

Post-processing of the SAS® Log

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Introduction

The SAS log file is an integral part of the SAS system, functioning as our eyes and ears into the execution of a SAS program jobstream. The quantity of information available can get to be overwhelming and the poor brain hits information overload. The eyes glaze over and you take a break whether you get up and move around or stay staring at the listings. SAS has provided many options to tailor the output produced in the log but I find that often the elimination of information from the log file is not what I want. What I really want is a way to scan the log for indications of problems and then be able to look at a detailed log of the job execution immediately in the vicinity of the problem indication.

Overview

With the SAS options of MPRINT, SYMBOLGEN, and SOURCE2 enabled, you will get all the detailed information but scanning the log for a large job becomes very difficult. I decided that a much better tact would be to let the computer do the scanning and give me a brief report of the locations of possible problems.

My objectives were simple:

- Find an easier more effective way to validate proper execution of a program;
- Save some trees so that they can provide shade rather than input for a shredder;

• Save my eyes so that I can read the restaurant menu at dinner (my wife will read it to me but she tends to edit a bit -- I hear a selection of what I should eat rather than what I want to eat).

This program is designed to run in batch mode rather than under Display Manager. Most large programs are scheduled and run at night and this post processing program is designed to be placed in the next jobstep after the SAS program that it is supporting. The detailed SAS log and job output are held on disk rather than printed. Instead, the output from the SCANLOG program is printed and reviewed prior to release of the normal job output. The SCANLOG output can be tailored so that a very simple GO/NOGO type report can be evaluated by a report distribution group and printing of the job output based on this evaluation. If the job requires further review, the output and detailed SAS log are still on the Output spool with a HOLD status. A programmer or system analyst can run SCANLOG on the SAS log with a different PARMS file and extract more detailed information to review.

So far so good. We've generated a couple error reports of varying sophistication, saved a tree or two by not just printing the output and log for probably bad runs, and minimized CPU time by not having to rerun the jobstream to try and duplicate the problem.

Block Analysis

Now let's block the project into smaller tasks so that we don't run astray when we start writing the code. The input will be the SAS log from a job execution with MPRINT, SYMBOLGEN, and SOURCE2 options enabled. The desired output is a customized brief report flagging possible problems and giving an index into the detailed log to assist in review. Tasks are as follows:

- Read the detailed log in and create a SAS dataset with variables for the log line number, source line number, and line text.
- Create a PARMs file containing the character strings to search for in the detailed log.
- Read in the PARMs file and generate complete SAS program statements. Write these statements to a temporary file.
- %INCLUDE the temporary file into this job execution to select the log lines to be printed.
- Format the selected lines and generate the SCANLOG report.

Infile

The detailed log is read in to a SAS dataset using INFILE and INPUT statements to generate the variables LOGTXT and CDELN. The variable LOGLN is generated from the current line N variable. One small problem with the infile is that the SAS log is a variable length record file in CMS. SAS doesn't like to read variable length records with an INFILE statement, so a system copy function is used to make a temporary file with fixed length records.

PARMS

The PARMs file and how it's handled are the heart of the project and the place for individual creativity. The file is typically a flat file of 80 column fixed length records and is stored on a disk that will be accessible to SCANLOG when it is run. Columns 1 thru 3 are the test number. Columns 4 thru 10 will be reserved for control flags. Columns 11 thru 80 contain the search string. The test number is just a sequential number to aid in the readability of the PARM file and to slightly simplify coding in SCANLOG. All substatements for a given test will have the same number in these columns. Column 4 is coded as follows:

blank -- the first statement of a test requiring that the search string be found for selection;

+ (plus) -- a substatement requiring that this search string also be found for selection <AND function>;

- (minus) -- a substatement requiring that the search string is not found <AND NOT function>;

C -- if the search string is found, the line is selected and handled as a special comment.

Column 5 is spare -- who said that you have to use all of your flag fields on the first generation of a program? This will provide enough basic control capability to build a workable program and leave a lot of opportunity for future enhancement.

Generate Code

This next task is what makes the whole project go. We will take very simple statements from a flat file and build

executable SAS code from them. The person writing the PARMs file needs to know nothing about SAS syntax to write or maintain the file. SCANLOG builds a SELECT clause based on the PARMs file and then writes it out to a temporary disk file. The PARMs file is read into a SAS dataset with variables of SEQ, CNTL, CNT, SPEC, and STRNG. This dataset is then set into a DATA NULL step that writes lines to an external file described in a FILE statement with PUT statements. Debugging this type of code generation is quite simple because you can look at the actual code lines produced in the output file and quickly tell if something has gone astray.

One "enhanced" feature is included in the sample code, the ability to check for generation of missing values and to print the lines where the value was generated as well as the summary note. This feature is enabled by coding a "M" in column 6 of any card in the PARM file. For ease of maintenance, a separate card with a STRNG of "missing values" is used. The macro flag variable MIS is set to "Y" at the end of the DATA NULL that builds the code if a "M" is found in the SPEC field.

The next DATA step simply executes the generated code against the log dataset, setting a SEL variable to 1 if the observation is selected for printing.

Enhancement

First, why trap missing values? Fact — Real world data entered by real world people contain missing numeric data in 'required' fields. SAS handles these missing values as best it can in calculations but many times the results are not what you would have liked. Trapping missing values adds lines of code and may or may not be warranted. This is a

case by case decision for the programmer to make. In general, I trap for missings by testing the variable for "less than or equal to zero" and then conditionally performing the computation. This means that if a "Missing values were generated" line is found in the log, something bears a closer look.

This enhancement to SCANLOG automatically ferrets out these missing messages and prints the message and guilty code lines. The log dataset is scanned for the string "missing values" and if found, the SEL flag is set and a line count variable is set to 2 and retained. The next observation is selected because the line count is greater than 0, the line count is then decremented. The next observation is also selected because the line count is greater than 0. This observation is additionally processed because the string "at" was found. Up to 5 code line numbers are extracted from the xxx:yyy constructs in this observation and written to a special temporary dataset. If 5 line numbers are found, a caution note is put in the LOGTXT field of the next line and that line's SEL flag is set. The caution note does not overwrite any information since this line is blank in the log. The log dataset is then sorted by CDELN and the special temporary dataset merged in to set the SEL flag on the additional observations.

If additional special routines are written, they can be added here. The only requirement is that the SEL flag is set on the selected observations.

Printing

The log dataset is subset with the SEL flag to form the final dataset for printing. In the sample code printing is done by a simple PROC PRINT with labels and titles. More

elaborate output could be added to route messages to the system operator's console, send the log to an analyst's VM reader, etc..

Conclusion

The intent of this paper was to introduce some possibly different techniques for handling changing parameters in a generalized SAS program and to demonstrate a method for dynamic code generation at run-time other than the use of macros. The actual interfacing of the Scanlog program into your particular jobstreams will vary between systems: on MVS it will just be another jobstep; on the PC it can be added to a batch file; on CMS it requires the use of GLOBALV variables to pass parameters around the SAS EXEC program. Add these techniques to your bag of programming tricks and use as you see fit.

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Author

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Source Listings for ScanLog

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1  /*
2  Program Number: SCANLOG.OUTL  Last Revised: 8/2/91
3
4  Program Name: Scanlog Utility
5
6  Author: W.E. Adams, Trilogy Consulting Corp.
7
8  Description: Scan SAS log from previously executed SAS job
9               for specific strings as described in PARM file.
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11 Infiles: source file, PARM file
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14 Outfiles: SCANLOG.LISTING
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16 Note: See end of this program for example of PARM file and
17       code to call this program.
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