

## Paper 296-25

**Creating HTML Output with Output Delivery System**

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**ABSTRACT**

Have you ever wanted to turn your basic monospace SAS® Listing output into formatted output viewable by all on the web? If the answer is “yes”, then this workshop will show you how to use the Output Delivery System (ODS) to create HTML output by formatting output in Hypertext Markup Language (HTML). ODS controls the formatting of all procedure and DATA step output and provides great flexibility when working with output. You will learn how to use ODS to create an HTML file, a table of contents, a table of pages, and a frame file.

This workshop is intended for SAS Software users with some PC-SAS and HTML experience. Before attending this workshop, you should be comfortable using PC-SAS, an Internet browser such as Internet Explorer or Netscape, and HTML.

**INTRODUCTION**

The SAS® System Output Delivery System (**ODS**) controls the formatting of all output objects. 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.

Prior to ODS, SAS users were accustomed to using the basic output available with each procedure or with using techniques of merging SAS output into document editors such as MS-Word. The advantages for using default procedure print formats are that they are familiar to users and easy to use. Beyond that, there is not too much motivation for using them, especially when incorporating procedure output into a formatted document.

Inherent limitations exist with listing files: 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 deployment.

This paper highlights several areas where ODS can turn your basic monospace SAS® Listing output into formatted output viewable by all on the web.

**OUTPUT DESTINATIONS**

Specific types of output can be generated with ODS:

- ① Standard SAS listing
- ② HTML code for web deployment
- ③ Output data set,
- ④ Rich Text Format (RTF)

ODS has been designed so multiple output destinations can be created at the same time. Each output destination is 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 for procedure code is:

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

**HTML IN REVIEW**

A quick review of the major features of Hypertext Markup Language (HTML) is in order. HTML is used to format text for the World Wide Web or the Web for short. It is read and understood with any of the popular web browsers such as Internet Explorer or Netscape.

Special instructions can be provided to HTML by using one or more tags. Tags provide important information about how text should be formatted and are specified in pairs. Some browser software may interpret tags differently. So before deploying your output on the Web, verify that it can first be read by the different browsers.

HTML provides a way to modify tags through attributes. Specific attributes control text formats including font type, font size, and color as well as provide important information about linking to other places in the same document or another document.

An HTML link allows a browser to understand how to transfer control to other locations. As a browser sees each link, it usually highlights the associated text. Links are constructed using a pair of anchor tags to identify where to link to. An anchor tag that links to a Uniform Resource Locator (URL) destination might look like the following example:

```
<A href="http://www.software-intelligence.com">
</A>
```

The HREF attribute specifies what to link to and references a starting point for a link – in this case another URL. Once clicked, the corresponding home page for the URL is displayed. When using ODS, you will find that links and references are automatically created for you. To override any automatic link and reference features provided by ODS, you may need to make minimal changes to one or more HTML statements.

## HTML DESTINATION FILES

Four types of files are produced with the ODS HTML destination: ① body, ② contents, ③ page, and ④ frame. Each of file is created by specifying one or more options in the ODS HTML statement. To better understand the purpose for each file, a brief explanation appears below.

### The Body File

The body file consists of output created by your SAS job. When output is routed to the HTML destination, it is placed within one of three HTML tags: ① TABLE, ② IMG, or ③ as an HTML table. The nature of the output object determines which of the three tags are used for displaying with a Web browser.

When creating the body file, ODS handles output objects differently depending on the nature of the output. If the output object consists of tabular data without any graphics, ODS places the object within TABLE tags. When the object contains a graphic image, it is placed within IMG tags. And when the object does not contain tabular data or any graphic images, it is tagged as an HTML table.

### The Contents File

The contents file consists of a link to each HTML table within the body file. It uses an anchor tag to link to each table. By using your browser software, you can view the contents file directly or as part of the frame file.

### The Page File

The page file consists of a link to each page of ODS created output. By using your browser software, you can view the page file directly or as part of the frame file.

### The Frame File

The frame file displays the body file and the contents file, the page file, or both.

## LINKS AND REFERENCES IN ODS

The ODS statement controls how links and references are constructed between one or more of the HTML destination files. The basic syntax of the ODS statement follows:

```
ODS HTML ODS-action ;
```

```
< or >
```

```
ODS HTML HTML-file-specification < options > ;
```

When an ODS-action is specified, one or more output objects are selected or excluded, or the HTML destination

is closed. The available ODS-actions are: ① CLOSE, ② EXCLUDE, ③ SELECT, and ④ SHOW.

When an HTML-file-specification is specified, ODS routes one or more pieces of output to a designated file or files. The available HTML-file-specifications are: BODY=, ② CONTENTS=, ③ PAGE=, and ④ FRAME=. The available options include:

```
ANCHOR='anchor-name'
BASE='string'
GFOOTNOTE <or> NOGFOOTNOTE
GPATH=file-specification
GTITLE <or> NOGTITLE
HEADTEXT='HTML-document-head'
METATEXT='HTML-document-head'
NEWFILE=NONE <or> OUPUT <or> PAGE <or> PROC
PATH=file-specification
RECORD_SEPARATOR='string' <or> NONE
STYLE='style-definition'
TRANTAB='translation-table'
```

## DEPLOYING OUTPUT TO THE WEB WITH ODS

We are all painfully aware that standard SAS output has many limitations. With the popularity of the Internet, you may find it useful to deploy all, or selected pieces of output, on your web site. Figure 1 illustrates standard monospace SAS output from the PRINT procedure.

Movie Buff Listing						
Title	Length	Category	Year	Studio	Rating	
Brave Heart	177	Action Adventure	1995	Paramount Pictures	R	
Casablanca	103	Drama	1942	MGM / UA	PG	
Christmas Vacation	97	Comedy	1989	Warner Brothers	PG-13	
Coming to America	116	Comedy	1988	Paramount Pictures	R	
Dracula	130	Horror	1993	Columbia TriStar	R	
Dressed to Kill	105	Drama Mysteries	1980	Filmways Pictures	R	
Forrest Gump	142	Drama	1994	Paramount Pictures	PG-13	
Ghost	127	Drama Romance	1990	Paramount Pictures	PG-13	
Jaws	125	Action Adventure	1975	Universal Studios	PG	
Jurassic Park	127	Action	1993	Universal Pictures	PG-13	
Lethal Weapon	110	Action Cops & Robber	1987	Warner Brothers	R	
Michael	106	Drama	1997	Warner Brothers	PG-13	
Nat. Lampoon's Vacation	98	Comedy	1983	Warner Brothers	PG-13	
Poltergeist	115	Horror	1982	MGM / UA	PG	
Rocky	120	Action Adventure	1976	MGM / UA	PG	
Scarface	170	Action Cops & Robber	1983	Universal Studios	R	
Silence of the Lambs	118	Drama Suspense	1991	Orion	R	
Star Wars	124	Action Sci-Fi	1977	Lucas Film Lrd	PG	
The Hunt for Red October	135	Action Adventure	1989	Paramount Pictures	PG	
The Terminator	108	Action Sci-Fi	1984	Live Entertainment	R	
The Wizard of Oz	101	Adventure	1939	MGM / UA	G	
Titanic	194	Drama Romance	1997	Paramount Pictures	PG-13	

Figure 1. Standard SAS Output

ODS makes deploying standard SAS output to the web a simple process. Syntactically-correct HTML code is automatically produced and ready for you to deploy using your favorite Internet browser software. The ODS statement syntax follows:

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

Figure 2 illustrates web-ready SAS output from the PRINT procedure.

Obs	Title	Length	Category	Year	Studio	Rating
1	Brave Heart	177	Action Adventure	1995	Paramount Pictures	R
2	Casablanca	103	Drama	1942	MGM / UA	PG
3	Christmas Vacation	97	Comedy	1989	Warner Brothers	PG-13
4	Coming to America	116	Comedy	1988	Paramount Pictures	R
5	Dracula	130	Horror	1993	Columbia TriStar	R
6	Dressed to Kill	105	Drama Mysteries	1980	Filmways Pictures	R
7	Forrest Gump	142	Drama	1994	Paramount Pictures	PG-13
8	Ghost	127	Drama Romance	1990	Paramount Pictures	PG-13

Figure 2. Web-ready SAS Output

## CONCLUSION

With the growing popularity of the Internet, you may find the Output Delivery System (ODS) useful in deploying selected pieces of output on the Web. ODS makes the deployment of SAS output a simple process. Syntactically-correct HTML code is produced consisting of an HTML file, a table of contents, a table of pages, and a frame file for deployment using your favorite Internet browser.

## REFERENCES

Heffner, William F. (1998), "ODS: The DATA Step Knows," Proceedings of the 23rd Annual SAS Users Group International Conference, Cary, NC: SAS Institute Inc.

Lafler, Kirk Paul (2000), The SAS® Output Delivery System (ODS) Answer Guide, Revised and Updated, Software Intelligence Corporation, Spring Valley, CA, USA.

Lafler, Kirk Paul (1999), "Delivering Results with the Output Delivery System," Proceedings of the 24<sup>th</sup> Annual SAS Users Group International Conference.

Olinger, Christopher R. (1998), "ODS for Data Analysis: Output As-You-Like-It in Version 7," Proceedings of the 23rd Annual SAS Users Group International Conference, Cary, NC: SAS Institute Inc.

Patel, Himesh (1998), "Using SAS/GRAPH® Software to Create Graphs on the Web," Proceedings of the 23rd Annual SAS Users Group International Conference, Cary, NC: SAS Institute Inc.

SAS Institute Inc. (1999), The Complete Guide to the SAS® Output Delivery System, Version 7-1, Cary, NC, USA.

Wehr, Paul (1998), "Building Clinical Information Spaces on the World Wide Web," Proceedings of the 23rd Annual SAS Users Group International Conference, Ann Arbor, MI: STATPROBE, Inc.

## TRADEMARKS

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