

Multi-Platform Code and Data Management in SAS

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Abstract

This paper will cover basic uses of the SAS/CONNECT with some use of SAS/ACCESS as well. Items discussed will include collecting data from multiple Microsoft Excel spreadsheets, getting informational data from a mainframe, and reporting the data to a SAS report.

The paper uses a simple but enjoyable example of a weekly status report system to show the ideas presented. It is written for advanced SAS programmers with experience in multiple operating systems.

Introduction

Christopher Robin has been worried. All of his friends in the Hundred Acre Wood seem to be working harder and harder but accomplishing less and less. For example:

- It used to take Kanga only a few hours each day to wash Roo's clothes. Now it takes almost all day.
- Rabbit has not had a good vegetable crop in years.
- Eeyore's gloomy lack of motivation is spreading around to everyone.
- Pooh spends most of his day either eating hunny or looking for hunny to eat (like he always has), but lately it seems that he is finding less and less hunny for the same amount of effort.
- Piglet spends most of his time following Pooh around.

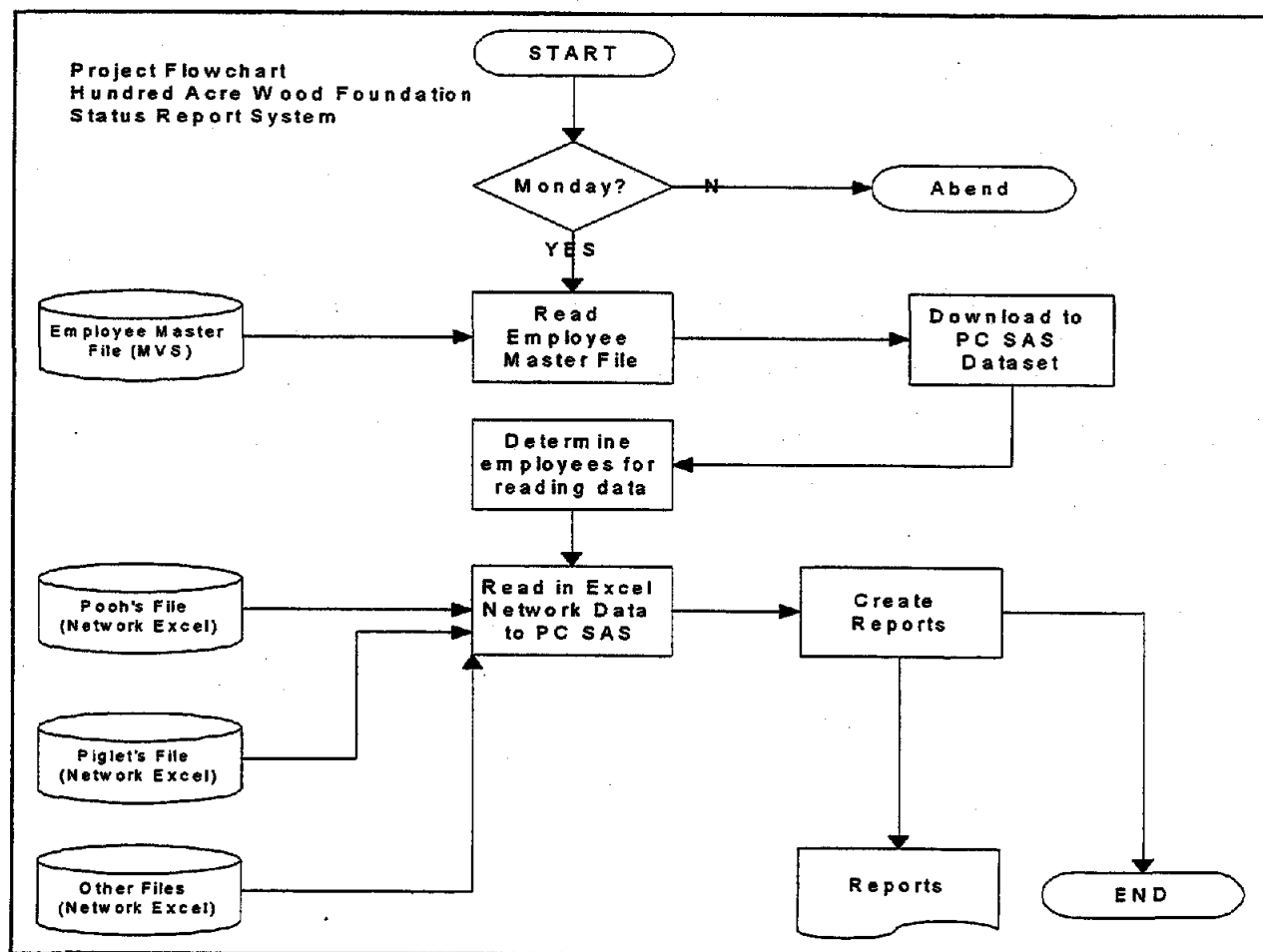
Christopher Robin loved everyone in the Hundred Acre Wood, especially Pooh Bear. Christopher Robin also wondered what would happen if all his friends continued to be less and less effective in their work. So he approached Owl with the problem. "Owl is very wise and always seems to have a good suggestion," thought Christopher Robin, as he walked to Owl's House.

Christopher Robin had a question that required an answer, so he pulled the bell cord that suspiciously looked like Eeyore's tail and waited for Owl to come to the door...

Project Description

For the purposes of this paper, we will complete a weekly status report application for the Hundred Acre Wood Foundation. This application will read data from multiple PC stations networked throughout the Hundred Acre Wood, create weekly reports, and send those reports to the proper destination in the Hundred Acre Wood.

This project is selected not because of its practical use in the SAS Software System, but because it is something that most everyone can comprehend. More practical applications include sales and marketing reports, research reports, or any number of applications where data is or can be stored on many PC stations on a network while also comparing to a mainframe. Use your imagination.



Phase 1: Initial Setup

"Organization is what you do before you do something, so that when you do do it, it isn't all mixed up."

—Christopher Robin

Everyone (except Rabbits Friends and Raletions) throughout the Hundred Acre Wood agreed to meet weekly at Christopher Robin's tree. They all agree that they could be more effective. A "project tracking system" is created at the first meeting. Everyone who wants to start a new project must first meet with Christopher Robin (Owl and Piglet can submit the request in writing because they know how to spell) who will then assign a project number. Some projects are for a specific period of time and some are ongoing.

Seeing the need for potential expansion, they developed a project numbering system. Each project will be number XXX-YYYY-Z, where XXX equals the manager number (Christopher Robin's number is 001), YYYY is the specific project number, and Z is a task classification number. Project task classification numbers are:

- 1=Administrative
- 2=Meetings
- 3=Training
- 4=Operational Activity
- 5=Emergency
- 6=Help Others
- 7=Other.

Pooh, being a bear of very little brain and also of very empty stomach, asked Christopher Robin if he would assign a project number for eating. Christopher then assigned the number 001-0001-004 to this ongoing project, which Pooh promptly began to work on.

Phase 2: Workstation Setup

Each member of the Hundred Acre Wood Foundation has a PC Workstation in their home.

The workstations were then networked to a main network hub in Christopher Robin's tree.

The group decided to use Microsoft Excel as the front-end application to help with the reporting.

Each employee has an Excel template called **TIMESHET.XLT**.

Here is one filled out by Pooh Bear for the week beginning 5/5/97:

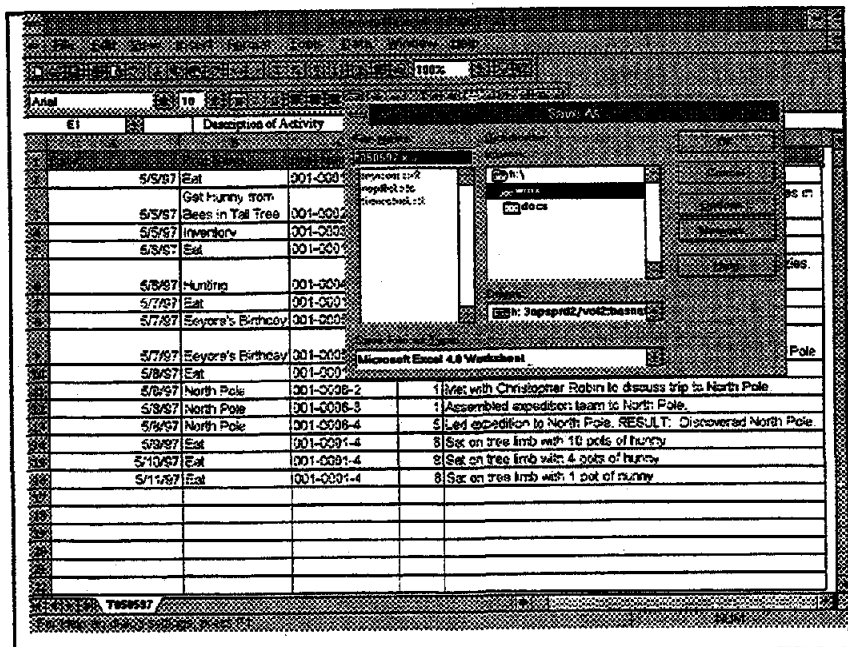
Date	Activity	Description
5/5/97	Eat	3 Ate Honey, Bread, and Condensed Milk
5/5/97	Get Honey from	4 Formed team with Christopher Robin to get honey from bees in
5/5/97	Bees in Tall Tree	1 Ate Honey, Bread, and Condensed Milk
5/5/97	Inventory	1 Completed inventory of honey.
5/5/97	Eat	3 Ate Honey, Bread, and Condensed Milk
5/5/97	Hunting	5 Formed Woodchuck-hunting party with Piglet and hunted Woodchuck
5/7/97	Eat	3 Ate Honey, Bread, and Condensed Milk
5/7/97	Eeyore's Birthday	1 Went shopping for a birthday present for Eeyore
5/7/97	Eeyore's Birthday	4 Attended Eeyore's Party—Official Hundred Acre Wood
5/8/97	Eat	1 Ate Honey, Bread, and Condensed Milk
5/8/97	North Pole	1 Met with Christopher Robin to discuss trip to North Pole
5/8/97	North Pole	1 Assembled expedition team to North Pole
5/8/97	North Pole	5 Led expedition to North Pole. RESULT: Discovered North Pole
5/9/97	Eat	8 Sat on tree limb with 10 pots of honey
5/10/97	Eat	8 Sat on tree limb with 4 pots of honey
5/11/97	Eat	8 Sat on tree limb with 1 pot of honey

Upon completion of each day, everyone has agreed to enter their time and activities into this project description template and save as **tMMDDYY.xls** (a Microsoft Excel v4.0 Worksheet), where **MMDDYY** is the date of the Monday of the week. They will be saved in their personal network directory. Pooh will save his time sheet for the first full week of May 1997 as **D:\POOH\TIME\050597.xls**. The data must be stored by 8:00 a.m. on Monday Morning of the following week.

NOTE: At the time of this writing, SAS/Access has the ability to read a Microsoft Excel 4.0 file, but Microsoft 5.0 is in use. Further, the foundation plans to upgrade to Windows95 and use Microsoft Excel 7.0.

To avoid incompatibility, each member of the Hundred Acre Wood Foundation must save each file as a Excel 4.0 Worksheet.

This is done by selecting **SAVE AS** under **FILE**, and then selecting **SAVE FILE TYPE AS MICROSOFT 4.0 WORKSHEET** in the drop-down box of the **SAVE AS** pop-up window as shown in the example on the right.



Phase 3: PC-Side Startup and Connection to Mainframe

At 8:05 A.M. on Monday, on a network PC in Christopher Robin's Tree, the job MAKEREPT.SAS begins. This section of the job checks to make sure it is MONDAY and then accesses an MVS DATASET that contains the names of every employee in the Hundred Acre Wood.

Description	Source Code
Set options	options ls=110 ps=59 pageno=1 ;
Set TODAY to a test value	%let today = 12MAY97 ; libname pc 'd:\wisas\work' ;
Check to see if TODAY is Monday	data _null_ ; call symput ('date', compress(put(intnx('day',"&today"d,-7), mmddyy8.), '/')) ; if WEEKDAY("&today"d) ne 2 ; put 'ERROR: Today is the wrong day of the week--program must be run Monday' ; put 'ERROR: The program will stop executing' ; abort abend 1111 ; run ;
SIGNON	signon a ; rsubmit ;
Read employee file	data view1 /view=view1 ; infile 'BAS0000.T.CONV.PDM.WISAS' ; input @1 name \$8. ; run ;
Download to PC	proc download data=view1 out=pc.temp status=no ; run ;
Signoff	endrsubmit ; signoff ;

Phase 4: Create Macro Variables of Each Name

Macro variables are created for each name in the employee list. Macro variables must be used because of the PATH= statement in the PROC ACCESS step.

Description	Source Code
Create macro variables &NAME1 through &NAMEX and a max value of the &NOBS	data _null_ ; set pc.temp nobs=nobs ; call symput ('name' trim(left(put(_n_, best.))), trim(left(name))) ; if _n_ = 1 then call symput ('nobs', trim(left(input(nobs, best.)))) ; run ;

Phase 5: PROC ACCESS Inside a Macro

A macro called %T_SHEET is created to loop through from &NAME1 to &&NAME&NOBS to create access and view descriptors of each Excel Spreadsheet and prepare for reading in to SAS. Each view descriptor is then appended (using PROC APPEND) to a master dataset.

Description	Source Code
Loop through each name, creating an ACCESS Descriptor and VIEW Descriptor for each file First time, use SET statement. Assign variable NAME After create view to assign NAME PROC APPEND Run Macro	<pre> %macro t_sheet ; %do i = 1 %to &nobs ; proc access dbms=xls ; create work.a&&name&i...access; path="d:\wisas\&&name&i\time\t&date..xls" ; getnames=yes ; assign=yes ; mixed=y ; list ; create work.d&&name&i...view ; select all ; run ; %if &i = 1 %then %do ; data pc.t&date ; set d&&name&i ; length name \$8 ; name = "&&name&i" ; if descript ne '' ; run ; %end ; %else %do ; data view1 /view=view1 ; set d&&name&i ; length name \$8 ; name = "&&name&i" ; if descript ne '' ; run ; proc append base=pc.t&date data=view1 ; run ; %end ; %end ; %mend t_sheet ; &t_sheet </pre>

Phase 6: Reporting

Now that the data is all assembled, experienced SAS programmers can code reports to their heart's content!

Hundred Acre Wood Foundation
Project Allocation

22:53 Thursday, June 5, 1997 2

NAME=EYORE

PROJ NAME	DESCRIPTION OF ACTIVITY	DATE	HOURS
Ate	Ate grass	05MAY1997	4
Ate	Ate grass	06MAY1997	4
Ate	Ate grass	07MAY1997	4
Ate	Ate grass	08MAY1997	4
Ate	Ate grass	09MAY1997	4
Ate	Ate grass	10MAY1997	4
Ate	Ate grass	11MAY1997	4
Complained	It's gonna rain. It's gonna rain.	05MAY1997	3
Complained	It's gonna rain. It's gonna rain.	06MAY1997	3
Complained	It's gonna rain. It's gonna rain.	07MAY1997	3
Complained	It's gonna rain. It's gonna rain.	08MAY1997	3
Complained	It's gonna rain. It's gonna rain.	09MAY1997	3
Complained	It's gonna rain. It's gonna rain.	10MAY1997	3
Complained	It's gonna rain. It's gonna rain.	11MAY1997	3
NAME			49

Hundred Acre Wood Foundation
Project Allocation

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NAME=OWL

PROJ NAME	DESCRIPTION OF ACTIVITY	DATE	HOURS
Study	Studied Olson's Standard Book of British Birds	05MAY1997	8
Study	Studied the Dynamics of Interbeing and Monological Imperati	06MAY1997	8
Study	Studied MVS JCL by Doug Lowe and REXX in the TSO Environmen	07MAY1997	8
Study	Studied Annual Reports of Travelers Group, Harley Davidson,	08MAY1997	8
Study	Studied Hebrew, German, and Italian	09MAY1997	8
Study	Studied and completed final assignment in Aeronautical Engi	10MAY1997	8
Study	Studied the Oboe	11MAY1997	8
NAME			56

Hundred Acre Wood Foundation
Project Allocation

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NAME=POOH

PROJ NAME	DESCRIPTION OF ACTIVITY	DATE	HOURS
Eat	Ate Hunny, Bread, and Condensed Milk	05MAY1997	3
Eat	Ate Hunny, Bread, and Condensed Milk	06MAY1997	3
Eat	Ate Hunny, Bread, and Condensed Milk	07MAY1997	3
Eat	Ate Hunny, Bread, and Condensed Milk	08MAY1997	1
Eat	Sat on tree limb with 10 pots of hunny	09MAY1997	8
Eat	Sat on tree limb with 4 pots of hunny	10MAY1997	8
Eat	Sat on tree limb with 1 pot of hunny	11MAY1997	8
Eyore's Birthday	Went shopping for a birthday present for Eyore	07MAY1997	1
Eyore's Birthday	Attended Eyore's Party--Official Hundred Acre Wood Foundat	07MAY1997	4
Get Hunny from Be	Formed team with Christopher Robin to get hunny from bees i	05MAY1997	4
Hunting	Formed Woozle-hunting party with Piglet and hunted Woozles.	06MAY1997	5
Inventory	Completed inventory of hunny.	05MAY1997	1
North Pole	Met with Christopher Robin to discuss trip to North Pole.	08MAY1997	1
North Pole	Assembled expedition team to North Pole.	08MAY1997	1
North Pole	Led expedition to North Pole. RESULT: Discovered North Pol	08MAY1997	5
NAME			56

Hundred Acre Wood Foundation
Project Allocation

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NAME=TIGGER

PROJ NAME	DESCRIPTION OF ACTIVITY	DATE	HOURS
Bounced	Bounced, Growled, and Bounced some more!	05MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	06MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	07MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	08MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	09MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	10MAY1997	8
Bounced	Bounced, Growled, and Bounced some more!	11MAY1997	8
NAME			56

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Summary

Remember that just because the data isn't easily accessible doesn't mean it cannot be accessed. SAS has the ability to read and write DB2, Dbase, Excel, Lotus, Flatfiles, MVS, VM, UNIX, OS/2, DOS, Windows, ... and a list of operating systems and database types too numerous to list here!

In ad-hoc development and research, often times a programmer will find data in many places and in many formats. Project design teams, statisticians, managers, and customers store data in just about any format they feel like. Christine Solomon (Developing Applications with Microsoft Office95, (c) 1996 Microsoft Press) puts it best:

"It's been said that 70 percent of the world's data is stored in spreadsheets and word processing files. Whenever I test this figure on business managers and IS professionals, they say that they wouldn't be surprised if it were even higher."

The data is out "there" somewhere and in some format—in many formats. SAS can read and write in most any format available. Cross-platform data management is a daily reality in today's Information Systems world.

So next time, when the question is asked "Can you write a SAS program to do ____?" shout out the answer "Yes!" The next step is to figure out HOW to write the request. Cross-platform data management may be the answer.

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