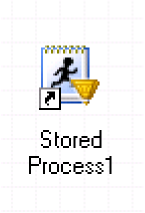
```
*   Begin EG generated code (do not edit this line);
*
*   Stored process registered by
*   Enterprise Guide Stored Process Manager V4.3
*
*
==================================================================
```

☐ Show full SAS code

☑ Run stored process when finished

9. Click Finish

10. To run, right click on Stored Process node and select ‘Run Stored Process1’



CONCLUSION

Creating an Enterprise Guide project so that users of any skill level can run it is not difficult. It only takes time and planning. This paper has walked through various techniques that can be used which are easy to implement. They include how to plan the project for the user’s skill level, utilizing prompts to enable multiple runs, automating the outputs and creating stored processes. Often, what was initially a one-time ad hoc request will turn into a repeated process. Approaching each request with the tips outlined above will make the programmer’s task of handing this off to the user that much easier and faster.

REFERENCES

Cochran, Ben. 2013. “Be Prompt! Do it Now!”. SAS Global Forum 2013.

Davidson, Kevin and Minh Duong. 2010. “Using Dynamic And Cascading Prompts in SAS Enterprise Guide”. SAS Global Forum 2010.

Fect, Marje and Rupinder Dhillon. 2012. “SAS Enterprise Guide 4.3: Finally a programmer’s tool”. SAS Global Forum 2012.

SAS Support. “Routing the Output and the SAS Log with PROC PRINTTO.” Accessed March 16, 2016.http://support.sas.com/documentation/cdl/en/basess/58133/HTML/default/viewer.htm#a001330273.htm

Hemedinger, Chris. The SAS Dummy. “10 tips for organizing your SAS Enterprise Guide projects”. October 10, 2011. http://blogs.sas.com/content/sasdummy/2011/10/10/10-tips-for-organizing-your-sas-enterprise-guide-projects/

Data.gov. “Consolidated State Performance Report, 2011-12”. April 1, 2015. http://catalog.data.gov/dataset/consolidated-state-performance-report-201112

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