

## A Hands-on Introduction to SAS 9.1.3 ODS

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### INTRODUCTION

Each and every programmer creates some type of output to his/her client regardless of whether that client is internal to the company or an external company. Typically these output files have the same look, feel and function industry wide. Although there were some differences, we all remember or still work with landscape reports with a white background and black type face and difficult to discern graphics unless viewed in color.

Within the release of SAS® 9.1.3 were included stronger, more powerful and more flexible enhancements to the Output Delivery System (ODS). ODS 9.1.3 now offers a multitude of ways to enhance your output and add to the form and function.

This hands-on-workshop will focus on introducing new users to the ODS system, usages, syntax and styles available for use. In addition participants will learn how to add links, drill down information and other tricks and techniques to make reporting more robust and useful.

### Output Types and Usages

While ODS offers a variety of output styles and types, most can be categorized into 5 groups. These groups are: RTF, PDF, HTML, XLS and XML.

#### RTF

Rich Text Format, or RTF, is an output type that allows the user the ability to send an output file to an MSWord document as a table. This type of output is very useful when SAS output is going to be directly integrated into a clinical study report using the MSWord application.

#### PDF

Portable Document Format, or PDF, is an output file that can be created from many different file sources or applications. The PDF output files differ from other output types in that all original fonts, formats, colors and other attributes are saved within the output file and the file cannot be revised. This file types adds an additional layer of convenience and security to the creation of output.

#### HTML

Hypertext Markup Language, or HTML, is a markup language that is used to create hypertext and hypermedia documents on the World Wide Web incorporating text, graphics, sound, video, and hyperlinks. This type of output is useful when the end user of the SAS output is an internet or intranet user. Users log on to the World Wide Web and can view, analyze, drill down and subset data based on the SAS output created.

#### XLS

XLS is the extension used when creating spreadsheet forms in MS Excel. It is often desirable to have SAS output saved into an Excel spreadsheet so that the end user has the ability to manipulate and analyze the data using Excel functions and macros.

## XML

Extensible Markup Language, or XML, files are defined by the W3C as “[XML] documents are made up of storage units called entities, which contain either parsed or unparsed data. Parsed data is made up of character, some of which form character data, and some of which form markup. Markup encodes a description of the documents storage layout and logical structure. XML provides a mechanism to impose constraints on the storage layout and logical structure.”<sup>1</sup>

XML, in many ways, acts as HTML, as both are a subset of the SGML (Standard Generalized Markup Language), standard programming language for use on the World Wide Web. XML is used more often for integration purposes.

## Syntax

The syntax used to standardize, format and save output through ODS is really quite easy. The standard syntax will always start with ODS. As an example, let's look at a simple situation. The programmer would like to save his/her output from a SAS listing file to an RTF file so that the study statistician can integrate it directly into a word document. Begin as follows:

Turn off the default printing to the listing file:

```
ODS listing off;
```

Turn on the pointer to the RTF file, making sure to assign the output file directory and name:

```
ODS RTF file = "mydir\report.rtf"  
      style = acirtf bodytitle;
```

```
PROC REPORT data = final;  
  < SAS code here >;
```

```
RUN;
```

In this example, we are creating a file called REPORT.RTF in the directory called MYDIR using the REPORT procedure. There are several aspects to notice with this syntax. Firstly, notice the style option. In this example, we are using a style created specifically for the company called ACIRTF. User created styles will be discussed later in the presentation. Secondly, notice the BODYTITLE option. This option will make the titles appear in the RTF files as a separate word table. If this option were omitted the title would appear as a HEADER in the file and would be more difficult to format.

After completion of the SAS procedure, be sure to redirect the output back to the default using the ODS statement.

```
ODS RTF CLOSE;  
ODS LISTING;
```

Now, let's review several other types of ODS statements:

```
ODS TRACE ON < / LISTING >;  
ODS TRACE OFF;
```

This ODS statement will allow the user to view, in the log file, which ODS output object is being used for the output and the components of the object. For even more information use the / LISTING option. This option will print the object being used interleaved with the listing results.

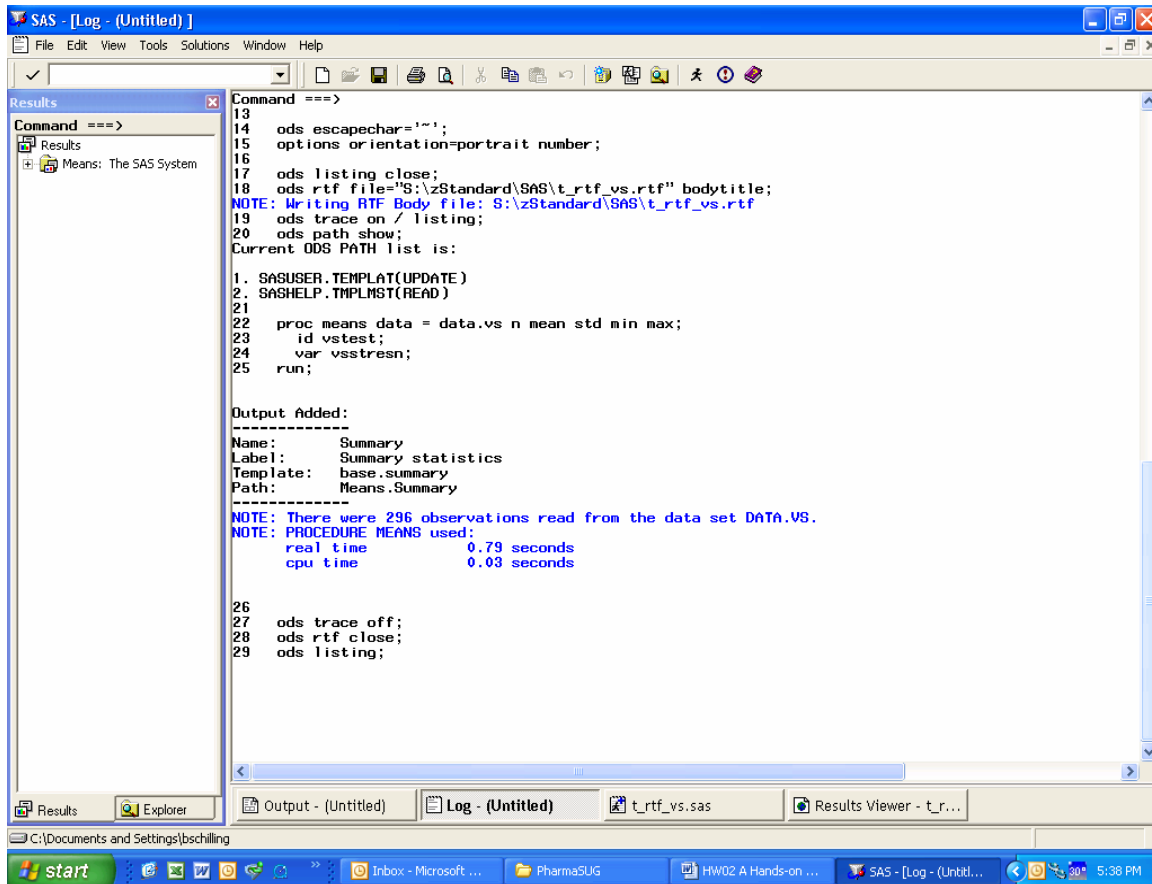
```
ODS PATH < SHOW>;
```

There exists a set of templates that are shipped as part of the SAS Base system. The default styles are listed in a subdirectory called Sashelp.Tmplmst. In addition, an empty subdirectory called Sasuser.Templat exists for the storage of user-defined templates and styles (as in the ACIRTF style in the earlier example.)

Using the ODS PATH statement, the programmer can change the default search order that SAS follows to find the templates (very similar to the SASMACR or FMTSEARCH options.) In addition, adding the SHOW option, the programmer can determine which path SAS is following to find the templates by looking in the log.

## HOW TO START

Let's start by using the log file. Using the MEANS procedure add the ODS statements TRACE ON and PATH. As was discussed earlier, these statements will us to find the templates and styles being used by SAS to create the RTF output. Following is a screen print of the log:



```
SAS - [Log - (Untitled)]
File Edit View Tools Solutions Window Help
Command ==>
13
14 ods escapechar='~';
15 options orientation=portrait number;
16
17 ods listing close;
18 ods rtf file='S:\zStandard\SAS\t_rtf_vs.rtf' bodytitle;
NOTE: Writing RTF Body file: S:\zStandard\SAS\t_rtf_vs.rtf
19 ods trace on / listing;
20 ods path show;
Current ODS PATH list is:
1. SASUSER.TEMPLAT(UPDATE)
2. SASHELP.TMPLMST(READ)
21
22 proc means data = data.vs n mean std min max;
23 id vstest;
24 var vsstress;
25 run;

Output Added:
-----
Name: Summary
Label: Summary statistics
Template: base.summary
Path: Means.Summary
-----
NOTE: There were 296 observations read from the data set DATA.VS.
NOTE: PROCEDURE MEANS used:
      real time           0.79 seconds
      cpu time            0.03 seconds

26
27 ods trace off;
28 ods rtf close;
29 ods listing;
```

Lines 19 and 20 display the ODS statements added to the SAS program for log information. After Line 20 the SAS system responded to the ODS PATH statement by showing the path for templates:

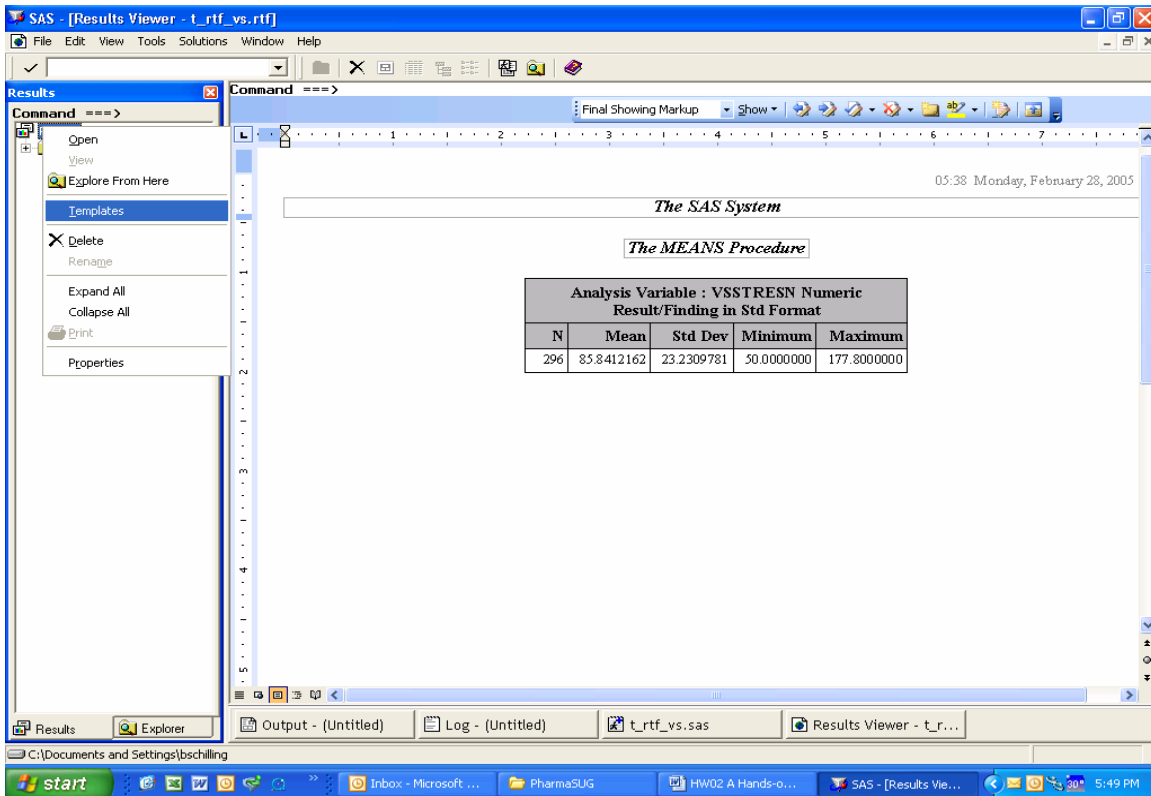
```
SASUSER.TEMPLAT(UPDATE)
SASUSER.TEMPLMST(READ)
```

After line 25 SAS responded to the ODS TRACE statement by displaying the information of the template that it used to write the RTF file:

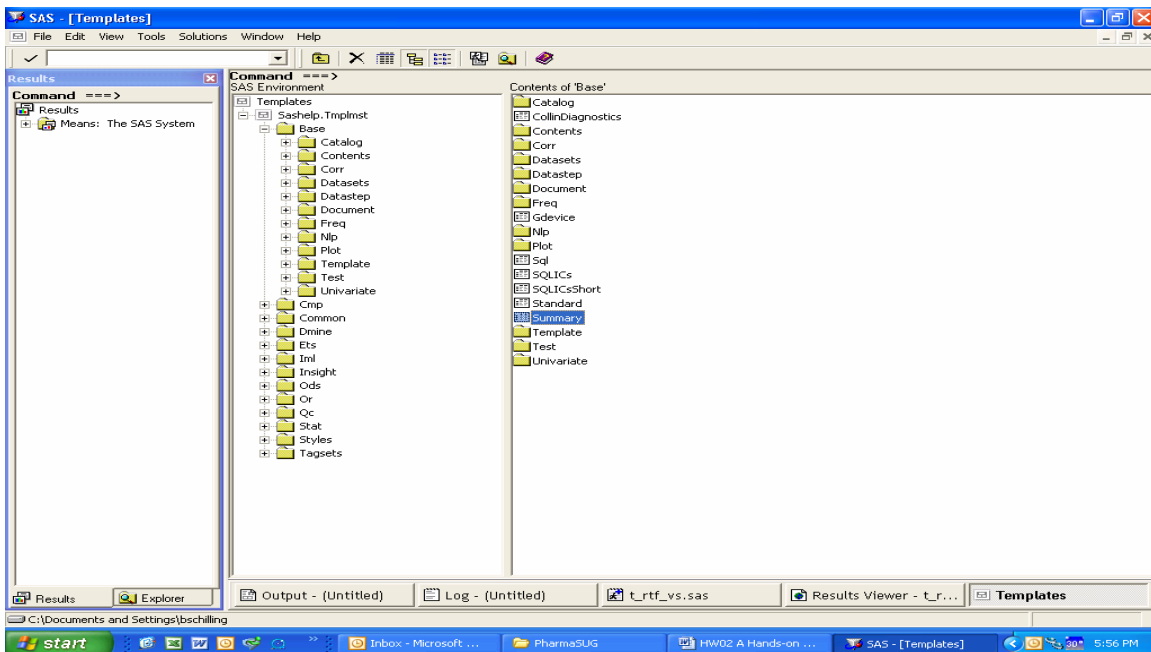
Output Added:

```
Name: Summary
Label: Summary Statistics
Template: base.summary
Path: Means.summary
```

The following screen print show the method by which to access these templates and view the TEMPLATE procedure that was used in the printing of the RTF file. To access this option, in the results window, click ONCE on the Results branch to highlight the name and then right click. You will see the following screen:



The window that opens will allow the option of TEMPLATES. Double clicking on the Templates option and then drilling down based on the log above, following screen will appear:



Now, double click the Summary template to launch the PROC TEMPLATE window that defines the SUMMARY template, as seen below:

```
Command ==>
proc template;
define table Base.Summary;
notes "Summary table for MEANS and SUMMARY";
dynamic c1mct one_var_name one_var_label one_var;
column class nobs id type ways (varname) (label) (min) (max) (range) (n)
) (nmiss) (sumwgt) (sum) (mean) (uss) (css) (var) (stddev) (cv) (
stderr) (t) (probt) (lclm) (uc1m) (skew) (kurt) (median) (mode) (q1)
(q3) (qrange) (p1) (p5) (p10) (p25) (p50) (p75) (p90) (p95) (p99);
header h;
define h;
text "Analysis Variable : " one_var_name " " one_var_label;
space = 1;
just = C;
print = one_var;
spill_margin;
end;
define class;
vjust = T;
id;
generic;
blank_dups;
end;
define nobs;
header = "N Obs";
vjust = T;
id;
end;
define id;
vjust = T;
id;
generic;
end;
define type;
header = "Type";
vjust = T;
id;
end;
define ways;
header = "Ways";
vjust = T;
id;
end;
define varname;
header = "Variable";
```

This screen print is the beginning of the PROC TEMPLATE that defines all of the columns, rows, styles, colors, etc that were used by SAS when executing the output of the PROC MEANS statements that were executed.

Once copied to the SASUSER.TEMPLAT subdirectory, all of these options can be changed to enhance the output to a variety of different output templates and styles.

## CONCLUSION

This paper only touched on the beginnings of the SAS 9.1.3 Output Delivery System. The power and abilities of the system are vast and varied. The more you practice you perform and output types that you modify, you will find that ODS can efficiently and effectively perform for you and produce state-of-the art output.

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