

**Use SAS[®] to
WAPtWAP
but remember
TMTOWTDI**

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WAPtWAP Problem Space

- Solution arises from repeating a discrete atomic task
- Solution requires massive repetition of task
- A data vector exists to drive the repetition

Three Techniques

- Create and then %INCLUDE a data file which is actually a SAS program
- Use a %do-%while loop within a SAS macro and call the macro
- Use PROC FCMP to build a function wrapper around a SAS macro to run the macro from a data step

Simple Example

- **Problem:** Need information about every SAS data set in a SAS data library
- **Solution:** Print first observation of each data set
- **Driver:** SAS dictionary table
DICTIONARY.TABLES

Common DRIVER data set

```
proc sql;  
  create table driver as  
  select  
    compress( libname || '.' ||  
              memname )  
    as DSN  
  from dictionary.tables  
  where libname = 'SASHELP';
```

NOTE: Table WORK.DRIVER created, with
144 rows and 1 columns.

DRIVER Data Set

WAPtWAP: Sample of DRIVER data set

Obs	DSN
1	SASHELP.AACOMP
2	SASHELP.AARFM
3	SASHELP.ADSMSG
4	SASHELP.AFMSG
5	SASHELP.ASSCMGR

The Atomic Task

```
proc print data =  
    SASHELP.AACOMP( obs = 1 );  
run;
```

%INCLUDE Method

```
filename doit TEMP;  
data _null_;  
    set driver; file doit;  
    put 'proc print data = '  
        DSN '( obs = 1 ); run;' ;  
    run;  
%include doit;  
filename doit clear;  
proc print data = SASHELP.AACOMP ( obs  
    = 1 ); run;
```


SAS LOG after %INCLUDE

NOTE: There were 1 observations read from the data set SASHELP.AACOMP.

NOTE: The PROCEDURE PRINT printed page 1.

NOTE: PROCEDURE PRINT used (Total process time):

... *and* 143 more NOTE blocks like this

%INCLUDE Pros and Cons

- Advantages
 - VERY portable (use TEMP destination)
 - Full power of data step available
- Disadvantages
 - Hard to de-bug
 - Ill-suited for complex SAS programming statements

Atomic SAS macro

```
%macro DoIt( DSN= );  
  
title1 "INCLUDE MACRO:  
    Printing first OBS of [&DSN.]";  
proc print data = &DSN.( obs = 1 );  
run;  
  
%mend DoIt;
```

Modified %INCLUDE Method

```
filename doit TEMP;
data _null_;
    set driver;
    file doit;
    put '%DoIt( DSN = ' DSN ' )' ;
    run;
%include doit;
filename doit clear;
%DoIt( DSN = SASHELP.AACOMP )
```

SAS LOG after %INCLUDE

NOTE: There were 1 observations read from the data set SASHELP.AACOMP.

NOTE: The PROCEDURE PRINT printed page 1.

NOTE: PROCEDURE PRINT used (Total process time):

... *and* 143 more NOTE blocks like this

%do-%while Method

```
%macro DoList( LIST= );  
%local C DSN; %let C = 1;  
%let DSN = %scan( &LIST., &C, ' ' );  
%do %while( &DSN ^= );  
    proc print data = &DSN.( obs = 1 );  
    %let C = %eval( &C + 1 );  
    %let DSN = %scan( &LIST., &C, ' '  
    );  
%end;  
%mend DoList;
```

Running the %DoList macro

```
proc sql noprint;  
    select DSN into :DSN_LIST  
        separated by ' '  
    from driver  
    ;  
quit;  
run;  
  
%DoList( LIST = &DSN_LIST. )
```

SAS LOG after %DoLoop

NOTE: There were 1 observations read from the data set SASHELP.AACOMP.

NOTE: The PROCEDURE PRINT printed page 1.

NOTE: PROCEDURE PRINT used (Total process time):

... *and* 143 more NOTE blocks like this

%do-%while Pros and Cons

- Advantages
 - MPRINT and SYMBOLGEN debugging
 - Full power of SAS macro facility
- Disadvantages
 - Requires %macro - %mend encapsulation of %do-%while loop
 - Character limit on size of macro symbol containing the driver list

Overloaded macro symbol

NOTE: The data set WORK.BIGDRIVER has 14400 observations and 1 variable.

```
proc sql noprint;  
    select DSN into :DSN_LIST2  
        separated by ' '  
    from BigDriver;
```

ERROR: The length of the value of the macro variable DSN_LIST2 (65540) exceeds the maximum length (65534). The value has been truncated to 65534 characters.

PROC FCMP Method

```
proc fcmp outlib = work.func.sug;  
  function doit( DSN $ );  
    rc = run_macro( 'DoIt', DSN );  
    return( rc );  
endsub;  
run;
```

- A function called '**doit**' is now available in data-step programming. The function runs the **%DoIt** macro.

Modified SAS macro

```
%macro DoIt( );  
%let DSN =  
    %sysfunc( dequote( &DSN. ) );  
  
title1 "FCMP RUN_MACRO: Printing first  
    OBS of [&DSN.]";  
proc print data = &DSN.( obs = 1 );  
    run;  
%mend DoIt;
```

Using the FCMP function

```
options cmlib = work.func;  
run;  
data _null_;  
  set BigDriver;  
  rc = doit( DSN );  
run;
```

NOTE: There were 14400 observations
read from the data set
WORK.BIGDRIVER.

PROC FCMP Pros and Cons

- Advantages
 - No size limit on driver data
 - Hides atomic task LOG messages
- Disadvantages
 - Requires modification of atomic macro to de-quote parameters
 - Only works with positional parameters

Comments, corrections,
and criticisms welcome

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