Delivering Results with the Output Delivery System (ODS)

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The Output Delivery System ***(ODS)*** in Version 7 of the SAS® System controls the formatting of all procedure output. It has many great features and provides flexibility when working with output since each output is split into two component objects: ① a ***data*** component and ② a ***template*** component. The data object contains the raw data values for each piece of output while the template object contains how the piece should look.

Procedure Output Listings

Prior to ODS, SAS users were accustomed to using the basic formatted output available with each procedure or with using techniques of merging SAS output into document editors such as MS-Word. The advantages of using default procedure print formats is that they are ① so familiar to users and ② easy to use. Beyond that, there isn't too much motivation for using them, especially when incorporating procedure output into a formatted document. The limitations of the listing file are ① monospace fonts are used, ② each output line is rendered at a time, ③ inability to control formatting, and ④ difficult to create HTML code for web enablement.

Delivering Results with ODS

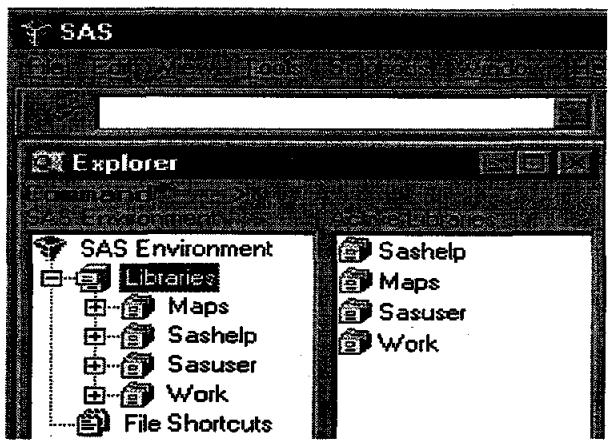
The Output Delivery System (ODS) provides added control for users to ① creating customized procedure output, ② create ***"master"*** templates, ③ produce output as two objects: a data component and a template component, ④ generate output as HTML code to simplify web enablement.

Interacting with ODS

Several ways exist for interacting with ODS: ① ODS statement, ② SAS Explorer, ③ Template procedure, and ④ output procedure.

The SAS Explorer

The SAS Explorer is a new Version 7 feature used to explore the various elements of the SAS System. It consists of the following elements: ① Libraries - listing of allocated SAS libraries and ② Results - contains the output directory as a result of executed SAS jobs.



ODS Output Structure

Output producing procedures create objects that consist of the following output structure: ① a name that can be referenced, ② a label containing information about the object, and ③ a directory path describing the output location within the directory structure.

Output Destinations

Specific types of output can be generated with ODS: ① standard SAS listing, ② HTML code for web enablement, ③ output data set, and ④ Rich Text Format (RTF). ODS has been designed so multiple output destinations can be created at the same time.

Output destinations are selected by specifying the desired ODS statement option prior to the execution of your SAS program. The syntax for the ODS statement follows:

ODS <output destination> ;

where <option destination> can be: ① rtf, ② html or ③ output.

Tracing ODS Output Components

Output producing procedures often create multiple pieces or tables of information. At times, it may be useful to know the names assigned to each piece of information. By knowing the names of each piece of output, you can better control what tables of information to be displayed in your output. The ODS statement syntax to use is:

ODS trace output ;
< SAS procedure code >
ODS trace off ;

Selecting Desired Output Components

Once you know the individual names of each output component, you are now ready to select the desired piece of information for reporting purposes. The ODS statement syntax to use is:

ODS select *output-component-name* ;
< SAS procedure code >

where ***output-component-name*** is the name of the desired output table, such as ***Moments*** in the UNIVARIATE procedure.

Web Enabling ODS Output

With the popularity of the Internet, you may find it useful to deploy selected pieces of output on your web site. ODS makes deploying procedure output to the web a simple process. Syntactically-correct HTML code is automatically produced and ready for you to deploy using your Internet browser's software.

The ODS statement syntax to use is:

ODS html body = *'user-defined-html-file-name'* ;
< SAS procedure code > ;
ODS html close ;

Using ODS to Output to Data Sets

At times, it may become necessary to have procedure output information written to a data set. ODS makes accessing individual tables an easy process. The syntax to use is:

ODS output *output-table-name* = *user-defined-table-name* ;
< SAS procedure code >

where ***output-table-name*** is the name of the desired output table (component) containing the information you want written to a data set, such as ***Moments*** in the UNIVARIATE procedure. ***User-defined-table-name*** is the name you supply for the newly created data set.

Examples

Standard SAS Procedure
```
proc print data=ws151.movies  noobs ;
  title1 'Detail Report Listing' ;
run ;
```

Web Enabling using PRINT
```
ods html body='a:\ods-print.html' ;
proc print data=ws151.movies  noobs ;
   title1  'ODS Web Enabled Detail Report' ;
run ;
ods html close ;
```

Web Enabling using CONTENTS
```
ods html body='a:\ods-contents.html' ;
proc contents data=ws151.movies ;
   title1  'ODS Web Enabled Contents Report' ;
run ;
ods html close ;
```

Web Enabling using FREQ
```
ods html body='a:\ods-freq.html' ;
proc freq data=ws151.movies ;
   title1  'ODS Web Enabled Frequency Report' ;
run ;
ods html close ;
```

Web Enabling using PLOT
```
ods html body='a:\ods-plot.html' ;
proc plot data=ws151.movies ;
   plot  rating * length ;
   title1  'ODS Web Enabled Plot Report' ;
run ;
ods html close ;
```

Web Enabling using UNIVARIATE

```
ods html body='a:\ods-univariate.html' ;
proc univariate data=ws151.movies ;
   title1 'ODS Web Enabled Univariate Report' ;
run ;
ods html close ;
```

Determining Results to Select

```
ods trace output ;
proc univariate data=ws151.movies ;
   title1 'Using ODS Trace' ;
run ;
ods trace off ;
```

Delivering Results of Choice

```
ods select Moments ;
proc univariate data=ws151.movies ;
   title1 'Delivering Results of Choice' ;
run ;
```

Delivering Output to Data Sets

```
ods output Moments = moments ;
proc univariate data=ws151.movies ;
   title1 'Delivering Output to Data Sets' ;
run ;
```

ODS RTF Output

```
ods rtf file='a:\ods-rtf.rtf' ;
ods select Moments ;
proc univariate data=ws151.movies ;
   title1 'Delivering RTF Output' ;
run ;
ods rtf close ;
```

Conclusion

The Output Delivery System (ODS) provides flexibility and enhanced output capabilities for all SAS output. It permits users to explore how output attributes and controls are set; how output can be web enabled; formatted using colors, fonts, and other stylistic characteristics; and how to create output data sets and RTF output files.

References

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