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Dynamically allocating exported datasets by the combination of pipes and ‘X’ statement

Xin Wei, Hoffmann-La Roche, Nutley, NJ

ABSTRACT

If you generate a thousand of tables in five minutes, you may also want to dump them into appropriate locations to show your clients that you are not only productive but also well-organized. In this paper we discuss the solution to dynamically export table into a destination whose name depends on data and you do not know in advance by the combination of system pipe option and ‘X’ statements in SAS data step.

INTRODUCTION

It is a frequent task for SAS programmers to write different result tables into the desired destinations in Windows system. Often times these destinations have to exist prior to the execution of exportation. It would be labor intensive and error-prone to manually create these subdirectories if many folders are needed or they have complex hierarchical structures. The problem is even compounded when the name of subdirectories to create for the exported table are data dependent. In the following examples, I will describe the solution to make the data exportation and creation of file folders a dynamic and coherent process by using pipe and ‘X’ statement.

CONCEPT

According to SAS support page, unnamed pipes “enable you to invoke a program outside of SAS and redirect the program's input, output, and error messages to SAS. This capability enables you to capture data from a program external to SAS without creating an intermediate data file”. A ‘X’ statement runs an operating system command or a Windows application from within a SAS session.

The example I am using demonstrates writing study budget for different companies into separated subdirectories designated for a particular company. First of all, the names of existing subdirectories from a particular directory were written into a SAS dataset by system pipe command. Then company names from dataset to export are searched against the SAS dataset holding existing folder names. If the folder for the current company already exists, SAS goes ahead to export the study budget data into this folder. If not, SAS invokes MS-DOS command by ‘X’ statement to create a new folder with the company name and write the corresponding file in it. When the process is completed, all data are automatically saved in the desired locations.

PROCESS

STEP 1:

This step creates a test dataset that contains three columns: company name, study name and study budget. The goal is to output the studies and their budget into a company subdirectory.

```
data test;
   length company $20 study $20;
   input company $ study $ budget;
cards;
ROCHE  XXXinhibitor 10000
ROCHE  XXXantagonist 20000
ROCHE  XXXantibody 30000
NOVARTIS XXXinhibitor 40000
NOVARTIS XXXantagonist 50000
NOVARTIS XXXantibody 60000
PFIZER XXXinhibitor 70000
PFIZER XXXantagonist 80000
PFIZER XXXantibody 90000
;
run;
```

STEP 2:

This step uses PROC SQL to parse all company names into a text string and then call a loop in SAS macro. Within each loop execution, a company name is parsed out of the company name list encoded by the macro variable &cmlst by %scan function. The study budget data will be exported for one company at a time. We will discuss what is going on within each loop in the next step.

```
proc sql noprint;
     select distinct company into: cmlst separated by ' ' from test;
quit;

%let i=1;
%do %while(%scan(&cmlst,&i,%str( )) ne);
    %let company=%scan(&cmlst,&i,%str( ));
    %let i=%eval(&i+1);
XXXXXXXXXX
%end;
```

STEP 3:

Step 3 covers the two main points of this report. Firstly a ‘pipe’ option is used in filename statement to read the folder name into variable ‘folder’ of SAS dataset ‘folder’. Once the desired subdirectory name/company names are compiled, it is compared to the company name that is parsed out of company name list from step 2. If the company folder is determined to exist, a flag variable (preset to 0 before the data step) is set to 1 by a call symput() function. Next the ‘X’ statement followed by a quoted MS-DOS command is conditionally executed to create the company subdirectory that does not exist. Here the ‘noxwait’ option is used to specify that the command processor automatically returns to the SAS session after the MS-DOS command is executed. Finally, a study budget table for a particular company is subset from master dataset through ‘where’ option and then exported to the company subdirectory that is guaranteed to be present at this moment.

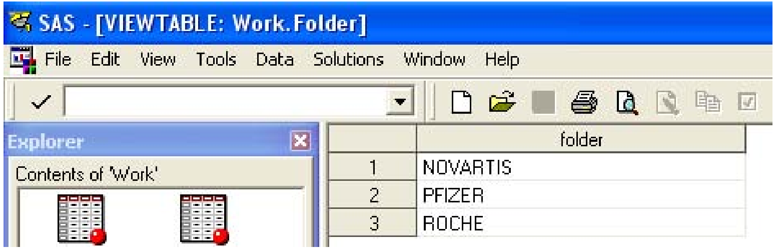
```
FileName MyDir Pipe 'dir "c:\test" /B';
data folder;
  infile MyDir lrecl=300 truncover;
  input @1 folder $100. @;
  format   folder $100.;
run;
%let flag=0;
data _null_;
     set folder;
     if upcase(folder)=upcase("&company") then do;
        call symput('flag','1');
        stop;
     end;
run;
%if &flag=0 %then %do;
options noxwait;
data _null_;
    x "mkdir c:\test\&company";
run;
%end;
proc export data=test(where=(department="&company"))
     outfile="c:\test\&company\budget.xls" replace;
run;
```

DISCUSSION

You can actually control what information is read from system by using various pipe options. The followings are two examples of dataset that holds the name of subdirectories for three companies

EXAMPLE 1:

```
FileName MyDir Pipe 'dir "c:\test" /B';
```

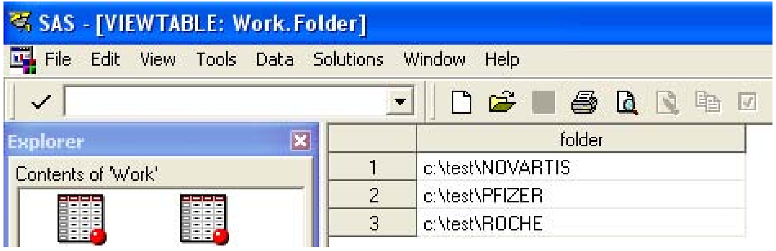


	folder
1	NOVARTIS
2	PFIZER
3	ROCHE

By using /B option at the end of statement, you only read the name of current directories in column 'folder'.

EXAMPLE 2:

```
FileName MyDir Pipe 'dir c:\test  /AD /B /S';
```

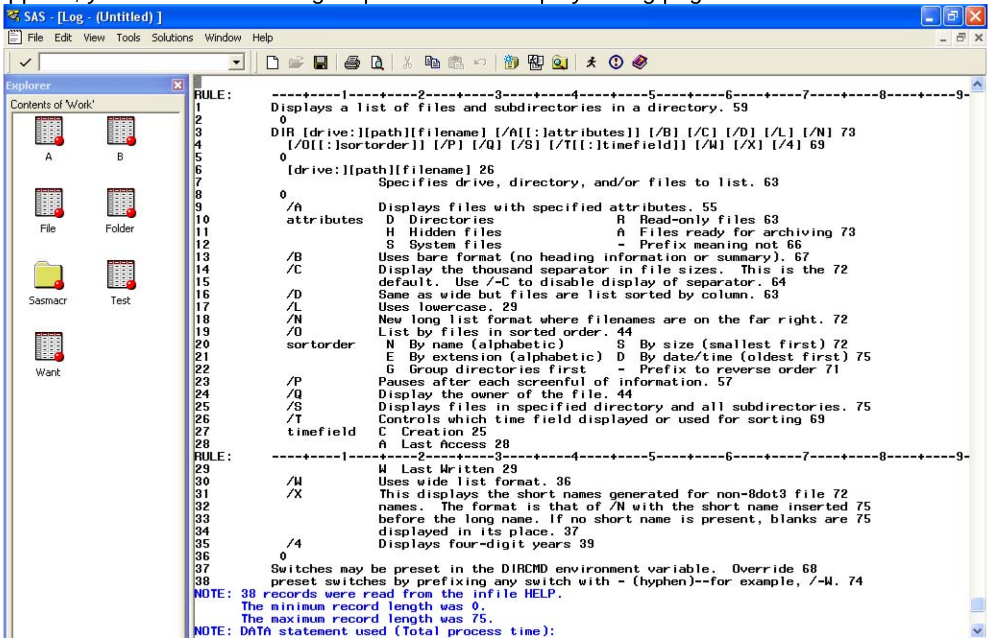

SAS - [VIEWTABLE: Work.Folder]
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'

	folder
1	c:\test\NOVARTIS
2	c:\test\PFIZER
3	c:\test\ROCHE

By using /AD /B /S you read the full path of current directories into the SAS dataset 'folder'.
In order to get the whole list of options and descriptions, run the following code in SAS session:

```
filename help pipe 'dir /?';
data _null_;
   infile help;
   input;
   list;
 run;
```

Once that happens, you have the following help information display on log page:


SAS - [Log - (Untitled)]
File Edit View Tools Solutions Window Help
Explorer
Contents of 'Work'
A
B
File
Folder
Sasmacr
Test
Want

```
RULE:     ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8----+----9-
1         Displays a list of files and subdirectories in a directory. 59
2          0
3         DIR [drive:][path][filename] [/A[[:]attributes]] [/B] [/C] [/D] [/L] [/N] 73
4           [/O[[:]sortorder]] [/P] [/Q] [/S] [/T[[:]timefield]] [/W] [/X] [/4] 69
5          0
6           [drive:][path][filename] 26
7                       Specifies drive, directory, and/or files to list. 63
8          0
9           /A          Displays files with specified attributes. 55
10          attributes   D  Directories                R  Read-only files 63
11                       H  Hidden files               A  Files ready for archiving 73
12                       S  System files               -  Prefix meaning not 66
13          /B          Uses bare format (no heading information or summary). 67
14          /C          Display the thousand separator in file sizes.  This is the 72
15                      default.  Use /-C to disable display of separator. 64
16          /D          Same as wide but files are list sorted by column. 63
17          /L          Uses lowercase. 29
18          /N          New long list format where filenames are on the far right. 72
19          /O          List by files in sorted order. 44
20          sortorder    N  By name (alphabetic)       S  By size (smallest first) 72
21                       E  By extension (alphabetic)  D  By date/time (oldest first) 75
22                       G  Group directories first    -  Prefix to reverse order 71
23          /P          Pauses after each screenful of information. 57
24          /Q          Display the owner of the file. 44
25          /S          Displays files in specified directory and all subdirectories. 75
26          /T          Controls which time field displayed or used for sorting 69
27          timefield   C  Creation 25
28                      A  Last Access 28
RULE:     ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8----+----9-
29                      W  Last Written 29
30          /W          Uses wide list format. 36
31          /X          This displays the short names generated for non-8dot3 file 72
32                      names.  The format is that of /N with the short name inserted 75
33                      before the long name. If no short name is present, blanks are 75
34                      displayed in its place. 37
35          /4          Displays four-digit years 39
36         0
37        Switches may be preset in the DIRCMD environment variable.  Override 68
38        preset switches by prefixing any switch with - (hyphen)--for example, /-W. 74
NOTE: 38 records were read from the infile HELP.
      The minimum record length was 0.
      The maximum record length was 75.
NOTE: DATA statement used (Total process time):
```

Invoking x statement cause the MD-DOS windows being repeatedly turn on and off, which is slightly annoying. A better alternative in the framework of pipe can achieve the same without having DOS window pop up. Just replace the following code

```
data _null_;
    x "mkdir c:\test\&company";
run;
```

with the followings:

```
filename md pipe "mkdir c:\test\&company";
data _null_;
infile md;
run;
```

CONCLUSION:

This simple example gives you flavor about the utility of executing windows operations within a SAS session. The code can be easily tweaked to generate more complex Windows subdirectory hierarchy in a data dependent manner.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Name: Xin Wei
Enterprise: Hoffmann La Roche Ltd
Address: 340 kingsland street
City, State ZIP: Nutley, NJ, 09110
Work Phone: 973-235-2520
Fax: 973-235-2134
E-mail: xin.wei@roche.com

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