

CATALOGER®: An Application Development Tool to View, Compare, and Document SAS® Catalogs and Data Files

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Abstract

This paper will present an application written entirely in SAS that greatly enhances the developer's ability to develop, compare, and manage SAS catalog entries and datasets. This application has point and click capabilities for printing catalog entries, including images of frame entries and complete descriptions of associated widgets directly into Microsoft Word® documents, creating publication quality documentation at the push of a button. The batch printing facility allows for printing of all catalog entries of virtually any type, including Program, Source, SCL, and Slist (including expanded sublists) entries. The text searching facility will search through all text-based entries for character strings and allow point and click access to the locations in any catalog entry containing the text string. Additionally, interactive, side-by-side comparisons of catalog entries in separate, independent windows on the same SAS/AF screen greatly enhances the application developer's ability to manage and compare different versions of SAS catalogs.

Introduction

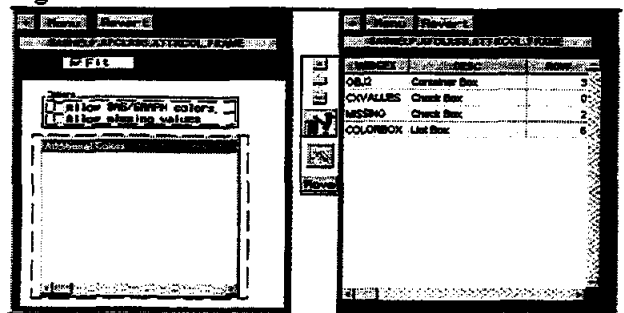
Developing complex applications for use in production environments often entails a full scale effort to manage the progression of code from development, through testing, and finally to the placing of the application into production. Managing three or four versions of the same application in various stages of development is a time consuming, tedious chore that is fraught with perils; i.e. omission of a bug fix, inadvertent updating of a catalog entry, improper synchronization of the application versions, etc. Then, when the application is finally ready to be placed in production, the documentation needs to be written. Often this task is put off until the

development is nearly complete because writing complete technical documentation takes a great deal of time and effort, and changes every time the application changes. Additionally, since the documentation happens after the development of the application, it is often rushed and is not as full and complete as it might be. Therefore, we developed CATALOGER, a SAS/AF application that makes it significantly easier to document and compare SAS catalog entries and SAS datasets.

Creating And Printing Documentation For Frame Entries In Microsoft Word®

Two separately scrollable and zoomable windows allow easy browsing and printing of virtually all SAS catalog entry types. For example, FRAME images may be displayed in scrollable windows, along with complete descriptions of all of the associated widgets in a neat, orderly table.

Figure 1



To create publication quality documentation via Microsoft Word®, click on the Menu push button, select Print All Entries of Type FRAME. The batch printing window is presented, in which the name of the output file is collected and some Word® output options are available. The user may limit the number of entries to process, select a range of entries, or allow all the entries to be documented. The next window lets the user select how much documentation is to be created. The

user may select to print the Frame Image, Widgets, Source, and/or the frame's LIST (including the ability to expand the sublists). The documentation for SASHELP.AFCLASS.ATTRCOL.FRAME in Microsoft Word® would create the following three pages; note there is no SCL entry to document, or there would be a fourth page.

Figure 2 (The FRAME Image)

SASHELP.AFCLASS.ATTRCOL.FRAME
Tuesday, April 15, 1997 5:58 PM

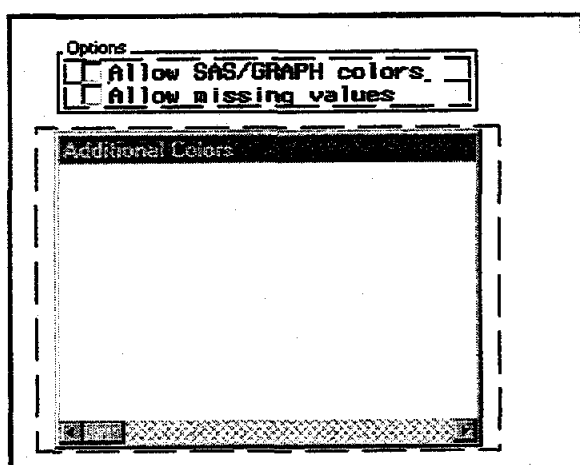
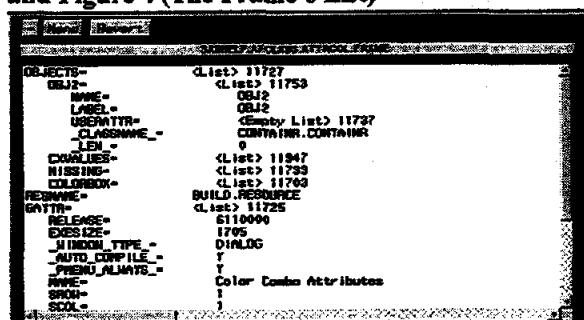


Figure 3 (The Widget Descriptions)

SASHELP.AFCLASS.ATTRCOL.FRAME
Tuesday, April 15, 1997 6:24 PM

WIDGET	TYPE	PROPERTY	MIN	MAX	COL	ROW	CLASS	TEXT	TITLE
OBJ2	Container Box		2.5	4.5	29.0	2.5	CONTAINER.C	CONTAINER	Options
CRVARIABLE	Check Box	OBJ2	0.0	0.0	29.0	2.0	CHECKBOX.C	ALLOW SAS/GRAPH colors	
MISSING	Check Box	OBJ2	2.0	0.0	29.0	1.0	CHECKBOX.C	ALLOW missing values	
COLORBOX	List Box		6.0	3.0	32.0	14.0	LISTBOX.L1	ALLOW Colors	ALLOW Colors

and Figure 4 (The Frame's List)



Viewing And Printing Catalog Entries

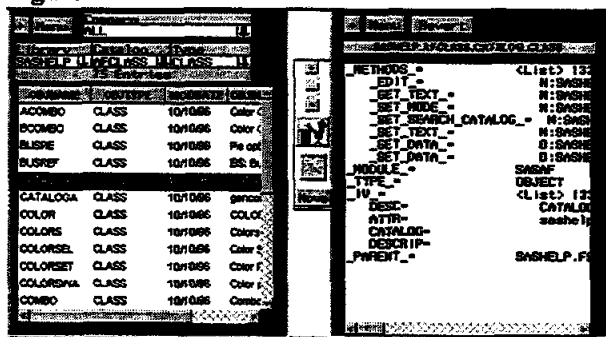
In addition to the FRAME entries, virtually all other catalog entry types may be viewed and/or documented in a similar manner. List-based entries (SLIST, LIST, CLASS, etc.) can be viewed and sublists expanded and collapsed in the CATALOGER windows simply by clicking on the name of the sublist. SAS formats are displayed in an easy-to-read data table. Other entry types such as DEV, KEY, FORM (all pages at once), PMENU and TOOLBAR are also easily viewed by point & click. FONT entries are shown with sample text in the selected font. GRSEG and IMAGE entries (both SAS catalog image entries or external file images) can be viewed through CATALOGER windows. Even special types like ASCII and VIDEO (AVI) can be easily displayed. Also, any entry that is viewed may be printed, and saved as an external file, including as a Microsoft Word® document. All examples in this paper, with the exception of SCL entries, will be SASHELP catalogs.

To view or print a catalog entry, for example a FRAME entry, select the library and catalog in which the entry exists by single-clicking on the down arrow control object next to the LIBRARY and CATALOG input fields. Single-click on its name in the window, and a popmenu appears that allows the selection of the frame image, widget descriptions, SCL, or frame image as it appears in Build mode. Selecting one of these options causes the entry to be displayed in the same window which formerly displayed the list of catalog entries. Clicking on the "Revert" buttons re-displays the lists of catalog entries.

Viewing And Printing Lists And Sublists

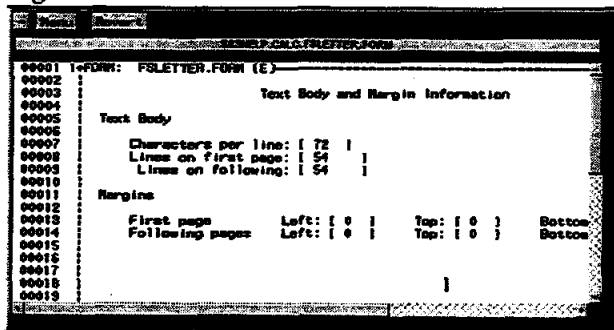
Sublists within a list can be easily viewed by clicking on a list item in the window, for example a CLASS entry. The sublists are noted by the designation "<List>" appearing to the right of the list entry. Click on the <List> and the sublist contents are displayed, properly indented. Click on the <List> again, and the sublist is collapsed.

Figure 5



Key definitions can be viewed and printed in exactly the same way. Other entry types that may be viewed and/or printed include device definitions (DEV) and FORM. For FORM entries, all pages of the FORM definition are included in the scrollable window, and any window can be quickly zoomed to view more of the entry, simply by clicking on the , and then restored by clicking on the .

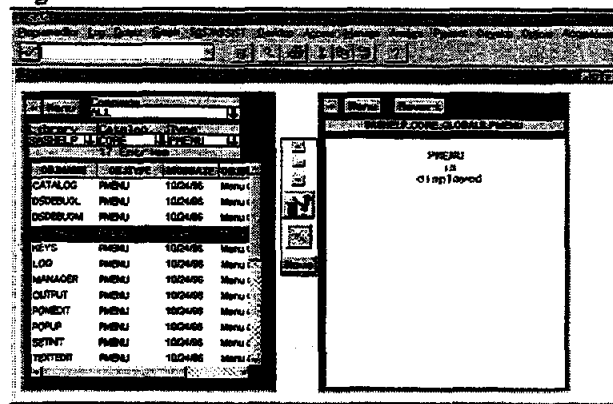
Figure 6



When FONT entries are selected in a CATALOGER window, sample text is

displayed using the selected font. Similarly, when a PMENU or TOOLBAR entry is selected, the Application Workspace (AWS) changes to display the selected entry. In the next example, the PMENU entry SASHELP.CORE.GLOBAL.PMENU is selected and CATALOGER displays it as it would appear in an application frame.

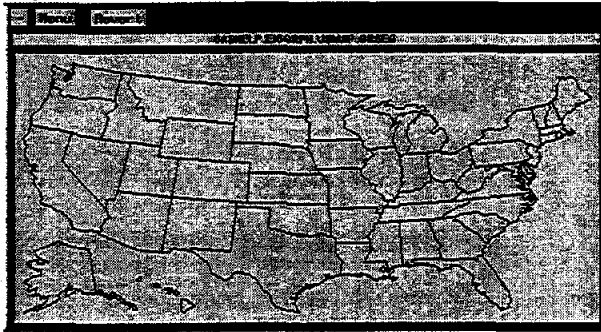
Figure 7



TOOLBAR entries behave in much the same manner, and when a TOOLBAR entry is selected, it will also change the AWS to display the selected entry. Both the TOOLBAR and the PMENU are active in the CATALOGER windows, and will attempt to execute any commands associated with the selection of an item in the PMENU structure or icon in the TOOLBAR.

Graphical entries such as GRSEG and IMAGE entries (both SAS catalog images and external file images) can also be displayed in CATALOGER windows. If an entry type of IMAGE is selected, a popup menu appears which allows the selection of viewing either a SAS catalog image or an external file image. The next figure is the entry SASHELP.EIS.USREGION.GRSEG displayed in a zoomed CATALOGER window, any image entry could be similarly displayed.

Figure 8



Viewing And Printing Special Types Of Catalog Entries

Video files (AVI) can also be played in a CATALOGER window. When the TYPE field is VIDEO, a dialog box is presented to allow selection of the video file to play. The first frame of the video clip is displayed in the window, and control of the viewing is allowed in two ways. If the PLAY button is selected, the video will play in it's entirety at it's regular speed. Frame by frame control, for both forward and reverse, is handled by the vertical scroll bar between the two CATALOGER windows. The top arrow reverses the sequencing of the video, while the lower arrow steps forward through the video.

Viewing And Printing ASCII Entries

Viewing and printing ASCII files is accomplished in the much the same way that video files are handled. When the TYPE field in the CATALOGER window is changed to ASCII, (either manually or by selecting ASCII from the selection list), a dialog box is presented to allow selection of the ASCII file to be placed in the CATALOGER window. Once in the window, the entry may be scrolled, viewed, printed, or saved to a Microsoft Word® document, just like any other catalog entry.

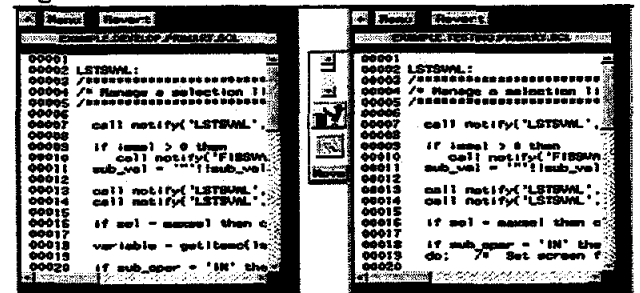
Synchronous Scrolling

The two CATALOGER windows can be scrolled simultaneously by clicking on the scroll bar in between the two windows. All text based entries and video (AVI) entries can be scrolled this way. Therefore, a catalog entry that appears in two catalogs (i.e. DEVELOP and TESTING) can be viewed simultaneously, making it much easier to identify where differences occur between versions of the entry. For example, assume two catalogs, DEVELOP and TESTING contain an SCL entry named PRIMARY. Assume also that the following code was added to DEVELOP.PRIMARY but not to TESTING.PRIMARY:

```
variable = getitemc(lsidmain,3);
```

The two windows might then look like:

Figure 9



Pressing the lower arrow on the scroll bar would cause the text in both entries to scroll upward in the windows. By carefully watching the two windows, we would notice that when line 18 was placed at the top, there would be a difference in the two. EXAMPLE.DEVELOP.PRIMARY.SCL had the new line of code. Pressing the upper arrow scrolls the code down the window, so that earlier lines may be viewed. Scrolling can be made automatic by selecting the

Automated Synchronous Scrolling icon,  found in between the two default windows.

Selecting this icon will automatically scroll the two windows, leaving the user free to concentrate on the contents of the windows.

Comparing Catalogs and Frame Entries

One of the most powerful features of this application is the compare facility. Basically, there are two ways to compare catalogs. First, to determine entries that are in one but not the other. Second, to compare like-named frame entries that are different. To determine differences between catalogs, select Mutually Exclusive from the popmenu presented for the COMPARE field. Each window will then contain the entries that are not in the other catalog. For example, assume all but 11 of the entries in SASHELP.ADE are copied to CATALOGR.ADE, and that one new frame is added to CATALOGR.ADE. A Mutually Exclusive comparison would result in:

Figure 10

ADDRESS DATA TYPE VALUE			ADDRESS DATA TYPE VALUE		
00000000 CLASS 1010000			00000000 FRAME 0010000		
00000001 CLASS 1010000			00000001 FRAME 0010000		
00000002 CLASS 1010000			00000002 FRAME 0010000		
00000003 CLASS 1010000			00000003 FRAME 0010000		
00000004 CLASS 1010000			00000004 FRAME 0010000		
00000005 CLASS 1010000			00000005 FRAME 0010000		
00000006 CLASS 1010000			00000006 FRAME 0010000		
00000007 CLASS 1010000			00000007 FRAME 0010000		
00000008 CLASS 1010000			00000008 FRAME 0010000		
00000009 CLASS 1010000			00000009 FRAME 0010000		
0000000A CLASS 1010000			0000000A FRAME 0010000		
0000000B CLASS 1010000			0000000B FRAME 0010000		
0000000C CLASS 1010000			0000000C FRAME 0010000		
0000000D CLASS 1010000			0000000D FRAME 0010000		
0000000E CLASS 1010000			0000000E FRAME 0010000		
0000000F CLASS 1010000			0000000F FRAME 0010000		
00000010 CLASS 1010000			00000010 FRAME 0010000		
00000011 CLASS 1010000			00000011 FRAME 0010000		
00000012 CLASS 1010000			00000012 FRAME 0010000		
00000013 CLASS 1010000			00000013 FRAME 0010000		
00000014 CLASS 1010000			00000014 FRAME 0010000		
00000015 CLASS 1010000			00000015 FRAME 0010000		
00000016 CLASS 1010000			00000016 FRAME 0010000		
00000017 CLASS 1010000			00000017 FRAME 0010000		
00000018 CLASS 1010000			00000018 FRAME 0010000		
00000019 CLASS 1010000			00000019 FRAME 0010000		
0000001A CLASS 1010000			0000001A FRAME 0010000		
0000001B CLASS 1010000			0000001B FRAME 0010000		
0000001C CLASS 1010000			0000001C FRAME 0010000		
0000001D CLASS 1010000			0000001D FRAME 0010000		
0000001E CLASS 1010000			0000001E FRAME 0010000		
0000001F CLASS 1010000			0000001F FRAME 0010000		
00000020 CLASS 1010000			00000020 FRAME 0010000		
00000021 CLASS 1010000			00000021 FRAME 0010000		
00000022 CLASS 1010000			00000022 FRAME 0010000		
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00000026 CLASS 1010000			00000026 FRAME 0010000		
00000027 CLASS 1010000			00000027 FRAME 0010000		
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00000029 CLASS 1010000			00000029 FRAME 0010000		
0000002A CLASS 1010000			0000002A FRAME 0010000		
0000002B CLASS 1010000			0000002B FRAME 0010000		
0000002C CLASS 1010000			0000002C FRAME 0010000		
0000002D CLASS 1010000			0000002D FRAME 0010000		
0000002E CLASS 1010000			0000002E FRAME 0010000		
0000002F CLASS 1010000			0000002F FRAME 0010000		
00000030 CLASS 1010000			00000030 FRAME 0010000		
00000031 CLASS 1010000			00000031 FRAME 0010000		
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00000036 CLASS 1010000			00000036 FRAME 0010000		
00000037 CLASS 1010000			00000037 FRAME 0010000		
00000038 CLASS 1010000			00000038 FRAME 0010000		
00000039 CLASS 1010000			00000039 FRAME 0010000		
0000003A CLASS 1010000			0000003A FRAME 0010000		
0000003B CLASS 1010000			0000003B FRAME 0010000		
0000003C CLASS 1010000			0000003C FRAME 0010000		
0000003D CLASS 1010000			0000003D FRAME 0010000		
0000003E CLASS 1010000			0000003E FRAME 0010000		
0000003F CLASS 1010000			0000003F FRAME 0010000		
00000040 CLASS 1010000			00000040 FRAME 0010000		
00000041 CLASS 1010000			00000041 FRAME 0010000		
00000042 CLASS 1010000			00000042 FRAME 0010000		
00000043 CLASS 1010000			00000043 FRAME 0010000		
00000044 CLASS 1010000			00000044 FRAME 0010000		
00000045 CLASS 1010000			00000045 FRAME 0010000		
00000046 CLASS 1010000			00000046 FRAME 0010000		
00000047 CLASS 1010000			00000047 FRAME 0010000		
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0000004A CLASS 1010000			0000004A FRAME 0010000		
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0000004D CLASS 1010000			0000004D FRAME 0010000		
0000004E CLASS 1010000			0000004E FRAME 0010000		
0000004F CLASS 1010000			0000004F FRAME 0010000		
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00000059 CLASS 1010000			00000059 FRAME 0010000		
0000005A CLASS 1010000			0000005A FRAME 0010000		
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0000005C CLASS 1010000			0000005C FRAME 0010000		
0000005D CLASS 1010000			0000005D FRAME 0010000		
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00000060 CLASS 1010000			00000060 FRAME 0010000		
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0000006A CLASS 1010000			0000006A FRAME 0010000		
0000006B CLASS 1010000			0000006B FRAME 0010000		
0000006C CLASS 1010000			0000006C FRAME 0010000		
0000006D CLASS 1010000			0000006D FRAME 0010000		
0000006E CLASS 1010000			0000006E FRAME 0010000		
0000006F CLASS 1010000			0000006F FRAME 0010000		
00000070 CLASS 1010000			00000070 FRAME 0010000		
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00000072 CLASS 1010000			00000072 FRAME 0010000		
00000073 CLASS 1010000			00000073 FRAME 0010000		
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00000079 CLASS 1010000			00000079 FRAME 0010000		
0000007A CLASS 1010000			0000007A FRAME 0010000		
0000007B CLASS 1010000			0000007B FRAME 0010000		
0000007C CLASS 1010000			0000007C FRAME 0010000		
0000007D CLASS 1010000			0000007D FRAME 0010000		
0000007E CLASS 1010000			0000007E FRAME 0010000		
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00000080 CLASS 1010000			00000080 FRAME 0010000		
00000081 CLASS 1010000			00000081 FRAME 0010000		
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0000009F CLASS 1010000			0000009F FRAME 0010000		
000000A0 CLASS 1010000			000000A0 FRAME 0010000		
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000000A2 CLASS 1010000			000000A2 FRAME 0010000		
000000A3 CLASS 1010000			000000A3 FRAME 0010000		
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000000A5 CLASS 1010000			000000A5 FRAME 0010000		
000000A6 CLASS 1010000			000000A6 FRAME 0010000		
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000000A8 CLASS 1010000			000000A8 FRAME 0010000		
000000A9 CLASS 1010000			000000A9 FRAME 0010000		
000000AA CLASS 1010000			000000AA FRAME 0010000		
000000AB CLASS 1010000			000000AB FRAME 0010000		
000000AC CLASS 1010000			000000AC FRAME 0010000		
000000AD CLASS 1010000			000000AD FRAME 0010000		
000000AE CLASS 1010000			000000AE FRAME 0010000		
000000AF CLASS 1010000			000000AF FRAME 0010000		
000000B0 CLASS 1010000			000000B0 FRAME 0010000		
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000000B2 CLASS 1010000			000000B2 FRAME 0010000		
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000000B9 CLASS 1010000			000000B9 FRAME 0010000		
000000BA CLASS 1010000			000000BA FRAME 0010000		
000000BB CLASS 1010000			000000BB FRAME 0010000		
000000BC CLASS 1010000			000000BC FRAME 0010000		
000000BD CLASS 1010000			000000BD FRAME 0010000		
000000BE CLASS 1010000			000000BE FRAME 0010000		
000000BF CLASS 1010000			000000BF FRAME 0010000		
000000C0 CLASS 1010000			000000C0 FRAME 0010000		
000000C1 CLASS 1010000			000000C1 FRAME 0010000		
000000C2 CLASS 1010000			000000C2 FRAME 0010000		
000000C3 CLASS 1010000			000000C3 FRAME 0010000		
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000000C8 CLASS 1010000			000000C8 FRAME 0010000		
000000C9 CLASS 1010000			000000C9 FRAME 0010000		
000000CA CLASS 1010000			000000CA FRAME 0010000		
000000CB CLASS 1010000			000000CB FRAME 0010000		
000000CC CLASS 1010000			000000CC FRAME 0010000		
000000CD CLASS 1010000			000000CD FRAME 0010000		
000000CE CLASS 1010000			000000CE FRAME 0010000		
000000CF CLASS 1010000			000000CF FRAME 0010000		
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000000D1 CLASS 1010000			000000D1 FRAME 0010000		
000000D2 CLASS 1010000			000000D2 FRAME 0010000		
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000000D4 CLASS 1010000			000000D4 FRAME 0010000		
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000000D8 CLASS 1010000			000000D8 FRAME 0010000		
000000D9 CLASS 1010000			000000D9 FRAME 0010000		
000000DA CLASS 1010000			000000DA FRAME 0010000		
000000DB CLASS 1010000			000000DB FRAME 0010000		
000000DC CLASS 1010000			000000DC FRAME 0010000		
000000DD CLASS 1010000			000000DD FRAME 0010000		
000000DE CLASS 1010000			000000DE FRAME 0010000		
000000DF CLASS 1010000			000000DF FRAME 0010000		
000000E0 CLASS 1010000			000000E0 FRAME 0010000		
000000E1 CLASS 1010000			000000E1 FRAME 0010000		
000000E2 CLASS 1010000			000000E2 FRAME 0010000		
000000E3 CLASS 1010000			000000E3 FRAME 0010000		
000000E4 CLASS 1010000			000000E4 FRAME 0010000		
000000E5 CLASS 1010000			0000		

Detailed Frame Comparisons

Same-named frame entries in two catalogs can be compared to determine how they are different. The details that can be compared are: Number of Widgets, Name of the SCL entry, Compile Size, Resource Entry used, and the Modified Date. To perform the comparison, click on the COMPARE icon, (the magnifying glass icon above the Move button). The Frame Comparison window is then presented. In this window, all frame entries from both catalogs are listed

alphabetically, and are marked where differences exist.

Figure 11

Any Difference	Diff. Compile Size
Diff. # of Niddets	Diff. RESOURCE name
Diff. SDL source entry	Diff. modified dates

The check boxes at the top of the window allow selection of comparisons of particular differences, and are cumulative. For example, if "Dif. # of Widgets" and "Dif. Compile Size" were selected, all those entries with different number of widgets and different compile sizes would be displayed.

Comparing SAS Datasets

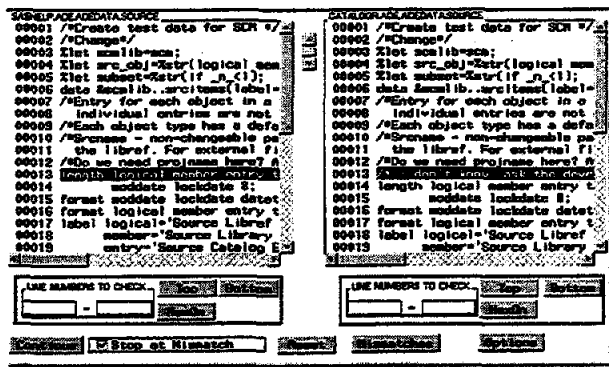
SAS datasets that reside in two or more libraries may be compared in exactly the same manner catalogs are compared. Datasets that reside in one library but not the other can be identified, and same name datasets can be compared for Number of Observations, Number of Variables, Number of Deleted Observations, BUFSIZE, Index types, PROTECT, COMPRESS, REUSE, and Date/Time values.

Comparing Text-Based Entries

Any two text-based entries can be compared line-for-line. Examples of the types of text entries that can be compared are: SCL, SOURCE, CBT, LOG, OUTPUT, SLIST, LIST, CLASS, EIS, RESOURCE, FOLDER.

and ASCII files. To start the comparison, select one entry from each of the windows. Next, click on the COMPARE icon. The Text Comparison window then presents with the two entries in side by side windows. Clicking on the Compare button at the bottom right performs the comparison and the first occurrence of a difference in both files is highlighted.

Figure 12



Automatic resynchronization occurs so that any other differences are highlighted when the Continue button is selected.

Finding A Text String

The search facility allows searching for all occurrences of a text string in all of the text-based entries. For example, to find all the occurrences of the text string "Call Display" in all SCL entries in a catalog, click on the MENU button in the CATALOGER main window. Select "Find Text String". A window appears to prompt for the string to search and the types of entries to search. When the search is completed, a data table is populated with the entry name, line number, and text where the string was found. Clicking on the row will open then entry listed on the row and place the line containing the string at the top of the window.

Conclusion

Cataloger is a SAS/AF application written to greatly simplify the task of SAS/AF application development by automating the tasks of documentation and code management. The batch printing facility, compare facility, and search facility make CATALOGER an invaluable tool for the development and maintenance of SAS/AF applications and SAS datasets.

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