Batch processing and sysparm

A step towards scheduling

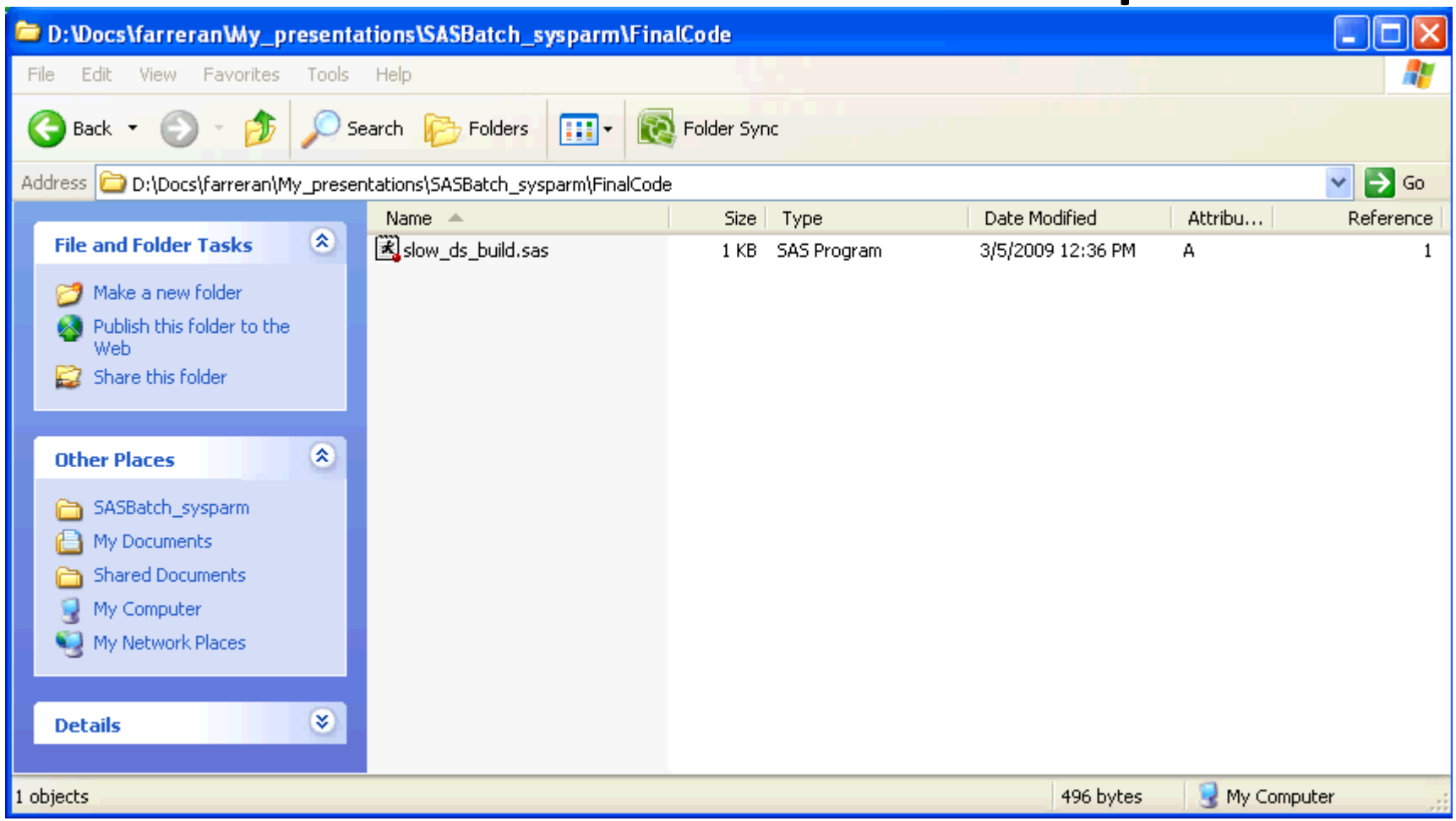
SAS modes of execution

- Foreground PC/SAS or SAS Display Manager
- Client server SAS/Connect or Enterprise Guide
- Background MVS JCL or Unix shell script
- Background SAS on MS Windows

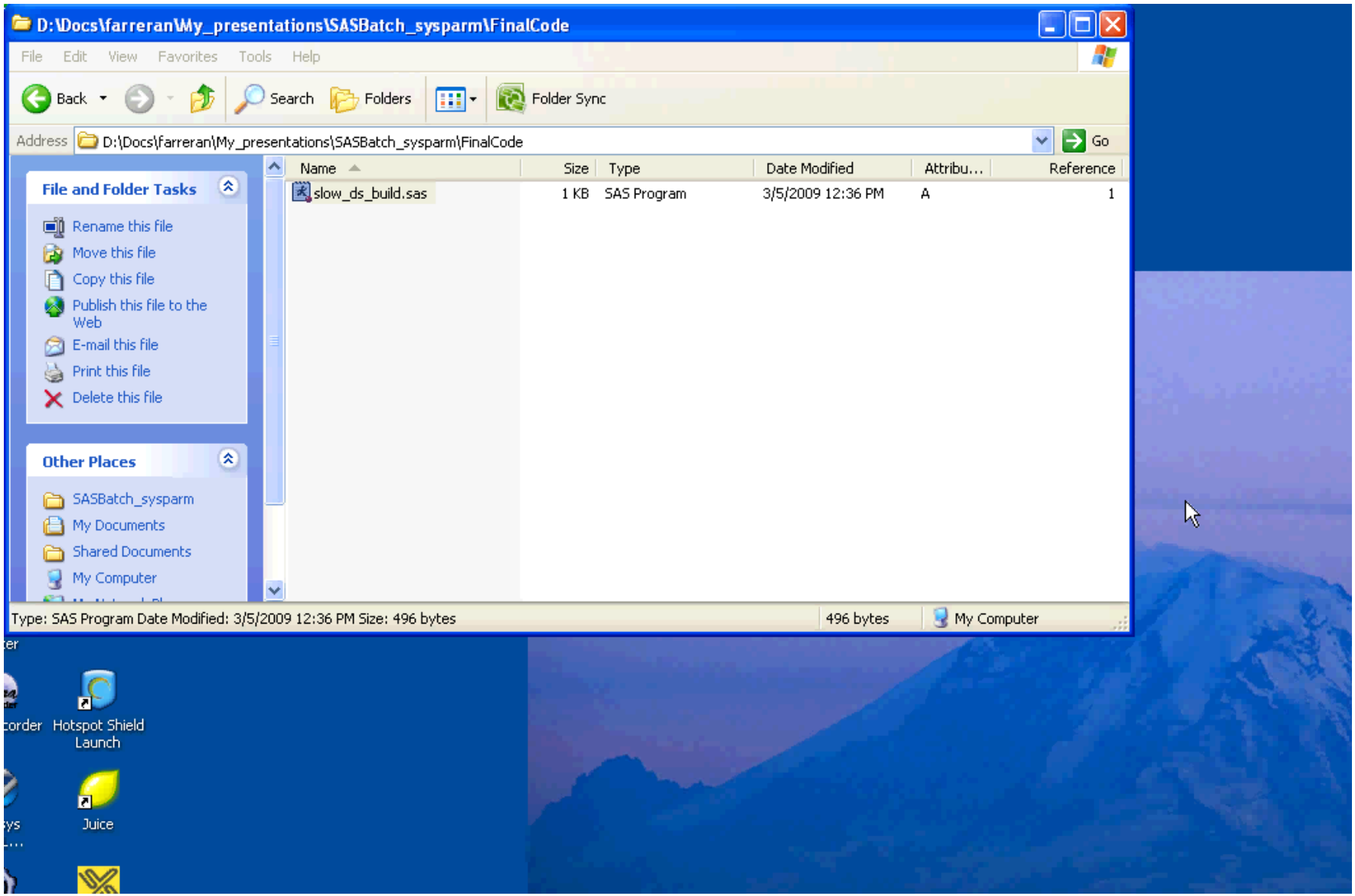
PC/SAS native options

- Right-click on program.sas and Batch submit
- Batch submit from the SAS Viewer
- Windows command shell

Batch submit from MS Explorer



Batch submit from SAS Viewer



Batch submit from command shell

C:\WINXPRO\system32\cmd.exe

```
D:\Docs\farreran\My_presentations\SASBatch_sysparm\FinalCode>dir *.sas /b
slow_ds_build.sas

D:\Docs\farreran\My_presentations\SASBatch_sysparm\FinalCode>..\scripts\sas91 slow_ds_build.sas
```

Why bother?

- Majority of SAS users have repeatable tasks
- Every SAS user has access to a sas executable
- All platforms have background processing
- Operational groups do not know SAS
- We move on but our code may stay

Operational requirements

- Consistency
- Minimum intervention
- Process level control
- Isolation from other activity
- Graceful failure
- Parallel processing

Existing parallel processing options

- Enterprise Guide Process Designer
- Multiple sessions of EG or PC/SAS
- MP Connect
- %systask coding
- SAS DI Studio
- Scripting

Principles of SAS scripting

- SAS business logic is read-only
- SAS code is portable and self contained
- Use parameters to control processing
- Use environment settings at initialisation
- Keep logs and listings

Combining existing techniques

- SAS macro functions
- Operating system scripting
- Process monitoring
- -sysparm startup option

SAS startup options

- Default options are defined in sasv9.cfg
- Options can be overridden at session startup
- -sysparm must be the last option
- Sas.exe –sysin annual.sas -sysparm “2007”

Enhancing simple reports

- Some basic code:

```
%let year = 2004 ;

proc print noobs
  data = sashelp.orsales ;
  where year=&year and product_line='Sports' ;
run ;
```

Enhancing simple reports

- Some basic macro code:

```
%macro orion_print(year) ;
proc print noobs
  data = sashelp.orsales ;
  where
    year=&year and
    product_line='Sports' ;
run ;
%mend orion_print ;

%orion_print(2004) ;
```

Enhancing simple reports

- Some read-only macro code:

```
%macro orion_print(year) ;
proc print noobs
  data = sashelp.orsales ;
  where
    year=&year and
    product_line='Sports' ;
run ;
%mend orion_print ;

%orion_print(&sysparm.) ;
```

Enhancing simple reports

- Some read-only macro code with basic check:

```
%macro orion_print(year) ;
proc print noobs
  data = sashelp.orsales ;
  where
 %if "&year" ^= "" %then %do ;
  year=&year and
 %end ;
    product_line='Sports' ;
run ;
%mend orion_print ;

%orion_print(&sysparm.) ;
```

Check for non-blank &year

Putting it together

- Open cmd window in SAS code location
- >"c:\Program Files\SAS\SAS 9.1\sas.exe" macro_orion_print -sysparm '2004‘
- Notice that macro_orion_print.log and macro_orion_print.lst have been created

Enhancements

- More source code control
- Automatic macro locations
- Return code trapping
- Logging
- Multiple parameter passing

Enhancing simple reports

- Production ready code:

```
options mautosource
        sasautos=("&MLIB",'!sasroot/sasautos');

%orion_print(&sysparm.) ;
```

Sas91.bat DOS batch script

```
echo off
"C:\SAS\SAS_Home\SAS 9.1\sas_batch.exe" %*
if errorlevel 2 if not errorlevel 3 goto err
if errorlevel 1 if not errorlevel 2 goto warn
if errorlevel 0 if not errorlevel 1 goto ok
:warn
echo SAS exited with a Warning. Check %1.log
goto end
:err
echo SAS exited with a Error. Check %1.log
echo Return code = %ERRORLEVEL%
goto end
:ok
echo Seems OK.
echo Return code = %ERRORLEVEL%
echo Parm1 = %1
echo SASlog is %1.log
:end
echo End of sas91.bat
```

Adding more controls

- Add more parameters to basic code:

```
%let year = 2004 ;
%let pline = Sports ;

proc print noobs
  data = sashelp.orsales ;
  where year=&year and product_line="&pline" ;
run ;
```

Adding more controls

- Add more parameters to macro:

```
%macro orion_print2(year,pline) ;
proc print noobs
  data = sashelp.orsales ;
  where year=&year and product_line="&pline" ;
run ;
%mend orion_print 2;

%multi_sysparm ;

%orion_print2(year,pline) ;
```

← Creates multiple macro variables

Multi sysparm macro

- Accepts multiple name value pairs e.g –sysparm ‘name1=value1,name2=value2’
- &name1 &name2 are %global

Sysparm splitting example

```
%let sysparm = name1=value1,name2=value2,name3=value3 ;

data _null_;
  length  sysparm express param value $ 200;
  sysparm = symget('sysparm');
  do i=1 to 50 until(express = '');
    express = left(scan(sysparm, i, ',')); /* name=value */
    param   = left(upcase(scan(express, 1, '='))); /* name */
    value   = left(scan(express, 2, '='));
    valid   = not verify(substr(param, 1, 1),'ABCDEFGHIJKLMNOPQRSTUVWXYZ_')
      and     not verify(trim(param),'ABCDEFGHIJKLMNOPQRSTUVWXYZ_0123456789')
      and     length(param) <=32 ; /* Ensure valid V8 macrovar name */
    if valid then call symput(param, trim(left(value)));
  end;
run;

%put _user_ ;
```

Gives

GLOBAL NAME2 value2
GLOBAL NAME3 value3
GLOBAL NAME1 value1

Putting it together – Part 2

- Open cmd window in SAS code location
- >..\scripts\sas91.bat macro_orion_print2 -sysparm “year=2001,pline=‘Sports‘”

Other additional information

Google search string for SUGI and SGF papers: sysparm site:www2.sas.com filetype:pdf

Peter Crawford's very robust techniques for isolating PC-SAS projects
http://www2.sas.com/proceedings/forum2007/051-2007.pdf
Bernard Tremblay's reference to Rick Aster's split sysparm code
http://listserv.uga.edu/cgi-bin/wa?A2=ind0009D&L=sas-l&P=R11619
How SAS startup configurations are decided
http://support.sas.com/onlinedoc/913/getDoc/en/hostwin.hlp/a000104286.htm#searchrules
Elaborate system that uses SYSTASK for controlling process flow
http://www2.sas.com/proceedings/forum2008/017-2008.pdf
Comprehensive Unix based production system
http://www2.sas.com/proceedings/sugi31/126-31.pdf
Using SYSPARM and other automatic variables
http://www.sascommunity.org/wiki/images/0/01/SYSPARM_paper-Jackson.pdf
Very comprehensive and complicated script
http://www.sascommunity.org/wiki/Batch-submission_WSH_Script